LULEÅ UNIVERSITY OF TECHNOLOGY

LICENTIATE THESIS

Industrial Buying Behavior in the Swedish and Polish Mining Industries

A Comparative Study

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ABSTRACT

The understanding of the behavior of organizations when buying is of paramount importance to the industrial marketer, as effective marketing strategies inherently rely on the knowledge of the buyers. This study’s purpose is to develop a deeper understanding of the Industrial Buying Behavior (IBB) of organizations in a particular line of industry, namely mining.

Sweden has a long tradition in the mining industry with its organizations clearly in the forefront of mining technology. The Swedish mining industry has also played a central role in enhancing the development of the domestic manufacturers of mining equipment. Among the potential export markets for Swedish manufacturers of mining equipment, the Eastern-block, and Poland in particular, was identified as a suitable example of emergent buyers of products for mining activities. The selection of mining equipment and technology, with emphasis on the capital equipment that is used for mining production, is shown to have a dominant influence in the profitability of metal mining companies. Hence, this study’s exploratory and descriptive aim is to characterize the IBB of Swedish and Polish metal mining companies when purchasing Capital Equipment for Mining Production (CEMP).

Through case study research, four metal mining companies in Sweden (Ammeberg AB, Terra Mining AB, Boliden Mineral AB, and LKAB), and one metal mining company in Poland (KGHM) are investigated. IBB is characterized through the description of the buying process of CEMP, the identification of those who participate in the process, the understanding of their involvement and influence, and the assessment of the factors affecting the buying process and buying center of the metal mining companies.

The buying processes of CEMP have shown to be quite similar among all the studied metal mining companies. A similarity with the conceptual framework as composed of eight sequential buyphases is also ascertained, except for the companies’ common emphasis given to negotiation as a buying activity.

The buying center dimension was characterized through it’s composition, roles, and influence. Common among all the companies is the involvement of the upper level operating management (e.g. production, purchasing). In the Swedish cases, top management becomes involved when the monetary value of the capital equipment is considered as high. However, decision-making power lies in the upper-level operating management (i.e. the production department). In the more high-level centralized and planning-oriented Polish organization, decision-making is taken to comparatively higher hierarchy levels (upper level strategic management and top management). The function/departmental involvement is found to vary depending on the organization’s size and the high importance given to the CEMP purchases. The size of the buying centers is found not to vary due to the organizations’ size. Finally, in the Swedish cases it is shown that production is the core functional area, which holds the major influence and thus decision-making power concerning the CEMP purchases. In the Polish case the technical staff functions show comparable influence.
Among the factors studied, the following were found to considerably affect the IBB of the metal mining companies. The domesticated nature of the CEMP market and the high-degree of knowledge between the sellers and buyers affects the companies’ industrial buying. Long-term relationships are valued and essential for the development of CEMPs adapted to the specific mining environments of the metal mining companies. A high degree of interdependency exists between buyers and sellers. The production orientation of all the metal mining companies was found to considerably affect the patterns of influence and the roles of the buying center in the Swedish cases, as production is identified as the core functional area of these companies. The high importance attributed to the CEMP purchases clearly affects the size and function/departmental involvement of the buying center. The technological complexity of the CEMP purchase is also connected to importance and is shown to influence the composition of the buying center. Finally, the monetary value was found to affect the vertical involvement and the size of the buying center.
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Luleå, October 1997
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Chapter One: Introduction and Research Problem

1.1 Introduction

Understanding the behavior of organizations when buying is of paramount importance to the industrial marketer, as effective marketing strategies inherently rely on the knowledge about the buyers. Organizational buying has been defined as a "complex process of decision making and communication, which takes place over time, involving several organizational members and relationships with other firms and institutions" (Webster and Wind, 1972a, p.1). Hence, the understanding of firm's organizational buying can be difficult to attain, as it may involve many different participants in a multi-stage process, where different factors are determinant for the purchasing decisions. The aim of this study is to investigate how organizations in a particular line of industry (mining), purchase a product type (capital equipment), in two different countries (Sweden and Poland).

Sweden has a long tradition in the mining industry with it's organizations clearly in the forefront of mining technology. Moreover, the country possesses a large sector, which produces advanced mining equipment, from which 80 to 90 percent are exported worldwide. Among the present and potential export markets for Swedish mining equipment, the attractiveness of the former Eastern-block market led to the selection of Poland due to it's technologically developed mining sector and it's rapid adaptation to a market economy.

Throughout this chapter the background of the study is discussed leading to the research problem formulation. Finally, the study's outline is provided.

1.2 Background of the Study

1.2.1 Industrial Buying Behavior

Industrial Buying Behavior is the field of industrial marketing that addresses the understanding of how industrial goods and services are bought by industrial organizations. One example of the relative importance given to this field by marketing scholars and practitioners is provided by Möller and Pesonen (1981) when discussing the large amount of efforts conducted in studies of Industrial Buying Behavior (hereafter IBB):
"This attention is well deserved as the understanding of buying behavior is the cornerstone of industrial marketing strategy"  
(op.cit., p.265)

Thus, the understanding of IBB remains fundamental to the supplier of the industrial firm due to the subsequent marketing management implications concerning how to best satisfy the customers demand, which in turn will have direct effects on the growth and profitability of the industrial supplier. Many scholars and practitioners within the field have attempted to add to this understanding by providing answers to questions such as:

- How do industrial organizations buy?  
- Why do they buy in a certain way?  
- Who is involved in the buying?  
- What variables are influencing the way organizations buy? etc.

Through the years of research on the subject of IBB, a vast number of answers have been provided. The accumulated amount of evidence supporting certain issues in the field of IBB has led to a general, although not universal, agreement concerning certain areas. Such areas are the consensus found in the conceptualization of the buying process (as composed by a number of decision stages), or the need of identifying and characterizing the participants in the process. These and other conceptual frameworks constitute bases for developing an increased "understanding" of IBB. However, numerous empirical studies have provided evidence of factors which account for a differentiation in IBB, often due to industry specific needs (e.g. "One can think of many products where the mission of the firm will determine the importance of the purchase" (Mattson, 1988, p.205)).

This has led authors to argue for the need to study such complex phenomena as IBB on a descriptive, industry-by-industry basis.

"Research ... is needed on an industry-by-industry basis on the interactions, decisions, and behavior of buying centers. One of the major problems in organizational buying behavior per se is simply that much descriptive work has not yet been done on a large scale"

Bonoma and Zaltman (1978),  
(as quoted by Kennedy, 1984, p.45)
"First, more descriptive modeling is needed to increase our knowledge of the structure and tasks of the organizational buying process in term of various products and industries" 
(Möller, 1985, p.14)

Seven years have passed between these two statements and apparently the need for studies on an industry-by-industry basis persisted during these years. Moreover, although eleven years have passed since the last statement was made, no indication that the validity of this statement has changed has been found in the literature on IBB. Continuing this need for descriptive work on an industry-by-industry basis, combined with the relevancy of IBB for industrial marketing, underlies our decision to conduct our research which intends to study IBB in a particular line of industry.

1.2.2 Industry Selection and Scope of the Study

The need for studying IBB on an industry-by-industry basis was demonstrated in the previous section. Therefore, when a lack of studies concerning IBB in the mining industry was found during a pilot study, this brought attention concerning further research towards this line of industry as a representative of a major cluster in the Swedish economy. The lack of studies concerning IBB in the mining industry has been further established during the research prior to this study since no such study was found.

1.2.2.1 The Swedish Mining Industry and the Swedish Mining Equipment Industry

According to Sölvell, Zander and Porter (1993, p.61):

"The Swedish economy grew initially out of Sweden's endowments of natural resources"

Mineral resources and forest related products have led to the development of two of the major industrial clusters in the Swedish economy: the materials/metals cluster which accounted for 12.5 percent of total Swedish exports in 1985, and the forest products clusters accounting for 17.9

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1 Data base searches and a literature review on IBB implemented prior to this study showed no change in the need for descriptive studies of IBB on an industry-by-industry basis.
2 A pilot study concerning IBB in the Swedish Mining Industry was conducted by the authors during 1993 and 1994.
percent of total Swedish exports in 1985. In the first cluster is included not only the mining companies (producers of iron or nonferrous metals such as copper, zinc, lead, gold and silver) but also the manufacturers of equipment related to mining such as rock-drillers, mineral crushing machinery, hoisting and loading equipment, etc. Presently, the Swedish metal mining industry consists of two iron ore mines, 14 sulfide ore mines and two gold mines. Sweden is the leading iron, lead and silver producer in EU-EFTA, and the production of gold, copper and zinc represents 36.3, 32.1 and 23.6 percent of the EU-EFTA total production respectively (see Table 1), thus occupying a significant position concerning output from metal mining activities.

Table 1: The Swedish Production Compared with the Rest of the Mining Industry in EU-EFTA 1992

<table>
<thead>
<tr>
<th>Country</th>
<th>Iron (Mill. tons)</th>
<th>Copper (tons)</th>
<th>Lead (tons)</th>
<th>Zinc (tons)</th>
<th>Gold (kg)</th>
<th>Silver (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>12.3</td>
<td>89,018</td>
<td>106,657</td>
<td>173,183</td>
<td>6,582</td>
<td>285,000</td>
</tr>
<tr>
<td>Spain</td>
<td>1.6</td>
<td>47,000</td>
<td>197,000</td>
<td>8,547</td>
<td>211,000</td>
<td>27</td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
<td>42,900</td>
<td>194,100</td>
<td>170,783</td>
<td>148</td>
<td>1135,141</td>
</tr>
<tr>
<td>Portugal</td>
<td>150,483</td>
<td></td>
<td>194,100</td>
<td>170,783</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>1.4</td>
<td>14,929</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>138,716</td>
<td>18</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,862</td>
<td>16</td>
</tr>
<tr>
<td>Other EU-EFTA</td>
<td>2.2</td>
<td>22,711</td>
<td>57,543</td>
<td>170,783</td>
<td>148</td>
<td>135,141</td>
</tr>
</tbody>
</table>

Source: Adapted from World Mining Data (1994). Note: tons = metric tons.

The mining industry has played a central role in enhancing the development of the domestic mining equipment industry. The constant need for improvement of mining productivity through modern mining technology in order to remain competitive with producers from countries where labor costs are considerably lower has led to the development of a wide number of internationally competitive manufacturers of mining equipment and related machinery. According to a list provided by the Swedish Trade Council, 65 major manufacturers and exporters of mining equipment could be identified in 1993.

3 The source of data is a study on the Swedish economy, Sölvell, Zander and Porter (1993), where the role of industrial clusters are examined in depth. Although the results of the study were first published in 1991, the data concerning exports refers to 1985 and more up-dated values were not available.

4 This study was initiated during 1994 and therefore data from this year is presented as it provides sustainability for the background of this study.
Between 80 to 90 percent of the mining and processing equipment produced in Sweden is exported worldwide and most of the "best selling equipment" has been thoroughly tested in Sweden before being marketed and introduced abroad.

1.2.2.2 Export Markets for Mining Equipment

The sizes and locations of export markets for mining equipment are closely linked to ongoing and planned mining activities in different regions, and the possibility for export to these regions. Large, but mainly mature, markets exist in North America and Australia. In other areas such as South America, Africa, China and the former Eastern-block expanding export markets can be found.

In order to assess the relative attractiveness of different potential export markets for the Swedish manufacturers of mining equipment, the research team of this study conducted an exploratory mail survey where 33 manufacturers were asked to list the most interesting potential export markets for their companies. The rate of response was 45 percent, and results showed that the former Eastern-block was seen as a significant potential export market. Moreover, the geographical proximity (from a Swedish manufacturers viewpoint) and the evident need of industrial rehabilitation justify a closer look at the former Eastern-block as a potential export market.

1.2.2.3 Poland and the Lubin Copper Mines

In the former Eastern-block the Lubin copper mines in Poland offer a suitable example of emergent buyers of products for mining activities due to three major factors.

1. "Poland, together with Hungary and the Czech Republic, are the most developed Central European economies" (Hooley, 1993, p.9). The change into a market-led economy has moved at a fast pace in Poland, and trading with Western countries has forced Polish firms to adopt new marketing techniques, the compliance to Western quality standards, etc. Poland can therefore serve as an example of how this process of change can develop in other countries belonging to the former Eastern-block, at least in what concerns the effects of these changes on management and organizational issues in industrial enterprises.
2. Poland, ranked as the fifth copper producer in the world with a capacity of approximately 500,000 metric tons per year, is one of the four dominating countries in the former Eastern-block in terms of mining industry (other countries are: Russia, Kazakhstan and Uzbekistan), ("Metaller från Öst – Hot eller Möjlighet?" 5, 1993). Poland has significant mineral resources such as hard coal, sulfur, copper, silver, zinc, lead, natural gas, salt, and other minerals. According to the Foreign Trade Research Institute the "workable copper reserves in Poland will, at the present level of output, suffice for 96 years" ("Poland Your Business Partner", 1993, p.16). Copper mining is dominated by the State-owned company KGHM based in Lubin, which runs three underground copper ore mines.

3. In an evaluation of mining activities in the former Eastern-block Bomsel (1992) states the following: "When we began visiting mining and metallurgical combines in Central and Eastern Europe in 1990, and the following year in Russia and the Ukraine, we had no idea that so many sites in the largest mineral producing zone in the world, would be operating in defiance of market logic. In all Central and Eastern Europe, only the Lubin (Poland) copper mines were operating at a profit" (op.cit., p.277). The Lubin copper mines are therefore considered to provide a good example of the mining sector with re-defined market economic goals that in the future will emerge in the former Eastern-block.

1.2.3 The Mining Environment and IBB

In this study, IBB in the mining environment, particularly IBB of mining companies, will be studied. The need, endorsed by scholars in the field (e.g. Bonoma and Zaltman, 1978; Kennedy, 1984; Möller, 1985) of studying IBB on an industry-by-industry basis has already been referred on pages one and two. However, the following question still needs to be posed:

Why is it so relevant to study IBB in the mining environment?

Any operating mining company requires a wide range of inputs in form of equipment and supplies in order to be able to produce it’s output (ore, pellets, concentrates, etc.). Such "inputs" usually represent the major cost to the mining company. Therefore, the need of effective buying procedures and it’s continuous monitoring cannot be overemphasized. Yet, we feel that

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5 The title of the article is "Metals from the East – Threat or Opportunity?"
a brief description of some features, which characterize mining activities and directly and/or indirectly affect IBB, is essential to provide the basis for answering the above question.

"The bases upon which the firm competes will strongly influence its buying activities and pattern"
(Robinson, Faris and Wind, 1967, p.116)

"One can think of many products where the mission of the firm will determine the importance of the purchase"
(Mattson, 1988, p.205)

What is then the mission and the bases on which mining companies compete?

Most countries in the world are endowed with mineral resources like fuels, metals, nonmetals and rock-minerals. However, not all mineral resources can be classified as an ore, an economic deposit or an economic field. For this to happen, an economic criterion has to be satisfied meaning that the extraction of such mineral resources must be profitable. From the tracing of "profitable" mineral resources to the moment the output of a mineral venture is introduced in the market, a process takes place. The process is called the "Mineral Supply Process" and is composed of five stages that are pursued by basically any mining company as natural components of their production chain (see Figure 1).

Figure 1: The Mineral Supply Process

The exploration phase is the first stage of the mineral supply process. In this stage, the assessment of the mineral resources profitability potential takes place as a result of a long-term geological evaluation (normally between 8 - 12 years). This ultimately leads to the characterization and

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6The term "ore" is normally used only in connection with economic mineral resources where the metal content is the primary value constituent. The term "economic deposit" is used in connection with economic solid mineral resources in general, whereas the corresponding term normally used in connection with hydro-carbons is "economic field".
delineation of the size, grade and other parameters of the mineral deposit. Thus, the geological environment is characterized and constitutes the first determinant for the bases in which mining companies compete. Mineral deposits constitute the geological basis for mineral supply and their specific and unique characteristics will thereby influence all the subsequent stages and associated investments.

Once the profitability potential is established the development of the mineral deposit can start. This normally means that a complex set of infrastructures and facilities has to be developed in order to ensure the operationalization of the extraction process. This can be said to constitute the "skeleton" of the mine, and its shape is determined by the geological environment. This stage culminates with the "start-up" of the mine. Naturally, major investments are associated with this stage. The investment capital for contemporary mineral projects commonly runs into half a billion dollars or more. To raise such investment capital, financial packages and global approaches are usually necessary. The major slice of the total initial investment is for the purchase of major capital equipment for mining production items and set-up of infrastructures and facilities.

**Mining** is the stage in the mineral supply process where a known, evaluated and developed mineral deposit is worked in order to make the naturally occurring mineral association accessible to processing. Again, huge investments are associated with this stage. Capital equipment and supplies are constant key inputs in "mining". Such inputs include a wide range of product lines, from capital equipment for mining production items such as drilling rigs and ventilators, to supply items such as rock drilling tools and explosives. The selection of cost effective capital equipment for mining production, which is suitable to the specific requirements of the mineral deposit and thereby lead to an optimization of the production process associated with mining, is essential for the profitability of any mining company.

The **processing** stage includes one or more steps leading to an upgrading of the "value component" of the mineral deposit. The result may be a mineral concentrate, a metal, or other products suited to be brought to the mineral market by the last stage in the "mineral flow", i.e. **transportation**.

Finally, the output of mineral ventures can be introduced in the mineral market. Two aspects need to be referred at this point, namely, the global mechanisms of metal price setting and currency rates. No single mining company is able to directly influence these two variables. Thereby, the competitive position of mining companies becomes ultimately dependent
upon "controllable" cost-effective solutions related to each stage of the mineral supply process, in which investments in capital equipment for mining production are determinant. After the above considerations we can conclude that no "mine" is similar to another "mine". This is due to the geological environment and it's effect on the associated mineral supply process that therefore cannot be reproduced from one environment to another. Figure 2 illustrates the factors influencing the profitability of mining companies.

<table>
<thead>
<tr>
<th>Uncontrollable Factors:</th>
<th>Controllable Factors:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geological Environment</td>
<td>Selection of Mining Equipment</td>
</tr>
<tr>
<td>Metal Price and Currency Rates</td>
<td>and Technology</td>
</tr>
</tbody>
</table>

![Figure 2: Factors Influencing the Profitability of Mining Companies](image)

These characteristics constitute the bases on which mining companies will compete and where the selection of optimal capital equipment for mining production for each specific mine will be a key element for the companies' performance and long-term profitability. A deeper understanding of IBB is therefore of significant importance in an industry where one product type (capital equipment for mining production) will have such a dominant influence on the profitability of the company. Thus, our study will focus on the IBB of mining companies. An empirical descriptive approach to the study seems appropriate, as it will hopefully allow apprehending and enhancing all the complexities of industrial buying in such a multifaceted environment.

### 1.3 Research Problem

In the previous sections we presented the background of this study. The importance of understanding IBB in marketing activities and from a strategic managerial viewpoint was discussed and the mining industry was selected as an appropriate researchable line of industry. The significance of the Swedish mining industry and specifically it's importance for the development of the Swedish mining equipment industry was indicated, and the possibilities of emerging export markets for Swedish mining equipment in the former Eastern-block and the Polish mining industry as a suitable
example were discussed. Finally, some characteristics and features of the mining environment and possible effects on the IBB of the mining companies were given.

At this point we have chosen the field which will be the object of our research study. On the basis of what has been outlined in the previous sections we are now able to formulate our research problem:

**How can the industrial buying behavior of the Swedish and Polish mining companies be characterized, concerning the purchase of capital equipment for mining production?**

Our decision to focus on the purchase of capital equipment for mining production (such as drilling rigs, loaders, trucks, etc.) is due to the relative significance of this equipment, in terms of value, complexity and importance of the product to the mission of the mining company, as discussed previously in section 1.2.3.

Concerning the Swedish and Polish mining companies, the previous characterization of the mining industries in these two countries shows a common significance of metal mining production, with the Swedish position as a major metal producer in EU-EFTA (see Table 1) and Poland with a position as the world's fifth copper producer. Moreover, the value of metal mining output is primarily determined by worldwide metal price setting, and therefore metal producing mining companies will largely experience the same environment concerning pricing of their products. Our research problem can then be further narrowed to:

**How can the industrial buying behavior of the Swedish and Polish metal mining companies be characterized, concerning the purchase of capital equipment for mining production (hereafter CEMP)?**

Hence, our specific interest in this study is directed towards the understanding of IBB in metal mining companies when the most complex buying situations occur. We refer to “complexity” in terms of technology, value of purchase, and relevancy and adequacy of the purchase to the mission and strategic management implications to the metal mining companies. In the next chapter, an overview of literature is conducted and subsequently research questions are formulated. Thereafter, a theoretical frame of reference emerges and afterwards answers to the research questions are sought throughout this thesis.
1.4 Outline of the Study

This study is divided into six parts containing seven chapters: Introduction and Research Problem, Overview of Literature, Frame of Reference, Methodology, Swedish Cases and Polish Case, Analysis, and Findings and Conclusions. Figure 3, illustrates the outline of the study.

Figure 3: Outline of the Study

1.5 Summary

In this chapter we have attempted to establish a context for our study by presenting it's background and defining our research problem. We first define our area of interest, which is industrial buying behavior (IBB). Second, our interest in the mining environment has been explained by outlining some characteristics of the Swedish mining industry, the Swedish mining equipment industry and their potential export markets, with emphasis on the former Eastern-block (and Poland in particular). Furthermore, we have outlined some characteristics of the Polish mining industry, which provided a basis for explaining the choice of Poland in the context of our study of IBB in the mining industry. Finally, we briefly
characterized the mining environment in regards to some unique features which constitute the bases on which mining companies compete, namely the mineral supply process and the geological environment.

Once the background was established, the research problem of this study could be formulated and certain delimitations were put forward. Finally, the structure of the study was presented.
Chapter Two: Overview of Literature

2.1 Introduction

The aim of this study is to provide a characterization of the industrial buying behavior (IBB) of mining companies when purchasing capital equipment. A theoretical basis that best supports the aim of the thesis needs to be created. In order for this to be possible, we will first provide an overview of a selected bibliography concerning IBB. The selection is based on the research problem presented in the end of chapter one, and also to some extent on the degree of general recognition of importance in studies by scholars in the area of IBB. Additionally, examples of recently published studies are presented.

The importance of understanding organizational buying behavior has long been recognized (e.g. Copeland, 1924). Webster and Wind (1972a) defines organizational buying as a "complex process of decision making and communication, which takes place over time, involving several organizational members and relationships with other firms and institutions. It is much more than the simple act of placing an order with a supplier" (op. cit., p.1). The investigation of these and other aspects of organizational buying has been the concern of many scholars and practitioners in the field. Our overview of literature regarding IBB is divided into three parts:

- some of the conceptual frameworks and state-of-the-art reviews which have been done in the field are revised and a conceptual structure for the literature review is selected
- a number of studies which address partial aspects or constructs of IBB without attempting its arrangement in a system context are reviewed chronologically in accordance to the conceptual structure previously determined
- some of the system models proposed in the literature are also reviewed

The study’s research problem combined with the implemented overview of literature will finally lead to the formulation of this study’s research questions, which are presented at the end of this chapter.

An overall assessment of the literature indicates that a number of theories (organization and management theories, economics, behavioral science theories, etc.) have, and continue to contribute to the field of organizational buying behavior. This fact has certainly contributed to a lack of conformity in the use of certain terminology: e.g. industrial buying behavior (IBB) and
organizational buying behavior (OBB) are used by many scholars as synonymous; buying process is used similarly to purchasing process and buying decision process; etc. Therefore, it seems appropriated to provide some clarification in what concerns the use of these terms within the scope of this study.

IBB is used by some scholars in the field as equivalent to OBB while others see IBB as part of the area of organizational buying behavior, which in this view also includes the professional buying from institutions and resellers. When referring to earlier studies, we will adopt the terminology used by the author(s) in question. Regarding our own usage of the terms, industrial buying will denote the buying of industrial firms for the purpose of utilization in their own production, and organizational buying as the larger field incorporating all forms of purchases made by organizations (cf. Möller, 1993, p.4).

The terminology purchasing is adopted by many authors (e.g. purchasing situation, purchasing process, etc.) while others use buying (e.g. buying situation, buying process). It is not our intention in any way to get involved in the investigation of existing differences in the application of the terminology or if they are used basically as synonymous, however, it’s usage throughout this thesis will be the following:

- when reviewing literature, we will utilize the terminology adopted by the author in question, whether buying or purchasing

- regarding our own usage of the terms we utilize the terms purchasing and buying as synonymous

### 2.2 Studies Providing Classifications of Organizational Buying Behavior

The following examples of reviews providing classifications of studies in the field of IBB have been selected due to the number of references made to them in other studies. Additionally, examples of recently published reviews are presented.

Webster and Wind (1972a) use a threefold classification of the traditional views of organizational buying: task, nontask, and complex models. They further define:
"Task models are those emphasizing task-related variables (such as price) whereas the nontask models include models that attempt to explain organizational buying behavior based on a set of variables (such as the buyer's motives) which do not have a direct bearing on the specific problem to be solved by the buying task, although they may be important determinants of the final purchasing decision. In addition to this pure classification into task and nontask variables, one has of course to recognize some possible combinations of task and nontask variables in a complex model" (op.cit.,p.12).

Other authors, Banville and Dornoff (1973), analyze industrial buying behavior in terms of two schools of thought: economic and behavioral. A parallelism with Webster and Wind's (1972a) classification may be established as "task-oriented models tend to concentrate on the economic aspects of industrial buying" (Johnston, 1981, p.17), while "non-task oriented models attempt to explain industrial buying behavior by concentrating on the human aspects of the individuals within the firm involved in the purchasing process" (Ibid), or in other words emphasis is given to the behavioral aspects.

A reconceptualization and classification of buying behavior is proposed by Bonoma and Zaltman (1978), (see Figure 4). The foundation is a social influence conceptualization with a classification drawn from the transactional bases of social psychology. Interactive social factors are presumed to be dominant influences on the organizational buying process. The latter is stressed to be an interactive, dyadic, and transactional process. In this view, it is therefore regarded as theoretically impossible to study industrial buying without at the same time studying industrial selling, since the influences on the processes are to a major extent created in this interaction.
<table>
<thead>
<tr>
<th>Within the Organization</th>
<th>Between Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Intradepartemental, Intra-organizational Influences</td>
<td>III. Intradepartemental, Inter-organizational Influences</td>
</tr>
<tr>
<td><strong>The Purchase Agents</strong></td>
<td><strong>Professionalism among Purchasers</strong></td>
</tr>
<tr>
<td>Factors in Buying</td>
<td></td>
</tr>
<tr>
<td>- Social factors</td>
<td>- Face to face communication, satisfaction</td>
</tr>
<tr>
<td>- Decision Strategies</td>
<td>- Trade shows and press</td>
</tr>
<tr>
<td>- Price, cost factors</td>
<td>- Rising status</td>
</tr>
<tr>
<td>- Product type and stage</td>
<td>- Reciprocity I</td>
</tr>
<tr>
<td>- Reinvention</td>
<td></td>
</tr>
<tr>
<td>- Supply continuity and shortage</td>
<td></td>
</tr>
<tr>
<td>- Computerization</td>
<td></td>
</tr>
<tr>
<td>- Bidding, rating systems</td>
<td></td>
</tr>
<tr>
<td>- Risk avoidance</td>
<td></td>
</tr>
<tr>
<td>- Promotion</td>
<td></td>
</tr>
<tr>
<td>II. Interdepartemental, Intra-organizational Influences</td>
<td>III. Interdepartemental, Inter-organizational Influences</td>
</tr>
<tr>
<td><strong>The Buying Center</strong></td>
<td><strong>Organizations and Environment</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>- Organizational structure</td>
<td>- Technological changes</td>
</tr>
<tr>
<td>- Power and conflict processes</td>
<td>- Nature of suppliers</td>
</tr>
<tr>
<td>- Gatekeeper role</td>
<td>- Nature of business</td>
</tr>
<tr>
<td>- Role theory</td>
<td>- Cooperative buying</td>
</tr>
<tr>
<td>- Climate</td>
<td>- Legalities</td>
</tr>
<tr>
<td>- Hierarchically imposed buying; interlocking factors</td>
<td>- Reciprocity II</td>
</tr>
<tr>
<td>- Information scanning</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: The Organizational Buying Locus of Influence Grid (Bonoma and Zaltman, 1978, p.2)

Note: Large-type labels indicate general concept areas. Small-type headings indicate specific topics addressed in workshop discussions. Hence, the subheads are not exhaustive of the generic concepts.

 Shortly later, a work by Wind and Thomas (1980) reviews the state-of-art of organizational buying behavior categorizing the academic studies published in the field into three major areas: The Buying Center, The Buying Process and Factors Affecting the Organizational Buying Center and Process. They further subdivide these major areas as follows:
The Buying Center
- Identifying the Composition of the Buying Center
- Roles of the Buying Center
- Influence in the Buying Center

The Buying Process
- Overall Buying Process
- Identification of Needs
- Identification of Alternatives (Search Process)
- Set Purchase and Usage Criteria
- Evaluate Alternative Buying Actions
- Purchase Decisions
- Post Purchase Evaluation

Factors Affecting the Organizational Buying Center and Process
- The Buying Situation
- Personal Factors
- Interpersonal Factors
- Organizational Factors
- Inter-organizational Factors
- Environmental Factors

Another author, Johnston (1981) groups the empirical studies which deal with specific aspects of organizational buying in the following manner:

"The research can be grouped into three relatively homogeneous types:

1. observations of organizational buying behavior in specific purchase situations;
2. analyses of the aggregate frequencies of involvement of different organizational functions in the purchasing functions of the purchasing process; and
3. studies of the behavior and decision style of specific, formal-role, decision participants (for example, purchasing managers, engineers)” (op.cit., p.49).

This author proposes a ”system approach” to the study of industrial buying behavior, as ”probably the best way to incorporate and understand all of the complexities and interactions that take place in industrial buying behavior” (op.cit., p.39).
Even though the characteristics are different, a "system approach" is also proposed by Johnston and Spekman (1982) as they develop a framework for the modeling of much research done in IBB by adapting Kickert van Gigch's (1979) meta-system approach to organizational decision making (see Table 2). This system is defined as "a set of objects, a set of relations among all the objects, and an environment with relations among the objects" (Johnston and Spekman, 1982, p.136). Applying this definition the authors view the organizational buying process as a system and the participants in the process as objects of the system. The partitioning of such a system into *subsystems* (subsets of the objects with all the original relations), *aspect systems* (all the objects with only a subset of the relations), and *phase systems* (systems identical to the original system only for a certain time) is done as follows:

"Subsystem
individuals, buying centers, groups,
functional departments, organizational divisions,
strategic business units

Aspect systems
issues, topics, tasks, decisions

Phase systems
time phases of the decision process."

(Ibid)

The structure of the organizational buying process is then defined as the set of relationships between subsystems, aspect systems, and phase systems (see Table 2):

Table 2: Structure of an Organizational Decision Process

<table>
<thead>
<tr>
<th></th>
<th>Subsystems</th>
<th>Aspect Systems</th>
<th>Phase Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsystems</td>
<td>Interactions, Power, Communications</td>
<td>Who does what? Person-task relationships, department responsibilities</td>
<td>Who acts when?</td>
</tr>
<tr>
<td>Aspects Systems</td>
<td>Functional coordination, Issues, work flow, scheduling</td>
<td>What is dealt with, when?</td>
<td></td>
</tr>
<tr>
<td>Phase Systems</td>
<td></td>
<td></td>
<td>What sequence? Time periods for decisions</td>
</tr>
</tbody>
</table>

Source: Johnston and Spekman (1982, p.137)

A somewhat more simplified partition of theoretical and empirical studies in OBB is proposed by Backhaus and Koch (1985) as they use the two-fold classification of "Partial Models" and "System Models". By partial models
they refer to those which "in each case investigate only partial aspects of the complex buying decision process, without combining the various blocks of knowledge to form a model providing an overall explanation" (op.cit., p. 376). By system models they mean those which "attempt to classify the variables of organizational buying behavior and to arrange them in a system of mutual dependence" (Ibid).

Möller (1985) reviews the basic conceptualizations of organizational buying and analyzes research strategies applicable to these conceptualizations. He argues that "the key conceptualizations of organizational buying behavior comprise the phases or subprocesses of the buying process, the elements of that process, and the contextual factors affecting it" (op.cit., p. 4).

More recently, through a combined literature- and field-based perspective, Bunn (1994), specifies four constructs underlying buying activities, in which buyers engage as key aspects of organizational buying: (1) procedural control, (2) proactive focusing, (3) use of analysis techniques, and (4) search for information. Focusing on these underlying buying activities the author develops and evaluates scales related to these constructs. The study further claims that such constructs and measures are useful to explore many areas of organizational buying, including characteristics of the decision-making process, antecedent contextual variables, and the structure of the decision-making unit.

Johnston and Lewis (1996) reviewed 165 articles (121 conceptual articles and 44 empirical articles) published during the last 25 years of research on organizational buying behavior. The authors present 13 constructs that permeate the organizational buying behavior literature:

1. Purchase characteristics
2. Organizational characteristics
3. Group characteristics
4. Participant(s) characteristics
5. Process or stages
6. Seller characteristics
7. Informational characteristics
8. Buyer-Seller relationships
9. Environmental characteristics
10. Conflict / negotiation tactics
11. Communication networks
12. Decision rules
13. Role stress
To summarize, the above reviewed studies are presented in Table 3:

Table 3: Summary of Presented Studies Which Review and Categorize OBB

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Proposed Categories:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webster and Wind</td>
<td>1972a</td>
<td>Task, non-task, and complex models.</td>
</tr>
<tr>
<td>Banville and Dornoff</td>
<td>1973</td>
<td>Economical and behavioral &quot;schools of thought&quot;.</td>
</tr>
<tr>
<td>Bonoma and Zaltman</td>
<td>1978</td>
<td>Classification drawn from the transactional bases of social psychology. OBB as interactive, dyadic, and transactional.</td>
</tr>
<tr>
<td>Wind and Thomas</td>
<td>1980</td>
<td>Studies in OBB divided into three major areas: the buying center, the buying process, and the factors affecting the organizational buying center and process.</td>
</tr>
<tr>
<td>Johnston</td>
<td>1981</td>
<td>Empirical research grouped in three types: purchase situation, involvement in the purchasing process, and behavior and decision style. Proponent of &quot;System approach&quot;.</td>
</tr>
<tr>
<td>Johnston and Spekman</td>
<td>1982</td>
<td>Meta-system approach to organizational decision-making.</td>
</tr>
<tr>
<td>Backhaus and Koch</td>
<td>1985</td>
<td>Partial models and system models.</td>
</tr>
<tr>
<td>Möller</td>
<td>1985</td>
<td>Key conceptualizations: phases of subprocesses of the buying process, the elements of the process, and the contextual factors affecting it.</td>
</tr>
<tr>
<td>Bunn</td>
<td>1994</td>
<td>Key aspects of organizational buying as: procedure control, proactive focusing, use of analysis techniques, and search for information.</td>
</tr>
<tr>
<td>Johnston and Lewin</td>
<td>1996</td>
<td>Conceptual and empirical articles are separated; 13 constructs referred to as determinants of OBB are put forward.</td>
</tr>
</tbody>
</table>

Whatever the angle from which organizational buying behavior is approached, a consensus is apparently found towards the relevance of studying (separately or conjointly) some of what appear to be major determinants of industrial buying. These include: the identification of those who participate in the purchasing process, the industrial buying decision conceptualized as a process which can be subdivided in a number of separate stages, and factors which affect the economic and behavioral decision-making of those individuals involved.

The classification proposed by Wind and Thomas (1980) comprises most of the aspects which are assessed by many authors as major components of industrial buying behavior. This has led to the choice of this categorization for our literature review. However, we will exclude two sets of factors proposed by Wind and Thomas:
• the effect of the firm’s marketing variables, and
• the effect of the marketing strategies of competitors

The base for excluding these two sets of factors is the commodity type of product (uniform product traded at world market prices) that is produced by the industry that will be the focus of this study. Thus, the two excluded sets of factors are considered as having little relevance to the study of buying behavior in the selected line of industry.

An aspect not included in the conceptual framework by Wind and Thomas (1980) is the division between partial models (or partial approaches) and system models (or complex models) discussed by Backhaus and Koch (1985). In order to include this aspect, we will use the framework of Wind and Thomas for the review of partial models (or partial approaches) and thereafter review system models (or complex models) in a separate section. Hence, our overview of literature on OBB will be implemented as follows, (see Figure 5):

1. Review of studies providing partial models of organizational buying behavior presented in accordance to the conceptual structure proposed by Wind and Thomas (1980).

2. Review of system models (or complex models).

![Figure 5: Structure of Review of Literature on OBB](image-url)
2.3 Studies Providing Partial Models of Organizational Buying Behavior

In this following section we will present a review of selected studies of OBB categorized according to the conceptual structure provided by Wind and Thomas (1980). Underlying the selection are the number of references made to these particular studies in other studies, thus it's degree of recognition by scholars in the field. Additionally, examples of recently published studies are presented. Wind and Thomas identify three major concepts of OBB: the buying process, the buying center, and factors affecting buying process and buying center. "These three concepts can provide the basis for organising much of the diverse research efforts in organisational buying behavior" (op.cit.,p.240). The authors further divide these concepts as it is illustrated in Figure 6. The presented framework will be the basis of the presentation for the up-coming sections (sections 2.3.1 - 2.3.3).

At the end of each of these sections, evolved patterns from the reviewed literature are provided. Research questions are then formulated and a selection of theoretical areas for this study’s frame of reference are presented.

**Figure 6: Major Concepts of OBB**
(Wind and Thomas, 1980)

2.3.1 The Buying Process

In the following section a review of studies that can be categorized in the first major component of OBB, namely the buying process, is presented. The presentation follows the issues used by Wind and Thomas (1980) when they are presenting research concerning the buying process (Figure 7).
2.3.1 BUYING PROCESS

- 2.3.1.1 Overall Buying Process
- 2.3.1.2 Identification of Needs
- 2.3.1.3 Identification of Alternatives
- 2.3.1.4 Set Purchase and Usage Criteria
- 2.3.1.5 Evaluate Alternative Buying Actions
- 2.3.1.6 Purchase Decisions
- 2.3.1.7 Post Purchase Evaluation

Figure 7: Issues Related to the Buying Process.
(Wind and Thomas, 1980)

Buying is not an event. "From the time at which a need arises for a product or service, to the purchase decision and its subsequent evaluation, a complex myriad of activities can take place" (Wind and Thomas, 1980, p.242). It is therefore a "process" in which separate steps, stages, and/or phases may be identified. Such a sequential division of the buying process has long been the concern of many researchers.

2.3.1.1 Overall Buying Process

Cyert, Simon and Trow (1956) are often quoted as one of the pioneer attempts to understand the sequential nature of the buying process (e.g. Johnston and Speakman, 1982). Through a qualitative approach they documented an originally unprogrammed decision process. They illustrated three processes that are involved in business decision making:

1. Common processes, representing the basic activities of which the whole decision process is composed;
2. Communication processes, which stand for the information exchanges within the organization; and
3. Problem-solving processes, which are those concerned with the identification of different alternatives, directed toward the solution of the decision problem itself.
The authors called the identified processes as program steps. Their major contribution to the conceptual framework of the buying process can be said to be the proposed "analysis of a decision in terms of a hierarchical structure of programs (...) provide a useful technique of analysis for researchers interested in the theory of decision as well as for business executives who may wish to review the decision-making procedures of their own companies" (op.cit.,p.248).

The proposed "technique" has in fact been used! A proliferation of buying process models composed of a wide variety of programs, elements, stages, phases, and steps can be found in the literature published thereafter. Some examples include:

Webster (1965) proposed a four-elements model. To use a more commonly used terminology we refer to them as phases: "1) problem recognition, 2) organizational assignment of buying responsibility, 3) search procedures for identifying product offerings and for establishing selection criteria, and 4) choice procedures for evaluating and selecting among alternatives" (quoted from Johnston, 1981, p.42).

Two years later, Robinson, Faris, and Wind (1967) developed an eight-stage model of the buying process, mostly known as The Buygrid Framework. The Buygrid was the result of a study of three organizations and a vast number of purchasing situations. The outcome is a proposed conceptual framework for the analysis of industrial buying situations which, "should be applicable to buying organizations of all kinds and sizes" (op.cit.,p.10). The eight buyphases are the following:

1. Anticipation or Recognition of a Problem (Need) and a General Solution
2. Determination of Characteristics and Quantity of Needed Item
3. Description of Characteristics and Quantity of Needed Item
4. Search for and Qualification of Potential Sources
5. Acquisition and Analysis of Proposals
6. Evaluation of Proposals and Selection of Supplier(s)
7. Selection of an Order Routine
8. Performance Feedback and Evaluation

These eight buyphases are combined with three types of purchase situations: the new-task, the modified rebuy, and the straight-rebuy. Three factors are determinant towards the incorporation of a buying situation in the correspondent buyclass: (1) the newness of the problem, (2) the information requirements, and (3) the consideration of new alternatives.
The existence and duration of the identified buyphases varies with the purchase situation, and the authors establish a correlation between the eight fundamental activities or BUYPHASES and the three basic types of buying situations or BUYCLASSES (see Table 4).

Table 4: The Buygrid Analytic Framework for Industrial Buying Situations.

<table>
<thead>
<tr>
<th>BUYPHASES</th>
<th>BUYCLASSES</th>
<th>New Task</th>
<th>Modified-Rebuy</th>
<th>Straight-Rebuy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anticipation or Recognition of a Problem (Need) and a General Solution</td>
<td>New Task</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>2. Determination of Characteristics and Quantity of Needed Item</td>
<td>Modified-Rebuy</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>3. Description of Characteristics and Quantity of Needed Item</td>
<td>Straight-Rebuy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. Search and Qualification of Potential Sources</td>
<td>New Task</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>5. Acquisition and Analysis of Proposals</td>
<td>Modified-Rebuy</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>6. Evaluation of Proposals and Selection of Supplier(s)</td>
<td>Straight-Rebuy</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>7. Selection of an Order Routine</td>
<td>New Task</td>
<td>Yes</td>
<td>Maybe</td>
<td>No</td>
</tr>
<tr>
<td>8. Performance Feedback and Evaluation</td>
<td>Modified-Rebuy</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>


With reference to this table, the most complex buying situations occur in the upper left part of the grid. In a new task situation, when a product is purchased for the first time, all the eight stages of the buying process are important, but the initial phases are crucial. In a modified rebuy, the early phases as well as the latter phases are important. In a straight-rebuy situation, the first stages of the process are of little importance and the major emphasis is placed in the latter stages.

Many researchers rapidly adopted the use of the BUYGRID as an analytical tool in a variety of empirical studies. This framework is also the "triggering device" of many enlightened discussions in the field of
conceptualization of the buying process. Webster and Wind (1972a, pp.24-25) state that the model, "is virtually devoid of predictive ability, and offers little insight into the nature of the complex interplay between task and nontask variables". More recently, Johnston and Speakman (1981, p.139), add that, "one problem is that the flow of stages as presented by Robinson et al. may not progress sequentially and the entire process may consist of a number of iterative loops, depending on the complexity of the purchasing situation". Wherever one stands, it is undeniable that the Buygrid Framework constitutes an obligatory reference to most of the work published within the IBB field.

After the publication of Robinson et al. Buygrid Model, the conceptualization of the buying process gains an increased popularity and a proliferation of proposed models surge in the field. Among others Saleh et al. (1971), (as quoted by Johnston, 1981), identify four stages in the buying process: problem recognition, search processes, choice procedures, and post-choice evaluations.

Webster and Wind (1972a) state that "The organizational buying decision process can be described in terms of a general model of organizational decision processes composed of five basic stages: identification of need, establishing objectives and specifications, identifying buying alternatives, evaluating alternative buying actions, and selecting the supplier. The specific nature, importance of, and interrelations among these stages vary across organizations and buying situations, yet this model does provide a good starting point for the understanding of the buying decision process" (op.cit.,p.31). Despite this consideration, the authors are mostly critical towards the conceptualizations of the buying process: "it seems that attempts to identify a general decision-making process are bound to be fruitless" (Ibid). It is for this reason that the organizational buying behavior model includes a decision process without any attempt to identify the specific stages of the process. Another of these authors' considerations is worth to be kept in mind:

"Despite the intuitive appeal and scattered evidence in favor of the somewhat similar descriptive models, there is no way to identify the one 'true' decision-making process that exists in all organizational buying decision processes. Furthermore, it is most likely that such a universal decision-making process does not exist-primarily because of differences in organizational characteristics, the people who are involved in the various stages, the given buying situation, and the importance of the given task" (Ibid).
These authors also questioned the sequential nature of the stages:

“All buying decisions begin with the identification of need and culminate in the selection of one or more suppliers. Each of the five stages of the decision process is likely to occur as a more or less distinct and identifiable phenomenon, although some stages may be repeated several times and the organizational buying process may "jump around" from one stage to the next. After the vendor has been chosen, a variety of decisions may be required to maintain and administer the buyer-seller relationship” (op.cit., p.112).

Another author, Kelly (1974) adopts Swandby’s (1973) five-function model as the one that "allows for identification of those involved in the decision to purchase an offset press regardless of whether they are in the purchasing department or not" (Kelly, 1974, p.423). The five stages of Swandby’s model are: recognizing the need; searching for information on alternative solutions to the need; evaluating alternatives; deciding on the brand; and approving the funds necessary for the purchase.

A different angle is proposed by Hillier (1975, p.99) as he adopts "a nuclear approach to decision-making in the industry buying process" and differentiates between three industrial buying processes: the individual buying process, the inter-company functional buying process, and the corporate buying process. He study’s the corporate buying process and recognizes four stages the buying organization goes through when purchasing any product which is also associated with a major decision. The stages are: "the precipitation of the purchase; the product specification; the selection of the appropriate supplier to invite to tender and the most suitable supplier to provide the product; and finally, the degree of satisfaction the customer shows towards the purchase, and the extent of their feelings of commitment to the supplier on subsequent occasions” (op.cit., p.102).

Another model developed, usually referred to as the "probably the most complex model using phases to describe the industrial-buying decision process” (Johnston, 1981, p.43) is the interactive-process model of Backhaus and Gunter (1976) composed by 12 stages, each with several dimensions. Johnston (1981) remarks the trend towards a PERT model.
Another complex model is presented by Wind (1978) in his study of purchasing scientific and technical information (STI) by manufacturing firms. The number of buying phases proposed is twelve:

1. Identification of Needs
2. Establish Specifications
3. Search for Alternatives
4. Establish Contact
5. Set Purchase and Usage Criteria
6. Evaluate Alternative Buying Actions
7. Determine Budget Availability
8. Evaluate Specific Alternatives
9. Negotiate with Suppliers
10. Buy
11. Use
12. Conduct Post-Purchase Evaluation

Other models may be considered as a "modified" version of a previous developed model. Bellizi (1981), for example, studied the role of organization size related to industrial buying influences. Through a pilot study the author predetermined six occupational groups that may be involved in buying in the commercial construction industry. Thereafter, the total influence of each participant category (group) was measured by adding together the reported influence on each of the buying activities. The buying activities considered are a modified version of the activities as proposed by Robinson et al. (1967) and depicted in a 9-stage model:

1. Anticipation of Recognition of a Problem (Need) and a General Solution.
2. Determination of General Characteristics and Quantity of a Needed Item.
3. Specific Description of Characteristics and Quantity of Needed Item.
4. Search for and Qualification of Potential Sources.
5. Gathering of Relevant Purchase Information and Acquisition of Proposals.
7. Evaluation of Information and Proposals and Selection of Supplier.
8. Selection of an Order Routine.

Möller (1981) studies industrial buying behavior of production materials and develops a comprehensive conceptual model of production material
buying, denominated the MAT - buy model. The following "subprocesses" constitute the model:

A-Purchase Initiation  
B-Evaluative Criteria Formation  
C-Information Search  
D-Supplier Definition for RFQ'S (Request for Quotation's)  
E-Evaluation of Quotations  
F-Negotiations  
G-Supplier Choice  
H-Choice Implementation

After defining the principal "subprocesses" or stages, he then describes each substage using "the tabular system for decomposing any decision process into a set of categories of decision components put forward by Farley, Hulbert and Weinstein (1980, p.47)" (as quoted by Möller,1981, p.15). These categories are input, communication, evaluation and recommendation, decision-making, conflict resolution, decision implementation, and monitoring.

Some authors (e.g. Cyert, Simon and Trow, 1956; Bonoma and Zaltman, 1978) have pointed out to the need of descriptive research within the field on an industry-by-industry basis. Both Kennedy (1983) and Woodside and Vyas (1983) have implemented empirical studies that involved detailed flow-charted descriptions of the buying processes.

Kennedy (1983, p.55) argues that, "descriptive research methodology offers an impressively pragmatic approach to organizational buying models buildings by comparing the sequence of decisions and activities between different samples of industries, products, and time frames". Using this method she studies the purchasing process of a raw material (steel plate). The following stages in the buying process are identified:

1. The Raw Materials Requirements Planning  
2. Preparation of Request for Tender  
3. Evaluation of RFQs  
4. Trial and Evaluation of Material Performance  
5. Choice of Supplier and Placement of Order/Contract  
6. Receipt of Goods  
7. Consolidation of Buyer/Supplier Relationship

Woodside and Vyas (1983) implement descriptive research on the industrial buying process of a raw material (fuel oil) by a large
manufacturing plant. They develop a flowchart of the buyflow that can be divided in five parts corresponding to five formal steps in the purchasing process:

1. Problem Recognition
2. Search for Potential Sources
3. Vendor Qualification
4. Evaluation of Vendor Proposals
5. Selection of an Order Routine

The similarity with the previous descriptions by Wind (1967), Cyert, Simon and Trow (1956), Pettigrew (1975), Woodside and Samuel (1981) is remarked and the study helps to provide empirical validity to the conceptualization of the formal partition of the buying process.

Naumann, Lincoln and McWilliams (1984) aim at providing empirical validation to the Webster and Wind (1972) model: “More specifically, the research attempts to identify the perceived amount of influence possessed by various organization functions (e.g. purchasing, production, engineering, etc.) across three purchase situations (new buy, modified rebuy, and straight rebuy) and four different purchase phases (need identification, establishment of specifications, identifying buying alternatives, and supplier selection)” (Naumann, Lincoln and McWilliams, 1984, p.114). The four phases had been used by Laczniak (1979) in “An Empirical Study of Hospital Buying” (as quoted by Naumann, Lincoln and McWilliams, 1984, p.117) and are based on the Webster and Wind model (1972).

A somewhat different approach is proposed more recently by Nielsen, with the “Nielsen Box-Model”, described in Domanski, Freytag, Guzek and Nielsen (1991). This model describes the buying process as four decision knots: the strategic-choice decision, the technical-choice decision, the commercial-choice decision and the transactional-choice decision. The first decision knot includes decisions perceived to be important for the future business, the second, decisions concerning functional needs, the third, decisions related to supplier selection, and the fourth, decisions concerning order routines, etc.

A recent article by Burger and Cann (1995) proposes the following buying process for buyers of higher technology industrial goods and services (see Figure 8):
The authors further describe the process as follows:

1. Trigger Process, defined as the triggering event which sets the consequent decision steps in motion (e.g. the failure of a machine, news of a new product, complaints by users);
2. Needs Assessment, where the decision-making unit (DMU) is formed and a list of requirements or benefits sought and the dimensions of the ultimate solution to the needs is developed;
3. Information Search, where a variety of potential vendors, information sources, and opinion leaders are sought;
4. Vendor Selection, where by using various selection criteria the DMU reduces the vendor list to a small number of potential vendors from which proposals are requested;
5. Proposal Evaluation, where the received set of proposals are compared and contrasted, each vendor is informed of areas of improvement and several cycles of refinement of proposals may occur in combination with the next stage;
6. Word-of-Mouth Evaluation, where information from previous buyers is requested and serves as an input for the former stage, when the DMU feels strongly enough that one proposal is satisfactory, the
7. Buying Decision is made.

Finalizing this section, one can point out to the existence of numerous studies in IBB which address the specific topic of the buying process. Only a few selected studies were reviewed. From the above review, it can be
noticed that most authors have attempted the modeling of such a process in a distinguished number of sequential phases, stages, or steps ordered chronologically. Consensus is not attained and a general model applicable to "all" buying processes cannot be found within the field. Möller (1981) uses the following words:

"The varying complexity of different process models suggests that the buying process is shaped by the nature of the product, buying organization, and buying situation (straight rebuy, modified rebuy, new task, Robinson et al. 1967). Moreover, it is evident that the same product can be purchased in different ways by different organizations - or even by the same company at different times"

(op.cit., p.15)

However, even though the buying process is complex and differs by product/industry, the utility of such modeling, with emphasis to the proposed Robinson et al. (1967), "has been verified across a number of different purchasing contexts" (Johnston and Speakman, 1982, p.139).

2.3.1.2 Identification of Needs

The identification of needs is the "triggering" device which sets in motion the buying process, and can be originated from various sources, within the buying organization or external to it (e.g. supplier, customer). Although this first stage of the buying process is widely recognized by many researchers, not many studies have specifically focused in the investigation of this particular phase.

A study by Grönhaug (1977) investigates the purchase of minicomputers by Norwegian companies. He argues that "problem recognition" is the starting point of the buying process and distinguishes between "gradual" and "sudden" need perception as dependent of the type of organization (market and non-market) and organizational size (more or less than 30 employees). For example, in small organizations he finds that "sudden" need perception prevails. Also, the final initiate (both in "gradual" and "sudden" need perception) is in most cases taken by the buyer.
2.3.1.3 Identification of Alternatives (Search Process)

This particular aspect concerns the quotation selection process or rather the identification of alternative vendors that are selected to submit their bidding, and the determination of attribute importance, which influence this process. The search and qualification of suitable potential suppliers may, as referred by Robinson et al. (1967), "consist of no more than identifying a preferred source from a reference list. At the other extreme, qualification may require both extensive search to find appropriate suppliers and extended consideration of which suppliers are in fact qualified (e.g., Value Analysis and Systems Engineering studies)" (op.cit., p.16).

Wind (1970) examines the source loyalty of industrial buyers. He does so by studying the purchase of components in an electronics firm. A model is initially proposed for testing, which hypothesizes that source loyalty in the purchase of industrial components is a function of four major sets of variables:

1. The "traditional" task variables of price, quality, delivery, quantity and services, commonly considered in the purchasing literature to be the sole determinants of decisions.
2. The buyer's past experience with the various sources, assumed to be summarized in his attitudes toward the various sources.
3. The organizational variables, reflecting the effect of the specific organizational setting on the buyer's decisions and behavior (pressure for cost savings, dollar value, and number of complaints).
4. The factors perceived by the buyer to simplify his work.

These variables were then examined by multiple regression and discriminant analysis and it confirmed the existence of source loyalty and the influence of the studied variables as determinants of this loyalty, with emphasis to the set of organizational variables included in the scope of the study.

Banville and Dornoff (1973, p.253) empirically investigated "the extent of economic and/or noneconomic influences upon the purchasing executive's source selection decision". Private residential builders were asked to rank the motives they considered significant in their source selection process. The results indicated that economic factors (service, quality of product, supplier stands behind product, low price, reputation for fair dealing, nearness of supplier, supplier extends credit, reciprocity) were of greater importance than non-economic factors (friendship with supplier, salesman's personality, prestige of dealing with supplier, improves my
status in my firm) in the selection of a source of supply. However, for
certain product classes the non-economical factors were found influential in
the industrial buyer’s source selection process.

Also, Grönhaug (1975a) conducted research into the search process. He
develops the following model:

\[ S = f(P, T, A) \]

where:

- \( S \) = search is a function of:
  - \( P \) = perceived product performance risk;
  - \( T \) = time pressure; and
  - \( A \) = ability in information handling

In terms of organizational buying, the author states that product-
performance risk is the predominant risk-type. He further formulates six
hypotheses (1-3 related to the perceived-risk component, 4-5 to the ability,
and 6 to the time-pressure component of the model) which are empirically
tested among 30 retail stores with a total of 120 purchases (4 purchases per
store) being mapped. The proposed hypotheses predict that the amount of
information search correlates positively with:

Hyp.1. - buying of production goods compared to institutional goods;
Hyp.2. - the size of the purchase;
Hyp.3. - the novelty of the buying problem;
Hyp.4. - organization size;
Hyp.5. - education of top-manager(s); and negatively with:
Hyp.6. - time pressure

The findings of this study substantiate the hypotheses. The author also
remarks in conclusion that, “the organizational buyer may search for
buying alternatives, and not as often implicitly assumed in much of the
research, that buying goals and alternatives are ‘given’, and that the only
interesting decision in the buying process is the choice of supplier”
(op.cit.,p.22).

Another aspect is enlightened in Woodside and Vyas’ (1983) descriptive
study of the industrial buying process of a raw material (fuel oil) by a large
manufacturing plant. Concerning the search for potential sources of this
particular raw material, the study reports the need of the buying company
to develop a second source of supply to avoid a single source situation,
even though an “excellent” relationship combined with service and
satisfactory shipping schedule had being accomplished with the present
supplier of raw material.
Bunn and Clopton (1993) develop an empirical taxonomy (consisting of five distinct information source mixes) of industrial customers' information source use based on the responses obtained from a survey of 636 industrial customers. Three purchase dimensions - involvement, complexity, and multiple influence - are found to influence and structure the industrial customer's choice of information source mixes. Table 5 summarizes the study's results.

Table 5: Summary Descriptions of Information Source Mixes.

<table>
<thead>
<tr>
<th>Title</th>
<th>Information Sources</th>
<th>Transaction Attributes</th>
<th>Situational Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mix 1</td>
<td>Sales-person Centered</td>
<td>Relies most on selected vendor's salesperson and purchase records</td>
<td>Predominantly straight-rebuy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Multiple vendors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Some competitive bidding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unimportant purchase with least uncertainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Little multiple influence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Little negotiation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Short decision length</td>
</tr>
<tr>
<td>Mix 2</td>
<td>Internally-Limited</td>
<td>Reliance on internal sources; others inside, users, purchase records, other internal sources Very little use of salespeople</td>
<td>Predominantly straight-rebuy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single source</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Little competitive bidding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low importance and uncertainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Some multiple influence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Little negotiation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Short decision length</td>
</tr>
<tr>
<td>Mix 3</td>
<td>Specification Seekers</td>
<td>Heavy reliance on sales literature and catalog / directories Moderate reliance on users and selected salesperson</td>
<td>More use of new vendors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single supply source</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More new task or modified rebuy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Some competitive bidding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low importance</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Little negotiation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High uncertainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Moderate decision length</td>
</tr>
<tr>
<td>Mix 4</td>
<td>Balanced Searchers</td>
<td>Reliance on internal-personal sources: top management, users, others inside Internal-impersonal sources: purchase records, memos and reports, other internal documents External sources: salespeople - selected and other, other supplier employees</td>
<td>Predominantly modified-rebuy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Multiple sourcing with existing vendors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More use of competitive bidding</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Highly important purchase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Moderate uncertainty, but relatively high multiple influence, and extensive negotiation Moderate decision length</td>
</tr>
<tr>
<td>Mix 5</td>
<td>Aggressive Searchers</td>
<td>Most extensive mix of sources consisting of: All personal sources - internal and external Impersonal sources include: sales literature, trade publications, other commercial sources, and internal memos and reports.</td>
<td>Highest percentage of new task</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Multiple sourcing with most new vendors</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Highest use of competitive bidding</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Highly important purchase, with greatest uncertainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Highest level of multiple of influence Extensive negotiation Longest decision length</td>
</tr>
</tbody>
</table>

Also recently, Weiss and Heide (1993) study the nature of organizational search in high technology markets. They refer to the search process as representing “a vendor’s ‘window of opportunity’ during which buyers are likely to be most susceptible to marketing efforts” (op.cit., p.230). The general proposition is that search in high technology markets is determined by such markets’ unique characteristics (i.e. pace of change and technology heterogeneity) and by certain aspects of a firm’s present buying situation (i.e. switching costs and prior experience). The specific product purchase of computer workstations is empirically investigated and results showed that:

- a higher perceived pace of technological change tends to increase search efforts and to decrease the overall duration of the process

- technological heterogeneity had no effect on search effort

- search effort as well as perceptions of marketplace characteristics were conditioned by the prior situation of the buyer (“when buyers have built up large vendor-specific switching costs they tend to put less effort into the search process” and “when compatibility with incumbent equipment is unimportant, buyers tend to increase their search efforts” op.cit, p.229)

- buyers with less experience needed more search effort and tended to perceive increased amounts of technological heterogeneity (the latter was opposite to the authors initial propositions and is explained in the basis that, “experienced buyers are able to identify what data (i.e., product features, etc.) to disregard but inexperienced buyers are not” op.cit., p.230)

2.3.1.4 Set Purchase and Usage Criteria

Once a set of potential vendors is selected and the various offers/biddings are presented “set purchase and usage criteria” takes place. This stage focuses mainly in the assessment of the relative importance of different purchase (vendor selection) criteria. A number of empirical studies, from which we refer a few, have focused on the criteria used by industrial firms to make purchase decisions.

Klass (1961) studies the factors that affect industrial buying decisions. Personal interviews are conducted with 300 executives in 208 industrial companies in the United States. Findings showed that: “Industrial
purchasers buy - or don’t buy - from a particular supplier for many reasons. But when it comes down to it, the most important reasons are buyer’s attitudes toward, or image of your product quality, delivery, price and salesmen” (op.cit.,p.33).

Håkansson and Wootz (1975) study four-decision variables which serve as a basis for supplier selection. These are: two-supplier characteristics (location -meaning location in different countries, and size) and two-bid characteristics (price and quality). At the same time, they manipulate the study in the dimension of “perceived risk” by studying purchases of different products. They formulate a “perceived risk model” and hypothesis for testing with 43 purchasers from three large internationally-oriented mechanical firms in Sweden. Four different purchasing situations are studied: two which are perceived by the purchasers as low need uncertainty situations (standard screw and standard print), and two high need uncertainty situations (special screw and pressing tool). Concerning the supplier characteristics, results showed that location was the most important decision variable in high need uncertainty situations. As to size, no differentiation was found regarding high and low need uncertainty situations. Concerning bid characteristics, price was found to be a more important decision variable than quality. This fact was even more emphasized in the low need uncertainty situations.

Dempsey (1978) investigates the relative importance of twenty vendor attributes (listed below) in two different types of organizations (the electronics manufacturing industry and the electric utilities industry) across two different buying situations (the capital equipment/ new-task buying problem and the component material/modified rebuy problem). The study was confined to purchasing managers as respondents to a nationwide (U.S.) mail sample survey. Results indicated the following ratings (variables are arranged in descending order of overall average importance), (see Table 6).
### Table 6: Listing of Vendor Attributes

<table>
<thead>
<tr>
<th></th>
<th>Attributes affected by buying task</th>
<th>Attributes affected by type of organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Delivery capability</td>
<td>*</td>
</tr>
<tr>
<td>2.</td>
<td>Quality</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Repair service</td>
<td>*</td>
</tr>
<tr>
<td>5.</td>
<td>Technical capability</td>
<td>*</td>
</tr>
<tr>
<td>6.</td>
<td>Performance history</td>
<td>*</td>
</tr>
<tr>
<td>7.</td>
<td>Production facilities</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Aid and advice</td>
<td>*</td>
</tr>
<tr>
<td>9.</td>
<td>Control systems</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Reputation</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Financial position</td>
<td>*</td>
</tr>
<tr>
<td>12.</td>
<td>Attitude toward buyer</td>
<td>*</td>
</tr>
<tr>
<td>13.</td>
<td>Bidding compliance</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Training aids</td>
<td>*</td>
</tr>
<tr>
<td>15.</td>
<td>Progress communications</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Management and organization</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Packaging capability</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Moral/legal issues</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Geographic location</td>
<td>*</td>
</tr>
<tr>
<td>20.</td>
<td>Labor relations record</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Dempsey (1978, p.259)

It was also found that:

- nine of the vendor attributes were affected by the type of buying task (marked with an * in Table 6), varying significantly between the new task buying problem and the modified-rebuy problem
- four were also affected by the type of organization (marked with ** in Table 6)

Thus, as stated by the author “The purchasing agents in this study generally perceived repair service and warranties, technical capability, financial position, aid and service, and training aid to be significantly more important in a capital equipment/new-task buying situation than in a component material/modified rebuy situation” (op.cit.,p.260). Moreover, “buyers in the electric utilities companies were significantly more sensitive to a vendor’s repair service and warranties, bidding compliance, and training aids than were buyers in the electronics manufacturing companies. Meanwhile, the buyers in electronic manufacturing firms gave significantly greater weight to the vendors’ production facilities and prices than did their counterparts in the utilities companies” (op.cit., pp.260-261).

Through factor analysis, the study also concludes that buyers’ group characteristics of expected vendor performance or vendor attributes into
five basic categories (see Table 7). These categories are referred as the five fundamental vendor evaluation factors (listed in descending order of importance) and the vendor attributes included in each category are referred with the correspondent number (1-20) on the list provided in Table 6 (see previous page):

<table>
<thead>
<tr>
<th>Vendor Evaluation Factors</th>
<th>Importance</th>
<th>Related Vendor Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Economic Criteria</td>
<td>1</td>
<td>1, 2, 3, 6</td>
</tr>
<tr>
<td>Attendant Services</td>
<td>2</td>
<td>4, 5, 8, 10, 14</td>
</tr>
<tr>
<td>Geographic Affinity</td>
<td>3</td>
<td>6, 12, 13, 17, 18, 19</td>
</tr>
<tr>
<td>Assurance Mechanisms</td>
<td>4</td>
<td>1, 4, 9, 13, 15</td>
</tr>
<tr>
<td>Vendor Stability</td>
<td>5</td>
<td>7, 10, 11, 16, 18, 20</td>
</tr>
</tbody>
</table>

Source: Adapted from Dempsey (1978, p.261)

Regarding the proposed construct, the author remarks that the less important factors (e.g. vendor stability) may be critical if they’re used as a screening factor. As stated: “Thus, even though Vendor Stability is not on the same level of overall importance as Basic Economic Criteria, it may be a factor which could block a vendor from being included in the final stages of the selection process” (op.cit., p.262).

2.3.1.5 Evaluate Alternative Buying Actions

Once an assessment of the different vendor criteria is conducted, an evaluation of the bids / proposals presented by the different potential vendors takes place. This stage culminates in the selection of a particular supplier. Some examples of studies, which address this topic, are hereby presented.

Crow, Olshavsky and Summers (1980) investigate two of the buying phases as defined by Robinson et al. (1967), namely the fifth (Acquisition of proposals) and sixth (Evaluation of Proposals). Specifically, they state the research objectives of the study as follows:

1. “Develop detailed descriptive models of the individual industrial buyer’s choice strategy for quotation requests and for final supplier choice.
2. Investigate the effects of two situational factors, number of potential vendors and time pressure, on buyer’s choice strategy” (op.cit., p.34).
A convenience sample of 14 experienced purchasers from six manufacturing firms is used in the context of protocol analysis of five modified-rebuy electrical component purchases.

Considering the first research objective, it was found that “buyers tended to arrive at a set of vendors to quote and select a final supplier by eliminating ‘unworthy’ candidates in a non-compensatory fashion” (op.cit., p.43). A two-stage quotation request model is constructed. The first stage consists of a “conjunctive” screening of the vendor history file on delivery and quality with ‘good’ as the minimum acceptable rating” (op.cit., p.39). “If too few (many) vendors remained after the initial conjunctive screening process the criteria for acceptance would be relaxed (tightened)” (Ibid). The authors identify this second-stage as a lexicographic model8 and exemplify the reasoning “If too few vendors were obtained, the buyer would add to this group those vendors who pass the initial criterion for delivery (“good”) but a raised criterion (“excellent”) for quality” (Ibid). No direct comparison is effectuated among the different vendors. Regarding the final supplier choice a three-stage model combined with a truncated version was utilized by 12 of the 14 buyers.

Considering the second research objective it was found that ”time pressure” and ”number of potential vendors” did not appear to affect the buyers’ quotation request and supplier choice strategies.

Möller and Pesonen (1981) studied small business purchasing using a sample of excavator contractors in Finland. Decisive factors among the buyers were: “technical operating characteristics and durability of the excavators and their expected maintenance service” (op.cit., p.267). They found that brand loyalty was used as a risk reducing factor and that decision attributes were to a large extent model-specific (different attributes for different excavator models).

Crow and Lindqvist (1982) studied how past vendor performance influences industrial buyer’s vendor selection decisions. The sample consisted of 12 industrial buyers from manufacturing companies. The past supplier performance was operationalized as: quality, delivery, and

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7 According to the conjunctive model, a multidimensional alternative x = (x1, x2, ..., xn) is judged acceptable only if xi>yi for all i, where y = (y1, y2, ..., y3) is the standard (Crow, Olshavsky and Summers, 1980, p.38).

8 A lexicographic model initially selects among alternatives on the basis of the single most important characteristic. When this is insufficient (i.e., ties occur) the second most important characteristic is used and so on (Crow, Olshavsky and Summers, 1980, p.39).
technical assistance performance. Five clusters of decision logic and two general patterns of decision logic were found. The first pattern (used by one cluster) was the use of all three criteria and ranking based on trade-offs. The second pattern was used by four of the clusters and used a minimum performance level on one or more criteria. The clusters represented differences in the set of criteria used. No general pattern of a “key” supplier attribute was found.

2.3.1.6 Purchase Decisions

This aspect concerns the decision to buy and how it is taken. The “purchase decision” is not solely the act of formally issuing a purchase order/contract but rather comprises all aspects involved in its preparation.

Hillier (1975, p.102), argues that, “the essence of a decision is that the decision-maker should be able to exercise a conscious choice over a number of alternatives”. The incremental nature of decisions is described in three-states through which each decision passes in the corporate industrial buying process:

- the negative state (where the decision cannot be implemented due to lack of authorization of the proper senior level within the organization)
- the zero-state (the juncture where the final authorization is granted but still the criteria of choice can be changed), and
- the positive state (where the decision can be implemented and forms the basis for further decisions)

The author further remarks the need of relevant information as the basis for the decision and identifies two categories of sources of information:

1. individuals which provide information which acts as a constraint on further decisions which can be made (e.g. senior management) - constituting a control function, and
2. individuals who provide background or specialist information, constituting an information function.

Pettigrew (1975) empirically studies the purchase of computer equipment (value amounting to 3,5 million pounds) in a single firm. He proposes that “industrial purchasing decisions are tied up, as many organizational activities, with the politics of the firm” (op.cit.,p.4), and further defines political behavior as “behaviour by individuals or groups which makes a
claim against the resources sharing system of the organization” (Ibid). One of the findings of this study emphasizes the importance of controlling the information flow during an industrial purchasing decision and outlines the advantages of the structural position of the technical gatekeeper within the communication and information systems on the buyer’s decisions.

Another aspect is pursued by Bird (1976) as he investigates the influence of reverse reciprocity in the selection of sources of supply and purchase decisions in the industrial sector during times of scarcity. The author defines reverse reciprocity as: “If you will sell your firm’s products to me, my firm will sell our products to you,” and points out that, “Whereas traditional reciprocity is seller oriented, reverse reciprocity is buyer oriented” (op.cit., p.12). The results of this empirical study showed that this practice had in fact been used by a considerable number of small- and medium-sized firms during the 1973-74 period of scarcity in the U.S.

2.3.1.7 Post Purchase Evaluation

Post-purchase evaluation is related to the feedback of information concerning how well the purchased product and/or service has solved the problem and how the selected vendor has performed.

Few studies were found which particularly focused on this stage of the buying process. An example is given by Burger and Cann’s (1995) article which addresses the need of focusing on post-purchase strategy as a key to successful industrial marketing and customer satisfaction in the purchase of higher technology industrial goods and services. The authors argue that after the purchase, the customer must learn to use it and integrate it into the organization, and that use/integration is a process consisting of several steps, which depend on two major factors:

1. the organization culture/leadership style of the buyer, and
2. the post-purchase marketing plan of the seller.

The proposed “Use integration/satisfaction process” is (see Figure 9):
Furthermore, they stress the need to use post-purchase marketing strategies to increase customer satisfaction, in connection to the different steps identified in the former process. Examples include the need for the seller to assist and help the buyer in designing the changes needed in the physical plant to accommodate the new technology (Physical requirements); in locating the "right" people to work with the new technology (New hires/fires); etc.

We have, at this point, concluded this study's review of literature concerning the buying process. We initiated it by presenting some illustrative models of the buying process. Thereafter, a number of selected studies addressing the "key buying process stages" (Wind and Thomas, 1980, p.242) were reviewed.

2.3.1.8 Evolved Patterns from Reviewed Literature on the Buying Process

To summarize the section of the overview of literature concerning the buying process as a major determinant of IBB, we present a table (Table 8) with the studies reviewed and the corresponding focus of the study regarding the different aspects, as proposed by Wind and Thomas, 1980.
Table 8: Summary of Studies Focusing on the Buying Process of IBB

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<tr>
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<td>Banville and Dornoff</td>
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<td>Kelly</td>
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<td>Grönhaug</td>
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<td>Bird</td>
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<td>Grönhaug</td>
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<td>Dempsey</td>
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<td>Wind</td>
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<td>Crow, Olshavsky and Summers</td>
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<td>Crow and Lindqvist</td>
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<td>Kennedy</td>
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<td>Woodside and Vyas</td>
<td>1983</td>
<td>X</td>
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<tr>
<td>Naumann, Lincoln and McWilliams</td>
<td>1984</td>
<td>X</td>
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<td>Nielsen</td>
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<td>Burger and Cann</td>
<td>1995</td>
<td>X</td>
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It can be observed from the above table that the work published by Robinson et al. (1967) led to a proliferation of studies on the buying
process. The majority of this research focused on the overall nature rather than within any of the specific stages of the process. Moreover, the interest of scholars in the investigation of the buying process has apparently been maintained throughout the past three decades, with studies continuously being published. This fact is also ascertained in Johnston and Lewis’s (1996) analysis on past OBB research where the consistency of studies published which address the buying process as an investigation topic within OBB can be noted.

Regarding the studies focusing on the overall nature of the buying process it can be noticed that the proposed conceptualization of the buying process as a sequence of steps, stages, and/or phases provided by Robinson et al. Framework (1967), is adopted by many scholars in the field (e.g. Wind, 1978; Bellizi, 1981; Woodside and Vyas, 1983; Burger and Cann, 1995). However, this conceptualization is not without critics, e.g. the questioning of the sequential nature of the stages (Webster and Wind, 1972a). Examples of empirical studies which involve detailed flow charted descriptions of the buying processes are provided by e.g. Kennedy (1983), and Woodside and Vyas (1983).

Research conducted which focuses solely on the initiation of the buying process (need recognition) has proven to be scarce, e.g. Grönhaug (1977). Regarding search for alternative vendors the review conducted shows us that it is influenced by the perceived product performance risk, time pressure, and ability in information handling, as referred by Grönhaug (1975a). These findings are also partially substantiated in the recent study by Weiss and Heide (1993). Concerning the attributes sought, both economic and non-economic factors were shown to influence the source selection decision (Banville and Dornoff, 1973). Source loyalty is also an aspect, which needs to be understood in this process, with organizational variables as the major determinants of this loyalty (Wind, 1970). Regardless of the how extensive the search and qualification is conducted the quotation selection process culminates with a particular set of potential vendors presenting their bidding.

Concerning the studies which focus on set purchase and usage criteria, the dimension of perceived risk (Håkansson and Wootz, 1975; Möller and Pesonen, 1981) and the buying task were found to influence the decision.

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attributes for vendor selection (Dempsey, 1978). In regard to the relative importance of different attributes (evaluation of alternative buying actions) the studies reviewed show that delivery capability, quality, and technical assistance performance were highly rated (e.g. Möller and Pesonen, 1981; Crow and Lindqvist, 1982).

In respect to research conducted focusing on purchase decisions and post-purchase evaluation, the conducted review has shown that not many studies address these as sole topics of investigation. Examples were provided by Pettigrew (1975) and Hillier’s (1975) studies, which have emphasized on the relevancy of information and communication for an individual within an organization in terms of a decision.

To finalize, it can be remarked that the buying process is a major area of investigation within the OBB field. Much of the research carried out recently is still based on the conceptual framework by Robinson et al. (1967) proposed three decades ago. The description of the buying process as a sequential number of stages has an inherent intuitive appeal, and the fact that a number of overlaps and parallelism may occur between the proposed eight buyphases does not diminishes the applicability of this tool in OBB research.

2.3.1.9 Formulation of Research Question and Selection of Areas for Characterization of the Buying Process

The former overview of literature which focuses on the buying process as a major component of IBB provides evidence on the need to study the activities which take place during industrial buying as a stepwise decision process. Our research problem was formulated as:

How can the industrial buying behavior of the Swedish and Polish metal mining companies be characterized concerning the purchase of capital equipment for mining production (CEMP)

Hence, when characterizing IBB, one of it’s fundamental aspects is the understanding of the industrial buying process, consequently, the following research question is put forward:

How can the buying process of CEMP in Swedish and Polish metal mining companies be characterized?
The industrial buying process, also referred as the industrial buying decision process, will be based on the conceptualization provided by Robinson, Faris and Wind (1967) in their Buygrid framework.

The application of this model provides a conceptualization of a standard buying decision process and is therefore selected to deal with the research question, which concerns the industrial buying process. Furthermore:

- the model has since its introduction gained much support from other researchers (validation) and is one of the most (if not the single most) quoted model in IBB (e.g. Crow, Olshavsky and Summers, 1980; Bellizi, 1981; Johnston and Spekman, 1982; Mattsson, 1988)

- the concept of buyphases is due to its purely descriptive character easy to operationalize

2.3.2 The Buying Center

The Buying Center concept, as it is presently most often referred as, was first introduced by Webster and Wind (1972b). The buying center encompasses “all those individuals and groups who participate in the purchasing decision-making process, who share some common goals and the risk arising from the decisions” (op.cit., p.6). A rather similar definition of the buying center and the buying influence was given by Robinson, Faris and Wind (1967, p.101) as, “The individuals who are related directly to the purchasing process, whether users, buying influences, decision makers, or actual purchasers are members of what can be termed a ‘buying center’”. Furthermore, “A buying influence is anyone who becomes involved, directly or indirectly, in the problem-solving or decision making activities which constitute the procurement process” (op.cit., p.122). Spekman and Stern (1979) define membership in the buying group as, “a purposive involvement in the procurement process” (op.cit., p.56) where purposive involvement is defined as “organization members who perceive themselves to be active in a particular buying group” (Ibid). The same authors also give the following description of the buying center: “Thus, the buying group construct defines an informal, cross-departmental decision unit in which the primary objective is the acquisition, importation, and processing of relevant purchasing-related information” (Ibid).

It is, however, generally recognized that the first study to emphasize the multipersonal involvement in the industrial buying is Cyert, Simon and Trow (1956). The earlier works generally focused only on the purchaser as
the person carrying out the industrial purchasing. A very early study mentioned by Harding (1966) gives an example of this view and as a matter of fact with an example from the same line of industry focused in our study: “In mining firms a materials man selects, purchases, receives and delivers all articles required” (Charles Babbage, “On the Economy of Machinery and Manufacturing”, 1842) (as quoted by Harding, 1966, p.76). Since the introduction of the concept numerous studies have considered different aspects of the buying center.

In this section, the review will contain three different aspects, as proposed by Wind and Thomas (1980), see Figure 10:

2.3.2.1 Identifying the Composition of the Buying Center

The composition of the buying center, including its conceptual definition, empirical findings concerning size, hierarchical levels represented, functional areas involved etc. has been a general area of research in OBB: “The general findings on the composition of the buying center suggest that it varies by organization and even within a given organization, by buying situation and other idiosyncratic characteristics” (Wind and Thomas, 1980, p.242).

Cyert, Simon and Trow (1956) was, as previously mentioned, the first study to emphasize the multiperson involvement in the information search and decision process in connection with organizational buying.

An early report of the importance of other levels than top management and other departments than the purchasing department is given by Harding (1966) who emphasizes the importance of middle management in the
purchase process, as compared to top management and the purchasing department.

Robinson, Faris and Wind (1967) are, as noted previously, the first study to use and define the concept of the buying center: "The individuals who are related directly to the purchasing process, whether users, buying influences, decision makers, or actual purchasers are members of what can be termed a 'buying center'" (op.cit., p.101).

This definition is somewhat different from the one that Webster and Wind (1972b) proposed for the buying center as "all those individuals and groups who participate in the purchasing decision-making process, who share some common goals and the risk arising from the decisions" (op.cit., p.6). The latter is also the definition most often used by scholars in IBB (e.g. Lilien and Wong, 1984; Mattson, 1988).

Many studies have reported findings concerning how the size of the buying center is affected by other factors. Kelly (1974) did not find buying center size to be significantly affected by company size. However, he found that there was a clear tendency that the more people involved in the purchase, the longer it took between the recognition of the need and actual purchase. The user of the purchased equipment was less involved than anticipated (2 of 18 purchases). A low involvement of the purchasing department (4 of 18 purchases) was also noted.

Also Patchen (1974) reports on the size of the buying center and found that an average of 15.0 persons were mentioned by respondents as having been involved in the purchase decision process. The variation in participants was more related to importance of the decision than to the specific company. In 24 decisions rated as of "moderate or major importance" an average of 19.8 persons were reported as involved while in 13 "more minor" decisions the average of participants was reported as 7.9 persons. Conservative estimations of the number of people having an important part in the decision indicated an average of 4.8 which clearly shows that the decisions were made by a group of people and not by just one or two persons.

The size of the buying center is also focused by Grönhaug (1975b) who, in his study of specialty stores, found that the size of the buying center was affected by perceived product importance, degree of routinization of purchase, and resources available to carry out the purchase.

A new structural conceptualization of the buying center and its influences is made by Hillier (1975). He uses an "atomic" model to describe the
Decision Unit as the core with a primary shell consisting of a Control Unit, and a secondary shell representing an Internal Information Unit. Finally, a third shell represents an External Information Unit.

Wind (1978) reports findings from an empirical study including 171 manufacturing firms concerning the boundaries of organizational buying centers in the purchase of a scientific and technical information system. Two of the three research questions concerned the composition of the buying center: (1) who is involved in decisions regarding the purchase?, and (2) does the composition of the buying center vary by size of the firm? The third research question concerned the roles in the buying center but since he uses role as an equivalent to position, this is also a matter of participation (i.e. composition of the buying center). One of the research questions deals partly with influence and will be discussed later in this review. Findings concerning the composition of the buying center are:

- the multiperson nature of the purchasing decision was clearly evident
- the data suggests that in many cases the responsibility for the buying decision is shared among two or more positions, that is increasing the complexity of the process
- a low involvement by the research librarian and a high involvement of the purchasing agent
- significant differences were found due to company size. As the size of the organization increases from small (0-99 employees) to medium sized or large (100-999 and over 1000 employees respectively), the responsibility for the purchasing decision shifts down in the organization

Other authors, such as Doyle, Woodside and Mitchell (1979) studied, among other variables, buying center size and composition of the buying center in their study of a cross section of British industrial supplying firms operating in new-task and rebuy situations. The sizes of their customers’ buying centers were found to be smaller in the straight rebuy situation (2-3 members) compared to new-task and modified rebuy situations (3-6 members). The composition of the buying centers fluctuated during buying phases in all three buying situations. The purchasing agent was reported to be the person who was member in nearly all buying phases for most straight rebuy situations. In modified rebuy and new task situations, the presence of the purchasing agent was reported to be less dominant (three of seven cases) and he was only involved in one of these seven cases when the final decision was made. Board members were present as members in the buying center in four of the seven modified rebuy and new task situations.
Spekman and Stern (1979) employed a micro-sociological approach from organizational theory to investigate the effects of environmental uncertainty on the structure of the buying center. In this paper, Spekman and Stern also provide a definition of membership in the buying group as “a purposive involvement in the procurement process” (op.cit.,p.56). Purposive involvement is defined as “organization members who perceive themselves to be active in a particular buying group” (Ibid). This definition differs from those given by Robinson, Faris and Wind (1967) and Webster and Wind (1972b) in that the buying center members shall themselves perceive their active membership.

The dimensions of the buying center structure employed by the authors were: centralization, participation in decision-making, rules and procedures, and division of labor. The expected results that low environmental uncertainty would result in a bureaucratized structure and high environmental uncertainty would favor a less bureaucratized structure were confirmed by the dimensions ”division of labor” and “participation in decision-making.” However, they could not be found in the other two dimensions with statistical significance. The results also positioned the composite profile of the 52 buying centers studied (representative of purchases of 21 different commodities) at the bureaucratic end of the structural continuum. Finally a statistically significant positive relationship between the influence of the purchasing agent and the environmental uncertainty was found.

Johnston and Bonoma (1981) report on a study of 62 purchases in 31 different organizations (services and capital equipment respectively). They hypothesized that five dimensions of the buying center could be specified and measured as follows:

- vertical involvement: the number of levels of the organizational hierarchy involved in communication and influence concerning the buying
- lateral involvement: the number of different departments and/or divisions involved in communication and influence concerning the buying
- extensivity: the total number of individuals involved in the buying communication network.
- connectedness: the degree to which the members of the buying center are linked with each other by direct communication
- centrality: the centrality of the purchasing manager in the buying communication network
Their results concerning the buying center dimensions showed that differences existed between the purchase of capital equipment and services in the following way:

- **vertical involvement:**
  significantly greater depth (more organizational levels involved) for capital equipment
- **lateral involvement:**
  generally fewer departments involved in service purchase
- **extensivity:**
  significantly more extensive for capital equipment
- **connectedness:**
  a tendency towards higher connectedness in the purchase of services

Other authors, Crow and Lindquist (1982) investigated the effect of type of purchase decision, as well as firm and buyer characteristics, on the size of the buying center. As they say, the size of the buying center increases from modified rebuy (average 2.02 persons) to new task (average 2.37 persons) as an effect of the more complex task. Two firm characteristics (size and main function of the firm) were found to have significant influence on the size of the buying center in the modified rebuy situation. When the number of employees increases, buying center size increases, and non-profit organizations have larger buying centers than for-profit organizations. The same pattern could be observed in the new task situation, but here the results were not statistically significant.

Concerning influence of buyer characteristics on the size of the buying center the only significant factor found was that of the education of the buyer in the modified rebuy situation. Low levels of education (high school) and high level of education (graduate school) increased the size of the buying center compared to intermediate levels of education. In the new task situation, although the results were not clearly statistically significant, the buying center generally increased its size compared to the modified rebuy when considering the same levels of education. In the new task, the size of the buying center also showed a general increase with higher levels of education.

During the same year, Moriarty and Bateson (1982) report results concerning the buying center's (decision making unit, DMU) size and involvement of different functional and organizational levels. Their study's purpose was to compare the effects of single stage versus exhaustive
snowballing on the result of the identified DMU. The reported size of the buying center in small, medium, and large companies is reported to be on average 3.5 members when applying single stage sampling. These numbers are then increasing to an average of 5.4, 5.9, and 7.3 members respectively when exhaustive snowball sampling is employed. The company size classification was made in the intervals of 100-249, 250-1000, and over 1000 employees. Concerning involvement of different functional areas a very low involvement of purchasing is reported only in 11 of the 319 DMUs. The dominant organizational levels involved in the DMUs are reported to be upper, top, and middle management, present in respectively 58.2, 51.8, and 41.0 percent of the DMUs.

Kennedy (1983) analyzed in her case study of the purchase of steel plate by a manufacturing company the buying group composition over each stage in the decision making process. What she states as one of the most significant conclusions of her case study is: “buying group membership appears to evolve during the procurement process and is a function of the information requirements and needs of a particular buying context” (op.cit.,p.55). She finds support for the findings of Doyle et al. (1979) that the buying group seems to be smaller in straight rebuy situations compared to modified rebuy and new task situations. Concerning the variation of the buying center composition she observes that: “At each stage, there is a buying center and the locus of responsibility varies from one stage to another” (Ibid).

Lilien and Wong (1984) used self-reports of involvement or non-involvement (no degree of involvement) in each of seven phases of the buying process concerning 16 product types in an exploratory study of the buying center in the metal working industry. They found that identifiable patterns of purchase process involvement do exist over a range of industrial products, that is a variation of the buying center composition. They also found a general trend in that when administrative duties were added as a secondary function in the job description, the level of involvement increased. They also observed that all 16-product categories showed the same general pattern of involvement over the decision phases for each job category.

Patton, Puto and King (1986) report the result of an experimental study and find support for the suggestion in other literature that the individual decision maker may have the prominent role in vendor selection decisions during a modified rebuy. They also found that size of the firm appears to influence the ratio of joint versus individual decisions. Large firms reported higher percentages of joint decisions and lower percentages of individual decisions when compared to smaller firms.
In the empirical testing of his model, Mattson (1988) found that the involvement of different hierarchical levels in the buying center differed due to the type of product, the importance of the product in relation to the mission of the company, the dollar value of the product, and the complexity of the product. Strict statistical significance is lacking in some cases, but the general pattern shows the involvement of successively higher management levels in the sequences: consumption products, other product essentials, core product essential, and capital equipment. The same pattern applies to the increase of dollar values and increase of complexity.

Other authors, Johnston and Page (1990) analyzed locus of influence (vertical and lateral involvement) and information processing in the buying center. The use of involvement as a measure of influence was discussed and concluded in the following way: “Thus, identification of buying center members on a participation basis seems to result in reliable information, while the use of perceived influence measures does not” (op.cit.,p.588). Vertical involvement was operationalized as the number of hierarchical levels involved (six standard levels were used), and lateral involvement as the number of departments and divisions engaged in the purchase decision. They found that vertical and lateral involvement (expressed as locus of influence) is affected by both organizational structure and purchase situation.

McWilliams, Nauman and Scott (1992) investigated the variance of buying center size with purchase situation and purchase phase. They found significant relationship between the size of the buying center and both purchase situation and purchase phase. Significant interaction was also found between purchase situation and purchase phase. The mean size of the buying centers was between 5.10 and 2.67.

A study by Henthorne, LaTour and Williams (1993) examined the role of informal members of the buying center and how they influenced the organizational buyers' performance-, social-, and economic-risk behavior. These informal members are both external and internal to the organizations and are shown to have a rather significant and different impact on the perceived risk.

In his study of two product cases with different technical complexity Möller (1993) reports on the buying group structure or complexity in terms of three dimensions: number of persons, levels, and functions. Concerning the more complex product (production equipment) a clear trend can be observed from higher numbers in new task, medium numbers in modified
rebuy to low numbers in straight rebuy (persons: 15.7 / 6.4 / 2.5; functions: 4.8 / 3.4 / 2.0; levels: 4.2 / 2.8 / 1.7). No observations were made concerning new task in the less complex product case (office supplies) but in the two remaining buying situations the same trend as in the complex case was seen (persons: 10.2 / 1.8; functions: 3.5 / 1.8; levels: 2.4 / 1.3). One contradiction to the expected trends was that there are clearly more persons involved in the modified rebuy of the less complex product. This is explained by the much larger “user group” of the less complex product (office supplies). The perceived level of transaction uncertainty was found to increase the complexity of the DMU in both cases.

2.3.2.2 Roles in the Buying Center

The identification of different roles played by the buying center members and studies of what functional area and/or hierarchical level perform these roles during different stages of the buying process has been due to its importance from a marketing perspective.

Almost four decades ago, Harding (1966) emphasized the importance of middle management in initiating the purchase, selecting a supplier “pool” and approving the final supplier.

Webster and Wind (1972b) in their model of organizational buying proposed five different roles performed by the buying center participants:

- **users** - actually use the purchased product
- **deciders** - select the vendor / supplier of the product
- **influencers** - add information or decision criteria to the decision process
- **buyers** - execute the contractual arrangements
- **gatekeepers** - control the flow of information into the buying center

Pettigrew (1975) studied the flow of information (communication entering and exiting the firm) during a purchase process. In doing so he observed the importance of individuals controlling the information flow (gatekeepers) which, by means of structuring it, heavily influenced the outcome of the purchase.

Grönhaug (1977) studied the purchases of minicomputers by organizations and distinguished between three different roles in the buying center: initiator, decider and other influencer. The following observations were noticed:
• in all but one case the buyer initiated the purchase
• in market organizations the initiator was found in the top level of the organization, whereas in non-market organizations "others" (i.e., users) where more common as initiators
• deciders were in 12 of 16 cases found at the top level. The four other cases came from non-market organizations
• concerning the group “other influencers”, broad discussions were found in 8 of 16 cases, six of these in non-market organizations
• interesting patterns could be observed concerning the sequence: initiator – “other influencer” - decider. In market organizations this pattern was “up-down-up” and in non-market organizations it was “down-all levels-top/team”

In their study of supplier organizations in new task and rebuy situations, Doyle, Woodside and Mitchell (1979) reported that for firms operating in straight rebuy situations, the major initiator in the customer firm was either the user or the purchasing agent (36 percent each) followed by supplier’s sales force (18 percent) and others (10 percent). For companies operating in modified rebuy and new task, the major initiator was the group “others” including marketing manager of supplier firm, suppliers of other products, and engineers of customer’s firms (41 percent), followed by suppliers’ sales force (23 percent), the user (22 percent), and purchasing agents (14 percent).

Bonoma (1982) pursued another aspect as he evaluated product purchase situations in order to identify where the major influence is located in the buying center (“Who really does the buying”, op.cit.,p.111). He based his approach mainly on psychological and emotional factors and sets up a procedure for analyzing buying decisions using four questions, the first being:
• who is in the buying center?

His findings concerning this question added the initiator of the process as a sixth role (Initiator) to the buying center as developed by Webster and Wind (1972b). The roles defined by Bonoma were thus the following:

• initiators
• deciders
• influencers
• purchasers
• gatekeepers
• users
Wind and Robertson (1982) suggest the concept of the linking pin role and reports results from a study of the "linking pin" role in a hospital buying center. The linking pin roles are played by persons exerting leadership in their own group and also have an effective membership in another unit. This linking pin role can be seen as an intra-organizational counterpart to the inter-organizational boundary role.

Another study by Eckles and Novotny (1984), investigated the perceived role (decider / influencer) of the purchaser in the purchases of 13 different product classes. They conclude that product class is a significant contributor in the identification of decider and influencer in the buying center.

A few years later, Mattson (1988) studies the management level of decisions (hierarchical level of decider) concerning different purchase needs (product categories), dollar value of purchase, and complexity of purchase. Although there is a lack of strict statistical significance in some cases, the general pattern clearly shows that the management level of decision is shifted towards top management in the sequences: consumption products, other product essentials, core product essential, capital equipment. This shift towards top management is also occurring with higher dollar values and higher complexity.

More recently, Möller (1993) compares two product cases of different complexities. Results show that there are essentially three groups of DMU participants: executors, determinators and gatekeeper. He describes the executors as those who carry through the processes, and are the execution specialists (i.e. act as "buyers"). The determinators are the potential and existing users, and also those who decide what to do. The gatekeeper role is found to be played by more or less all categories involved. However, the author also notes that normally, only the executors are perceived as gatekeepers by the selling organizations.

2.3.2.3 Influence in the Buying Center

The question of who is the most influential in the buying center (during certain stages in the buying process or totally) is of course a very central question from a marketing perspective. The research in this area has however been faced with considerable measurement problems, as can be noticed from the following review.

An early definition of influence was given by March (1955) in the following way: "that which induces behavior on the part of the individual
at time $t_1$ different from that which might be predicted on the basis of a knowledge of the individual organism at time $t_0$” (op.cit.,p.438). He also identifies three ways of measuring influence in an organization: attributed influence, opinion change, and influence attempts.

Strauss (1962) reports on an empirical study concerning the work behavior of purchasing agents. His findings show that the expected formal vertical work-flow co-exists with important lateral intraorganizational contacts, formal and informal, that can be seen as tactics used by the purchasing agent in order to influence the terms of the requisitions he receives. These tactics increase the ability of the purchasing agents to act and thereby also raise their own status.

The problem associated with using self-reports when measuring influence is mentioned by Harding (1966, p.78) who notes, “there is a great tendency for each person to exaggerate his role in a particular transaction”.

In his article, Blickstein (1971), collects and presents different views from sales management practitioners concerning the search for the Key Buying Influence (KBI) so-called “the sales version of Mr.Right” (op.cit.,p.51). The proliferation of buying influences, e.g. “Years ago the purchasing agent was the single dominant factor, but as factors become more complex, the influence broadened” (Ibid), and the need to get beyond the purchasing agents to reach the decision-makers in planning, design, and production is put forward. Understanding the company’s buying situation is paramount to accurately isolate the KBI: “The best bet is to go to purchasing personnel and find out exactly who’s in charge of buying for each part of the type of system or equipment you want to sell” (op.cit.,p.53).

This observation finds support in McMillan’s (1973) empirical study concerning the self-reported influence of the purchasing agent, the scientist, and the manager in the purchase of intermediate chemical products. The following was noted:

- all three investigated functions were involved in the selection of the vendor
- all three members perceive and actually have considerable influence and responsibility in the selection of the vendor
- all members of the buying center believe their importance to be greater than it appears to be
- all three members view the scientist as the most influential in the vendor selection

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One final finding from the study is that the salesman is not regarded as a very credible source of information.

Kelly (1974) investigated the purchase of an offset press in firms located in north-central USA: “In all 18 organizations, the individual evaluating the information was the one considered most important or influential in selecting the brand purchased” (op.cit.,p.428). He also found that this person regarded by the other buying center members as most influential was also regarded to be a sort of “resident expert” on the equipment in question.

In an attempt to understand “Who is influential and why?”, Patchen (1974) discusses the five bases of power originally distinguished by French and Raven (1959): reward, coercive, referent, legitimate and expert. Patchen concludes that, “there is no necessary implication that these are the only five types of power that could be distinguished” (op.cit.,p.198). His empirical study identifies the major characteristic of the “influential” as a person who will be affected to a large extent by the decision (have a stake in the decision). Two other important characteristics of persons regarded as influential in the buying decision are either persons characterized as experts, or persons who have a responsibility to make a choice or recommend a product. The author also notes disagreement among the informants concerning who had most influence on each decision.

Other authors, such as Cooley, Jackson and Ostrom (1978), concentrated their study of relative power (influence) on two basic stages in the buying process: product selection and supplier selection in modified rebuy situations. The influence distribution between the functions purchasing, production, and engineering, was studied and a fourth category for others was also included. Four hypotheses were tested and the results showed that significant differences in relative power between functions were found.

Purchasing was found to be most influential in supplier selection, while engineering was the most influential in product selection. All functions perceived themselves somewhat more influential in each case than others. Differences in power distribution were also found in product selection due to whether the firm produced for stock or customer orders. However, these differences were not detected for supplier selection. Finally, power perceptions differed due to the size of the firm (two groups, more or less than 1000 employees) with purchasing being perceived to be relatively more influential both in supplier and product selection in the smaller firms.
In the same year, Wind (1978) reports on the influence in purchasing decisions concerning scientific and technical information systems. His findings showed that the most influential person is reported to be the R&D manager. There are, however, a large number of phases where other functions are more influential, e.g. the controller (budget availability), and the purchasing manager (negotiations and supplier selection). In other cases other functions were found equally or almost as important as the R&D manager, e.g. the purchasing manager (supplier evaluation), and the R&D scientist (need recognition and search for alternatives).

Bellizi and Walter (1980) analyze the role of the purchasing agent from the perspective of his influence in different stages of the buying process. They find support for the belief that the purchasing agent exercises his major influence during search for and qualification of sources, gathering of relevant purchase information, and selection of order routine, whereas he has very little influence during performance feedback and evaluation.

Bellizi (1981) evaluated the impact of organization size on the influence of buying center participants in different stages of the buying process. Data was collected from 140 general construction companies. After a pilot study six occupational groups were selected: 1) presidents, vice presidents and owners; 2) company engineers; 3) architects and consulting engineers; 4) purchasing agents; 5) construction site superintendents; and 6) shop foremen and other building trade workers. Buying influence was defined as, “the formal or informal power of a person to affect others or outcomes in buying situations whether or not exerted consciously” (op.cit., p.138). The size of the firms were categorized according to their annual sales volume of construction: small < $999,999; medium $1,000,000 - $24,999,999; and large >$25,000,000. The results showed that there is a relationship between size of the firm and buying center influence. Group 1 shows a decreasing influence with increasing size of the firm. Groups 2, 3, 4 and 6 show increasing influence with increasing size of the firm. However, group 5 shows approximately the same influence in all three sizes of organizations. On average, groups 1, 2, 4 and 5 were more influential in the buying center than groups 3 and 6.

Bonoma (1982) outlines five types of power bases in organizations and also categorizes them according to whether their influence is positive (champion power) or negative (veto power). The bases of power are the same as originally distinguished by French and Raven (1959), but Bonoma uses attraction instead of referent and status instead of legitimate. When dealing with the question “Who are the powerful buyers?” he makes the following two remarks in the first few lines:
• "The powerful are often invisible, at least to vendor representatives"
• "Unfortunately, power does not correlate perfectly with organizational rank" (op.cit., p.114).

Further, Bonoma summarizes the five major power bases as follows in Figure 11.

<table>
<thead>
<tr>
<th>Type of Power</th>
<th>Champion</th>
<th>Veto</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reward:</strong></td>
<td>Ability to provide monetary, social, political, or psychological rewards to others for compliance</td>
<td></td>
</tr>
<tr>
<td><strong>Coercive:</strong></td>
<td>Ability to provide monetary or other punishments for noncompliance</td>
<td></td>
</tr>
<tr>
<td><strong>Attraction:</strong></td>
<td>Ability to elicit compliance from others because they like you</td>
<td></td>
</tr>
<tr>
<td><strong>Expert:</strong></td>
<td>Ability to elicit compliance because of technical expertise, either actual or reputed</td>
<td></td>
</tr>
<tr>
<td><strong>Status:</strong></td>
<td>Compliance-gaining derived from a legitimate position of power in a company</td>
<td></td>
</tr>
</tbody>
</table>

Figure 11: Power Bases in Buying Center.
(Bonoma, 1982, p.115)

He also notes that "Buying centers and individual managers usually display one dominant power based in purchasing decisions" (op.cit., p.115).

An often quoted paper concerning measurement of participation and influence in the buying process is Silk and Kalwani’s (1982). Their paper also includes a summary of eight studies: Weigand, 1966; McMillan, 1973; Grashoff and Thomas, 1976; Kelly, 1974; Grönhaug, 1977; Patchen, 1974; Choffray, 1977 and Spekman, 1977. The findings of the study concerning measurement of participation and influence in the buying process, can be summarized as follows:
measures of participation in the purchase decision, with a satisfactory reliability may be obtained by asking questions focusing on specific stages

measures of influence in the buying process have not yet been able to provide results of acceptable validity and reliability. Although their results discourage the use of “single questions or items” they do suggest that, “Steps to structure the informant’s task, such as asking for reports of events and interactions rather than for inference about social phenomena, are likely to reduce measurement error” (Silk and Kalwani, 1982, pp.179-180)

the assessment of purchase participation and influence should be obtained from more than one informant

Also, Bellizi and McVey (1983) studied the influence of buying center participants in different buying situations. The buying influence was operationalized as, “the formal or informal power of person to affect others or outcomes in buying situations whether or not exerted consciously” (op.cit.,pp.58-59). The buying situations studied included capital equipment, accessory equipment, major materials (commodities), and operating supplies. Their major finding is that “there is general nonsignificance of the buyclass variable at least as a predictor of industrial buying influence” (op.cit.,p.61).

Morris and Freedman (1984) discuss a special type of influence formation or tactic to change the power distribution in the buying center. “Coalitions formation becomes a means for redressing power inequalities and enhancing one’s influence in product and vendor selection” (op.cit.,p.127).

Other authors, such as Naumann, Lincoln and McWilliams (1984) investigated the perceived relative influence of different functional areas in different purchase situations and different purchase phases. They found the following trend characteristics: purchasing and production increased and research and development and engineering decreased their relative influence when going from new buy, to modified, to straight rebuy situations. Concerning influence in different purchase phases, they found a general trend indicating that the relative influence of purchasing increased whereas the relative influence of production, research and development, marketing, and engineering decreased when going from the earlier to the later of the four phases.

Thomas (1984) reports on findings from a study concerning bases of power that influence the interpersonal influence process in a new task buying situation. Three of the five bases of power identified and defined by French
and Raven (1959), Legitimate-, Referent- and Expert-Power, are operationalized and assessed for three “key buying center participants”: Librarian, Scientist, and Manager, for the purchase of a new scientific and technical information service. The following observations were reported:

1. “Even though expertise is the most important base of power across all three positions, it is more important among managers (.55) than among scientists (.50) and librarians (.45).
2. Authority as a base of power is relatively important to librarians (.26) and managers (.24) than to scientists (.20).
3. Referent stature as a base of power is relatively more important to scientists (.21) than to librarians (.16) and managers (.15).
4. Departmental membership is relatively more important to librarians (.13) than to scientists (.09) and managers (.06)” (Thomas, 1984, p.212).

The author notes that expertise is a more important base of power than legitimate authority. This fact has also been reported by Patchen (1974).

Another study by Crow and Lindquist (1985) investigated the perceived self-influence of the organizational buyer upon the purchase decision in new task and modified rebuy situations as functions of selected firm and buyer characteristics. In the modified rebuy situation, only education appeared as a significant characteristic of the buyers perceived influence. In the new task situation, no statistical significance was found between buyer characteristics and perceived influence. Number of employees and firm’s function (manufacturing, service for profit, nonprofit) showed statistical significance as characteristics for the perceived influence in modified rebuy situation. No statistical significance was found between chosen firm characteristics and perceived influence of the buyer in new task situation.

The results of a field investigation of 251 organizational purchase decisions performed by Kohli (1989) suggests that expert power followed by reinforcement power (defined as the ability to mediate positive, reward power, and negative reinforcements, coercive power) are the most important influence determinants. The author developed the following conceptual framework (Figure 12):
The study takes into account individual behavior as well as buying center and situational variables to explain more completely the variations in a participant’s influence. Besides the bases of power originally discussed by French and Raven (1959), (reward, coercive, referent, legitimate, and expert power), this study includes two additional bases of power modeled as determinants of interpersonal influence: Information Power, which reflects the “gatekeeping” ability of an individual; and Departmental Power, defined as the relative importance of a department to an organization in general, thus suggesting that an individual’s influence is related to the power of the corresponding department in the organization.

The study finds that the effectiveness of individual power bases varies with buying center size, viscosity, time pressure, and the strength of accompanying influence attempts. “More specifically, the findings suggest that individuals who primarily have expert power tend to exert greater influence in committees that are large, viscid, and not under time pressure and when they do not make very strong influence attempts” (op.cit.,p.61).

Figure 12: Determinants of Manifest Influence
(Kohli, 1989, p.52)
On the other hand, "individuals who primarily have reinforcement power tend to exert greater influence in committees that are small, not very viscid, and under time pressure and when they make strong influence attempts" (Ibid).

Other authors, Ronchetto, Hutt, and Reingen (1989) apply a structural perspective to the study of influence and assert that "organizational actors derive influence from the position they occupy within the buying system" (op.cit., p.51). The authors adopt the "buying system" as the unit of analysis, meaning that they examine "the streams of behavior that characterize ongoing organizational buying activities in the firm" (Ibid). This as opposed to other authors, who focus on the buying center as the unit of analysis. By investigating a 171-member organizational network, it is shown that an organizational actor's influence in the buying system is derived from the formal as well as the network structures.

Corfman (1991) discusses the formation of individuals' perception and his/her reporting of relative influence in a group and proposes a model to explain sources of errors in perceptions and reports of relative influence. His empirical study is based on spouses, but the discussion is also regarded as appropriate for groups such as buying centers. The conclusions confirm the findings of Silk and Kalwani (1982) concerning specific measures as a tool to increase reliability in reporting. The proposed model can be summarized as follows: Actual influence is influenced by Joint Choice Process, Memory, Inferential Ability and Perceptual Bias before the Perceptions of Relative Influence is formed. Perceptions of Relative Influence is then influenced by Reporting Bias before the Self Reports on Relative Influence can be achieved. The Specificity of the Measure will influence the Inferential Ability, the Perceptual Bias and the Reporting Bias.

In his study concerning two product cases with different complexities, Möller (1993) found that when the complexity of the buying task increased, "experts" gain more influence. He refers to this as "a specialist strategy, i.e. the buying activities and problems connected to more complex products become so complex and time-consuming that they, to a large extent, must be taken care of by experts, in this case the executor category 'production engineering'" (op.cit., p.208).

More recently, Venkatesh, Kohli and Zaltman (1995) focus on the influence strategies used by managers in buying centers. They develop a conceptual framework where they categorize six prominent influence strategies on the basis of three key dimensions:
1. Coercive intensity, defined as, “the extent to which a target of an influence attempt feels that not complying with the wishes of the source will lead to adverse consequences for him or her” (op.cit., p. 72);
2. Task orientation, defined as, “the extent to which a source’s message focuses on task-oriented appeals” (Ibid); and
3. Instrumentality, defined as, “the extent to which an influence strategy relies on a source’s ability to meet out rewards or punishments” (Ibid).

The six influence strategies are requests, information exchange, recommendations, promises, threats, and legalistic pleas. The authors propose the following structure (Table 9):

<table>
<thead>
<tr>
<th>Influence Strategy</th>
<th>Coercive Intensity</th>
<th>Task Orientation</th>
<th>Instrumentality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non coercive</td>
<td>Soft coercive</td>
<td>Hard coercive</td>
</tr>
<tr>
<td>Requests</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information exchange</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendations</td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Promises</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Threats</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>Legalistic pleas</td>
<td></td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>

Source: Venkatesh, Kohli and Zaltman (1995, p. 72)

The authors then argue that the choice of a particular influence strategy is related to two sets of characteristics: source and target. In the source characteristics are included the six types of power defined by French and Raven (1959) and Raven (1965): referent power, information power, expert power, reward power, coercive power, and legitimate power. In the target characteristics are included three related variables:

- viscosity, i.e. “the extent to which members of a DMU work together as a team as opposed to being fragmented and hostile to each other” (Venkatesh, Kohli and Zaltman, 1995, p. 74)
- familiarity, i.e. “the extent to which members of a DMU know each other” (Ibid); and
- size, i.e. “the number of persons composing the DMU” (Ibid)
A number of relationships are then hypothesized between the characteristics and the use of any of the six influence strategies. The following Table 10 is presented:

Table 10: Hypothesized Relationships Amongst Source and Target Characteristics and Use of Influence Strategies

<table>
<thead>
<tr>
<th>Antecedents</th>
<th>Noncoercive strategies</th>
<th>Soft coercive strategies</th>
<th>Hard coercive strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Requests</td>
<td>Information Exchange</td>
<td>Recommendations</td>
</tr>
<tr>
<td>Source</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referent power</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Information power</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Expert power</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reward power</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coercive power</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Legitimate power</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Target</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscidity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Familiarity</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Venkatesh, Kohli and Zaltman (1995, p.74)

Based on the responses obtained from 187 purchasing agents through a mail survey, data was analyzed concerning three topics: (1) the pervasiveness of the six types of influence strategies, (2) the antecedents of the influence strategies, and (3) the effectiveness of the influence strategies. The results obtained showed that:

1. Noncoercive strategies and recommendations (a soft coercive strategy) are the most frequent used strategies, specially in intra-organizational contexts. The authors also notice that promises are used more between firms (inter-organizational contexts) that within the firm (intra-organizational context).

2. Source characteristics were found to shape the choice of the influence strategy more strongly than target characteristics: “People make greater use of influence strategies that correspond to their particular bases of power, with the exception of requests, which are used more widely without much regard to whether or not the person possesses referent power” (op.cit.,p.79).
3. The recommendation strategy was found more effective than other influence strategies: "DMU members who habitually try to influence others by using the recommendation strategy are likely to exert more influence than those using other influence strategies" (Ibid).

We have, at this point, concluded this study's review of literature concerning the buying center. We initiated it by presenting the buying center concept and thereafter reviewed studies which focused on the aspects as proposed by Wind and Thomas (1980): the composition, the roles, and the influence in the buying center.

2.3.2.4 Evolved Patterns from Reviewed Literature on the Buying Center

To summarize this section concerning the buying center as a major component of IBB we present a summary table with the total studies reviewed (Table 11).

It can be observed in Table 11 that the interest for the conceptual area and the three related aspects of the buying center (composition, roles, and influence) has been maintained throughout the last three decades. This fact is also ascertained in Johnston and Lewis's (1996) analysis of past OBB research where it can be noted the consistency of studies published which address the buying center as an investigation topic within OBB.
Table 11: Summary of Studies Focusing on the Buying Center in IBB.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Composition</th>
<th>Roles</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>March</td>
<td>1955</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Cyert, Simon, and Trow</td>
<td>1956</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strauss</td>
<td>1962</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harding</td>
<td>1966</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Robinson, Faris and Wind</td>
<td>1967</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blickstein</td>
<td>1971</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Webster and Wind</td>
<td>1972a</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>McMillan</td>
<td>1973</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelly</td>
<td>1974</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Pachtchen</td>
<td>1974</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gronhaug</td>
<td>1975b</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hillier</td>
<td>1975</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pettigrew</td>
<td>1975</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gronhaug</td>
<td>1977</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooley, Jackson and Ostrom</td>
<td>1978</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Wind</td>
<td>1978</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Doyle, Woodside and Mitchell</td>
<td>1979</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speckman and Stern</td>
<td>1979</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bellizi and Walter</td>
<td>1980</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bellizi</td>
<td>1981</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnston and Bonoma</td>
<td>1981</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bonoma</td>
<td>1982</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Crow and Lindqvist</td>
<td>1982</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Moriarty and Bateson</td>
<td>1982</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silk and Kalwani</td>
<td>1982</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind and Robertson</td>
<td>1982</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bellizi and McVey</td>
<td>1983</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kennedy</td>
<td>1983</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eckles and Novotny</td>
<td>1984</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lilien and Wong</td>
<td>1984</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morris and Freedman</td>
<td>1984</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naumann, Lincoln and McWilliams</td>
<td>1984</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thomas</td>
<td>1984</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crow and Lindqvist</td>
<td>1985</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patton, Puto and King</td>
<td>1986</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mattson</td>
<td>1988</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Kohli</td>
<td>1989</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ronchetto, Hutt and Reingen</td>
<td>1989</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johnston and Page</td>
<td>1990</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corfman</td>
<td>1991</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McWilliams, Naumann and Scott</td>
<td>1992</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Henthorne, LaTour and Williams</td>
<td>1993</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Möller</td>
<td>1993</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Venkatesh, Kohli and Zaltman</td>
<td>1995</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We have chronologically presented a total of 22 studies published over a period of 38 years that have considered *compositional aspects* of the buying center. The research reported in these studies has focused on addressing one or more of the following four areas:

1. Definition of the buying center.
2. Size of the buying center and influences on the size due to differences in other factors.
3. Vertical and lateral dimensions of the buying center as influenced by differences in other factors.
4. Degree of involvement/participation of different functions.

The multi-person involvement in most industrial buying activities is given strong support by these studies. Single-person buying centers (autonomous decision making) can however occur in less complicated buying situations of routinized character.

The general findings concerning size, vertical and lateral involvement is that these dimensions increase with:

- the increased complexity of the product
- the value of the product
- the importance of the product
- the newness of the buying situation (or complexity of the task)
- the complexity of the organizational structure
- the size of the organization (no significant increase due to this factor is also reported), and
- the time period between initiation and actual purchase

The degree of involvement or participation in the buying center is reported to vary during the buying process. That is, not all members are participating at each stage in the process. It is, however, difficult from a conceptual view point to accept the finding reported by Kennedy (1983, p.55) that "At each stage, there is a buying center...", since the buying center is defined as including all individuals involved during all stages of the process.

One area showing contradictory results is the involvement of the purchasing agent. Both high and very low degrees of participation are reported.

Concerning the *roles* within the buying center, the research presented above falls mainly into three different categories:
1. Definition of the roles in the buying center.
2. Identification of the functions occupying these roles under different situations.
3. Importance of these roles from a marketing perspective.

The roles first described by Webster and Wind (1972) included:

- deciders
- influencers
- buyers / purchasers
- gatekeepers
- users

These roles were later complemented by Bonoma (1982) with the role of the
- initiators

The above conceptualization has gained major acceptance by other scholars.

Product class and also dollar value have been reported (Mattson, 1988) as important factors concerning functional and hierarchical position of deciders and influencers. The role of the initiator has often been occupied by the function also occupying the role of the user or by the purchasing agent.

Major implications from a marketing perspective are given to the role of the gatekeeper due to his/her ability to control the flow of information and thereby influencing the material the decisions are based upon.

In respect to influence in the buying center, the problem connected with measuring influence has been an obstacle reported by numerous studies over the past three decades. However, the results of Silk and Kalwani's (1982) study that validity and reliability of measuring influence can be improved by "Steps to structure the informant's task...". This has been confirmed by Corfman (1991), and thereby a direction to improve future studies have been provided.

There is a strong support in the reviewed studies indicating that the buying center participant seen as the "expert" by the other members often has a major influence (e.g. Thomas, 1984). Another participant, noted by Patchen (1974) with a high degree of influence is the participant with the major
stake in the purchase, i.e. the participant that will have the major responsibility for the operation of the purchased product. It should be remarked that these two influential participants can be the same person, since the one with the major knowledge about a certain product, the "expert", might be the one who also has a major responsibility for its operation after the purchase. Regarding supplier evaluation (qualification of suppliers) and supplier selection, the purchasing agent is generally found to exert a major influence.

2.3.2.5 Formulation of Research Question and Selection of Areas for Characterization of the Buying Center

The former sections have provided evidence on the importance and relevance of studying the group of individuals within the buying organization involved in purchasing. This study’s research problem is:

How can the industrial buying behavior of the Swedish and Polish metal mining companies be characterized concerning the purchase of capital equipment for mining production (CEMP)

Thus, when characterizing the industrial buying behavior, one of it's fundamental aspects is the understanding of the buying center. We can thus formulate the following research question:

How can the buying center of the Swedish and Polish metal mining companies be characterized when purchasing CEMP?

Johnston and Bonoma (1981), provided a detailed review of buying center studies and also developed an approach for studying buying center structures and interaction patterns (composition). In connection with this study the authors also tested it empirically (including capital equipment purchases). The approach developed and tested in these studies has later been used both in conceptual discussions (Möller, 1993) and in developing and testing new approaches to the study of buying centers (Johnston and Page, 1990; Salehi-Sangari, 1990). We will therefore select this approach in our study due to its recognition, and the fact that it has been tested in research concerning capital equipment, which is in the focus of this study.

The variables or dimensions used by Johnston and Bonoma (1981) are as follows:
• vertical involvement: the number of levels of the organization's authority hierarchy exerting influence and communication within the buying center
• lateral involvement: the number of different departments and divisions involved in the buying center
• extensivity: the total number of individuals involved in the buying process
• connectedness: the degree to which the members of the buying center are linked to each other by directly communications concerning the purchase
• centrality: How central the purchasing manager is in the communication network

Regarding the dimension of lateral involvement, an extension of the concept as it was proposed by Johnston and Bonoma (1981) will be considered. Studies that have investigated Polish companies have indicated that the concept of the buying center is broader and that in many cases decisions may be strongly influence or even dependent on opinions of persons outside the company (Domanski and Guzek, 1992). Banting, Beracs and Gross (1991) have studied the buying process in capitalist and socialist countries and have also verified that persons with a certain functional responsibilities, inside or outside the company, may be involved in the purchasing process. Hence, we will not adopt Johnston and Bonoma's (1981) lateral involvement but rather a function / departmental involvement which is defined as follows:

• function/departmental involvement: the total number of different functions, departments and divisions involved in the buying process

In view of our research question, a theoretical frame selected concerning roles in the buying center is Bonoma's (1982) approach. A delimitation is made, however, as we will restrict our study to the identification of the participants of the buying center and to the assessment of the most influential parties. We will therefore use the following role concepts in the buying center:

• initiator: initiating the buying process
• decider: makes the (formal) decision (yes or no) concerning vendor and product
• influencers: all those who "have a say" concerning the purchase
• purchaser: obtains the product
• gatekeeper: controls information (and might even control vendors access) to decision makers
• users: the actual user (consumer) of the product

These actors (roles) in the buying center have been used by many researchers and are also, with the exception of the initiator, the same as those identified by Webster and Wind (1972b).

Concerning influence in the buying center, there seems to be a substantial consensus in the literature about the problem of measuring influence in the buying center. Due to the exploratory nature of our study, we will not attempt to directly measure influence. Our approach is therefore to use involvement as a substitute for influence (cf. Johnston and Page, 1990, p.590). This is however not to say that there is no difference between influence and involvement (cf. Mattson and Salehi-Sangari, 1993, p.20). Thus, we will basically use involvement as a measurement tool for influence. Additionally, when possible, positions of the buying center before entering the decision process will also be considered. Moreover, outcome of decisions will also be used to interpret the influence of members or coalitions in the buying center. This view is in accordance with the definition of influence given by March (1955, p.438), “as that which induces behavior on the part of the individual at time t₁ different from that which might be predicted on the basis of a knowledge of the individual organism at time t₀”.
2.3.3 Factors Affecting the Buying Process and the Buying Center

In the following section a review of studies, which can be categorized as belonging to the third major determinant of OBB, namely the factors that affect the buying process (BP) and buying center (BC), are presented (Figure 13).

2.3.3 FACTORS AFFECTING BP & BC

- 2.3.3.1 Buying Situation
- 2.3.3.2 Personal
- 2.3.3.3 Interpersonal
- 2.3.3.4 Organizational
- 2.3.3.5 Inter-organizational
- 2.3.3.6 Environmental

Figure 13: Factors Affecting the Buying Center and Process
(Received and Thomas, 1980)

As proposed by Wind and Thomas (1980), the third area where much of the literature related to “partial approaches” in IBB can be included, concerns the factors which influence both the organizational buying center and buying process. That is, those factors which are found to explain and predict organizational buying behavior. These authors further subdivide these factors into two sets of factors: (1) the buying situation, and (2) the personal, interpersonal, organizational, inter-organizational, and environmental factors. In this section, we will address these sets of factors in a sequential way and present a selection of studies in a chronological manner.

2.3.3.1 The Buying Situation

Among the factors recognized as affecting the buying center and the buying process, factors relating to the specific buying situation have gained considerable attention. The buying situation factors often refer to the factors included in the BUYGRID conceptualization (Information requirements, Newness of the Problem, and Consideration of New Alternatives). However, other factors as indicators of buying situation have been proposed. Examples of such situational factors are time pressure, complexity, importance, and monetary value. In the following presentation,
we will include studies that address all the factors that are directly related to the purchasing situation, and thus influence it.

In the study by Robinson, Faris and Wind (1967), product type was found to provide little discrimination between different observed IBB. Therefore, these authors introduced the buying situation in their BUYGRID concept. The buying situations were characterized as New task, Modified Rebuy, and Straight Rebuy. The major factors that determined the incorporation in the correspondent buyclasses were newness of the problem, information requirements and consideration of new alternatives (Table 12).

<table>
<thead>
<tr>
<th>Type of Buying Situation</th>
<th>Newness of the Problem</th>
<th>Information Requirements</th>
<th>Consideration of New Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>High</td>
<td>Maximum</td>
<td>Important</td>
</tr>
<tr>
<td>Modified Rebuy</td>
<td>Medium</td>
<td>Moderate</td>
<td>Limited</td>
</tr>
<tr>
<td>Straight Rebuy</td>
<td>Low</td>
<td>Minimal</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: Robinson, Faris and Wind (1967, p.25)

Sheth (1973) assigns three product specific factors that might influence the buying center and process:

- time pressure
- perceived risk
- type of purchase

Sheth suggests that if the purchase is carried out under a great deal of time pressure, this might lead to a less complex buying behavior. Regarding perceived risk, according to Sheth, higher levels of perceived risk will increase the probability of a joint decision compared to an autonomous decision. Concerning type of purchase, Sheth includes two types of classifications: one being the buyclass and the other the product type (capital equipment, maintenance products, etc.)

Hillier (1975) suggested a categorization of industrial purchases based on the consumers’ viewpoint. The four major categories proposed were:
Håkansson and Wootz (1975) formulate a perceived risk model where purchasing behavior is a function of perceived risk, buying situation characteristics, decision-maker characteristics, and characteristics of the decision environment in the firm. The authors argue that the behavior of the purchaser will, to a certain extent, be standardized due to various factors. This will make the buying situation component central, and it can therefore be seen as a function of perceived risk. In their empirical study concerning supplier selection, they carry out an experiment involving 43 purchasers representing three of the largest mechanical firms in Sweden. Results regarding supplier selection showed that location was more important than size of the supplier company, especially in high-need uncertainty situations. Concerning bid selection, price was found more important in low-need uncertainty situations, and quality more important in high need uncertainty situations. An interesting methodological observation was that the quality dimension was emphasized in the oral opinions of the purchasers, but was not found in their average behavior in the experiments.

Kotler (1980) proposed a detailed classification of industrial goods (Figure 14):

<table>
<thead>
<tr>
<th>Goods entering product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm products</td>
</tr>
<tr>
<td>Natural products</td>
</tr>
<tr>
<td>Component material</td>
</tr>
<tr>
<td>Component parts</td>
</tr>
<tr>
<td>Capital items</td>
</tr>
<tr>
<td>Buildings, land rights</td>
</tr>
<tr>
<td>Fixed equipment</td>
</tr>
<tr>
<td>Portable, light factory equipment</td>
</tr>
<tr>
<td>Office equipment</td>
</tr>
<tr>
<td>Transportation equipment</td>
</tr>
<tr>
<td>Goods not entering product</td>
</tr>
<tr>
<td>Operating supplies</td>
</tr>
<tr>
<td>Maintenance and repair items</td>
</tr>
<tr>
<td>Maintenance</td>
</tr>
<tr>
<td>Advisory services</td>
</tr>
</tbody>
</table>

Figure 14: Classification of Industrial Goods Proposed by Kotler (1980) (Eckles and Novotny, 1984, p.95)
This classification was later employed by Eckles and Novotny (1984) who investigated the perceived role (decider/influencer) of the purchaser in purchases of 13 different product classes. They conclude that product class is a significant contributor in the identification of decider and influencer in the buying center.

Lilien and Wong (1981) studied whether there were product characteristics that lead to observed differences in decision-structures within buying organizations. "The result was a very strong indication from these data of a single underlying dimension" (op.cit., p.30). This dimension was found to represent product complexity.

In the same line, Bellizi and McVey (1983) tested the effects of product type and purchase experience on industrial buying behavior. The product types were capital equipment, accessory equipment, major materials (commodities) and operating supplies. Purchase experience was studied using the buygrid variables: new-task, modified rebuy and straight rebuy. The study indicated that product type was a meaningful variable, but: "The findings reported in this study suggest that there is general non-significance of the buyclass variable at least as a predictor of industrial buying influence" (op.cit., p.61).


Mattson (1988) uses six groups of intra-company variables that will influence the buying situation and therefore the composition of the buying center in the presented model. These variables include the buyers' mission (type of firm specific variable) and five purchase-specific variables: buyclass and buyphase (Robinsson, Faris and Wind, 1967), purchase need (Kotler, 1980), dollar value and complexity, and finally, time commitment and life cycle.

McQuiston (1989) proposes a model which suggests that the purchase situations attributes of novelty, complexity, and importance are causal determinants of participation and influence in an industrial purchase decision. Novelty is defined as the lack of buying experience within the organization; complexity as the amount of information needed to make an accurate evaluation; importance as the perceived impact of the purchase on organizational profitability and productivity. Findings of this study indicate that as novelty and importance to the buying organization increase, more
information is sought by the members of the decision-making unit. Moreover, the complexity of the purchase situation is related positively to both participation and influence.

Johnston and Page (1990) used structural equations to test a model for analyzing structure and information processing in the buying center. They draw the following conclusion concerning the purchase situation from their results: "The results obtained from the model tested in this paper suggest that the BUYGRID categorization needs to be extended to include the dimensions of importance and complexity when considering the functioning of the buying center" (op.cit.,p.599).

More recently, Bunn (1993) developed a taxonomy of buying patterns and situations consisting of six prototypical buying decision approaches:

1. Casual Purchase
2. Routine Low Priority
3. Simple Modified Rebuy
4. Judgmental New Task
5. Complex Modified Rebuy
6. Strategic New Task

The categories are differentiated by the combination of the relative amount of the following buying activities: information search, use of analysis techniques, focus on proactive issues, and reliance on control mechanisms.

The use of a particular "buying decision approach" is determined by four situational characteristics:

- purchase importance, defined as "the buyer's perception of the significance of the buying decision in terms of the size of the purchase and/or the potential impact of the purchase on the functioning of the firm" (op.cit.,p.45)
- task uncertainty, defined as "the buyer's perceived lack of information relevant to a decision situation." (Ibid)
- extensiveness of choice, defined as "the buyer's perception of the breadth of alternatives available as choices in the context of a particular decision situation" (Ibid)
- perceived buyer power, defined as "the buyer's perception of the firm's negotiation strength in a particular buying decision situation" (Ibid)
An empirical approach is adopted by Dholakia, Johnson, Bitta and Dholakia (1993) as they investigate the decision-making time (DMT) of organizational buyers concerning the acquisition of telecommunications products and services. Decision-making time is defined as the “amount of time an organizational buyer invests in the acquisition process, begins with need recognition and ends when the organization’s buying center arrives at a solution for filling the need” (op.cit.,p.282). Findings reveal that buyclass, firm size, decision-making unit (DMU) size, number of information sources, and number of alternatives in the consideration set, significantly influence decision-making time (DMT). In more detail, results showed that:

- buyclass had the greatest effect on DMT, e.g. novel purchase situations tended to prolong DMT to a higher degree than the other examined variables
- DMT was longer with increasing number of participants in the DMU
- DMT was longer when more information is accessed and the consideration set was larger
- new task situations did not significantly affect information search, a rather unexpected finding further explained by the high perceived risk of the purchase situation which restricts the pattern of search activity (the authors also refer to Puto, Patton, and King, 1985)
- another unexpected finding concerns the size of the firm which had a positive relationship with information search, meaning that relatively larger organizations in the study implemented a more thorough and systematic search than smaller firms

Möller (1993) made a comparative study of two product cases with different technical complexity (office supply and production equipment). The study shows that differences in technical complexity will induce differences both concerning the buying center and the buying process.

Other authors, Puri and Sashi (1994) examine the complex purchasing situation of computer integrated manufacturing (CIM, defined as the deliberate integration of automated systems into the processes of producing a product). The buying center of such a complex purchase is identified as the CIM project team whose members originate from various functional areas (engineering, manufacturing, purchasing, and data processing). The complexity of the buyers’ needs is found to be a determinant for the buyer behavior, and the authors present a structural role analysis as the method which provides “the basis for determining the alliances required to develop and jointly market solutions for buyer problems” (op.cit.,p.27). Emerging
alliances are a result of the need to satisfy complex buyer needs and will reflect the seller’s marketing orientation and their correspondent focus on buyer needs.

2.3.3.2 Personal Factors

The second set of factors which affect the organizational buying center and its buying process, as proposed by Wind and Thomas (1980), includes four subsets of factors: personal, interpersonal, organizational, inter-organizational, and environmental.

The first subset of factors which will be covered concerns the personal factors which include variables idiosyncratic to the individual (e.g. personality, gender, education, motivation, perceived roles, etc.). A number of studies have addressed the effects of personal factors on the organizational buying center and process.

Harding (1966) studied 49 non-repetitive purchases of products by ten companies (each with more than 1000 employees). A total of 181 executives were interviewed and an independent mail survey was run in order to confirm the executives’ replies. One of the central conclusions of the study is that, “people buy, not companies” (op.cit.,p.80). As remarked by Harding, “corporate decision-makers remain human after they enter the company. They respond to ‘image’; they buy from companies to which they feel ‘close’; they favor suppliers who show them respect and personal consideration, and who do extra things ‘for them’; they ‘over-react’ to real or imagined slights, tending to reject companies which fail to respond to bingo, or delay in submitting requested bids” (op.cit.,p.76). Another finding of this study was the existence of an invisible shield, a barrier of psychological standardization a potential new supplier had to deal with. Yet in 17 of the 49 purchases studied, a new supplier was chosen. Concerning this fact, it was found that advertising and promotional materials were essential to establish a ‘good image’.

Crow and Lindquist (1982) made the observation that “5 of the 12 purchasers had more years with the firm than years of purchasing experience” (op.cit.,p.206). These purchasers indicated that this experience with their company outside the purchasing department helped them understand the problems in “the plant” and gave them better possibilities to help meeting the needs.
In their study Henthome, LaTour and Williams (1993) examine the influence on organizational buyers’ performance-, social- and economic-risk behavior by informal members of the buying center. These informal members are both external and internal to the organizations and are shown to have considerable but also rather different impact on the perceived risk of the organizational buyer.

Owens Swift and Coe (1994) develop a scale (the sourcing preference scale, SP) to measure the preferences of purchasing managers for single or multiple sourcing of products. The measurement unit was the purchasing manager and the purpose was to determine whether there were demographic differences between purchasing managers who prefer single sourcing and those who prefer multiple sourcing. Concerning demographic characteristics results showed that purchasing managers who have a preference for single sourcing tend to be:

1. Male rather than female;
2. Married rather than single;
3. Certified Purchasing Managers (CPM).

2.3.3.3 Interpersonal Factors

The second subset of factors concerns the interpersonal. These include variables present in the social interplay between the actors involved in organizational buying. A few studies that address this particular topic are presented.

Bonoma and Zaltman (1978) are critical against the emphasis put in the rational factors as the basis for industrial buyers’ decisions. They found that, “the major factors influencing the industrial purchasing decision are social ones, not rational economic ones. Friendship and reputational factors are the two most often cited by experienced managers” (op.cit.,p.215). Furthermore, they argue that the most important variables in a dyadic (two persons, two firms, two industries) are the relational variables (e.g. trust, cooperation) between the two parties. Among the latter, the most relevant are the exchanges that take place between the members of the dyad.

In their discussion of the dyadic paradigm Bonoma, Bagozzi and Zaltman (1978) propose four classes of variables for the interpretation of the dyadic interaction for viewing the behavior in the marketing dyad:
• relational variables with their source in the interaction. Examples include dependence, power, influence, conflict, reciprocitivity, exchange, intensity, and competition

• social structural variables emerging from the situation. Examples of these variables are third party interdependence (i.e. social structure in the purchase department) and horizontal and vertical differentiation (between the actors in the dyad)

• social actor variables located in the actors. Theoretical examples are given as: comparison levels, history of reward, personality characteristics (within actor structure), and capabilities and resources of actors

• normative variables with location or source in the interaction, the situation and the actors. The normative variables are classified into three categories: Individual norms (basic personal orientation), relational norms (how the interaction should be), and situational norms (alternative behavior due to circumstances). Examples are given as: social norms, roles and standards, and role expectation

Bristor (1993) hypothesizes that buying center members’ decision specific influence can be explained by their personal network of relationships. Results from this study point to the need of having numerous contacts to the right people in the right places. Additionally, influential buying center members engage in advocacy and gatekeeping behaviors. Advocacy is measured through “five indicators: efforts to persuade others; the use of vendor-based information to generate support; the use of non-vendor based information to generate support; pushing favored alternatives; and opposing disfavored alternatives” (op.cit., p.81). The measures of gatekeeping utilized were “the extent to which a buying center member: referred sellers to others, passed seller information along to others; or did not pass information about this specific decision along” (Ibid).

More recently, Dion, Easterling and Miller (1995) investigate the effect of personality traits and types and trust on the sales outcomes of business-to-business relationships. They put forward the following five propositions:

1. A salesperson’s personality unilaterally influences sales outcomes.
2. Sales outcomes will be enhanced when buyers and sellers exhibit the same personality types.
3. Perception of buyer-seller personality similarity will enhance sales performance.
4. Trust will enhance sales performance.
5. There is a relationship between a buyer’s perception of buyer-seller similarity and ”actual” buyer-seller similarity.
Results showed that the two first propositions were not supported. On the other hand, both perceived buyer-seller similarity and performance were correlated with trust, which is essential for the development of successful buyer-seller relationships. Thereby, buyers will tend to buy from salespeople they perceive to be similar to themselves. Concerning the last proposition, no support was found in the study.

2.3.3.4 Organizational Factors

The third sub-set of factors includes those who are related to the organization per se (e.g. size, technology, structure, tasks and goals, people). Studies that address this topic and its influence on organizational buying are presented.

Banville and Dornoff (1973) found in their study concerning supplier selection among private residential builders that the size of the firm had very little influence on the ranking of factors influencing the supplier selection. The only differences identified were that larger firms placed more emphasis on the credit provided by the supplier, while smaller firms ranked friendship with the supplier higher.

In the same year, Sheth (1973) incorporates three company specific factors in his model:

- organization orientation
- organization size
- degree of centralization

Concerning the orientation of the organization, Sheth suggests that a technology orientation in the company will lead to an engineering dominated situation that will also influence the buying behavior of the firm. Consequently, in a production-oriented company, the production personnel will exert a dominant influence in buying decisions. The suggested effect of the company size is that larger organizations will show a higher tendency for joint decision making, compared to smaller organizations. Higher degrees of centralization are postulated to reduce the likeliness of joint decisions.

Grönhaug (1977) investigates other dimensions. He studied the purchases of minicomputers by organizations believed to “stress rationality and to be high in problem solving capacity” (op.cit.,p.439). Furthermore, the buying
situation was assumed to be of great importance to the investigated organizations. He found that sudden need perceptions were found in small organizations whereas larger organizations had a gradual need perception. Additionally, the two cases of gradual need perception found in small organizations occurred in non-market organizations, a finding interpreted as an indication of less environmental instability perceived by these organizations. Another finding was that in market organizations top management played a more active role than in non-market organizations. Another difference between market and non-market organizations was related to the budget issue. In non-market organizations, negotiations with regulatory groups were necessary, while market organizations obtained necessary resources through their activities in the market.

Hallén (1980) focuses on the production technology used by the buying firm and its connection to requirements for change and stability in supplier relations. The production technologies are classified in a matrix with six cells (Figure 15):

<table>
<thead>
<tr>
<th></th>
<th>Single unit production</th>
<th>Intermittent production</th>
<th>Continuous production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Transformation</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Figure 15: Technology Classification  
(Hallén, 1980, p.87)

The following examples of the processes in each cell are: 1) Ship building, 2) Glass-blowing or other handicraft, 3) Production of heat exchangers, 4) Production of pharmaceutical drugs, 5) Automobile industry, and 6) Steel mills or chemical plants.

The empirical study includes three companies in cell 5 (automotive industry) and one company in cell 6 (chemical industry). The following pattern was found concerning stability requirements: Great need for "inflow" stability (indicated by number of parallel suppliers) was as expected (continuous production) found in both cells, and somewhat more pronounced in cell 6. The more frequent deliveries found in cell 5 compared to 6 are explained as an effect of "high unit value" in cell 5. It was also noted that there is a tendency for an increase on the number of
parallel suppliers when the major supplier is foreign. When frequent deliveries are made (or needed), domestic suppliers seem to dominate.

Two types of change in seller-buyer relationship are discussed: Change of supplier (indicated by age of relationship) and cooperation (indicated by R&D contacts and complexity in contact pattern). Long overall relationships were found in both cells (52 percent, more or equal to 20 years). A higher proportion of recently established suppliers is found in cell 5 (compared to cell 6). This is explained as a probable effect of rapidly changing requirements (dynamic industry). Complexity in contact pattern did not show any clear difference. However, R&D contacts showed a very marked difference. In cell 5, 15 out of 16 cases included R&D contact, whereas, in cell 6, 5 out of five cases did not include such contacts. This is explained by the higher complexity of input in industry belonging to cell 5.

Concerning size, Bellizi (1981) found support for Sheth’s (1973) reasoning that larger organizations will show a higher tendency for joint decision making compared to smaller organizations.

Chambers, Anderson and Dunlap (1986) investigated the impact of reward and measurement systems on the organizational buying behavior. Their findings support that the reward and measurement system in an organization will influence the buying behavior.

Dholakia, Johnson, Bitta and Dholakia (1993) reported on the influence of the size of the firm on the decision-making time (DMT) of organizational buyers concerning the acquisition of telecommunications products and services. They remarked a positive relationship between organization size and information search. Larger organizations tended to be more engaged in a more thorough and systematic search than smaller firms did. This finding is presented as an "unexpected finding" as the authors had predicted that a broad-based expertise and acquisition experience would lead to less extensive information search. Two possible explanations are put forward: “despite their expertise and experience, larger organizations still approach the process more systematically and professionally in general” (op.cit.,p.289); and due to the differentiation of larger organizations, where “perhaps the technical experts and, indeed, other participants in the buycenter, are more isolated than in small organizations” (Ibid). In addition, it is also remarked that more information is sought in larger organizations due to personal reduction and enhancing of rewards related to the acquisition process.
A different aspect is investigated by Sriram and Banerjee (1994) as they assess the impact of EDI (Electronic Data Interchange) adoption on purchasing. The study showed that a number of organizational changes occurred as a result of its adoption (e.g. closer cooperation and functional integration, the change in the information flow within the organization, EDI was viewed as a tool for achieving strategic advantage over competitors). Moreover, concerning the role of EDI transaction volume, the study shows that “EDI has necessitated greater changes in buyers’ training programs and greater changes in payment terms for high volume users than is the case for low volume users” (op.cit., p.36).

In their study of single versus multiple sourcing preference, Owens Swift and Coe (1994) also examine the effect of organizational characteristics on the sourcing preference (SP). Results showed that purchasing managers who prefer single sourcing tend to be:

1. Found more often at firms with SIC code 37 (transportation equipment) than at either SIC 28 (chemical and allied products) or SIC 36 (electrical/electronic equipment firms);
2. Working at larger companies (either in sales or number of employees); and
3. Found at firms which have a high current level of single sourcing.

2.3.3.5 Inter-organizational Factors

Inter-organizational factors include a wide number of variables related to the inter-organizational relationships between buying and selling organizations. Wind and Thomas (1980) present Evan’s (1966) organization-set approach where any inter-organizational system is composed by an input organization-set, a focal organization-set (the buying organization), and an output organization-set. Viewed from this perspective, factors which affect the organizational buying of the focal organization may include e.g. size, diversity, and network configuration (Wind and Thomas, 1980, p.253); the formal and informal interaction patterns among members of the inter-organizational system, etc. A number of studies which address inter-organizational aspects, are reviewed. Many of these studies are also referred as part of the so-called “channel literature” (e.g. Dabholkar, Johnston and Cathey, 1994) where typically dyadic and network analysis are distinguished. For the purpose of this study’s overview of literature, “channel literature studies” and studies dealing with inter-organizational factors are included in one and the same category.
Bird (1976) discusses reverse reciprocity as a part of industrial buying behavior. He found evidence of reversed reciprocity during the last half of 1973 and the first half of 1974 in the United States, and concluded that, theoretically, reverse reciprocity might occur during periods of scarcity.

Ford (1984) examines whether there is an association between the industrial purchasers' assessments of their suppliers' technical and commercial skills and the perception of other dimensions of the suppliers' performance. Seven sets of variables were used: commercial skill, technical skill, commitment to market, commitment to customer, distance, adaptability, and conflict. The author finds strong association between the buyers' assessment of technical and commercial skills and the buyers perception of the suppliers' performance in the other dimensions (variables). A conclusion that is drawn from these findings is that, in addition to the importance of price, quality, and delivery, these other relational dimensions need to be managed by the successful supplier.

Campbell (1985) presents a description of different market types resulting from the chosen marketing and purchasing strategies of the selling and buying organization. The product characteristics, the buyer characteristics and the seller characteristics are influencing Buyer's interaction strategy (Competitive, Cooperative or Command) and the Seller's interaction strategy (Competitive, Cooperative or Command). His study was carried out in areas where long-term stable relationships are important (in contrast to research concerned with the process of discrete purchase decisions). The following classification of buyer-seller relationship is proposed (Figure 16):
Ford, Håkansson and Johanson (1985) develop a model describing the strategic options available to companies in their interaction with other companies. The authors suggest four aspects that should be focused in the analyses of company interaction. They start their discussion of these aspects with questions that will be answered by the “content” of the aspect:

<table>
<thead>
<tr>
<th>Question</th>
<th>Aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>What can you do for me?</td>
<td>Capability</td>
</tr>
<tr>
<td>How do you see me?</td>
<td>Mutuality</td>
</tr>
<tr>
<td>What are you prepared to do for me, compared to what you do for others?</td>
<td>Particularity</td>
</tr>
<tr>
<td>Which variations are there in these ”whats” and ”hows”?</td>
<td>Inconsistency</td>
</tr>
</tbody>
</table>

The authors stress that there is a close inter-relationship between the aspects (or dimensions), but at the same time argue that they should not be integrated into one dimension. The close inter-relationship should be viewed as a sign of the dynamic character of the interaction. Finally, a discussion concerning strategic issues based upon these inter-related dimensions is carried out.
Gadde and Mattsson (1987) investigated stability and change in network relations between suppliers and buyers. They found when the relation is studied in a network context quite turbulent developments might be observed. The pure exchange of one supplier for another was found to be a rather unusual purchasing strategy. Instead, gradual replacement of one supplier for another could be observed. The authors used a categorization of suppliers into seven different groups (from single source to one of two or more complimentary suppliers) to describe and discuss these entry and exit patterns. A few of their observations are:

- in nine of 20 exit patterns once the position had been weakened it could not be strengthened again
- suppliers who never reached a position as main supplier showed irregular change patterns
- it is probably rather difficult to enter directly as a "single source" under normal conditions, and it seems more difficult the more established the buyer company is

They also emphasize the need to study the supplier-buyer relations over extended time-periods since these observed changes occur gradually over a number of years.

Heide and John (1990) emphasize the dramatic changes in the nature of buyer-supplier relationships towards closer ties, alliances, and partnerships, and develop a model of closeness in industrial buyer-supplier relationships (original equipment manufacturer-supplier ties). They investigate three aspects of relationship closeness:

1. Joint action, defined as “the degree of interpenetration of organizational boundaries” (op.cit.,p.25);  
2. Continuity, defined as “the perception of the bilateral expectation for future action” (Ibid); and  
3. Verification of supplier, defined as “the scope of efforts undertaken by the buyer \textit{ex ante} to verify the supplier’s ability to perform as expected” (Ibid).

The study’s general hypothesis is that “close relationships emerge as responses to the need of safeguarding transaction-specific assets and adapting to uncertainty” (op.cit.,p.33). Thereafter six propositions are put forward:
H1: “Greater continuity expectations increase the level of joint action” (op.cit., p.26).
H2: “Increased verification efforts by the buyer increase the level of joint action” (Ibid).
H3a: “Specific investments made by the OEMs and suppliers will increase the level of joint action” (op.cit., p.27).
H3b: “Specific investments made by the OEMs and suppliers increase expectations of continuity” (Ibid).
H3c: “Specific investments made by OEMs and suppliers increase their supplier verification efforts” (Ibid).
H4: “Perceptions of volume unpredictability increase expectations of continuity” (op.cit., p.28).
H5: “Perceptions of technological unpredictability reduce expectations of continuity” (Ibid).
H6: “Perceptions of performance ambiguity increase supplier verification efforts” (Ibid).

Results showed that all hypotheses, except for H4 and partially H3b were supported. Concerning H3b, it was found that OEM’s investments in specific assets did not show any significant effect on continuity.

Recently, Perdue and Summers (1991) studied purchasing agents’ use of negotiation strategies in rebuy purchases of components parts. Negotiation is defined as the decision-making process through which a buyer and seller establish the terms of a purchase agreement. They quote Alderson (1957) when referring to negotiation as the “crowning process of business effort” (as quoted by Perdue and Summers, 1991, p.175). Three negotiation strategies are addressed:

- **problem solving** strategy (similar to “integrative bargaining”) is defined as, “the extent to which purchasing managers actively encourage sellers to work with their buying firms to develop and evaluate alternative purchasing arrangements that have the potential for reducing costs and/or increasing performance” (op.cit., p.176), and
- two aggressive-bargaining strategies (i.e. manipulating perceptions and tough tactics) are defined as the “extent to which purchasing agents stand firm in their positions and use tactics designed to elicit concessions from sellers” (Ibid)

They develop a conceptual framework based on a series of depth interviews with 17 purchasing agents in 12 manufacturing firms. Five contextual variables are found to affect the negotiation strategies likely to be used by
the purchasing agents (material cost sensitivity, uniqueness of the buying firm's specifications, supplier competition, buyer's cooperative orientation, and buyer's preparedness).

Heide and John (1992) investigate structural aspects of interfirm relationships. They focus on the buyers' decision-making control in the context of buyer-supplier relationships. The presence of buyer-specific assets (physical assets, organizational procedures, and training that are specific to a particular supplier relationship) and relational norms (defined as consisting of flexibility, information exchange, and solidarity) are shown to influence interfirm relationships, e.g. "relational norms determined the firm's ability to acquire control" (op.cit.,p.42). Furthermore, the authors conclude "firms should structure relationships in a discriminating way, based on the characteristics of the situation in question. Firms should not pursue control as a goal in its own right, but only attempt to acquire control when specific assets are at risk (...) The key is to be protected against abuse of control, and relational norms can serve the purpose" (Ibid).

Hallén, Johanson and Seyed-Mohamed (1993) study whether the technology of the customer firm has an impact on the relationships established between suppliers and customers. Three technological categories are considered: (1) customers with unit production; (2) customers with mass production; and (3) customers with process production techniques. Product complexity, delivery frequency, and age of relationship are assumed to have different effects on interfirm adaptation and interfirm social structure depending on the technological structure of the customer. It was found that relationships with unit and mass production customers have similar structures while process technology relationships differ from the former relationships. In the latter, the conditions for building and maintaining relationships seem to lack the socio-technical mechanism which reinforces the relationship (that is present when interaction occurs with unit or mass production customers).

More recently, Han, Wilson and Dant (1993) examine the state of practice that exists between buyers and suppliers so far as their relationships with each other are concerned. The following are investigated:

1. Which are the main factors moving industrial buyers towards using fewer suppliers?
2. Which are the characteristics of a good close long-term relationship?
3. Which are the main advantages of a good close long-term relationship?
4. Which are the problems of long-term relationships?
A total of 41 companies, both in the supplier and buyer side were investigated. Purchasing agents from the buyer’s organization and company salespeople from the supplier’s organization were the selected respondents. Regarding the above mentioned questions, results showed that:

1. Both buyers and suppliers perceived enhanced performance, purchasing cost reduction, and increased technical cooperation as the main factors moving buyers towards purchase from fewer suppliers.

2. Consensus is found between buyers and suppliers responses. Mutual trust in the relationship and satisfactory exchange are the identified major characteristics of a good relationship.

3. From the buyer’s point of view, the main advantages were reliability of supply, improved schedules, lower product/production costs, and the ability to resolve conflicts satisfactorily. From the supplier’s viewpoint, the following factors were identified as primary advantages: price/production stability, enhanced marketing efficiency, optimal capacity planning, and customer orientation.

4. The problems with long-term relationships regarding both suppliers and buyers concerned the possibility of better exchange alternatives in the future and future uncertainty due to over dependence.

Finally, the authors remark that although companies tend to reduce their potential supplier sources, most industrial buyers avoid the sole sourcing as they consider over-dependence as a risk for abusive relationships.

Metcalf and Frear (1993) study the affect of perceived product importance on the complexity of partnership interaction processes. Five hypotheses are presented and tested in the aircraft industry. Four of these are empirically supported and indicate that:

1. Perceived product importance leads to high level of interfirm cooperation.
2. Perceived product importance leads to high level of information exchange.
3. Perceived product importance leads to high level of social exchange.
4. Perceived product importance leads to extensive inter-organizational communication networks.

However, the fifth is not supported indicating that:

5. Perceived product importance by the buyer does not lead to mutual adaptation.
Anderson, Håkansson and Johanson (1994) develop a conceptual construct of dyadic business relationships within a business network context. They conceptualize business networks as sets of connected relationships and focus in “managers’ perceptions and imputed meanings of the connectedness of a focal relationship to other relationships, as they act as key informants on its effects on their firm’s decisions and activities” (op.cit.,p.1). A business network is defined as “a set of two or more connected business relationships, in which each exchange relation is between business firms that are conceptualize as collective actors (Emerson, 1981)” (as quoted by Anderson, Håkansson and Johanson, 1994, p.2). Furthermore, connectedness is defined as “the extent to which ‘exchange in one relation is contingent upon exchange (or non-exchange) in the other relation’ (Cook and Emerson 1978, p.725)” (Ibid). Seven constructs are proposed:

1. Network identity
2. Anticipated constructive effects on network identity
3. Anticipated deleterious effects on network identity
4. Outcomes given comparison level
5. Outcomes given comparison level for alternatives
6. Cooperation
7. Relationship commitment

Dabholkar, Johnston and Cathey (1994) focus on long-term business-to-business exchange relationships. They explore the determinants of negotiation behavior in dyadic relationships and propose a categorization of this negotiation behavior which forms ”the basis of a conceptual framework that examines the formation and maintenance of exchange relationships.” (op.cit.,p.134).

Negotiation behavior is classified along two dimensions (time perspective and gain perspective) and the following matrix is put forward (Figure 17):
Further, they develop the framework which:

- proposes bi-directional links between the negotiation behavior by two parties and the exchange relationship between them
- examines the determinants of the negotiation behavior for each party (organizational influences, individual influences, and "other party" influences)
- investigates changes in business-to-business relationships over time in response to external factors (e.g. switching costs and competition)

Evans and Laskin (1994) propose a comprehensive model of effective relationship marketing. Relationship marketing is defined as “the process whereby a firm builds long-term alliances with both prospective and current customers so that both seller and buyer work toward a common set of specified goals” (op.cit.,p.440). The proposed model consists of inputs (understanding customer expectations, building service partnerships, empowering employees, and total quality management); outputs (customer satisfaction, customer loyalty, product quality, and profitability); and ongoing assessment (consisting of customer feedback and integration). The model is then tested in the U.S. automated immunochemistry industry.

Sriram and Banerjee (1994), assess the impact of EDI (Electronic Data Interchange) adoption on purchasing. Regarding a firm’s relationships with its suppliers, the study showed a reduction in the level of supplier performance monitoring. Moreover, it was found that EDI tended to promote long-term relationships which increased mutual trust.
Perrien and Ricard (1995) discuss the meaning of a marketing relationship by using the marriage metaphor (between a seller and a buyer) in which the development of a relationship is mapped out in a five-phase model (awareness, exploration, expansion, commitment, dissolution). By conducting a qualitative investigation within the service arena of commercial banking it is revealed that “sellers (i.e., bankers) regard relationship as a strategic issue, because it impacts on organizational structure, the decision-making process, and human resource management” (op.cit., p.37). Buyers (i.e. mid-market companies), on the other hand, "consider relationship as merely a communication process that should enhance the relevance of the seller’s offering” (Ibid).

Schmitz (1995) argues for a renewed research agenda regarding industrial buying behavior due to the recent emphasis on the supply chain process, as well as changes in buyer-seller interaction. He focuses on the understanding of the persuasion process between buyers and sellers. The author proposes the application of the Elaboration Likelihood Model (ELM), commonly used in consumer marketing, to industrial buying behavior research. The ELM addresses two different paths that may be taken in response to exposure to persuasive communication: the central route and the peripheral route. The first is likely to occur when the recipient is both motivated and has the capability to process the message. If such doesn’t occur, then “persuasion cues” will affect persuasion. Schmitz quotes Petty and Caciopo (1986) when explaining persuasion cues as the “factors or motives inherent in the persuasion setting that are sufficient to produce an initial attitude change without any active thinking about the attributes of the issue or the object under consideration (original emphasis)” (op.cit., p.84). Further, the author draws some considerations concerning the application of this conceptualization to the buying center and subsequent managerial implications such as the need to process information customized in terms of the "individual" in the buying center. Finally, some research propositions are put forward concerning the application of the ELM on IBB:

1. The need for the identification of the variables in buyer-seller interaction that affect central versus peripheral processing (suggestions include perceived risk, credibility, trust, length of the relationship).
2. The need to determine how the buyclass theory affects the influence process (e.g. hypotheses is that central processing is of critical importance when a “new-task” situation is at hand, as opposed to
the relevancy of peripheral processing when a “straight-rebuy” situation occurs).

3. The need to determine the patterns of influence of the buying center in terms of the identification of which members utilize central processing and will be affected by peripheral cues; the development of influence strategies used by sales representatives categorized in terms of the situations used, the target audiences, success rates, and processing route.

2.3.3.6 Environmental Factors

The last sub-set of factors addressed in this review which affect organizational buying are the environmental factors, meaning those factors external to the buying organization (other than those reflected within the inter-organizational setting), such as the economic, political, legal, technological, and social/cultural factors (Wind and Thomas, 1980). A number of authors have differentiated between the impact of environmental factors on IBB in western countries (Samli, Grewal and Mathur, 1988) or in a Western business context (Davies, Leung, Luk and Wong, 1995), as compared to non-western environments. Examples of studies which have addressed the latter include e.g. Bamgboye, 1992 (developing countries); Roos, Veie and Welch, 1992 (Eastern Europe); Davies, Leung, Luk and Wong, 1995 (Oriental cultures). This section of the literature review will take into consideration such differentiation and therefore the presentation will be divided in two-subsections:

1. The presentation of studies on this topic which have focused solely on Western Europe and North-America.

2. The presentation of studies on this topic which have focused on environments other than Western Europe and North-America.

Studies addressing environmental factors focusing solely on Western Europe and North America

Håkansson and Wootz (1975) examined the selection of suppliers in an international context. They analyzed the psychic distance between purchasing firms in Sweden and their foreign suppliers. Focus was given to the assessment made by domestic purchasers on the relative importance of price and quality when buying from abroad. Five countries were included in the study (England, Germany, France, Italy, and Sweden) and the results
showed that England and Germany were closer to Sweden than France and Italy.

*Psychic distance* and its impact on buyer-seller interaction in an international context is also investigated by Hallén and Widersheim-Paul (1979). They define *psychic distance* as a difference in perceptions, “a measure of the difficulty a seller has to perceive or estimate the needs of a buyer or the corresponding difficulty a buyer experiences in perceiving the seller’s offer” (op.cit.,p.6). Focusing in the international aspect they create two other measures:

- inter-country distances, related to the psychic distance between the perceptions between two countries (i.e. the difference between the perceptions of an average firm in one country as seen by foreign and by domestic businessmen)

- intra-firm distances, related to the psychic distances between any two actors in each of the organizations (i.e. the difference between the perceptions of a counterpart as seen by the different people in the same firm)

Concerning inter-firm distances, they study the psychic distance from the viewpoint of the actual firms on both the perceiving and the perceived side. More than 900 relationships between buyers and sellers are mapped in five western-European countries (England, Germany, France, Italy, and Sweden). The analysis showed that Italy appears to be the most isolated country of the group whereas Sweden is the most integrated in the group. The authors further develop a model of psychic distance seen as a continuous process (international perspective) where the following three stages are identified:

1. Pre-contact stage
2. Initial interaction stage
3. Maturing interaction stage

In the *pre-contact* stage, the inter-country distance is the most relevant measure of psychic distance as it is mainly determined by factors on a national level (such as differences in language, level of development, and level of education between the countries in question). In the *initial interaction* stage, a purchase has occurred, and the psychic distance consists of a mixture between inter-country and inter-firm distances, with a continuous shift of importance from the first to the second. In the last stage, the *maturing interaction* stage, the inter-firm distance decreases as a closer
relationship between the buyer and supplier develops. However, a consequence may be that intra-firm distances increase (e.g. a closer contact between employees of both selling and buying organizations may result in split loyalties).

One of the previously mentioned researchers, Hallén (1982), also studied three groups of factors which influence the extent of international purchasing in a firm, these are:

1. Market conditions.
2. Attitude towards buying from abroad.
3. Ability to execute purchasing transactions in foreign markets.

Within the framework of the IMP project, 33 supplier relationships were recorded in five Swedish industrial firms. The results from this study showed that:

1. In a small country like Sweden the need from buying from abroad became imperious due to the limited number of domestic sources of supply.
2. Swedish firms had a favorable attitude towards foreign suppliers but prefer domestic suppliers.
3. International orientation is reflected in the competency and expertise of the Swedish buyers in international business.

Finally, the author states that, “a firm’s ability to draw benefits from foreign supply markets is largely dependent upon its’ capacity to use it’s innate experience of international business” (op.cit.,p.75). Furthermore, “competence is crucial for the extent of actual purchasing from abroad... and this competency is linked to the firm’s organization and the conditions for making use of the experience of doing business abroad” (Ibid).

Banting, Ford, Gross and Holmes (1985) investigate industrial purchasing in four English speaking countries (Australia, Canada, United Kingdom, and United States) across two different industries (paper and chemical). Strong similarities across countries are identified regarding the purchase of materials and components. Concerning departmental involvement in materials and components purchases, the purchasing department takes a strong role at the beginning (initiation and survey of potential vendors) and at the end of the process (evaluation and selection of suppliers). “Research is involved at the early and intermediary phases, whereas operations, design-development, and production engineering play a strong, active or supporting role through much of the buying process” (op.cit.,p.144). In
equipment purchases, early involvement of top management (overall policy and planning group) is denoted, operating and engineering personnel act as advisors throughout the buying process, and purchasing becomes involved solely in the final stages.

Again, Hallén and Johansson (1985) analyze the effects of environmental determinants on the industrial purchasers’ evaluation of suppliers. Two separate dimensions of supplier performance are evaluated: 1) extent of adaptations to individual customers needs, and 2) general quality of the offer. Differences in the evaluation of the two supplier-performance dimensions are related to environmental characteristics (cultural affinity between countries and industrial environment of the supplier country). Data from five Western European countries is used for the empirical testing of the models. The results show that there is an obvious relationship between the evaluation by the industrial purchaser of the industrial environment in the supplier country and the quality dimension. Results concerning cultural affinity and adaptation can be summarized as follows:

- two groups of close cultural affinity developed; Latin countries (Italy and France) and Northern countries (Germany, Sweden and Britain)
- cultural affinity seems to be a stable phenomenon
- intercountry affinity is not symmetrical
- the higher the cultural affinity, the more the supplier tends to adapt their offers to the customer

A wider perspective is pursued by Samli, Greval and Mathur (1988) as they propose a model for international industrial buying behavior where the environmental variables of importance in an international perspective have been emphasized compared to earlier models in IBB.

**Studies addressing environmental factors focusing on other than solely Western Europe and North-America**

Banting, Beracs and Gross (1991), report on a two-nation comparative study of the buying process in the chemicals processing companies of Canada and Hungary. The involvement of different departments during the stages of the buying process is mapped for three major categories of goods (materials, components, and equipment). Among the similarities reported are:

- the buying process for all three categories of products is viewed as a series of steps which are handled in a similar way in both nations
• engineering departments in both nations exert more impact in the purchase of components than raw materials purchases, especially during the early stages of the buying process
• purchasing plays a major role in the case of materials in most stages of the buying process
• top managers become involved in the purchases of equipment in both countries
• the number of involved departments in both countries tends to increased as the buying situations become less structured and hence more complex

Among the dissimilarities reported are:

• demographic (age and educational background, managerial functions) characteristics differ in the sense that Canadians tend to be older and have less formal training than Hungary
• organizational (size) characteristics differ in the sense that larger firms tend to be more typical in Hungary (dominance of state enterprises and cooperatives) than in Canada
• in Hungary, for all the three product categories, a significant higher percentage of respondents limit the supplier choice and the range of products to be considered to a "limited to one make" policy in their organizations. This fact is due to national policy constraints regarding the importation of goods from Western nations in order to preserve hard currencies
• the technical staff, "Design and Development Engineering", takes a major role in Hungary but not in Canada
• the dominance of production engineering is not valid for Hungary
• a higher involvement of "Production Engineering" for both components and equipment occurs in Canada
• the "Overall Corporate Policy and Planning" function is involved to a greater extent in Hungary than in Canada in the case of materials and equipment

The impact of environmental factors is described by Domanski et al. (1991) in an exploratory comparison of the buying behavior in a Polish and a Danish firm. They suggest an intermediate variable, the survival factors, which relate to the scarcest resource. In the Danish case product development (a competitive assortment) is the survival factor. In the Polish case, supplies and “hard currency”, are found to be the prime problem areas (the survival factors).
Studies addressing industrial purchasing in developing countries in Africa are few. One such example is found in the article by Bamgboye (1992). Source searching in the organizational buying process is examined in Nigeria, specifically in Nigerian organizations that are involved in energy and power supply, transportation and communications, textiles, construction, and tobacco. Five categories of capital equipment (consistent with the organizations) were chosen for the study. It is shown that personnel from different functional areas are involved in source searching. The factor that most likely determines the search is dissatisfaction with existing supplier. Furthermore, source searching is undertaken on a continuous basis in both the private and public sectors of the economy.

Again, concerning Poland, Domanski and Guzek (1992) provide examples of the environmental influences on the buying center composition and the decisions taken during the buying process. Their study of the Polish State-owned enterprises in the furniture industry shows how structures and influences develop differently from those normally found in market-oriented economies, due to environmental factors. They describe five types of buying influences typical of the Polish industrial environment:

1. Influence of other Polish producers. It is not uncommon that top managers from other Polish firms with knowledge about a product are included in the buying center as an influencer.
2. Influence of Polish foreign trade enterprises. These organizations still have a very strong position due to the know-how that they developed during the past economic system.
3. Influence of a foreign importer of Polish furniture. Foreign importer might execute heavy influence on selection of equipment due to quality and other demands.
4. Influence of a foreign supplier of new equipment. In this case personal contacts with top management are believed to play an important role.
5. Influence of joint venture partners. Here the joint venture partner will often also be the foreign importer of the products and therefore the third influence type applies.

Another analysis of buying behavior among Polish industrial buyers is implemented by Jaworska (1992). The study focuses on the effects induced by the industrial environment in Poland, specifically the effects of the "sellers market" prevailing in Poland. The author argues that buyers should workout their own strategies of behavior towards suppliers. The purchase strategy employed by Polish enterprises is further discussed using the four elements of product, price, choice of purchasing source, and
communication with environment. From this discussion the following can be noted:

- an important internal activity concerning the product is the creation of acceptance, especially from the production department, of more easily accessible materials (with worse parameters) than the ones sought for
- the major problem concerning availability of "hard currency"
- two types of segmentation of suppliers: horizontal segmentation resulting in a "geographical scattering" of suppliers, and a vertical segmentation according to position in distribution channel
- there is a reluctance of the Polish industrial market against trade middlemen

Roos, Veje and Welch (1992) conduct an exploratory study focusing on the area of environmental protection equipment in Czechoslovakia. They map the procurement of industrial products in Czechoslovakia before 1989, and characterize it as "largely a bureaucratic process over which the user organization had limited influence and in which potential foreign suppliers were restricted in the extent to which they could influence decision-making activities" (op. cit., p. 260). More recently, and especially since the monopoly of foreign trade was abolished on January 1, 1990, the buying processes under the new system have been simplified and integrated by the user company. The authors remark that former time spans (which could range from 2 to 5 years) have been shortened (six to seven months), e.g. in the acquirement of simpler equipment. Regarding supplier selection criteria, a shift towards less emphasis on price in the selection criteria is noted. The following criteria were found as the most important:

1. References
2. Experience in the field
3. Satisfying the user's needs
4. Acceptable price

Concerning the buying center, the general pattern regarding the composition of the procurement team for environmental protection goods tended to consist of people from the technical, financial, and investments departments.

Mattson and Salehi-Sangari (1993) compare industrial buying behavior in four different countries or regions: USA (represented by the tri-state region of Virginia and North and South Carolina) France, Sweden and the LDCs of southeast Asia (represented by South Korea, Malaysia, Singapore,
Taiwan and Thailand). Their findings suggest that culture has a significant impact on:

- the buying decision process in terms of buying center composition
- the relative influence/involvement/participation of team members
- the emphasis given to different stages in the process
- the criteria used in supplier search

Ahmed, d’Astous and El Adraoui (1994) study how product perceptions are affected by the knowledge of the country of origin. They adopt a multidimensional perspective by distinguishing between the country of design and country of assembly. Results showed that country of design was a more important cue than country of assembly and brand name. Moreover, the more complex the product technology, the greater the perceived importance of design skills. When other cues such as brand, price, and warranty were provided, developed countries were treated in a homogeneous way and perceptual prejudicial differences towards newly industrialized countries decreased.

A study employing two different instruments for measuring cultural characteristics is reported by Chang and Ding (1995). The authors use Hofstede’s dimensions and Chinese Culture Connection’s Chinese value survey (CVS) to investigate the effects of culture on the vendor selection criteria price and delivery schedule. A comparison between industrial buyers from Taiwan and Mainland China (PRC) is made. No significant difference was found between Taiwanese and Chinese (PRC) industrial buyers when employing the national character instrument (Hofstede). However, the CVS instrument showed significant differences in the two dimensions of integration and Confucian work dynamism. This suggests that the research instruments used to measure cultural differences will perform differently in different cultures.

Another study by Davies, Leung, Luk and Wong (1995) addresses the need to understand the Chinese market from a network perspective in which the importance of personal relationships ("guanxi") is crucial. The authors remark that, “Most of the networking literature is relatively recent and has been largely concerned with the Western business context” (op.cit.,p.209). Survey data was gathered from Hong Kong Chinese executives. The authors conclude that the Chinese market cannot be tackled without the knowledge that Chinese will include business transactions in the context of their own guanxi networks. They also state that, “In China’s collectivist
culture, the 'real' decision-maker may be the network as a whole, not some mysterious and unseen individual" (op.cit.,p.213).

A study by Morris, Hansen and Pitt (1995) reports on the effects of environmental turbulence in the structure and functioning of the buying center. Specifically, they investigate the purchase of employee health benefits by South African corporations. Turbulence is conceptualized in terms of the competitive, technological, regulatory, and labor environments. A comparison of the results obtained with those of previous studies (Johnston and Bonoma, 1981; Lynn, 1987; Dawes et al., 1992; McWilliams et al., 1992) showed the following regarding the buying center:

- the size was significantly larger
- lateral involvement was less
- the participation across management levels was wider
- the high level of senior management involvement and formality

In what concerns the buying process, the authors state that, "Where turbulence was perceived to be higher, the buying process also tended to take more time, with participants requiring greater amounts of information and becoming more cost-conscious" (op.cit.,p.313).
2.3.3.7 Evolved Patterns from Reviewed Literature on Factors Affecting the Buying Process and the Buying Center

To summarize this section concerning the factors affecting the buying center and process as major determinants of IBB, we present a summary table where the studies reviewed are indicated with their corresponding focus regarding the different factors (as proposed by Wind and Thomas, 1980): the buying situation; personal and interpersonal (referred conjointly); organizational; inter-organizational; and environmental (Table 13).

Table 13: Summary of Studies Focusing on the Factors Affecting the Buying Center and Process of IBB

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Buying Situation</th>
<th>Personal and Interpers</th>
<th>Organizational</th>
<th>Inter-organizational</th>
<th>Environmental</th>
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<tr>
<td>Author</td>
<td>Year</td>
<td>Buying Situation</td>
<td>Personal and Interpersonal</td>
<td>Organizational</td>
<td>Inter-organizational</td>
<td>Environmental</td>
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<tr>
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<td>1990</td>
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<tr>
<td>Banting, Beracs and Gross</td>
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<td></td>
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<tr>
<td>Domanski et al.</td>
<td>1991</td>
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<tr>
<td>Perdue and Summers</td>
<td>1991</td>
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<td>Bamgboye</td>
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<tr>
<td>Domanski and Guzek</td>
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<td>Dholakia, Johnson et al.</td>
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<tr>
<td>Ahmed, d’Astous and El Adraoui</td>
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<td>1994</td>
<td></td>
<td>X</td>
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<td>Chang and Ding</td>
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<tr>
<td>Davies, Leung, Luk and Wong</td>
<td>1995</td>
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<tr>
<td>Dion, Easterling and Miller</td>
<td>1995</td>
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<tr>
<td>Morris, Hansen and Pitt</td>
<td>1995</td>
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<tr>
<td>Perrien and Ricard</td>
<td>1995</td>
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<td>Schmitz</td>
<td>1995</td>
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</table>

From the above table it can be verified that among the factors proposed by Wind and Thomas (1980), an increasing number of publications during the 1990s have focused on the investigation of the inter-organizational and environmental factors as determinants of OBB. Naturally, the number of studies revised is limited and hence this observation cannot be generalized in any way.
The review of literature implemented has shown the need to consider the buying situation and other related factors specific to a certain purchase when studying organizational buying, as they so strongly influence the buying center and buying process. This has been proven to be an issue of general agreement among scholars in IBB. There is, however, not an equal consensus as to which factors are the most important and thus should be employed. The following approaches, normally in some combination with each other, are generally found in the literature:

- buying situation specific factors as defined by the concept from the BUYGRID (newness of task, amount of information search and number of alternatives considered)
- buying situation specific factors as defined by product characteristics (product complexity, importance, monetary value, time pressure, perceived risk)
- buying situation specific factors characterized by product type

Regarding the personal and interpersonal factors, the amount of studies focusing on these factors is scarce. As stated by Harding (1966, p.80): “people buy, not companies”, therefore, personal distinctive variables such as gender, marital status, and professional experience are shown to influence the buying behavior in an organizational context. In this presentation we have also included a few studies where interpersonal factors (within the buying organization and in a “dyad” context) are shown to influence the organizational buying process and center. Social, relational, and normative variables are shown essential to comprehend when individuals interplay.

The affect of organization-specific factors in the buying behavior of companies is also addressed in the former review. For example, the size of the organizations was shown to influence decision-making (e.g. Sheth, 1973; Bellizi, 1981) need perception (Grönhaug, 1977), information search (e.g. Dholakia, Johnson, Bitta and Dholakia, 1993) and multiple versus single sourcing (Swift and Coe, 1994). Another organizational factor focused by Hallén (1980) is the production technology used by the buying firm and its effects in supplier relations (stability versus change).

Regarding the inter-organizational context, different aspects are focused and pursued by different researchers. A dyadic and interactive perspective is pursued by e.g. Campbell, 1985; Ford, Håkansson and Johnsson, 1985; Metcalf and Frear, 1993 ; and Perrien and Ricard, 1995. Perdue and Summers (1991) and Dabholkar, Johnston and Cathey (1994) focus on
negotiation behavior and strategies. Other authors focus on long-term buyer-seller relationships, e.g. Hallén, Johnsson and Mohamed, 1991; Heide and John, 1990 and 1992; Han, Wilson and Dant, 1993; Hallen, Johanson and Seyed-Mohamed, 1993; and Evans and Laskin, 1994. The need to study dyadic business relationships within a network context is evidenced by Gadde and Mattsson, 1987; and Anderson, Håkansson and Johanson, 1994. Finally, Sriram and Banerjee (1994) and Schmitz (1995) focus on inter-organizational aspects from a supply-chain-partnering context. To conclude, we remark that the inter-organizational setting is a growing area of research, with many studies being published recently. A better understanding of the working relationships between firms, (dyadic, within a network context, or from a partnering viewpoint) is imperative and of a paramount interest for both practitioners and scholars in the field of IBB.

Regarding the last set of factors (the environmental factors), the international context and the concept of "physic distance" is focused by some authors (Håkansson and Wootz, 1975 and Hallén and Widersteim, 1979). Environmental characteristics, such as cultural affinity and industrial environment, and its' influence on for e.g. supplier selection are verified by Hallén and Johansson (1985). Study's related to Poland (which is also the country addressed by our present study) show that factors such as "hard currency" (Nielsen et al.,1991 ;Jaworska, 1992), industrial environmental and market structure ( Domanski and Guzek, 1992 ; Jaworska, 1992 ) highly influence IBB. Cultural factors and it's effects are also pursued by other authors (Ahmed, d'Astous and El Adraoui, 1994; Chang and Ding, 1995; Davies, Leung, Luk and Wong, 1995; Morris, Hansen and Pitt’s, 1995). These studies show that significant differences occur in the buying center and buying process depending on the country of origin of the buying organization.
2.3.3.8 Emerged Research Question and Selection of Areas for Identification of Factors Affecting the Buying Process and the Buying Center

The overview of literature that focuses on the factors which affect the buying process and the buying center as major components of IBB provides evidence of the need to include possible affects of a certain number of factors in our study. Thus, attending to the formulated research problem "How can the industrial buying behavior of Swedish and Polish metal mining companies be characterized concerning the purchase of capital equipment for mining production (CEMP)?", a third research question for our study emerges:

Which are the most significant factors that affect the buying process and buying center in Swedish and Polish metal mining companies concerning the purchase of CEMP?

A selection of areas for identification of the most significant factors that affect the IBB is implemented through the examination of our research problem and the conducted literature review. Our research problem focuses on a particular product category (i.e. capital equipment), therefore the research questions are all restricted to the purchase of CEMP. A purchase of capital equipment, at least in the line of industry under focus, might imply technically new equipment or a technical "upgrading" of existing equipment, as well as the purchase of an additional unit of a previous purchased product. Thus, a purchase of CEMP might also include a considerable variation in newness, information search, as well as search for alternatives.

An extensively tested and also generally approved instrument for investigating the effects of the buying situation is provided by the buyclass variable of the buygrid framework. The buyclass variable has however been criticized by Ferguson (1979). This study uses selection of public warehouses for it’s empirical base and the author notices that the decision process of this service might be different from that concerning products. However, the new-task situation was not tested in this study. We do not find that this or any other critic opposes the inclusion of the buyclass variable in our frame of reference. Hence, we will use the buyclass variable (type of buying situation) of the buygrid framework as described by Robinson, Faris and Wind (1967) in our study (Table 14).
Table 14: Distinguishing characteristics of buying situations

<table>
<thead>
<tr>
<th>Type of Buying Situation</th>
<th>Newness of the Problem</th>
<th>Information Requirements</th>
<th>Consideration of New Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>High</td>
<td>Maximum</td>
<td>Important</td>
</tr>
<tr>
<td>Modified Rebuy</td>
<td>Medium</td>
<td>Moderate</td>
<td>Limited</td>
</tr>
<tr>
<td>Straight Rebuy</td>
<td>Low</td>
<td>Minimal</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: Robinson, Faris and Wind, 1967

Since other factors concerning the product (other than the buying situation) have been assessed as important in the literature on IBB, other product specific factors such as time pressure, importance, monetary value, complexity, perceived risk, and uncertainty must be considered as a part of the frame of reference.

This study is designed in order to study one specific type of product, or product group, namely capital equipment. Therefore, classifications concerning different types of products, as proposed for example by Hillier (1975) who wrote of production services, production facilities, production constituents and production transformers or Kotler (1980) who classified such products as goods entering product, capital items and goods not entering product, are not directly relevant for our frame of reference and will therefore not be included.

Sheth (1973) includes three product specific factors in his model: time pressure, perceived risk and type of purchase. In the discussion of type of purchase, he uses both the element of newness (once-in-a-lifetime - routine) and the type of product (capital expenditure - maintenance). As stated above, our study concerns only capital equipment which implies that product type will appear as a fixed variable. The newness aspect is part of the buying situation factor and will therefore be included as such. Since the need for new capital equipment might occur either as a consequence of a long term planning process, or as a result of a sudden break down of existing equipment, the variable time pressure will be included in our frame of reference.

Sheth (1973) refers to perceived risk as the combination of the magnitude of adverse consequences and uncertainty. Håkansson and Wootz (1975) also discuss perceived risk. They argue that the buying situation factor is central in influencing purchasing behavior and that the buying situation can
be seen as a function of perceived risk. The definition they employ for perceived risk \[\text{perceived risk} = f(\text{uncertainty, value of the consequences of the decision})\] is very similar to the one given by Sheth. Furthermore, the authors identify three dimensions of uncertainty: need, market, and transaction. Another very similar definition of perceived risk is given by Henthorne, LaTour and Williams (1993) who state: “In most industrial buying contexts, perceived risk has been viewed as a function of two variables: the importance of the purchase and the amount of uncertainty associated with the outcome of the purchase” (op.cit., p.42).

It should be noted that a combination of the three definitions given above points to a strong similarity between them: the magnitude of the adverse consequences (Sheth), value of the consequences of the decision (Håkansson and Wootz) and the importance of the purchase (Henthorne, LaTour and Williams). Mattson (1988) includes the importance of the purchase in his model and discusses it as the importance to the mission of the buying organization. This might be highly relevant for our study since it concerns equipment playing a central and vital role in the mission of the industry in question (mining). Mattson (1988) also incorporates the factor of monetary value of the product in his model. In a pilot study concerning the mining industry, the monetary value was found to play a distinctive role in the vertical dimension of the buying center (Baptista and Forsberg, 1994). This factor will therefore be included in the frame of reference.

Both Patchen (1974) and Grönhaug (1977) found that the size of the buying center is influenced by the importance of the purchase. Johnston and Page (1990) concluded the following: “The results obtained from the model tested in this paper suggest that the BUYGRID categorization needs to be extended to include the dimensions of importance and complexity when considering the functioning of the buying center” (op.cit.,p.599). Also McQuiston (1989) studies importance, novelty, and complexity as causal determinants of participation and influence in an industrial purchase decision. In his study, it was found that as the importance of the purchase increases for the organization, the members of the decision-making unit seek more information. This author defines importance as the perceived impact of the purchase on organizational profitability and productivity. We find that the above arguments further strengthen the selection of importance for our frame of reference.

Complexity is (as referred to above) considered as an important factor by Johnston and Page (1990). The way they discuss complexity makes it fairly similar to how Håkansson and Wootz (1975) use uncertainty. This observation that complexity is described or used in such a way that it can
be seen as a function of uncertainty, can also be found in other studies (e.g. Möller, 1993).

Grönhaug (1975a) makes the following statement: "The buyer seldom has full information - neither about the different buying alternatives nor about the consequences connected with various buying alternatives (and this is also often the case with regard to the buying goals) and must consequently act under uncertainty" (op.cit., p.15). It can thus be seen that uncertainty and perceived complexity can be viewed as lack of information.

The degree of information requirements and search for alternatives (which are variables used to indicate buying situation in the buygrid framework) can thus be used also as an indication of uncertainty and perceived complexity. In focusing on the purpose of this study, we choose to use the already-selected factors of the buygrid as a measure of uncertainty and perceived complexity.

To summarize, the following other product specific factors (other than buying situation) are selected for our theoretical frame of reference:

- time pressure
- importance of purchase
- monetary value

Another aspect that needs to be considered concerns the nature of the buyer-seller relationships in the capital equipment for mining production (CEMP) market. The authors' preunderstanding of the mining industry supported by a pilot study (Baptista and Forsberg, 1994), indicates that even when applying a worldwide perspective, and most definitely in a regional perspective, the number of actors in the market (buyers and sellers of CEMP) is restricted to only a few. Due to this limited number, buyers are usually quite well informed about the products and other characteristics concerning the very few potential suppliers. Therefore, we believe that the frame of reference needs to provide the possibility to evaluate effects of this possible structure of the market, within an inter-organizational setting. Campbell's (1985) proposed classification of buyer-seller relationships enfoils the interplay of marketing and purchasing strategies, leading to a characterization of the market structure (Figure 18). This conceptual framework is thus included in our theoretical frame.
### Figure 18: Classification of Buyer-Seller Relationship
(Campbell, 1985, p.37)

<table>
<thead>
<tr>
<th>Competitive Purchasing</th>
<th>Cooperative Strategies</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Independent Perfect Market</td>
<td>2 Mismatch</td>
<td>3 Independent Seller’s Market</td>
</tr>
<tr>
<td>4 Mismatch</td>
<td>5 Interdependent Domesticated Market</td>
<td>6 Dependent Captive Market</td>
</tr>
<tr>
<td>7 Independent Buyer’s Market</td>
<td>8 Dependent Subcontract Market</td>
<td>9 Mismatch</td>
</tr>
</tbody>
</table>

Our selection of metal mining companies for this study will be developed in the methodology chapter. However, since differences between the organizations will probably occur, as well as differences in their perceptions and behavior towards different suppliers can be expected, organizational and other inter-organizational factors (other than the structure of the market previously referred) need to be considered.

The conducted literature review regarding the organizational factors has shown that size is found to affect the organizational buying, and it will therefore be included in our theoretical frame. Moreover, the organizations under study are mining organizations which are usually relatively large corporations with different operating units that are highly production oriented. Thus, we find it appropriate to include organizational factors such as the company’s orientation and degree of centralization or differentiation. The following studies are selected as they have addressed these issues and can provide a suitable theoretical support: Sheth’s (1973) proposed company-specific factors (orientation, size, and degree of centralization), and Johnston and Page’s (1990) concept of organizational differentiation.

Concerning the inter-organizational factors, the literature overview shows that it is a growing area of research with many different aspects being pursued by different authors. In this research study we will limit the investigation of the factors related to the inter-organizational setting to the
perspectives of the buying organizations on buyer-seller relationships and the negotiation strategies adopted. Studies that have dealt with these aspects and may serve as a theoretical basis include Perdue and Summers (1991); Han, Wilson and Dant (1993); and Metcalf and Frear (1993).

Finally, since our study concerns IBB in two different countries (Sweden and Poland) and the literature has provided examples of a rather special industrial environment in Poland, we believe it is essential to include factors concerning the environment in our frame of reference. Among the factors, which can be included, the overview of literature has indicated that economical, political, legal, and social factors are important environmental aspects that need consideration. The following studies are selected as a means to provide a theoretical basis for the investigation of these aspects: Webster and Wind (1972b); Mattsson (1988); Domanski and Guzek (1992); and Jaworska (1992). The selection of the two final studies is essentially motivated due to their focus on Poland.
2.4 System Models and Other Major Conceptualizations

In this section we will present a chronological review of some of the system models and other major conceptualizations in the field of OBB. By system models it is meant those models which “attempt to classify the variables of organizational buying behavior and to arrange them in a system of mutual dependence” (Backhaus and Koch, 1985, p.376). Other major conceptualizations comprise key conceptualizations of organizational buying behavior where sets of variables are put forward and relations between these variables are proposed.

According to Webster and Wind (1972b) a “buying situation is created when some member of the organization perceives a problem that can be solved through purchasing action” (op.cit.,p.34).

In an attempt to determine who in the buying organization is involved in the buying process, the term buying center is created, and refers to those people in the organization who are related to the purchasing process (buying influences). The authors further define five buying roles within the buying center: users, deciders, influencers, buyers and gatekeepers.

- users - actually use the purchased product
- deciders - select the vendor / supplier of the product
- influencers - add information or decision criteria to the decision process
- buyers - execute the contractual arrangements
- gatekeepers - control the flow of information into the buying center

Webster and Wind consider four sets of variables as determinants for the decision-making process in a buying situation. These are environmental, organizational, interpersonal (the buying center) and individual (Figure 19).
Figure 19: The Webster and Wind Model of Organizational Buying Behavior
(Webster and Wind, 1972b, p.15)
Buyers are strongly influenced by environmental factors such as politics, economy, technology, laws, culture, and physical variables (climate, location, etc.). This influence, coming from outside the organization, is exercised by different types of organizations (Labor unions, government, suppliers, customers, trade associations, professional groups, other business and social institutions) and produces and defines, according to the model:

- information flow into the buying organization
- availability of goods and services
- general business conditions
- values and norms

Another set of variables that strongly influences buying behavior is the organizational factors. Webster and Wind divide these factors into four organizational sub-systems: technology, structure, tasks and goals, and people. These sub-systems "interact with one another to determine organizational functioning and define for individuals within the buying center the information expectations, goals, attitudes, and assumptions used in their decision making" (op. cit., p. 37).

The third set of variables considered by this model is the interpersonal determinants of buying behavior. The functioning of the buying center is analyzed in terms of the different social roles played by the participants (users, influencers, buyers, and gatekeepers). "The output of the group decision-making process is not only a solution to the buying problem but also a non-task satisfactions and growth for the group and its members" (op. cit., pp. 38-39).

The fourth and final set of variables considered is the individual participants. Individual variables such as personality, motivation, perceived roles, cognitive structure and learning process are brought into the decision-making process as, "only individuals can define problems, decide, and act" (op. cit., p. 39).

Another generic model is proposed by Sheth (1973). The Sheth model proposes the analysis of industrial buying behavior in terms of three sets of variables:

1. The "psychological world" of the buying participants.
2. The factors that influence decision-making.
3. The process of joint decision-making.

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The model is summarized in Figure 20 and is mainly concerned with joint decision making with emphasis on the psychological characteristics of individual behavior.

According to this model the differences among buyers' expectations (motives) are the result of the effect of the following variables: (1a) the background of the individuals; (1b) their information sources; (1c) active search; (1d) perceptual distortion; and (1e) satisfaction with past purchases. This set of variables will determine the buying expectations (motives) of each participant. These different expectations lead to conflict, referred in the model as (3) conflict resolution.
Figure 20: The Sheth Model of Organizational Buying Behavior (Sheth, 1973, p.51)
The model also considers the different set of variables that lead to autonomous vs. joint decisions. These variables are referred in Figure 20 as (2a) - Product specific factors and (2b) - Company specific factors. They are identified as time pressure, perceived risk and type of purchase (2a), and organization orientation, size and degree of centralization (2b). All these variables influence the industrial buying process. For example, a high-perceived risk decision will most probably lead to a joint decision whereas a low perceived risk decision may result in an autonomous decision.

The situational factors, referred as (4) in Figure 20, include strikes, supply shortages, etc. However, due to their broadness, the model provides no insight on their impact on the buying process.

The Sheth model attempts a conceptualization of the buying process. It's major strength can be said to be to provide an analytical framework to variables like buyers' expectations, perceptions, role orientations, life styles, and perceived risk.

The presentation by Hillier (1975) includes new or modified conceptualizations and/or definitions in five areas:

1. A new taxonomy of industrial purchase categories.
2. The concept of three different buying processes.
3. The duration of the corporate industrial buying process as a function of three types of complexities.
4. The delineation of four major decision areas.
5. The "atomic" model of the decision unit and it's influences.

The proposed new taxonomy of industrial purchases is based on the consumers' viewpoint:

1. Production services: those background services that augment the production process.
2. Production facilities: those physical goods or facilities that constitute the means of production either directly or indirectly, for the organization purchasing the industrial goods.
3. Product constituents: those goods, which are purchased by an organization for incorporation, either in their original form or some adaptation thereof, into the consumer's final product.
4. Product transformers: those products which help to transform (i.e. without necessarily forming an integral part of), the initial
product supplied by manufacturers, into the product eventually sold in the market place.

The three different buying processes usually involved in industrial buying are described as:

1. The individual process (the one each individual goes through when involved in the purchase).
2. The intercompany functional industrial buying process (between supplier and customer).
3. The corporate industrial buying process (takes place solely within the buying organization).

The duration of the corporate industrial buying process is described as a function of three elements:

1. The technical complexity of the product.
2. The commercial complexity of the negotiations.
3. The behavioral complexity of human interaction.

The following major decision areas identified in the process, each consisting of multiple (incremental) decisions:

1. Precipitating of the purchase.
2. Product specification.
3. Supplier selection.
4. Commitment to the supplier due to degree of satisfaction shown towards the purchase.

Finally he develops a group model of the decision unit and its influences (the "atomic" model):

1. The decision unit as the nucleus.
2. The control unit as the primary shell.
3. The internal information unit as the secondary shell.
4. The external information unit as the tertiary shell.

Bonoma, Bagozzi and Zaltman (1978) argue for a major shift in perspective, to what they call the "dyadic paradigm". They compare the basic views of the dyadic paradigm (interdependence, exchange, etc.) with what they call the "unit paradigm" with its basic stimulus-response view of buying behavior, and use Sheth’s model as an example of the unit paradigm. The proposed new perspective is based on three issues:
“(1) behavior, of whatever kind, can not be analyzed or explained independently of the context in which it occurs; (2) to ‘reduce’ explanations into constructs (however simple) which violate the structure of the interaction under consideration, is to guarantee confusion, and, most importantly; (3) since marketing is a social activity, marketers should adopt a social perspective for marketing analyses” (op. cit., p. 53).

In the presentation of a framework for viewing behavior in the “market dyad” four classes of variables are identified:

1. Relational variables with the source in the interaction. Examples include dependence, power, influence, conflict, reciprocity, exchange, intensity, and competition.
2. Social structural variables emerging from the situation. Examples of these variables are third party interdependence (i.e. social structure in the purchase department) and horizontal and vertical differentiation (between the actors in the dyad).
3. Social actor variables located in the actors. Theoretical examples are given as comparison levels, history of reward, personality characteristics (within actor structure) and capabilities and resources of actors.
4. Normative variables with location or source in the interaction, the situation, and the actors. The normative variables are classified into three categories: Individual norms (“basic” personal orientation), relational norms (“how the interaction should be”), and situational norms (alternative behavior due to circumstances). Examples are given as: social norms, roles and standards, and role expectation.

An example of the use of the dyadic paradigm is provided from the observation of a “purchasing agent - salesman interaction” in terms of the four concepts of: credibility, status inconsistency, empathy, and interpersonal attraction. They conclude that the dyadic paradigm change the focal unit to the relationship. Furthermore, they state “Perhaps the two most important implications of this shift is that it changes the way the investigator poses the questions and it changes his basic way of viewing the situation” (op. cit., p. 66).

The interaction approach has been presented by different authors active in the IMP group. Cunningham gave the first presentation in 1980 followed by a more comprehensive discussion by Hallén (1982).
In his article Cunningham (1980) presents an interaction model of industrial marketing and purchasing on behalf of the International Marketing and Purchasing (IMP) group. The IMP group includes researchers from France, Germany, Italy, Sweden and United Kingdom. The original IMP research project was an international, cross-sectional study aimed at understanding the nature of buyer-seller relationships. Over 300 companies covering 15 different industries in 5 countries were included in the study. The focus of the research presented in this article is on the relationships between buying and selling companies (within and between five European countries).

The interaction approach presented by Cunningham challenges the traditional ways of examining industrial marketing and purchasing in four major aspects:

1. It emphasizes the importance of the establishment and maintenance of relationships between suppliers and customers instead of analyzing discrete purchasing decisions.
2. It argues for the necessity of examining the interaction process between specific buyer and seller firms where either party may be taking the more active role in the transaction. This is in contrast to the view of industrial marketing as manipulating the marketing mix variables by suppliers in order to achieve a response from a generalized, and by implication, passive customer market.
3. It believes that the, “relative stability of industrial market structures, where buyer and seller know each other well and are aware of any movements in the buying or selling market” (op.cit.,p.323) is more relevant than the view of a market consisting of large number of buyers and sellers with easy and rapid changes in the structure.
4. It finally emphasizes, “the similarity of tasks of buyers and sellers in industrial markets” (Ibid) where both parties are searching suitable trading partners.

The research model recognizes four main groups of variables that describe and influence the interaction:

1. Variables relating to the elements and processes of interaction (product and services, information, finance and social value).
2. Variables characterizing the parties involved, both as organizations and as individuals (technology, organization size, structure and experience, individuals).
3. Variables describing the environment in which the interaction takes place (market structure, dynamism, internationalization of the market, social system and cultures).
4. Variables serving to portray the atmosphere affecting and affected by the interaction (power and dependence, cooperation and closeness).

Another model proposed by Andersson and Chambers (1985) focuses on reward/measurement systems of organizational buying behavior. They use expectancy theory and emphasize the role of reward and measurement systems in motivating purchasing process participants. The model consists of two submodels: the motivation model and the group consensus model.

1. In the motivational model they discuss the role of extrinsic (rewards from the organization) and intrinsic rewards (those which the gives to him- or herself) and the measurement system. In their discussion emphasis is put on the problems with measuring systems and the use of performance surrogates to judge employee performance. In their discussion on implications they state “Imperfect measurement and the use of performance surrogates can actually encourage behavior which is dysfunctional from the standpoint of organizational objectives” (op.cit.,p.13).
2. In the consensus model the authors discuss the interaction process among the buying unit members in order to reach a group decision. The authors refers to two empirical studies, one testing the core concepts of the model and another representing an extension of some of the models implications. The results are regarded as support for the model: “While the results of both studies are consistent with the reward/measurement perspective, much theoretical, conceptual, and empirical work remains to be done” (op.cit.,p.20).

Mattson (1988) presents a model of IBB that was developed in connection with a literature review implemented for a field study concerning transportation purchasing. The model is built mainly on variables that have been widely tested in earlier studies. However, some new untested variables are introduced because the author found that the literature suggested such variables as being important. The model is composed by four major groups of variables (Figure 21).
Figure 21: A Model for Determining the Composition of the Organizational Buying Center
(Mattsson, 1988, p.207)
The following "new untested variables" might be noted: the introduction of buyer mission in the model provides a possibility to include the importance of the product to the buying firm. The BUYGRID variables are in this model complemented with the variable dollar value and complexity. Dollar value is believed to be an important factor that has been given to little attention (often used as ceilings when delegating authority to purchasing agents). The variable product life cycle focuses on the influence from the stage of the buying company's product in product life cycle. Time commitment focuses on the influence of the length of the relationship between seller and buyer. Finally, the author introduces the variable procurement in order to consider the effects of variations in the power of the purchasing function in the buying company's organization. This is due to the, for instance, hierarchical level.

The model proposed by Samli, Greval and Mathur (1988) is designed in order to satisfy the needs of a model of industrial buyer behavior in an international perspective. They discuss the models of Webster and Wind (1972b), Sheth (1973) and Anderson and Chambers (1985) and conclude, "After reviewing these important industrial and organizational models, it became evident that they are mainly proposed for the United States" (op.cit.,p.21). The authors of the international industrial buying behavior model (IIBBM) emphasize, "four distinct features that differentiate it from previous domestic models and make it operational in world markets" (Ibid):

1. The use of an input-output format is believed to be the most appropriate way to incorporate the significant variation in influencing factors at the international level.
2. The recognition that certain outcomes of the buying decision may be of extrinsic or intrinsic value which might affect the motivation level of the buying unit members to such an extent that it would result in purchases being made prior to the needs being clearly identified.
3. The model identifies and prioritizes the influencing factors of international industrial buying behavior and develops a composite index utilizing a multi-attribute technique.
4. The model recognizes that the international buying process is basically different from the domestic buying process due to the multitude of influencing factors.
The model uses 34 different factors as variables included in the following sets of variables:

- individual factors
- environmental factors
- organizational factors
- government and regulatory factors
- societal / cultural factors
- uncertainty factors

The authors propose the development of an international industrial buyer behavior index based on these 34 factors and present a hypothetical evaluation for a particular country. However, they state “It must be emphasized that this is only one approach to this critical topic. Future research needs to focus on operationalization and measurements aspects of the proposed IIBBM” (op.cit., p.26).

The “Nielsen Box-Model”, was first presented in 1973 and has later been revised. A presentation of the developed model is given in Domanski, Freytag, Guzek and Nielsen (1991). The model is based on three primary dimensions. The first one being the buy class as described by Robinsson, Faris and Wind (1967): New Task, Modified Rebuy and Straight Rebuy. The second dimension is a description of the buying process as four “decision knots”: the strategic-choice decision, the technical-choice decision, the commercial-choice decision, and the transactional-choice decision. The third dimension is the factors influencing the buying behavior and here the classification from Webster and Wind (1972) is used: Environmental, Organizational, Social, and Individual. These three dimensions become 3x4x4 = 48 boxes (or cells). Each of these boxes contains a fourth set of factors which influence the basic buying behavior and those that influence the specific buying situation. It is argued that empirical research on the buy stages has shown a lot of variance and therefore the decision knots are introduced since the decisions associated to each knot will always have to be taken (prior to or during the purchasing process).

The four decision knots primarily include the following types of decision areas:
• the strategic-choice decision: decisions perceived to be important to the future business
• the technical-choice decision: decisions concerning functional needs
• the commercial-choice decision: decisions related to supplier selection
• the transactional-choice decision: decisions concerning order routines, etc

Concerning the fourth set of factors, it is argued that the buying behavior for a given product, at a given point in time, will be influenced by past experience, by the company, and by the individuals (i.e. factors influencing the basic buying behavior pattern). Moreover, the situational factors concerning the specific purchase are also affecting the buying behavior.

It is also emphasized that: “The model implies that, in order to describe and, particularly, to understand the buying behavior related to any product or service, it is necessary to apply a holistic view of the company in question” (op. cit., p. 12).

2.4.1 Evolved Patterns from Reviewed Literature on System Models and Other Major Conceptualizations

To summarize the review on System Models and other Major Conceptualizations please refer to Table 15.

Table 15: Summary of the Reviewed System Models and Other Major Conceptualizations of IBB.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Proposed Model / Major Conceptualization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Webster and Wind</td>
<td>1972</td>
<td>A General Model for Understanding Organizational Buying Behavior</td>
</tr>
<tr>
<td>Sheth</td>
<td>1973</td>
<td>The Sheth Model of Industrial Buyer Behavior</td>
</tr>
<tr>
<td>Hillier</td>
<td>1975</td>
<td>&quot;Atomic model&quot;</td>
</tr>
<tr>
<td>Bonoma, Bagozzi and Zaltman</td>
<td>1978</td>
<td>The Dyadic Paradigm</td>
</tr>
<tr>
<td>Cunningham</td>
<td>1980</td>
<td>The Interaction Approach</td>
</tr>
<tr>
<td>Andersson and Chambers</td>
<td>1985</td>
<td>Motivation model and the group consensus model</td>
</tr>
<tr>
<td>Mattson</td>
<td>1988</td>
<td>IBB Model</td>
</tr>
<tr>
<td>Samli, Grewal and Mathur</td>
<td>1988</td>
<td>IIBB - International Industrial Buying Behavior Model</td>
</tr>
<tr>
<td>Domanski et al.</td>
<td>1991</td>
<td>The &quot;Nielsen Box-Model&quot;</td>
</tr>
</tbody>
</table>
In the former section we have examined some of the most often quoted system models and other major conceptualizations, which have contributed to the development of the body of knowledge of IBB and OBB. It can be noticed that the models often differ in terms of their “core” conceptualizations (e.g. Webster and Wind, 1972 focus in the interacting set of environmental, organizational, interpersonal and individual factors; Hillier’s approach focuses on product complexity and human interaction; the “dyadic” approach focuses on relational, social structural, social actor and normative variables; etc.). However, a common denominator is that most of the proposed models include a large number of variables which evidences the complexity of studying IBB from a system perspective.

The conducted review of system models will not serve as a basis for formulation of any specific research question, however, their content will be considered when developing the final research questions for this study.
2.5 Summary and The Study’s Research Questions

In the previous sections of this chapter we have presented an overview of a selected bibliography concerning IBB. As mentioned previously (Chapter 2, section 2.1, Introduction), the selection was based on the research problem presented in the end of chapter one, and also to some extent on the degree of general recognition of importance in studies by scholars in the area of IBB. Additionally, examples of recently published reviews were presented.

A wide number of conceptual and empirical studies ranging within a four-decade period (1955 to 1996) were reviewed. This study’s overview of literature was structured based on Wind and Thomas’s (1980) categorization of the organizational buying behavior literature, based essentially on academic studies.

The three categories, as proposed by Wind and Thomas include: (1) the organizational buying process, (2) the buying center, and (3) the factors influencing the organizational buying center and process. Each of these major components of IBB was reviewed and research questions were formulated. Based on these, studies were selected, as those who provide the conceptual basis who enables the creation of the theoretical frame of reference required for this study’s implementation. Finally, some system models and other major conceptualizations were delineated.

The review of system models and other major conceptualizations did not provide basis for formulation of additional research questions due to the fact that the basic constructs contemplated in the presented system models are already taken into consideration in the research questions. As presented, the models often differ in terms of their core conceptualizations, but most of the basic constructs (e.g. buying process, buying center, environmental, situational, organizational) are common among them, and are already considered within the scope of research questions (buying center, buying process, and factors affecting the former). This study’s research problem and research questions are:

**Research Problem:**

How can the *industrial buying behavior* of the Swedish and Polish metal mining companies be characterized concerning the purchase of capital equipment for mine production (CEMP)?
Research Questions:

- How can the buying process of CEMP in Swedish and Polish metal mining companies be characterized?

- How can the buying center of Swedish and Polish metal mining companies be characterized when purchasing CEMP?

- Which are the most significant factors that affect the buying process and buying center in Swedish and Polish metal mining companies concerning the purchase of CEMP?

This study’s research problem has been defined and the overview of literature has led to a set of research questions, some further theoretical tools needed for this study will be discussed (based on our prior selection of studies) and subsequently a theoretical frame of reference will emerge in the next chapter.
3 Chapter Three: Frame of Reference

3.1 Introduction

This chapter will define our frame of reference for the study. The basis for the development of the frame of reference will be the research questions and their related theoretical areas put forward in chapter two. First, we will conceptualize the issues related to our research questions, and second, an operationalization is developed. Finally, the emerged frame of reference is presented.

3.2 Conceptualization

The basis for this study's conceptualization, is, as mentioned previously, the formulated research problem and research questions, as well as the associated theoretical areas selected in the former chapter. The study's research problem and the research questions posed were:

How can the *industrial buying behavior* of the Swedish and Polish metal mining companies be characterized concerning the purchase of capital equipment for mining production (CEMP)?

RQ1: How can the *buying process* of CEMP in Swedish and Polish metal mining companies be characterized?

RQ2: How can the *buying center* of the Swedish and Polish Metal Mining companies be characterized when purchasing CEMP?

RQ3: Which are the most significant *factors that affect the buying process and buying center* in Swedish and Polish metal mining companies concerning the purchase of CEMP?

In order to provide the means for the development of the conceptual framework for this study, the following models / concepts were selected in chapter 2 (Table 16):
Table 16: Selection of Models/Concepts for this study’s conceptual framework

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Theoretical Area</th>
<th>Selection of Models/Concepts and Correspondent References</th>
<th>Reasons for Selection Provided in Section, Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Buying Process</td>
<td>• Buypieces</td>
<td>2.3.1.9, pp.46-47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The buygrid framework, Robinson et al., 1967</td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>Buying Center</td>
<td>- Composition</td>
<td>2.3.2.5, p.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dimensions of the buying center</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Johnston and Bonoma, 1981; Domanski and Guzek, 1992</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Roles</td>
<td>2.3.2.5, pp.73-74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Roles of decider, influencer, gatekeeper, buyer, user</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Webster and Wind, 1972b</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Role of Initiator</td>
<td>2.3.2.5, p.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bonoma, 1982</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Influence</td>
<td>2.3.2.5, p.74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Influence measured through the lateral and vertical involvement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Johnston and Page, 1990</td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td>Factors That Affect IBB</td>
<td>- Buying Situation</td>
<td>2.3.3.8, pp.110-111</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Buyclasses: new-task, modified-rebuy, and straight-rebuy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Robinson, Faris and Wind, 1967</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Other Product Specific Factors</td>
<td>2.3.3.8, pp.111-113</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Time pressure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sheth, 1973</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Monetary value</td>
<td>2.3.3.8, pp.111-113</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mattson, 1988</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Importance of the purchase</td>
<td>2.3.3.8, pp.111-113</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patchen, 1974; Grönhaug, 1975; Mattsson, 1988; McQuiston, 1989; Johnston and Page, 1990</td>
<td></td>
</tr>
</tbody>
</table>

(Continued next page)
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Theoretical Area</th>
<th>Selection of Models/Concepts and Correspondent References</th>
<th>Reasons for Selection Provided in Section, Page</th>
</tr>
</thead>
</table>
| #3 (continued)    | - Organizational Factors       | - Size  
                      Sheth, 1973; Johnston and Page, 1990 
- Orientation  
                      Sheth, 1973 
- Degree of centralization, differentiation  
                      Sheth, 1973; Johnston and Page, 1990                                              | 2.3.3.8, p.114 |
|                   | - Inter-organizational Factors | - Structure of the Market  
                      Campbell, 1985 
- Effect of high perceived product importance on buyer-seller relationships  
                      Metcalf and Frear, 1993 
- Long-term relationships perceived advantages  
                      Han, Wilson and Dant, 1993 
- Negotiation strategy  
                      Perdue and Summers, 1991                                                          | 2.3.3.8, pp.113-114 |
|                   | - Environmental Factors        | - Economical, political and legal, social  
                      Webster and Wind, 1972b; Mattson, 1988; Domanski and Guzek, 1992; Jaworska, 1992 | 2.3.3.8, p.115 |
At this point, it is also essential to briefly describe how we perceive the major interactions between these concepts.

The *industrial buying decision process*, being the most accessible feature for observation, provides the “backbone” of our conceptual framework. This buying decision process is conducted and executed by members of the *buying center* composed of individuals from often-different functional areas within the buying company. The *composition* and interpersonal *influence* patterns in the buying center might, or most probably will, vary during the execution of the buying decision process. The *roles* of different individuals and functional areas may also vary. It should be noted that one individual might play different roles in different phases of the buying process, or he/she might even play multiple roles during a single phase of the process. Moreover, prior to and during the buying decision process, the members of the buying center will be influenced by a large number of different factors in a complex interaction pattern.

Among the factors, which affect the buying decision process and buying center members, the *buying situation and other product specific factors* have been a major area of research in the IBB literature. We have selected from the reviewed literature what we find to be the most relevant factors attending to our research problem and subsequently formulated research questions. Among the product specific factors (other than the buying situation), a discussion was implemented in chapter two concerning perceived risk, time pressure, complexity, importance, uncertainty, and monetary value. In our conceptual framework, time pressure, monetary value, and importance of the purchase were selected as those factors that best serve the purpose of this study.

The literature review concerning the *organizational factors* such as size, orientation, and organizational differentiation has clearly indicated that these factors need to be included in the conceptual framework of this study. Additionally, findings obtained in a previously implemented pilot study in this line of industry (Baptista and Forsberg, 1994) reinforce this inclusion.

The literature review regarding the *inter-organizational and environmental factors* has shown that diverse issues are pursued and different concepts are defined. The literature review has also shown us that a clear-cut distinction as to what factors are to be classified as inter-organizational or environmental is not possible in many cases. An overlap among these sets of factors occurs and is quite natural since the definition of the environment will be a result of the definition of the object of study (which in this
particular study are the metal mining companies). Moreover, the statement by Anderson, Håkansson and Johanson (1994) reinforces this line of reasoning: “The environment is not completely given by external forces but can be influenced and manipulated by the firm, and there will also exist external, known actors that are influencing some of the firm’s internal functions” (op.cit.,p.4). Based on this view we will define which factors or aspects we will include in each of the two levels of factors:

- the inter-organizational which include a number of variables related to the inter-organizational relationships between buying and selling organizations, and
- the environmental which include those factors which are external (other than those already reflected within the inter-organizational setting) to the buying organizational. These variables are what Mattson (1988) refer to as variables which set the general scenario, and hence affect in some way all other factors, and consequently the decisions of the organizations.

The selection of inter-organizational factors is based on the aspects and concepts which have been pursued in a significant number of previous studies, and also to a great extent on the combined preunderstanding of the authors of the mining industry. Hence, the classification of buyer-seller relationships, structure of the market (as proposed by Campbell, 1985) is an aspect which needs to be discussed as it will set the scenario for buyer-seller relationships in the CEMP market. Other aspects, which can be included in the inter-organizational context relate to the expected high-perceived product importance that will most probably affect the nature of buyer-seller relationships. A number of studies have also addressed the negotiation strategies adopted by the buying firm as an inter-organizational factor affecting the buying process and buying center. Finally, the aspect of long-term relationships is included due to its relevance in the theory reviewed.

Among the environmental factors, economic, political and legal, and social factors constitute a basis for understanding the scenario in which IBB of the mining companies when purchasing CEMP takes place. This also implies that the environmental factors will be of a fundamental importance when comparing decisions and actions in different environments.

Finally, and due to the mainly exploratory purpose of this study, and thereby more emphasis on overview than detail, we have chosen not to include personal and interpersonal factors in our frame of reference.
3.3 Operationalization

In this section, the concepts and variables that have been selected for the frame of reference of this study will be further developed in order to provide basis and means for observation and measurement.

3.3.1 The Buying Process

The operationalization of the buying process will be based on the buygrid framework of Robinson, Faris and Wind (1967). The reasons previously mentioned (see section 2.3.1.9, pp.46-47) regard the high degree of recognition of this framework in the field and it's ease of operationalization due to it's descriptive character. The focus will thus be on observing the number and content of successive decision stages during the purchasing process. The eight buyphases as defined in the buygrid framework are the following:

1. Anticipation or recognition of a problem (need) and a general solution
2. Determination of characteristics and quantity of the needed item
3. Description of characteristics and quantity of the needed item
4. Search for and qualification of potential sources
5. Acquisition and analysis of proposals
6. Evaluation of proposals and selection of supplier(s)
7. Selection of an order routine
8. Performance feedback and evaluation

3.3.2 The Buying Center

Our operationalization of variables describing the buying center will be based on the studies by Johnston and Bonoma (1981) concerning the dimensions of the buying center and on the roles proposed by Webster and Wind (1972b) and Bonoma (1982). The final concept that will be employed in order to describe the buying center is differences in influence between the participants.

The operationalization proposed by Johnston and Bonoma (1981) is selected (with exception for the dimension of lateral involvement) due to the fact that it is widely recognized by scholars in the field, together with the fact that it is has been employed and also validated concerning purchases
of capital equipment (see also discussion in section 2.3.2.5, p.69). The proposed measures concerning buying center dimensions are:

- vertical involvement: measured as the number of levels of the organization’s authority hierarchy exerting influence and communication within the buying center
- extensivity: measured as the total number of individuals involved in the buying process
- connectedness: conceptualized as the degree to which the members of the buying center are linked to each other by directly communications concerning the purchase. This concept is evidently less direct since it includes more of a subjective evaluation of what type of communication that actually took place during the purchasing process. In our study we will focus and thus operationalize this concept as the degree of involvement and thus anticipated communication in groups formed during the purchase as opposed to temporarily or more distal positions during the purchasing process
- centrality: conceptualized by Johnston and Bonoma as how central the purchasing manager is in the communication network. However, studies have shown that the purchasing manager or purchasing agent is not always in a position that is central in the purchasing network. Therefore, we will operationalize this concept as the function or position that is performing the task as a leader (coordinator) of information gathering, processing and evaluation. Hence, the identification of who has an overall responsibility to carry the purchasing process forward and thus is functioning as a center for the communication during the purchasing process

Instead of lateral involvement as proposed by Johnston and Bonoma, a function/departmental involvement dimension is adopted as to provide means to detect eventual involvement in the purchases of CEMP of persons with certain functional responsibilities (inside or outside the company). Hence, this buying center dimension is measured as:

- function/departmental involvement measured as the total number of different functions, departments and divisions involved in the buying process

Concerning the roles performed in the buying center during the purchasing process, the conceptualizations and operationalizations made by Webster and Wind (1972b) and Bonoma (1982) will be utilized. The selection is due mainly to the high degree of applicability of this concept found in literature (see also section 2.3.2.5, pp.73-74).
• initiator: operationalized as the person or function initiating the buying process
• decider: operationalized as the person or function that makes the (formal) decision (yes or no) concerning vendor and product
• influencers: operationalized as those persons or functions who "have a say" concerning the purchase
• purchaser: operationalized as the person or function who obtains the product
• gatekeeper: operationalized as the person or function who controls information (and might even control vendors access) to decision makers
• users: operationalized as the person or function who is the actual user (consumer) of the product

Finally, in respect to measuring influence in the buying center, we have selected to follow the approach employed by Johnston and Page (1990). The reason for selecting this approach is due essentially to the exploratory nature of this study and the recognized difficulties of effectively measuring influence found in the literature which induces a more indirect approach (see also section 2.3.2.5, p.74). Hence, influence is operationalized as:

• the degree of involvement (lateral and vertical) during the different decision stages as a substitute for a direct measurement of influence

3.3.3 Factors Affecting the Buying Process and the Buying Center

3.3.3.1 Buying Situation

Our selection of the buygrid framework as a frame of reference concerning observation and description of buying situation provides us with an extensively tested and thus validated tool for observation of the buyers' perception of differences between buying situations concerning newness, information requirements, and search for alternatives (Table 17):
Table 17: Distinguishing characteristics of buying situations

<table>
<thead>
<tr>
<th>Type of Buying Situation</th>
<th>Newness of the Problem</th>
<th>Information Requirements</th>
<th>Consideration of New Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>High</td>
<td>Maximum</td>
<td>Important</td>
</tr>
<tr>
<td>Modified Rebuy</td>
<td>Medium</td>
<td>Moderate</td>
<td>Limited</td>
</tr>
<tr>
<td>Straight Rebuy</td>
<td>Low</td>
<td>Minimal</td>
<td>None</td>
</tr>
</tbody>
</table>

Source: Robinson, Faris and Wind (1967, p.25)

An issue that needs consideration, when employing the definitions of the buying situations given by Robinson, Faris and Wind (1967) to purchases of capital equipment of often-high technical complexity is:

- when a buying situation should be regarded as a new task versus when should it be regarded as a modified rebuy

If a product for a specific purpose has been bought before, the newness of the problem cannot be considered as high (hence it is not a new task). However, if the technical development since the last purchase has been high, both the information requirements and the consideration of new alternatives may be so important that the buying situation should be considered a new task. We will therefore place more emphasis on the amount of information search and the consideration of new alternatives rather than newness of the problem when labeling a specific buying situation as new task or modified rebuy.

3.3.3.2 Other Product Specific Factors

From the discussion carried out in chapter two when selecting the areas/concepts regarding other product specific factors (see section 2.3.3.8, pp.111-113), complementary factors to the buying situation were selected for inclusion in the frame of reference. These included time pressure, importance, and monetary value. The discussion so far has also shown that the literature provides clear evidence concerning the importance of these factors. However, their operationalization is not as evident since all these factors will be highly influenced by relative perceptions of the person providing the information. We will therefore base our observation of these
factors on an intention aimed at qualitative analysis and hermeneutic understanding. However, as a general guide:

- time pressure will be observed as the perception that a lack of time constitutes a limiting factor in performing the buying task
- importance will be observed as how vital the proper function, that is the fulfillment of the specified need, is to the production system
- monetary value will be observed either as the actual price of the equipment, or when more appropriate, as the cost of the investment

3.3.3.3 Organizational Factors

The organizational factors selected for inclusion in the frame of reference (see section 2.3.3.8, p.114) were: size, orientation and organizational differentiation.

- size will be operationalized as three different measures: annual turnover, number of employees, and total yearly mine production (measured as tonnes of mined ore). These three different measures will provide different aspects of the size of the organization and will thus provide a good base for comparison between the different cases examined in the study

- orientation has been used by researchers in order to include differences due to product orientation, technology orientation and differences due to the production technology. The determination of the company’s mission and whether the company is production, distribution, or service oriented serve as indicators for which departmental areas hold decision power and are interested in the buying decision-making process. Since we will study only one line of industry, we will attempt to increase the sensitivity in measuring this factor by including officially formulated or unofficially perceived goal(s) or strategic intent of the organizations

- degree of centralization and organizational differentiation will be considered. Differentiation is operationalized as the number of plants and separate operating locations, as one of the measurements proposed by Johnston and Page (1990). In our particular study, it means that the concept is operationalized as the number of operating mines and concentrators. Degree of centralization as an indicator of joint versus autonomous decision making will be also contemplated (Sheth, 1973)
3.3.3.4 Inter-organizational Factors

The inter-organizational factors selected for observation (see section 2.3.3.8, pp.113-115) include relationship and interaction aspects, namely:

1. The classification of buyer-seller relationships, structure of the market (Campbell, 1985).
2. The possible affect of high perceived product importance on buyer-seller relationships (Metcalf and Frear, 1993).
3. The perceived advantages with long-term relationships (Han, Wilson and Dant, 1993).

- our observations of the *structure of the market and classification of buyer-seller relationships* will be based on the matrix proposed by Campbell (1985) who proposed a description of different market types resulting from the chosen marketing and purchasing strategies of the selling and buying organizations. A preunderstanding of the mining industry leads to the inclusion of the structure of the market in the frame of reference. Even in a global perspective, the number of actors involved (potential sellers and buyers of CEMP) is restricted. The product characteristics, the buyer characteristics, and the seller characteristics are all influencing Buyer's interaction strategy (Competitive, Cooperative or Command) and the Seller's interaction strategy (Competitive, Cooperative or Command).

- *high perceived product importance* has been referred in previous literature as influencing the complexity of buyer-seller relationships (e.g. Metcalf and Frear, 1993). The nature of the product category included in this study, CEMP, together with a preunderstanding of the mining field has led to the inclusion of this aspect in our frame of reference. It's operationalization will, however, be subjective and based upon the perceptions of the respondents within each metal mining company.

- *long-term relationships* are the object of many recent studies and are thoroughly discussed in the IBB literature. The nature of the relationships between the mining organizations and their CEMP suppliers is then included in our frame of reference. The study by Han, Wilson and Dant (1993), where the perceived advantages of long-term relationships are investigated will serve as a theoretical
basis. The operationalization of these aspects is subjective and based on respondent’s perceptions

• the negotiation strategies adopted by the buying firm are another of the inter-organizational factors, which is included in our frame of reference. It’s operationalization is based upon Perdue and Summers’ (1991) two basic negotiation strategies that those involved in the buying process appear to pursue. These are problem solving, which primarily involves discovering ways to increase the benefits available in the buyer-seller relationships; and aggressive bargaining, which addresses the issue of how the available benefits are to be distributed between the two parties

3.3.3.5 Environmental Factors

As mentioned previously, the economic, political, legal, and social factors constitute a basis for the understanding of the scenario in which the IBB of the mining companies, when purchasing CEMP, occurs. The operationalization of these factors will not be clearly specified as it will be based on the perceptions of the study’s respondents as to which environmental factors they consider most influence, directly and indirectly, the issues under consideration in this study.

3.4 Emerged Frame of Reference

In the preceding sections we have conceptualized the issues to be included in our frame of reference which best provide the theoretical means to answer this study’s research problem and research questions. Second, this study’s operationalization of the concepts was developed. In this section, our emerged frame of reference is presented (Figure 22). A brief explanation of the conceptual framework is provided:

• our first concern is the identification of the buying decision process (the backbone of our conceptual framework)
• secondly, the composition, roles, and influence of the buying centers will be studied
• thirdly, the factors affecting the buying process and buying center are considered. Four levels of factors are represented in Figure 22 visualizing our conceptual framework
1. The environmental level: Which includes those factors that set the scenario and influence the company's buying behavior as a whole.

2. The inter-organizational level: The second set of factors are those related to the inter-organizational setting and selected for inclusion in our frame of reference: classification of buyer-seller relationships, high perceived product importance and long-term relationships, and negotiation strategies (interaction aspect).

3. The organizational level: The third set of factors observed focus on the buying organization's characteristics which are selected as factors that affect the buying behavior of the companies when purchasing CEMP (namely the size, orientation, and degree of centralization/ differentiation).

4. The product level: The fourth set of factors which are studied as potential influencers of the buying process and buying center are the buying situation factors and other product specific factors.

From each of these mentioned levels, arrows indicating influence are drawn to the boxes where the buying process and buying center conceptual areas are represented (Figure 22). The different levels (environmental, inter-organizational, organization, and product) affect and partly interact with each other (e.g. the environmental factors will directly and/or indirectly affect the inter-organizational setting, the organization, etc.). However, these inter-level effects are not represented in Figure 22, as they are not the focus of this study. As mentioned, it is the influence of the factors (selected within each level) on the buying center and buying process that are under investigation.
ENVIRONMENTAL FACTORS
Political – Economic – Social - Legal

INTER ORGANIZATIONAL FACTORS
Interaction - Relationship

BUYERS ORGANIZATIONAL FACTORS
Size – Orientation - Degree of centralization/differentiation

BUY CLASS
New task
Modified rebuy
Straight rebuy

OTHER PRODUCT SPECIFIC
CHARACTERISTICS
Time pressure
Importance
Monetary value

BUYING CENTER
Composition
Vertical involvement
Lateral involvement
Extensivity
Connectedness
Centrality

Roles
Initiator / Decider / Influencers
Purchaser / Gatekeeper / Users

BUYING DECISION PROCESS
(Buy phases)
1. Need recognition
2. Determination of solution characteristics
3. Description of solution characteristics
4. Search for sources
5. Acquisition of proposals
6. Evaluation of proposals; source selection
7. Selection of order routine
8. Performance evaluation

Figure 22: Emerged Frame of Reference
3.5 Summary

This chapter has provided the conceptual framework for this study. The selection of models and concepts adopted for the study was based on the selection that was implemented in chapter two (sections 2.3.1.9, pp.46-47; 2.3.2.5, pp.72-74; and 2.3.3.8., pp.110 to 115). The variables of the selected models were then operationalized in order to provide a basis and the means for their measurement. Finally, the emerged frame of reference was presented in Figure 22.
4 Chapter Four: Methodology

4.1 Introduction

This chapter presents the methodology of this study. The selected research methodology is based on the purpose of the investigation, the research problem and the research questions posed. Alternative paths are outlined and the reasoning underlying the choice of a particular one is presented.

This chapter is composed as follows:

- the purpose of the research, paradigm and method are discussed
- strategic methodological considerations are drawn and a research strategy is selected
- the study's unit of analysis is discussed and the sample of the study is specified
- data collection techniques are presented and the most suitable are chosen
- analytical considerations are taken, as those which will ultimately lead to the study's results, conclusions and/or implications, and finally
- the validity and reliability of the study's methodology are assessed

4.2 Purpose of the Research and Method

Research may be differentiated in terms of its purpose as exploratory, descriptive, or explanatory. This three-fold classification applies both to qualitative and quantitative research. According to Tull and Hawkins (1994), this categorization of research depends essentially on the type of information required to deal with the research problem.

1. Exploratory research is concerned with the general nature of the problem under investigation and the identification of the variables that relate to it. According to Yin (1994), exploratory research is used when the goal is to “develop pertinent hypotheses and propositions for further inquiry” (op. cit., p. 5). This type of research is usually involved in the tackling of a new problem/issue/topic about which little is known, so the research idea cannot at the beginning be formulated very well (Phillips and Pugh, 1994, p. 49).
2. Descriptive research, the second category, focuses on the accurate description of the variables in the problem model. The research goal is to "describe the incidence or prevalence of a phenomenon or when it is to be predictive about certain outcomes" (Yin, 1994, p.6). Philips and Pugh (1994, p.49) call it "Testing-out research" where the aim is "to find the limits of previous proposed generalizations" (Ibid).

3. Explanatory research, the third category, attempts to specify the functional relationships among variables in the problem model. Philips and Pugh (1994, p.50) call it "Problem-solving research".

In respect to our study, a categorization of the research purpose is required. With this in mind we present the formulated research problem and research questions. Again, our research problem has been defined as:

How can the industrial buying behavior of the Swedish and Polish metal mining companies be characterized, concerning the purchase of capital equipment for mining production (CEMP)?

Subsequently, these research questions were formulated:

How can the buying process of CEMP in Swedish and Polish metal mining companies be characterized?

How can the buying center of the Swedish and Polish metal mining companies be characterized when purchasing CEMP?

Which are the most significant factors that affect the buying process and the buying center in Swedish and Polish metal mining companies concerning the purchase of CEMP?

This study's research problem indicates that our aim is to obtain a holistic view of the IBB in Swedish and Polish mining companies, focusing on the general nature of the problems and the variables that relate to it. Additionally, an elaborated description of the variables is also sought. Hence, the purpose of this research study is exploratory and descriptive. This purpose is also ascertained in the research questions one and two. Regarding research question three, the exploratory aim is latent, as focus is given to the description and assessment of the relative importance of the variables selected in this study's frame of reference. Hence, the descriptive aim is dominant.
Regarding the category of explanatory research, this study’s aim is not to establish causal relationships between the variables studied. The recognized complexity of IBB and the limited amount of knowledge gathered which directly relates to this study’s research problem, does not permit us to be explanatory and predictive.

Once the research purpose is clarified, we then must ask which research method/approach will best serve the purpose of our study? Here, two choices are available: quantitative and qualitative research.

Quantitative research is commonly applied in well-defined studies governed by a set of stated hypotheses. Most of the time it is associated with a natural science mode of research, where data is obtained from samples and observations looking for relationships and patterns that can be expressed in numbers rather than words. Statistical inferences govern a positivistic (objective) analysis and the researcher is clearly distanced from the object of research.

On the other hand, qualitative research is based on data in the form of words rather than numbers. Both narrow and holistic studies may be addressed. The analytical process is hermeneutic (interpretative) and emphasis is given to description and discovery. Thought is usually not governed by a clear set of hypotheses and the researcher is allowed to “float” more freely.

Rudestam and Newton (1992, p.24) argue that “Current research in the social sciences is very steeped in the empirical and quantitative traditions”, and that most social science research implemented in the 20th century has been quantitative. However, these authors add that a recent expansion of qualitative research in the social sciences has occurred, and emphasize the need and advantages of the qualitative approach: “A countervailing trend in social science research calls for sidestepping the artificiality and narrowness of experimental studies by promoting studies that allow researchers to be more spontaneous and flexible in exploring phenomena in their natural environment” (op.cit.,p.29).

We will by now relate the above discussion concerning quantitative and qualitative approaches to the purpose of our study. As mentioned previously, the purpose of this study is to obtain an holistic view of IBB. Rudestam and Newton (1992) state that:
"The holistic approach stresses that the whole is greater than the sum of its parts. Consequently, qualitative methods seek to understand phenomena in their entirety in order to develop a complete understanding of a person, program, or situation."

(op.cit., p.32)

According to another scholar, Polkinghorne (1991), qualitative methods are especially useful in the "generation of categories for understanding human phenomena and the investigation of the interpretation and meaning that people give to events they experience" (quoted by Rudestam and Newton, 1992, p.31).

In summary, the following reasoning underlies the selection of the qualitative approach as the most suitable for this investigation:

- the purpose of obtaining an holistic view of IBB, a complex phenomena which needs to be embraced in its' entirety
- the human involvement, meaning that personal inputs are essential and determinant

4.3 Theoretical Paradigms and Perspectives

After having defined the approach/method of this study as qualitative, it is appropriate to clarify which abstract principles and basic beliefs are guiding our research. These principles combine beliefs about ontology ("What is the nature of reality?", Denzin and Lincoln, 1994, p.13), epistemology ("What is the relationship between the inquirer and the known?", Ibid), and methodology ("How do we know the world, or gain knowledge of it?" Ibid). Guba and Lincoln (1994) define, at a general level, four major interpretative paradigms which structure qualitative research within the realm of social sciences: positivist, postpositivist, critical theory\(^{10}\), and constructivism.

The positivist and postpositivist paradigms "work from within a realistic and critical realistic ontology and objective epistemologies, and rely upon experimental, quasi-experimental, survey and rigorously defined qualitative methodologies" (Ibid). Critical theory assumes a "materialistic-realist ontology; subjectivist epistemologies and naturalistic methodologies\\(^{10}\)\

\(^{10}\) The term critical theory is used by Denzin and Lincoln (1994), as "denoting a set of several alternative paradigms, including additionally (but not limited to) neo-Marxism, feminism, materialism, and participatory inquiry. Indeed, critical theory may itself usefully be divided into three substrands: poststructuralism, postmodernism, and a blending of these two" (p.109).
(usually ethnographies) are also employed. Empirical materials and theoretical arguments are evaluated in terms of their emancipatory implications” (op.cit., p.14). Finally, the constructivist paradigm “assumes a relativist ontology (there are multiple realities), a subjective epistemology (knower and subject create understandings), and a naturalistic (in the natural world) set of methodological procedures. Findings are usually presented in terms of the criteria of grounded theory” (op.cit., pp.14-15).

In our study, our ontological, epistemological, and methodological assumptions lead us to select the constructivist paradigm. Hence, realities are multiple and dependent on the individual persons or groups which hold the constructions. Knowledge consists of those constructions about which a certain consensus is attained in a substantive, grounded theory. Multiple “knowledges” may coexist, and constructions are subject to continuous revision. The constructivist paradigm is also the one which best suits the exploratory and descriptive purpose of this study. Guba and Lincoln (1994) summarize paradigm positions on selected practical issues in the following way (Table 18):

<table>
<thead>
<tr>
<th>Issue</th>
<th>Positivism</th>
<th>Postpositivism</th>
<th>Critical Theory et al.</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inquiry aim</td>
<td>Explanation: Prediction and control</td>
<td>Critique and transformation; restitution and emancipation</td>
<td>Understanding; reconstruction</td>
<td></td>
</tr>
<tr>
<td>Nature of knowledge</td>
<td>Verified hypothesis</td>
<td>Nonfalsified hypotheses that are probable facts or laws</td>
<td>Structural / historical insights</td>
<td>Individual reconstruction coalescing around consensus</td>
</tr>
<tr>
<td>Knowledge accumulation</td>
<td>Accretion – “building clocks” adding to “edifice of knowledge”; generalizations and cause-effect linkages.</td>
<td>Historical revisionism; generalization by similarity</td>
<td>More informed and sophisticated reconstructions; vicarious experience</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Guba and Lincoln (1994, p.112)

4.4 Research Strategy

The selection of the research strategy employed in our study involves a clear focus on the formulated research problem and research questions, the exploratory and descriptive purpose of the study, the qualitative method and constructive perspective.
Yin (1994) identifies five major research strategies in the social sciences: experiments, surveys, archival analysis, histories, and case studies. The selection of any of these strategies depends on three conditions:

1. The type of research question posed.
2. The extent of control an investigator has over actual behavioral events.
3. The degree of focus on contemporary as opposed to historical events.

The first of these conditions is also the most relevant for the selection of the appropriate strategy.

Concerning the first of Yin’s conditions, our research questions are formulated in terms of "How" questions and are exploratory and descriptive in nature. Regarding conditions two and three, no control over behavioral events is required, and focus is given to the present. Following the line of reasoning proposed by Yin (Table 19) two of the above mentioned strategies can directly be eliminated, namely: experiment (as control over behavioral events is required) and history (as focus is given to past events). The remaining three are: survey, archival analysis, and case study. A brief discussion concerning these alternative strategies will provide more clarification for the final selection.

Table 19: Relevant Situations for Different Research Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Form of research question</th>
<th>Requires control over behavioral events?</th>
<th>Focuses on contemporary events?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, what, where, how many, how much</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival analysis</td>
<td>Who, what, where, how many, how much</td>
<td>No</td>
<td>Yes / no</td>
</tr>
<tr>
<td>History</td>
<td>How, why</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case Study</td>
<td>How, why</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: Yin (1994, p.6)

Survey research can be defined as “the systematic gathering of information from respondents in an interview using a set of questions, generally in the form of a questionnaire” (Tull and Hawkins, 1994, p.132). When the purpose is to e.g. map-out the prevalence of a certain phenomena, a survey can be designed in order to obtain empirical evidence from a range of respondents in a systematic way.
Archival analysis relies in secondary data, meaning "data that were developed for some purpose other than helping to solve the problem at hand" (op.cit.,p.80). However, it doesn’t necessarily mean that focus is given to past events. This type of research strategy is also applicable when the purpose of the research is descriptive or exploratory.

Case study research is a strategy that is achieving increased acceptance in academic research concerning business administration (cf. Gummesson, 1988, p.13). According to Yin (1994) "a case study is an empirical inquiry that:

- investigates a contemporary phenomenon within its real-life context, especially when
- the boundaries between phenomenon and context are not clearly evident" (op.cit.,p.13)

An important advantage of case study research is formulated as follows by Valdelin (1974):

"The detailed observations entailed in the case study method enable us to study many different aspects, examine them in relation to each other, view the process within its total environment and also utilize the researcher's capacity for 'Verstehen'. Consequently case study research provides us with a greater opportunity than other available methods to obtain an holistic view of a specific research project"

(as quoted by Gummesson, 1988, p.76)

Regarding our study, the purpose is to understand the industrial buying behavior of Swedish and Polish mining companies when a purchase of a CEMP takes place. Bonoma, Bagozzi and Zaltman (1978, p.53) view that "behavior, of whatever kind, cannot be analyzed or explained independently of the context in which it occurs". Since the nature of our investigation is holistic, the choice of a case study research strategy is found to be the most appropriate to tackle the research problem and questions at hand.

In conclusion, we would like to point out that the choice of a particular research strategy (case study) does not mean that all the remaining strategies (experiment, survey, archival analysis and history) are

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11 empathetic understanding
completely excluded. One should view the different research strategies in a pluralistic way (cf. Yin, 1994, p.15), therefore elements from different strategies will certainly be considered during the course of our study. The explicit selection of a certain strategy is, however, done as it provides the methodological framework to the way in which data is collected and analyzed.

4.5 Case Study Design

A brief discussion will be drawn concerning the design of the study. Yin (1994) refers to five components of a research design:

1. "the study’s questions
2. its propositions, if any,
3. its unit(s) of analysis,
4. the logic linking the data to the propositions, and
5. the criteria for interpreting the findings “ (op.cit.,p.20).

The first two components have already been discussed, regarding respectively the study’s research problem and research questions, and the conceptual framework developed in the former chapter. Concerning the two latter components, they are dealt with in the later sections of this methodology chapter. Hence, in this section, the discussion is limited to the specification of this study’s unit of analysis. Some scholars have defined unit of analysis as the case itself. Miles and Huberman (1994, p.25) define “case as a phenomenon of some sort occurring in a bounded context. The case is, in effect, your unit of analysis”. Yin (1994) remarks that unit of analysis “is related to the fundamental problem of defining what the ‘case’ is” (op.cit.,p.21). Following this line of reasoning, our case (or unit of analysis) could be defined as industrial buying behavior in the metal mining companies.

However, Yin further argues that “as a general guide, the definition of the unit of analysis (and therefore of the case), is related to the way the initial research questions have been defined” (op.cit.,p.22). Hence, in the definition of this study's unit of analysis, it is essential to take into consideration the formulated research questions.

Three logical sub-units have been identified in our conceptual framework: the buying process, the buying center, and the factors that affect the buying process and buying center. According to Yin (1994, p.41), “the same case study may involve more than one unit of analysis”. This is known as an
embedded case study design. When choosing between an holistic versus an embedded case study design the following issues were considered:

- "The holistic design is advantageous when no logical sub-units can be identified and when the relevant theory underlying the case study is itself of a holistic nature" (op.cit., p.42)
- a problem identified with the holistic design "is that the entire case study may be conducted at an abstract level with no measures or data" (Ibid)
- the risk that no specific phenomenon is examined in operational detail in holistic design
- sub-units in an embedded design can serve as an important device for focusing a case study inquiry

In our study, we have clearly identified logical sub-units (buying process, buying center, factors that affect the buying process and buying center). Furthermore, the arguments presented above in favor of the embedded design motivate the selection of this design. In conclusion, this study has an embedded case study design with the following embedded units of analysis:

- the buying process of the metal mining companies
- the buying center of the metal mining companies
- the factors that affect IBB of the metal mining companies

### 4.6 Sample Selection

Miles and Huberman (1994) indicate that sampling in qualitative research involves two actions:

1. The setting of boundaries, "to define aspects of your case(s) that you can study within the limits of your time and means" (op.cit., p.27).
2. The creation of a frame, "to help you uncover, confirm, or qualify the basic processes or constructs that undergird you study" (Ibid).

Thus, sampling in our study involves three stages:

1. The selection of the countries.
2. The selection of the type of equipment.
3. The selection of the mining companies within each country.
Regarding the selection of the two countries, Sweden and Poland, the sampling is judgmental and based in the following criteria:

- both country's common significance of metal mining production
- the importance of the Swedish metal mining industry for the Swedish economy and for the domestic manufacturers of mining equipment
- the significance of the Eastern-block as a potential export market for Swedish manufacturers of mining equipment and Poland as a suitable example 12

Concerning the selection of the type of equipment, the sampling is also judgmental and based on the relative significance of this equipment, in terms of value, complexity and importance of the product to the mission of the mining company 13.

The next sampling procedure is also of a judgmental nature and concerns the choice of metal mining companies in Sweden and Poland. Regarding the companies in Sweden, we mapped all producing metal mining companies, which consist of a total of five. One of the companies was then excluded due to the fact that, at the time of this study, it's operation had been maintained on a one-year-at-a-time basis for the last few years. Declining ore reserves were at the base of the company's operation policy. Moreover, contacts with this company revealed that purchasing of capital equipment for mining production had been at almost a zero level for a number of years. A decision to close down the operation was taken during 1996.

The remaining four metal mining companies were selected for this study. In order to avoid external influences (from e.g. joint-venture partners, etc.) only the Swedish mining operations of these companies' are under consideration. In the following table (Table 20) some generic characteristics concerning the mining operations of the companies are included:

12 A more thorough discussion concerning the selection of Sweden and Poland is found in the introductory chapter, section 1.2.2 Industry Selection and Scope of the Study, pp.3-6.
13 The selection of capital mining equipment is more thoroughly discussed in the introductory chapter, section 1.2.3 The Mining Environment and BB, pp.6-9.
Table 20: Generic Characteristics of Swedish Mining Operations of the Chosen Companies

<table>
<thead>
<tr>
<th>Chosen Swedish Metal Mining Companies</th>
<th>Generic Characteristics of the Swedish Mining Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>LKAB</td>
<td>Operates two underground mines with very large mine production (milled ore &gt; 16.5 Mtonnes/year at Kiruna and &gt; 8 Mtonnes/year at Malmberget)</td>
</tr>
<tr>
<td>Boliden Mineral</td>
<td>Operates 10 mines, ranging from an open-pit mine with a very large mine production (milled ore &gt; 17 Mtonnes/year at Aitik) to underground mines with moderate to low mine production (e.g. milled ore ~ 0.3 Mtonnes/year at Garpenberg, Långdal, Renström and Petiknäs).</td>
</tr>
<tr>
<td>Terra Mining</td>
<td>Operates one open-pit mine with medium-sized mine production (milled ore ~ 1 Mtonnes/year at Björkdal).</td>
</tr>
<tr>
<td>Ammeberg</td>
<td>Operates one underground mine with medium-sized mine production (milled ore ~ 0.8 Mtonnes/year at Zinkgruvan).</td>
</tr>
</tbody>
</table>

In setting the boundaries for the data collection in Poland, as referred previously (section 1.2.2.3, p.6), Bomsel (1992) stated that "When we began visiting mining and metallurgical combines in Central and Eastern Europe in 1990, and the following year in Russia and the Ukraine, we had no idea that so many sites in the largest mineral producing zone in the world, would be operating in defiance of market logic. In all Central and Eastern Europe, only the Lubin (Poland) copper mines were operating at a profit." (op. cit., p.277).

Thus, our selection is based on economic criteria, and the metal mining company selected KGHM Polska Miedz runs four underground mines with a total output of 26 million tonnes. With such a large mining production we expect that the company will need a continuous investment in CEMP to achieve such production in the company's mines.

To finalize this section, within the framework of this study, and applying a judgmental sampling, four mining companies in Sweden (Boliden Mineral AB, LKAB, Terra Mining, and Ammeberg Mining AB) and one mining company in Poland (KGHM) are selected.
4.7 Selection of Data Collection Methods

According to Yin (1994) data collection for case studies can rely on six sources of data. These are (1) documentation, (2) archival records, (3) interviews, (4) direct-observations, (5) participant observations, and (6) physical artifacts.

In this study, our aim is to use as many sources of data as possible within the time and financial resources available. As Yin (1994, p.9) emphasizes "a major strength of case study data collection is the opportunity to use many different sources of evidence" and "the most important advantage presented by using multiple sources of evidence is the development of converging lines of inquiry, a process of triangulation" (op.cit.,p.92). By this process of triangulation, Yin means that one has the possibility to obtain multiple measures of the same phenomenon, what is considered an advantage regarding the compliance to the validity criteria of any scientific work.

Within the scope of our research, we will utilize documentation as a mean to corroborate and augment evidence from other sources. Examples of such data are available mainly in form of company information material (such as annual reports, investment budgets, brochures, etc.), specific raw material databases, mining directories, etc. This documentation will provide us with an overall view of the present situation of mining companies in the two selected countries: Sweden and Poland. Thus, documentation is selected as a data collection method.

Archival records are not utilized in this research, as focus is given essentially to contemporary events. Archival data is not deemed as relevant, due essentially to the aim of studying IBB in it's present context.

Interviews can be defined as the collection of information from respondents. Interviews can assume three different forms: open-ended, focused, and structured (Yin, 1994). The open-ended interview, is the least-structured type where the respondent is not framed to any structured questions and is allowed to float more freely, expressing opinions and insights. The focused interview may be referred to as a semi-structured type of interview, where an informal conversation may be maintained within certain boundaries of pre-determined topics. Finally, the structured interview is more in line with what is found in a typical survey research, where the interview is guided by a thorough set of pre-designed questions.
Primary data collection through interviews is essential to tackle our research problem and subsequent questions. The complexity of the phenomenon under study and the "human" involvement make this choice vital. Obtaining data from those who actually participate in the purchasing process of capital equipment for mining production is paramount for the accomplishment of this study. Moreover, personal interviews are selected as the core source of data of our study, due mainly to the fact that social interaction and probing are possible, thus increasing the probability to obtain more accurate responses. We choose to use a "focused" personal interview in the following way:

1. The first concern regards the design of a *semi-structured interview guide* in English and Swedish (see Appendices I and II) for the purpose of helping to conduct the conversation through the topic coverage. Although these major topics should be covered, the researchers should be open to the possibility of changing to an open-ended interview type, if it is shown during the interview process that this is the most suitable. The translation type used is a pragmatic translation, meaning "translation of a message with an interest in the accuracy of information that was meant to be conveyed from the source language and is not concerned with other aspects of the original language version (e.g. aesthetics)" (Samiee and Jeong, 1994, p.213). This type of translation is selected due essentially to the nature of the questions posed. Moreover, eventual misunderstandings can be easily detected and corrected during the course of the actual interview.

2. The second issue concerns the identification of the person(s) who had the necessary insight in industrial buying behavior in the purchases of capital equipment for mining production, i.e. this study's respondents. In regard to:

- **Poland**, extensive contacts were needed in order to identify the key informants, establish contact, and obtain the necessary authorization to conduct the interview. Several months were required until the interview could take place. However, members of the company were always very cooperative. During the interview and our stay at the Polish mining company, assistance, guidance, and translation were provided by the Manager of the Privatization Department. His bilingual capacity, English and Polish, was assured by his extensive

---

14 Primary data is defined by Tull and Hawkins (1994, p.80) as "data collected to help to solve a problem or take advantage of an opportunity on which a decision is pending".
stay in the United Kingdom for education and professional reasons, together with the fact that Polish is his mother tongue

- **Sweden**, the identification of key informants was less time consuming, thus interview dates could be established rather rapidly

The identified respondents held the following functional positions in their respective company (see Table 21):

Table 21: Functional Positions of the Interviewee Subjects Selected for this Study

<table>
<thead>
<tr>
<th>Metal Mining Company</th>
<th>Interviewee functional position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammeberg Mining AB</td>
<td>Maintenance manager</td>
</tr>
<tr>
<td>Terra Mining AB</td>
<td>Mine manager</td>
</tr>
<tr>
<td>LKAB</td>
<td>Procurement officer</td>
</tr>
<tr>
<td>Boliden Mineral AB</td>
<td>Procurement officer</td>
</tr>
<tr>
<td>KGHM</td>
<td>Purchasing manager</td>
</tr>
</tbody>
</table>

3. The third concern was to provide the interviewee subjects with information material concerning this study. Such information was provided in Swedish in Sweden, and in English for the Polish case (see Appendix III). The aim was to:

- inform about the issues of interest of our study and introduce a certain terminology used in the field of IBB that might eventually be unfamiliar to the person in question
- allow the interviewee the time to reflect, prepare himself/herself and eventually obtain information which is needed and thus enables the interview to be conducted in a less time consuming way

4. Finally, the personal interviews were conducted in Swedish (in the Swedish companies), and in English (in the Polish company). During the personal interview in Poland, the bilingual translator was present at all times.

The other types of interviews available, such as computer and telephone interviews, were considered non-applicable due to technical impossibilities (computer links) and the fact that social interaction is reduced when using telephone interviews.
The three remaining sources of data, as proposed by Yin (1994) are: direct-observations, participant observations, and physical artifacts.

In direct observation, the investigator creates the opportunity for direct observations. Such may happen if, during the course of a field visit to the case study site, relevant behaviors are traced and available for direct observation. Thus, as it cannot be predicted, observational evidence is considered only to the extent to which it may provide information which may add to the core of data collected through the "personal interview" which takes place in the field.

Participant-observation is a mode of observation in which the researcher actually participates in the events being studied. This source of evidence may directly be eliminated, as it is not our intention to assume the role of "actors" at any stage, but rather the role of "spectators". Furthermore, the risk of personal bias could very easily damage the insights on our units of analysis.

Finally, Yin's sixth source of evidence is physical artifacts - "a technological device, a tool or instrument, a work of art, or some other physical evidence" (Yin, 1994, p.90). Within the scope of our study, its usage is eliminated as the possibility of access to particular capital equipment for mining production purchased cannot be foreseen.

In summary, the principle of triangulation is applied in this study when considering data collection, "using multiple sources of evidence is the development of converging lines of inquiry, a process of triangulation", (op.cit.p.92). Two sources of evidence will be used: documentation and interviews. The core of data collection is gathered through a personal interview.

4.8 General Analytical Strategy (Data Analysis)

According to Yin (1994,p.102) "every investigation should start with a general analytical strategy - yielding priorities for what to analyze and why". Basically, two general analytical strategies are available: relying on theoretical propositions and developing a case description.

When the first strategy is selected "one follows the theoretical propositions that led to the case study" (op.cit.,p.103). In our particular case it would mean that we would follow our frame of reference which was developed upon the former defined set of research questions and overview of
literature. If the second strategy is selected, the development of "a descriptive framework for organizing the case study" (op.cit.,p.104) is done. This means that we would use a descriptive mode for presenting our cases without the specific concern to follow our previously defined frame of reference.

In our study we are dealing with a complex phenomenon and a variety of cases studied within a pre-defined conceptual framework. Thus our analytical strategy relies on the theoretical framework developed. As previously mentioned, the purpose of our research is essentially exploratory and descriptive and the general research design is a multiple-case design with embedded units of analysis.

This study's embedded units of analysis were also defined as: the buying process (BP), the buying center (BC), and the factors that affect the industrial buying behavior of the metal mining companies concerning the purchase of CEMP. The analysis will be conducted in the following manner:

1) Within-case analysis
   • analysis is conducted within each case, at each unit of analysis level (buying process, buying center, and factors that affect BP and BC) against the emerged frame of reference of this study (Figure 23). The identified similarities and dissimilarities with the frame of reference provide the findings for each case

2) Cross-case analysis
   • a comparison among the findings from the cases is conducted. The comparative analysis is implemented at each unit of analysis level

3) Comparative analysis
   • findings from the Swedish cases are conjointly compared to the findings from the Polish case
Frame of Reference
- the buying process
- the buying center
- the factors that affect BP and BC

1) Within Case Analysis (unit of analysis for each case compared to frame of reference)

Data Case 5
Data Case 4
Data Case 3
Data Case 2
Data Case 1

Identifies similarities and dissimilarities with the frame of reference

Findings from Case 5
Findings from Case 4
Findings from Case 3
Findings from Case 2
Findings from Case 1

Concerning:
- the buying process
- the buying center
- the factors that affect BP and BC

2) Cross Case Analysis (findings from unit of analysis for each case compared to other cases)

Findings from Swedish Cases (C1, C2, C3, C4)

Findings from Polish Case (C5)

Concerning:
- the buying process
- the buying center
- the factors that affect BP and BC

3) Comparative Analysis (unit of analysis for Swedish cases compared to Polish case)

Legend:
C1 = Ammeberg Mining AB
C2 = Terra Mining AB
C3 = LKAB
C4 = Boliden Mineral AB
C5 = KGHM Polska Miedz

Figure 23: Study’s Data Analysis
4.9 Validity and Reliability

According to Shipman (1982) when reading a research report the reader should be able to find answers to the following question:

"If the investigation has been carried out by someone other than the author, using his methods, would the same results have been obtained?"

(as quoted by Gummesson, 1988, p.146)

In other words does the research fulfill the criteria of reliability?

Yin (1994) asserts the criteria of reliability as "demonstrating that the operations of a study - such as the data collection procedures can be repeated, with the same results" (op.cit.,p.33). In our study we have attempted to reduce the biases by documenting each case in an extensive and thorough manner, registering the different steps implemented during the data collection stage in a way that can be audited. Concerning personal interviewing it is difficult to ascertain to what degree bias could be eliminated. During the interviews, leading questions were avoided, and we have attempted to reduce bias by e.g. sending information material concerning the study (see Appendix III) in advance, and double checking some of the data collected during the interview afterwards.

Another question raised by Shipman (1982) is:

"Does the evidence really reflect the reality under examination?"

(as quoted by Gummesson, 1988, p.146)

In other words does the research fulfill the criteria of validity?

Hägg (1982) views "... validity as a continuous process that is integrated with theory and that requires the researcher to continuously assess his assumptions, revise his results, retest his theories and models and reappraise the given limitations that have been set for the study" (as quoted by Gummesson, 1988, p.81). Yin (1994) defines the criteria of construct validity as "establishing the correct operational measures for the concepts being studied" (op.cit.,p.33). This author also suggests a number of tactics that increase construct validity, namely:

- to use the principle of triangulation (use of multiple sources of evidence)
- to follow a chain of evidence; and
- to review the case draft study reports by key informants
Table 22 illustrates in which phase of research each of the tactics should be applied:

Table 22: Case Study Tactics and Different Phases of Research in Which Tactic Occurs.

<table>
<thead>
<tr>
<th>tests</th>
<th>case study tactic</th>
<th>phase of research in which tactic occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>construct validity</td>
<td>• use multiple sources of evidence</td>
<td>data collection</td>
</tr>
<tr>
<td></td>
<td>• establish chain of evidence</td>
<td>data collection</td>
</tr>
<tr>
<td></td>
<td>• have key informants review</td>
<td>composition</td>
</tr>
<tr>
<td></td>
<td>draft case study report</td>
<td></td>
</tr>
</tbody>
</table>

Source: Adapted from Yin (1994, p.33)

A brief discussion concerning the three mentioned tactics and their application is taken. In this study, the principle of “triangulation” is followed, as different sources of data are used (documentation and interviews). Concerning the establishment of a chain of evidence, this study builds on well-grounded theory. In addition, we have attempted to write this research study in a way that follows a logical stream that is maintained, from problem definition to the presentation of evidence and subsequent analytical considerations. Regarding the third mentioned tactic, a continuous review of this study’s written material has been conducted throughout the implementation of seminars with colleagues. Such reviews have allowed the authors to get feedback and revise the study’s material.

Concerning the operational measure instruments such as the pre-structured interview guide, reviews were carried out internally at the division level in order to test if the questions posed were ambiguous, rather than effective measures of the concepts under investigation. Another aspect, which adds validity to the study, regards a previous combined professional experience of 25 years of the authors from the line of industry investigated in this study. According to Carlson (1983) “...the more advanced knowledge that one has of the area under study, the greater the potential value of a study visit or an interview” (as quoted by Gummesson, 1988, p.58). Thus, our pre-understanding and familiarity with the mining industry is advantageous concerning many of the issues and aspects related to mining that are endorsed during the course of this investigation.
4.10 Summary

To summarize this chapter, the methodology adopted in this study can be visualized as follows in Figure 24:

![Figure 24: Selected Research Path](Marked in bold)
5 Chapter Five: Cases

5.1 Introduction

In this chapter, the empirical data of this study is presented. In the methodology chapter, five metal mining companies were selected for this study. Four companies are located in Sweden, i.e. Ammeberg Mining AB, Terra Mining AB, LKAB, and Boliden Mineral AB. The fifth metal mining company, KGHM Polska Miedz S.A., is based in Poland. The empirical data concerning each company will be presented as follows:

1. Introduction and Background
2. Objectives and Strategies
3. The Company's Mines
4. The Organization and the Purchasing Department
5. Industrial Buying Behavior of Capital Equipment for Mining Production (CEMP)
   • The Buying Process
   • The Buying Center
   • Factors Affecting the Buying Process and Buying Center

In the first section, introduction and background, overall information (e.g. history, financial statements) concerning the companies is presented. Second, generic statements of the companies' objectives and strategies are provided, in order to form a bases for understanding the companies' view of it's mission and environment. Third, a brief description of the company's mining operations is introduced. Fourth, characteristics of the organization and the purchasing department are presented. The general purchasing policy and the professional background of those who are responsible for the companies' purchasing are referred.

The fifth section, industrial buying behavior of CEMP, concerns the presentation of the empirical data specific to this study's embedded units of analysis. First, the standard procedures and activities involved in the buying process (BP) of CEMP are described. Based on the information obtained, a flowchart of the CEMP purchases is developed. Second, the buying center (BC) of the companies' when purchasing CEMP is identified and described in terms of it's composition, roles, and influence. Third, data attained concerning the affects of the factors in the BP and BC is presented. The factors included in our conceptual framework and thus under investigation are the buying situation, other product-specific factors, as well as organizational, inter-organizational, and environmental factors.
5.2 Case 1: AMMEBERG MINING AB

5.2.1 Introduction - Background

Ammeberg Mining AB operates a zinc deposit located at the village of Zinkgruvan in south central Sweden. The mine and associated concentrator at Zinkgruvan were operated since 1857 by the Belgian company Société des Mines et Fonderies de Zink de la Vieille Montagne. During 1990, this company merged with ACEC-Union Minière and since then and until recently, the mine and concentrator have been operated by Union Minière. In 1993, the operation at Zinkgruvan was formed as a wholly-owned Swedish subsidiary to Union Minière, and in 1994 the name of the company was changed to Ammeberg Mining AB. An attempt to introduce the company on the stock markets in 1994 failed. Then, in November 1995, an Australian mining company, North Limited, acquired the company. Presently, Ammeberg Mining AB is a wholly-owned subsidiary to North Limited which is a major Australian resource company with international interests in North and South America, Sweden, South East Asia and Africa. The North group is involved in mining, forestry and the design, manufacturing and marketing of mining and process equipment. In Table 23 some key indicators concerning Ammeberg Mining AB are provided.

<table>
<thead>
<tr>
<th>Table 23: Ammeberg Mining AB, Key Indicators 1991 and 1993</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MSEK, unless otherwise stated</strong></td>
</tr>
<tr>
<td><strong>INCOME STATEMENTS</strong></td>
</tr>
<tr>
<td>Revenue</td>
</tr>
<tr>
<td>Operating profit before depreciation</td>
</tr>
<tr>
<td>Operating profit</td>
</tr>
<tr>
<td>Profit after net financial items</td>
</tr>
<tr>
<td>Net profit for the year</td>
</tr>
<tr>
<td><strong>Average number of employees</strong></td>
</tr>
</tbody>
</table>

Source: Prospect "Inbjudan till förvärv av aktier i Ammeberg Mining AB" and information provided during interview

Invitation for acquiring shares in Ammeberg Mining AB
5.2.2 Objectives and Strategies

During the interview the vision of Ammeberg Mining was expressed as follows:

Ammeberg Mining shall continue to be a low cost (belong to the lower quartile among the world's zinc producing mines) producer of high quality zinc and lead concentrates.

High quality concerning the concentrates means high degree of separation (i.e. low lead content in zinc concentrate and vice versa). A major goal concerning the quality of the concentrates is also to lower the silica content in the concentrates. In order to obtain lower production costs two areas are focused:

- reduce mining of waste rock (optimizing ore/waste rock ratios)
- increase the recovery in the concentrator

5.2.3 The Company's Mines

Ammeberg Mining AB operates the Zinkgruvan deposit. This deposit consists of a number of separate orebodies where the major orebody Nygruvan constitutes the eastern mining area, whereas three minor orebodies, Knalla (presently mined out), Burkland, and Lindängen constitute the western mining area. A recently discovered orebody, Cecilia, is also located in the western area. The following Table 24 summarizes information concerning the Zinkgruvan mine during 1991 and 1993.

Table 24: The Zinkgruvan Mine, Mining Figures for 1991, 1993, and Budget 1996

<table>
<thead>
<tr>
<th>The Zinkgruvan Mine</th>
<th>1991</th>
<th>1993</th>
<th>1996 Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore mined, tonnes</td>
<td>648,085</td>
<td>675,363</td>
<td>675,000</td>
</tr>
<tr>
<td>Waist rock mined, tonnes</td>
<td>208,420</td>
<td>234,313</td>
<td>215,000</td>
</tr>
<tr>
<td>Zinc grade, %</td>
<td></td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>Lead grade, %</td>
<td></td>
<td>3.06</td>
<td></td>
</tr>
<tr>
<td>Silver, g/t</td>
<td></td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Reserves, tonnes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Proven and probable</td>
<td>11,375,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Possible</td>
<td>6,412,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Prospect "Inbjudan till förvärv av aktier i Ammeberg Mining AB" and information provided during interview
Starting in 1991, the company went through a major program in order to reduce the production costs. This program was implemented very efficiently and production costs were lowered from SEK 360 per tonnes in 1991 to SEK 160 per tonnes in 1994. For 1996, it is estimated that the cost will be approximately SEK 200 per tonnes. Among other activities, the number of employees was reduced from 483 in 1991 to the present 320 (i.e. a reduction of nearly 35 percent). At present, the company is well established in the lower cost quartile of the zinc producing mines worldwide, and in 1994 it held a position among the 5 percent of the lowest cost producers outside China and the former eastern block (no reliable information could be obtained concerning these areas).

5.2.4 The Organization and the Purchasing Department

Ammeberg Mining has a highly decentralized purchasing function with three independent groups: Geology department, Concentrator department, and Production-Maintenance department. The other departments including the administrative departments, also do their own purchasing but the purchase value is very small compared to the three department groups mentioned. Each of these groups handles their own purchasing needs independently (from investments to spare parts and supplies), except for some spare parts and supplies that are kept in stock. Ammeberg’s organization chart is provided in Figure 25.

![Ammeberg Mining's Operational Organization](image)

Figure 25: Ammeberg Mining’s Operational Organization

Note: Purchasing and warehousing functions are marked with gray color.
These items that are kept in stock and are handled in a "centralized way" by the purchasing and warehousing function found in the maintenance department (Figure 25). Also, the economy department, where the purchasing function was located a number of years ago, is conducting some minor "centralized" purchasing, but to a very limited extent. Since this study focuses on purchasing of capital equipment for mining purposes, the following presentation is concerned with the purchasing that is performed by the production-maintenance departments, also described in the interview as the "mine" departments. What can be seen as the formal purchasing function actually consists of two persons: the manager of the maintenance department (the interviewee, who also is "vice VD" at Ammeberg Mining), and the person responsible for the purchasing and warehousing function in this department. In Table 25, information regarding these two professionals is provided.

Table 25: Background of the Purchasing Professionals at Ammeberg Mining

<table>
<thead>
<tr>
<th>Title/Function</th>
<th>Background</th>
<th>Purchasing functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager of Maintenance department</td>
<td>Mining Engineer employed at Ammeberg since 1989.</td>
<td>Responsible for the warehouse and purchasing function situated in his department and also in most cases the central person in projects aimed at purchasing of capital equipment for the two &quot;mine&quot; departments.</td>
</tr>
<tr>
<td>Purchaser and Warehouse responsible</td>
<td>&quot;Company man&quot; with well over 25 years in the company. No formal purchasing education.</td>
<td>Handling all purchasing of supplies and spare parts that are kept in stock. This is done in cooperation with counterpart at the department for which the item is kept in stock.</td>
</tr>
</tbody>
</table>

In the following Table 26, the annual budget for Ammeberg Mining’s purchasing function is indicated:

Table 26: Annual Purchasing Handled by the Purchasing Function at Ammeberg Mining AB.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150</td>
<td>≈130</td>
<td>≈115</td>
<td>≈100</td>
<td>≈100</td>
</tr>
</tbody>
</table>
During 1995, the total of approximately SEK 145 million was attributed to purchasing at Ammeberg Mining. The following subdivision can be made concerning the different types of goods, Table 27.

Table 27: Percentages of Budget Allocated to Different Goods Purchased by Ammeberg Mining

<table>
<thead>
<tr>
<th>Types of goods</th>
<th>MSEK</th>
<th>% of Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials &amp; Components &amp; Standard Equipment</td>
<td>58</td>
<td>40%</td>
</tr>
<tr>
<td>Capital Equipment</td>
<td>20</td>
<td>13.8%</td>
</tr>
<tr>
<td>Services</td>
<td>48.3</td>
<td>33.4%</td>
</tr>
<tr>
<td>Other</td>
<td>18.5</td>
<td>12.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>144.8</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Normally, investments in CEMP, constitute approximately 85-90 percent of the total annual investments. However, from 1996 forward, and continuing for a five-year period, this figure will be reduced to approximately 75 percent due to major investments in the concentrator as part of the efforts in increasing the quality of the concentrates produced.

5.2.5 Industrial Buying Behavior of Capital Equipment for Mine Production

5.2.5.1 The Buying Process

The buying process of CEMP is composed of the following *nine* activities or *buyphases*:

**Phase 1 - Need Recognition and Preliminary Technical Specifications**

The initiation of the purchasing process concerning CEMP occurs, with virtually no exceptions, within the production department, where a preliminary technical specification is prepared in terms of the operational functions that need to be fulfilled. The preparation of an investment proposal based on the specifications is initiated.

**Phase 2 - Incorporation into Long-term plan or One-year Budget**

It is very rare that a purchase of CEMP at Ammeberg Mining is performed without having been incorporated as an investment issue in a one-year
budget or in the long-term plan for investments. Hence, the investment proposal is prepared by the production department and forwarded for evaluation and approval by the management group, or even the owners, the North group (for investments over SEK 1.5 million). Once this investment is approved, it’s inclusion in the company’s long-term plan or one year budget, formally triggers the buying process.

**Phase 3 - Technical Specifications**

After inclusion and approval in a one-year budget or the long-term plan, the actual purchasing process is initiated. At this phase a *project group* is formed with representatives from the production (using) and maintenance departments as well as the safety function. This phase includes the preparation of the technical and functional specifications, which is prepared by the project group.

**Phase 4 - Search for Potential Supply Sources (not always executed)**

When the technical and functional specifications from the prior phase are not satisfactory, i.e. do not match with the knowledge of what is available on the market, a search for possible product and supplier alternatives is performed. However, this phase is not always conducted. When the company is satisfied with the present supplier and/or equipment, alternative potential supply sources are usually not sought. When implemented, this phase is performed by the project group.

**Phase 5 - Invitation to Suppliers to Demonstrate Interest**

This phase is described as an invitation to suppliers to show their interest in providing the needed product, or in some cases a solution to the needed function. This phase might also include a first and preliminary screening of suppliers. Again, the project group is responsible for it’s implementation.

**Phase 6 - Acquisition and Evaluation of Proposals (Quotations) and Preliminary Selection of Qualified Suppliers**

At this phase a formal acquisition of proposals and their subsequent analysis and evaluation is performed. This evaluation includes technical issues as well as economical and financial considerations. A preliminary selection of qualified suppliers is an outcome of this phase. The constituted project group is involved in this phase.
Phase 7 - Discussions with Suppliers (Initial Negotiation) and Selection of Supplier

This phase is described as discussions in order to clarify and further specify different issues of largely technical but also economic character with the qualified suppliers from the previous phase. These discussions will pass over into what can be regarded as initial negotiations. As a final outcome of this phase a supplier will be selected. This phase is carried-out by the project group.

Phase 8 - Final Negotiation and Contract

When a selection of supplier has been done final contractual agreements are negotiated. During this phase the project group is reduced in number of active persons (commonly the representative of the safety department is excluded) and the presence of the manager of the mine is normally compulsory.

Phase 9 - Evaluation and Feedback

The final phase includes follow up, evaluation and feedback concerning the equipment that was purchased. It should be noted that the project group is kept active during the warranty period in order to facilitate and improve execution of follow up and feedback.

A flowchart of the described CEMP buying process at Ammeberg mine is presented in Figure 26:
5.2.5.2 The Buying Center

5.2.5.2.1 Composition of the Buying Center

Purchasing of CEMP at Ammeberg Mining is always carried out by a project group formed for each purchase. However, the composition of these project groups is fairly constant. The composition is as follows: the manager of the maintenance department (who is a member of the project group in 90 percent of the purchases), one representative from the production department, and the safety inspector. These three individuals constitute the minimum size of the project groups. It is however common that another representative from the maintenance department and another from the production department are present in the group. The size of the project group (3-5 individuals) is considered as optimal for performing the purchasing task with one exception, namely the non-participation of the foreman (work leader) in the buying center. Discussions concerning this are ongoing and the two considered alternatives are either to increase the groups or to exclude the operational management level in the project groups. Additionally to the project group, the mine managing director also participates in the buying process. This person’s participation is required.
for the formal approval of the CEMP purchase and during the final negotiations and contract arrangements and signature.

The following Table 28 illustrates the correspondent participation in the different phases of the buying process:

Table 28: Functional Areas of Ammeberg Mining AB Participating in the Buying Process of CEMP

<table>
<thead>
<tr>
<th>Buying Phases of CEMP Buying Process</th>
<th>Function/Departmental Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Involvement</td>
<td>Board of directors (ownership)</td>
</tr>
<tr>
<td></td>
<td>Top Management</td>
</tr>
<tr>
<td></td>
<td>Upper-level operating management</td>
</tr>
<tr>
<td></td>
<td>User (operator) level</td>
</tr>
<tr>
<td>1. Need Recognition &amp; Preliminary Technical Specifications</td>
<td>X</td>
</tr>
<tr>
<td>2. Long-term Plan or One-year Budget</td>
<td>X</td>
</tr>
<tr>
<td>3. Technical or Functional Specifications</td>
<td>X</td>
</tr>
<tr>
<td>4. Search for Potential Suppliers</td>
<td>X</td>
</tr>
<tr>
<td>5. Invitation to Suppliers to Show Interest</td>
<td>X</td>
</tr>
<tr>
<td>6. Acquisition and Analysis of Proposals &amp; and Preliminary Selection of Qualified Suppliers</td>
<td>X</td>
</tr>
<tr>
<td>7. Initial Negotiation &amp; Supplier Selection</td>
<td>X</td>
</tr>
<tr>
<td>8. Final Negotiation and Contract</td>
<td>X</td>
</tr>
</tbody>
</table>
Regarding the five dimensions of the buying center, the following general characterization can be stated:

- **Vertical involvement**: Three hierarchical levels exert influence and communication within the buying center, namely: top management level impersonated by the managing director; upper level operating management level impersonated by the maintenance and normally the production manager; and user (operator) level which includes the safety inspector. Investments over SEK 1.5 million, require approval from the North Group, so in these situations, at least one further hierarchical level is added (the number of levels that actually might participate in the organizational structure of North is unknown).

- **Function/Departmental involvement**: Four departments/functions are always present in the buying center: production, maintenance, safety, and top management. Assistance from the finance/economy departments may be requested during the evaluation of proposals concerning "economical technicalities".

- **Extensivity**: The total number of individuals involved in the buying process is three to five in the project group, plus the managing director (since all investments have to be approved by him). As previously mentioned, for investments over SEK 1.5 million, approval from North, the holding group, is also required. Furthermore, the economy/finance department is sometimes represented during the economical and financial evaluation of the potential suppliers proposals. Moreover, their assistance may also be required during the negotiations. This implies that the size of the buying center may vary from a lower total of four individuals to an upper figure of seven or more in special cases.

- **Connectedness**: The degree to which the members of the buying center are linked to each other by direct communication is high during the initial Phases 1-3, decreases somewhat during Phases 4-5, high again during Phases 6-7, and lower during Phase 8 (where only a reduced group from the project group is active). Phase 9 seems to be variable, but it should be noted that the project group remains in operation during the warranty period.

- **Centrality**: The centrality of the maintenance manager in the communication network is very evident concerning the focused type of CEMP at Ammeberg Mining.
5.2.5.2.2 Roles of the Buying Center

The identification of roles concerning the purchase of CEMP for mining operations is as follows:

- **Initiator** - production department
- **Gatekeeper** - maintenance manager
- **Influencer** - production department
- **Decider** - managing director
- **Buyer** - maintenance manager
- **User** - production department

Regarding the *initiator* role, it is always difficult to point to exactly where a discussion about changes or new needs for equipment actually starts. However, from a practical point of view the purchasing process at Ammeberg Mining is always initiated by the production department when they formulate a need, although the creation of awareness of this need might actually originate from elsewhere. Concerning the *gatekeeper* role, due to his very central role in the network of the project group, the maintenance manager has a major access and also possibility to control the information flow to the buying center, from it, and within it. The production departments role as a major *influencer* is very evident. However, it should be noted that both the maintenance manager and the manager of the mine might have the major influence in some cases. The role of the *decider* is played by the managing director since all CEMP investments must be approved by him. The role of the North Group concerning investments above SEK 1.5 million can not be seen as a role as decider since they will only say yes or no to an investment and not to a certain supplier or product. The actual *buyer* is the maintenance manager as he is the one who handles the majority of the purchasing documentation and contractual arrangements for the CEMP. Finally, the *user* of the CEMP is the production team of the mine.

5.2.5.2.3 Influence in the Buying Center

Considering influence in the buying center, three functions need consideration: production, maintenance, and safety, where representatives formally constitute the project group. As it can been noticed in Table 28, it’s involvement is present simultaneously in six of the nine buyphases, specifically from Phase 3 which relates to the elaboration of the technical or functional specifications to Phase 7 where initial negotiations and supplier selection take place. Concerning degree of involvement of the
different functional areas, production was identified as the one, which is expected to have the major influence due to their role of both user and expert concerning the equipment. However, the maintenance department will also have an expert role when issues of equipment maintenance are under consideration. The maintenance department is also represented by it’s manager, who can be expected to be able to exert major influence due to his centrality, his possibility to act as an gatekeeper, and also due to his dual role as the deputy manager of the mine. Finally, concerning security issues, the safety inspector can exert major influence by pointing at security reasons concerning different aspects.

5.2.5.3 Factors Affecting the Buying Process and the Buying Center

5.2.5.3.1 Buying Situation

Concerning the purchase of Capital Mining Equipment (CEMP) the following generic characterization was provided for CEMP purchases related to the mine (Table 29):

<table>
<thead>
<tr>
<th>Category</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Requirements</td>
<td>10-20%</td>
<td>10-20%</td>
<td>&gt;=70%</td>
<td>100%</td>
</tr>
<tr>
<td>Newness of the Problem</td>
<td>&gt;=50%</td>
<td>=25%</td>
<td>20-25%</td>
<td>100%</td>
</tr>
<tr>
<td>Consideration of New Alternatives</td>
<td>&gt;=30%</td>
<td>=30%</td>
<td>=30%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Concerning the CEMP purchases, the following Table 30 provides the estimated percentage of the following purchasing situations (buyclasses) conducted at Ammeberg Mining:
Table 30: Characterization of CEMP in Terms of Buyclasses

<table>
<thead>
<tr>
<th>Buyclass</th>
<th>Description</th>
<th>% of total CEMP purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>Buying capital equipment of a type not earlier purchased</td>
<td>15%</td>
</tr>
<tr>
<td>Modified-rebuy</td>
<td>Buying capital equipment which is based on a prior purchase of similar capital equipment, but differs in aspects such as quality, price, etc., and therefore includes the consideration of new alternatives.</td>
<td>60%</td>
</tr>
<tr>
<td>Straight-rebuy</td>
<td>Buying capital equipment as a direct replacement employing the same brand and supplier. Buying capital equipment as a direct replacement employing the same brand and supplier.</td>
<td>25%</td>
</tr>
</tbody>
</table>

5.2.5.3.2 Other Product Specific Factors

**Time Pressure**

From the normal procedure that all purchases of capital equipment will be handled as investment issues in a one year budget or in the long term plan of the company, time pressure is normally not an important issue concerning purchasing of CEMP.

**Monetary Value**

The monetary value associated to a CEMP purchase varies with the type of equipment under consideration. CEMP purchases at Ammeberg Mining are as a rule previously included in a long-term investment plan or at least in a one year budget. The composition of the buying center varies by the inclusion of an extra hierarchy level, the North Group, the owner, when the CEMP investment value is superior to SEK 1.5 million.

**Importance**

Ammeberg Mining’s vision was expressed as follows:
Ammeberg Mining shall continue to be a low cost (belong to the lower quartile among the worlds zinc-producing mines) producer of high quality zinc and lead concentrates.

This mining company’s mission is clearly production oriented and thus the importance of CEMP purchases for the achievement of lower production costs is of vital importance for the company.

5.2.5.3.3 Organizational Factors

Ammeberg Mining AB can be considered as a medium-sized (with an average number of 320 employees) production-oriented mining company. The buying decisions concerning CEMP are mainly taken jointly by the maintenance and production personnel. The centralization of the maintenance manager is very high. Concerning the organizational structure at Ammeberg, the areas of responsibility are clearly defined between the functions, however, these are complimented with a distinctly pragmatic and informal “ability” of cross-functional communication and cooperation. The impression was in a way more of a project team than a formal line organization.

5.2.5.3.4 Inter-organizational Factors

Ammeberg Mining’s members of the project group (which normally include the managers of the maintenance and production departments) have a well-grounded know-how of the CEMP supplier market. This is due to their own experience within the mining field, and to the fact that the number of potential vendors of CEMP is relatively small. Word-of-mouth concerning different manufacturers of CEMP is common and extremely important in a market where the number of buyers and sellers is relatively reduced and hence information and social exchanges are high.

As previously mentioned, the CEMP product perceived importance is high and long-term relationships with CEMP suppliers are commonly established. It was also referred that when the company is satisfied with a certain supplier, the search for other potential sources of supply is actually bypassed once Ammeberg prefers to purchase from the former supplier with whom past experience has been positive. The scope of the contractual agreements with CEMP suppliers is usually limited towards the purchase of the equipment itself. Spare parts, as well as maintenance and service agreements are not included. Ammeberg uses its own personnel to handle
maintenance and service of the CEMP. This policy is imposed by the financial situation of the mining company and its social obligations within the region. During the past years, the company has been forced to considerably reduce its personnel. Therefore, the use of its own personnel to handle service and maintenance is more appropriate than the possibility to subcontract from outside sources. Leasing agreements are not considered as a suitable alternative for the company to satisfy its needs of CEMP, due mainly to financial reasons.

5.2.5.3.5 Environmental Factors

The geological environmental and the economic factors of metal prices and currency rates were found to strongly influence the company's profitability and thus indirectly the buying behavior. Besides these, the environmental factor of social affinity was recognized as influencing in a very obvious way the buying behavior at Ammeberg. Due to the rather heavy reductions in the workforce during the last few years in connection with the company's completely dominant position as the leading employer in the area, a decision has been taken towards not including servicing of equipment in the purchasing contracts. Instead, their employees are utilized for the service of equipment.

Political factors were mentioned as indirectly influencing buying behavior of CEMP. The new governmental policy of nuclear power energy reduction, which implicates the shutdown of the first reactor in Barsebäck (before the July 1, 1998) will be translated in higher energy costs for the mining company. Energy costs are the second highest cost, next to labor costs, and account for around 10 percent of the company's costs. The fact that the mines are becoming deeper also implies higher energy costs in order to hoist the ore, provide ventilation and water pumping.
5.3 Case 2: TERRA MINING AB

5.3.1 Introduction - Background

Terra Mining was founded in 1980 and was originally an exploration company with focus on gold deposits. As a result of the discovery of a mineralization during the summer of 1985, which would later become the Björkdal mine, the company’s activities expanded to include mining. The Björkdal’s open-pit gold mine opened in 1988. Presently, Terra Mining’s operations comprise gold production in a mine and dressing plant as well as exploration. During the latter half of 1996 the company’s gold production activities will be expanded by opening a new gold mine in Pahtavaara, in Finland, which will be explored by the subsidiary Terra Mining Oy. The following figure illustrates Terra Mining’s business activities (Figure 27):

Figure 27: Terra Mining’s Activities
(Terra Mining Annual Report 1995)
The company produces three different gold concentrates, which are later refined into pure gold:

1. High-grade gravity concentrate containing on average about 40-50 percent gold.
2. Middling gravity concentrate, of medium gold grade, containing on average about 5,200 grams of gold per tonnes.
3. Floatation concentrate, of low gold grade, containing on average about 100 grams of gold per tonnes.

The first product, the high-grade gravity concentrate, accounts for 59 percent of Terra Mining’s total gold production, the second product, the middling concentrate 18 percent, and the third product, the floatation concentrate, 23 percent. The company’s products are sold entirely to four refineries located in the United Kingdom, Germany (two), and Sweden. Some business figures are indicated in Table 31:

Table 31: Terra Mining AB, Key Indicators

<table>
<thead>
<tr>
<th>MSEK, unless otherwise stated</th>
<th>1993</th>
<th>1994</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCOME STATEMENTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td>196.4</td>
<td>199.6</td>
<td>195.1</td>
</tr>
<tr>
<td>Operating profit before</td>
<td>73.4</td>
<td>54.0</td>
<td>31.7</td>
</tr>
<tr>
<td>exploration expenses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating profit</td>
<td>70.0</td>
<td>35.6</td>
<td>15.1</td>
</tr>
<tr>
<td>Profit after net financial</td>
<td>65.6</td>
<td>37.8</td>
<td>15.3</td>
</tr>
<tr>
<td>items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net profit for the year</td>
<td>56.6</td>
<td>30.2</td>
<td>6.4</td>
</tr>
<tr>
<td>KEY FIGURES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profit margin (%)</td>
<td>33.4</td>
<td>18.9</td>
<td>7.8</td>
</tr>
<tr>
<td>Net margin (%)</td>
<td>28.8</td>
<td>15.1</td>
<td>3.3</td>
</tr>
<tr>
<td>Return on shareholders’</td>
<td>62.6</td>
<td>25.8</td>
<td>9.8</td>
</tr>
<tr>
<td>equity (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return on total assets (%)</td>
<td>39.2</td>
<td>18.3</td>
<td>6.9</td>
</tr>
<tr>
<td>Equity/assets ratio (%)</td>
<td>68.9</td>
<td>70.0</td>
<td>52.8</td>
</tr>
<tr>
<td>Debt/equity ratio, multiple</td>
<td>0.16</td>
<td>0.02</td>
<td>0.40</td>
</tr>
<tr>
<td>Interest coverage, multiple</td>
<td>11.9</td>
<td>43.91</td>
<td>6.79</td>
</tr>
<tr>
<td>Average number of employees</td>
<td>50</td>
<td>64</td>
<td>58</td>
</tr>
</tbody>
</table>

Source: Terra Mining Annual report 1995, p.8

Terra Mining’s revenues depend on the quantity of gold produced and the gold price in SEK. The first factor is dependent on the gold grade in the ore as well as the dressing plant’s capacity and recovery level. The following Figure 28 illustrates the factors, which influence the company’s revenues:
5.3.2 Objectives and Strategies

Terra Mining expresses its vision as follows:

*By the year 2000, Terra Mining shall operate at least three mines and produce at least 150,000-200,000 oz (4,500-6,000 Kg) of gold annually. Growth will be achieved by maintaining healthy profitability and showing consideration for human health, safety, and the environment.*


5.3.3 The Company's Mines

Terra Mining AB is presently operating the Björkdal Mine, an open-pit gold mine that opened in 1988. The Björkdal orebody is of a complex geological character with gold grades and gold output varying in the different sections of the mine. The ore is mined in an open pit, which is currently one km long and 200 meters wide. The following figures summarize information concerning the Björkdal mine during the last five years (Table 32):
Table 32: The Björkdal Mine, Three-Year Summary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore mined (tonnes)</td>
<td>901,675</td>
<td>939,549</td>
<td>1,264,142</td>
</tr>
<tr>
<td>Ore to the dressing plant (tonnes)</td>
<td>839,794</td>
<td>877,247</td>
<td>1,157,106</td>
</tr>
<tr>
<td>Gold grade (g/tonnes)</td>
<td>3.33</td>
<td>2.62</td>
<td>2.11</td>
</tr>
<tr>
<td>Gold production (oz)</td>
<td>81,566</td>
<td>68,160</td>
<td>71,292</td>
</tr>
<tr>
<td>Gold production (kg)</td>
<td>2,537</td>
<td>2,120</td>
<td>2,217</td>
</tr>
<tr>
<td>Gold reserves (oz)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Proven and probable</td>
<td>757,400</td>
<td>841,300</td>
<td>888,700</td>
</tr>
<tr>
<td>-Possible</td>
<td>1,146,000</td>
<td>773,000</td>
<td>627,000</td>
</tr>
</tbody>
</table>

Source: Terra Mining Annual Report 1995

During 1993 and 1994, the Björkdal mine was one of the most cost-efficient mines in the Western world. In 1993, Björkdal was even among the most effective (top 10 percent) gold mines in the world. However, during 1995, despite heightened production, factors like lower grade and greater volumes of waste rock, together with a weak US dollar pushed the SEK cash costs around 20 percent higher in 1995 than in 1994.

Concerning investments, Terra Mining has continuously invested in the dressing plant, increasing it’s capacity from originally 300000 tonnes (1988) toward the permit limit of 1,3 million tonnes of ore processed.\(^\text{16}\)

### 5.3.4 The Organization and the Purchasing Department

At it’s operating mine, Björkdal, Terra Mining has a total of 48 employees. The company’s operational organization is as follows (Figure 29):

---

\(^\text{16}\) Permit to expand dressing operations at Björkdal to 1,3 million tonnes annually was received in May 95.
Terra Mining has no separate purchasing department. Purchasing is handled by both the mine manager and the dressing plant manager. Purchases who relate to mine production are handled by the first, and purchases concerning the running of the dressing plant are handled by the latter. The purchasing functions include:

- handling all purchases within the operational units (i.e. mine and dressing plant)
- establishment of general agreements with contractors
- search for information and suitable suppliers
- preparation of bids/inquiries
- analysis and evaluation of vendor’s proposals/quotations
- negotiation

There are no human resources solely allocated to the company’s purchasing functions. The background of the professionals who carry out purchases related to the Björkdal mine is summarized in the following Table 33:

<table>
<thead>
<tr>
<th>Title/Function</th>
<th>Background</th>
<th>Purchasing functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mine Manager</td>
<td>Mining Engineer, vast professional experience within the mining industry (in Sweden and abroad)</td>
<td>Handling all purchases (administrative routines included) needed for mine operations.</td>
</tr>
<tr>
<td>Dressing Plant Manager</td>
<td>Mechanical Engineer, Processing, 30 year professional experience within the Swedish mining industry</td>
<td>Handling all purchases (administrative routines included) needed for the dressing plant operations.</td>
</tr>
</tbody>
</table>

The following figures indicate the annual budget for Terra Mining’s Björkdal purchasing activities (Table 34):

Table 34: Annual Investment Budget for Mine Operation at Björkdal

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
<td>---</td>
<td>≈ 51.2</td>
<td>≈ 41</td>
</tr>
</tbody>
</table>

Annual investments (MSEK):
Concerning 1995, from the total of SEK 51.2 million attributed to operations at Björkdal mine, SEK 25.1 million was for mining external waste rock and SEK 14.6 million for exploration. Regarding the types of goods bought by the two operational units, mine and dressing plant, the following percentages were provided as illustrative for Björkdal until the present year, 1996 (Table 35):

Table 35: Percentage of Mine’s Budget Allocated to Different Types of Goods

<table>
<thead>
<tr>
<th>Types of goods</th>
<th>Mine (% of total mine budget)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>-</td>
</tr>
<tr>
<td>Components</td>
<td>-</td>
</tr>
<tr>
<td>Standard Equipment</td>
<td>-</td>
</tr>
<tr>
<td>Capital Equipment</td>
<td>-</td>
</tr>
<tr>
<td>Services</td>
<td>85-90</td>
</tr>
<tr>
<td>Other</td>
<td>10-15</td>
</tr>
</tbody>
</table>

5.3.5 Industrial Buying Behavior of Capital Equipment for Mine Production

5.3.5.1 The Buying Process

The buying process of a new-task CEMP is composed of the following fundamental *nine* activities or *buyphases*:

Phase 1 - Need Recognition and Preliminary Technical Specifications

The initiation of the purchasing process occurs within the mine production department. The recognition of equipment need arises in Björkdal open-pit mine due to need of reducing production costs. During 1995, production costs rose approximately 20 percent due to the lower grade in the ore, greater volumes of waste rock in the production cycle (drilling, blasting, loading, transporting, and crushing) and a weaker US Dollar. Thus, in a market where the producers have no control over the pricing of their product, i.e. gold, aiming at low-cost production is of primary importance. Once the need is triggered, preliminary technical specifications are prepared in terms of the operational functions that need to be fulfilled (e.g. loading capacity per hour, transporting needs in terms of volume, etc). At
this phase the need is not yet made explicit within the organization, however, alternative solutions are considered and a general solution towards the purchase of loading and transporting capital equipment as a way to reduce production costs is suggested. At Terra Mining, Björkdal mine, only one person is involved in this phase of the buying process, namely the mine manager, who is responsible for mining operations and the production cycle.

Phase 2 - Search for Potential Supply Sources

Once the general solution of purchasing loading and transporting capital mining equipment is determined, the search for potential supply sources is initiated. The mine manager, who has yet not made the need explicit within the organization, carries out the search for alternative sources of supply. A prerequisite for a vendor of capital mining equipment to be included as a potential supplier at Terra Mining, Björkdal, is that it’s equipment has been used in similar environments. The complex nature of the product limits considerably the number of suppliers which are able to satisfy the company’s need (even on a worldwide basis). Information is actively sought by contacting other mines where CEMP that fulfill the same functions are operational. Thus, search for potential supply sources is based on wide experience of the mining equipment industry and "word-of-mouth" from other buyers. The number of potential suppliers is usually limited to three or four. In this particular case of CEMP for loading and transportation, the number of potential supply sources were limited to three. No explicit qualification of the potential sources is done (e.g. value analysis), but rather an implicit qualification is carried out based on criteria such as supplier’s reputation, well-known past performance compliance, etc. This phase is solely performed by the mine manager.

Phase 3 - Technical Specifications

Complete performance specifications are prepared. Among other, capacity, life-time, availability considerations are included. Descriptive documentation is produced. This phase of the buying process is the sole responsibility of the mine manager.

Phase 4 - Acquisition and Evaluation of Budget Proposals

At this phase the mine manager, requests budget proposals from the range of three to four potential vendor sources (that were identified during the Phase 2 of the buying process). In this specific case of the new-task CEMP purchase, three potential supplier sources were contacted. Buyer-seller
interactions occur and technically qualified sales personnel from the potential suppliers become involved in the process. The technical specifications that were elaborated in the former phase serve as a basis for the buyer-potential suppliers' discussions and the preparation of the budget proposals. Once the latter are received, both a technical and economical evaluation is carried-out by the mine manager. As a result of this evaluation, potential vendor sources may be eliminated.

**Phase 5 - Inquiry (Bid)**

The preparation of the formal documentation which composes the inquiry, "Request for Quotation" (RFQ) is based on the former phases documentation and discussions. In this phase of the buying process an external consultant becomes involved in the purchasing process. His/her role is of an advisor in what concerns commercial, legal, and contractual aspects. Together with the mine manager the inquiry is prepared. Documentation such as the following is usually included: letter of invitation, information to tenders, technical specifications. The inquiry is then sent to the potential vendor sources which were considered qualified after the first screening, i.e. the evaluation that occurred during the former phase of the buying process.

**Phase 6 - Evaluation of Proposals (Quotations) and Preliminary Supplier Selection**

The various offers received from the potential vendors go through an evaluation process. Spreadsheet analysis is used. The potential suppliers are listed and different factors such as price, delivery terms, maintenance/spare parts, technical features of the CEMP, etc. are weighed against each other. The evaluation is done taking into consideration technical, economical, commercial, and legal aspects. The evaluation of the proposals is of the sole responsibility of the mine manager. The evaluation of proposals culminates in a preliminary supplier selection. The relative importance of different purchase criteria is assessed in the following way:

1. Quality
2. Delivery capability
3. Financial Position, Stability, Solution
4. Maintenance and Repair Service
5. Past experience, Reputation (references from other mines)
6. Price, in terms of cost SEK/equipment hour
7. Suppliers bidding compliance
8. Environmental aspects (e.g. vibration, sound level, dust)
The above listing is presented in decreasing order of relative importance, meaning that quality is the most important and price one of the least important. As a result of this phase, potential vendors are customarily eliminated, but as a "rule of thumb" two potential suppliers are frequently selected to participate in the next phase, initial negotiation.

**Phase 7 - Initial Negotiation**

Initial negotiations with two potential vendors of CEMP take place. As negotiation commences, the board of directors is informed, and approval for the CEMP purchase is required. The mine manager together with the company’s managing director conduct the negotiations with the potential suppliers. The commonly used negotiation strategy is "problem solving", meaning that those participating from the buyer’s company side encourage potential sellers to work and establish an enduring relationship which has the potential to reduce costs and increase performance. The initial negotiation may involve a series of adjustments to the initial offers and counter-proposals by the suppliers. Of a paramount importance is the negotiation concerning the maintenance and repair contract with all it’s components such as: service, spare parts, technical assistance, components storage, MRO (maintenance, repair, and operating or overhaul) supplies such as oil, grease, filters, diesel fuel, etc.

**Phase 8 - Supplier Selection**

Based on the negotiations held in the former phase, one potential supplier is eliminated and ultimately a vendor is selected. The criteria which are determinant for supplier selection are exactly the same that are determinant for the "preliminary supplier selection", presented in Phase 6. This phase is of the responsibility of both the mine manager and the managing director.

**Phase 9 - Final Negotiation and Contract**

Once a sole supplier is selected a final negotiation is implemented, with the objective of clarifying possible eventualities that can be predicted. The agreement reached through the negotiation is then formally written and signed by the parties. Delivery terms, payment terms, detailed maintenance and repair agreement, financial specificities exemplify aspects which necessarily are included in an order/contract. In the particular case of the new-task loading and transporting CEMP purchase, a leasing agreement for the period of 3 years was the solution selected. The agreement reached concerning maintenance and repair was determinant for the selection of the
suppliers. Aspects which were fundamental for the supplier selection were the inclusion in the offer of a components store at the buyer’s company site together with the full availability of a service/repair man of the supplier’s firm. These factors contribute to a considerably higher availability of the CEMP, and are therefore highly significant for supplier selection. The mine manager and the managing director are involved in this phase.

The flowchart presented in Figure 30 summarizes in a sequential way the phases that comprise the buying process of a new-task CEMP at Terra Mining, Björkdal:

![Flowchart of a CEMP New-Task Purchase at Terra Mining](image)

Figure 30: Flowchart of a CEMP New-Task Purchase at Terra Mining

5.3.5.2 The Buying Center

5.3.5.2.1 Composition of the Buying Center

The size of the buying center, meaning those individuals or groups who are directly related and participating in the purchasing process of a new-task CEMP is three: the mining manager, the managing director, and an external consultant. Table 36 illustrates the correspondent participation in the different phases of the buying process:
Table 36: Functional Areas of Terra Mining AB Participating in the Buying Process of CEMP.

<table>
<thead>
<tr>
<th>Vertical Involvement</th>
<th>Board of directors (ownership):</th>
<th>Function/Departmental Involvement</th>
<th>Managing Director</th>
<th>External Consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper level operating management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Involvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buying Phases of CEMP Buying Process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Need Recognition &amp; Preliminary Technical Specifications</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Search for Potential Supply Sources</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Technical Specifications</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Acquisition and Evaluation of Budget Proposals</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Inquiry</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Evaluation of Proposals and Preliminary Supplier Selection</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Initial Negotiation</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Supplier Selection</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Final Negotiation and Contract</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data concerning the purchasing of CEMP relate solely to the new-task buying situation due to the fact that no rebuy- situations of CEMP purchases have been carried out by the company before. Therefore, variations concerning the buying center composition with the buying situation factor cannot be determined.

Regarding the five dimensions of the buying center, data collected leads to the following characterization:

- **Vertical involvement**: Two levels of hierarchical level exert influence and communication within the buying center, namely: upper level operating management level impersonated by the mine manager and external consultant, and top management level impersonated by the managing director.
• Function/Departmental involvement: Two departments/three functions within the organization are involved in the buying process, specifically, the top management, the mine production department and the external consultant.

• Extensivity: The total number of individuals involved in the buying process is three, namely, the mine manager, the managing director, and the external consultant.

• Connectedness: The degree to which the members of the buying center are linked to each other by direct communication concerning the purchase is low in the initial phases of the buying process, where most of the activities are solely conducted by the mine manager, (Phases 1 - 6), and high in the late phases of the buying process (Phases 7 - 9).

• Centrality: None, due to the fact that the purchasing manager’s function is nonexistent at Terra Mining, Björkdal. However, the centrality of the mine manager in the communication network is clear.

5.3.5.2.2 Roles of the Buying Center

The identification of roles concerning the purchase of a new-task CEMP for mining operations is the following:

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>mine manager</td>
</tr>
<tr>
<td>Gatekeeper</td>
<td>mine manager</td>
</tr>
<tr>
<td>Influencer</td>
<td>mine manager</td>
</tr>
<tr>
<td>Decider</td>
<td>mine manager/managing director</td>
</tr>
<tr>
<td>Buyer</td>
<td>mine manager, external consultant,</td>
</tr>
<tr>
<td></td>
<td>managing director</td>
</tr>
<tr>
<td>User</td>
<td>mine production team</td>
</tr>
</tbody>
</table>

The initiator of the buying process is impersonated by the mine manager, who recognizes that the company’s acquisition of CEMP could reduce production costs. The role of the gatekeeper is also performed by the mine manager, i.e. the control of the information flow and to the greatest extent the determination of which vendors are to be considered. The mine manager is the sole influencer in the buying process. In fact, the mine manager influences the buying decision due mainly to his technical expertise and thorough knowledge of the production needs to be satisfied through the purchase of CEMP. Concerning the decider role, both the mine manager and the managing director are deciders. Although the mine
manager takes most the decisions and establishes directives concerning the
purchase of CEMP, the managing director still has the final saying in form
of the final approval. The buyer, or purchaser, are all those who are
concerned with the contractual arrangements of the CEMP. This role is
assumed by the mine manager, the external consultant, and the managing
director. The preparation of the inquiry is prepared by the mine manager
with the assistance of an external consultant. During negotiation, the
managing director becomes involved in the process, thus assuming the role
of the buyer. Finally, the user of the CEMP is the mine production team.

5.3.5.2.3 Influence in the Buying Center

Considering influence, Table 36 which provides the specification of the
different departments of Terra Mining AB involved during the different
phases of the buying process, shows that the production department,
represented by the mine manager, is highly involved during all the buying
phases of the new-task CEMP purchase. In the four initial phases of the
process he is even the sole participator, thus exerting sole influence. The
external consultant participates in Phase 5, inquiry, as an expert concerning
mainly commercial, legal, and contractual aspects. Thus, although the
degree of involvement is considerable during this phase, his/her influence
(degree of involvement) in the entire process is relatively low. During the
latter phases of the buying process, namely those consisting of the
negotiation process and actual supplier selection, the managing director
becomes involved. However, their degree of involvement is lower than the
corresponding degree of involvement of the mine manager, and this is due
to the fact that the latter has the expertise and know-how essential for
carrying out, e.g. the maintenance and repair agreement. Therefore, it is
again the mine manager that is identified as the most influential participant
of the buying center.

5.3.5.3 Factors Affecting the Buying Process and the Buying Center

5.3.5.3.1 Buying Situation

Concerning the purchase of Capital Equipment for Mine Production
(CEMP) the following generic characterization was provided for CEMP
purchases related to the mine (Table 37):
Table 37: Categorization of CEMP Purchases Regarding Buying Situation

<table>
<thead>
<tr>
<th>Category</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Requirements</td>
<td>≈50%</td>
<td>≈50%</td>
<td>≈50%</td>
<td>100%</td>
</tr>
<tr>
<td>Newness of the Problem</td>
<td>≈10%</td>
<td>≈60%</td>
<td>≈30%</td>
<td>100%</td>
</tr>
<tr>
<td>Consideration of New Alternatives</td>
<td>≈30%</td>
<td>≈70%</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

Concerning the purchases of Capital Equipment for Mine Production (CEMP) the following table (Table 38) provides the estimated percentage of the following purchasing situations (buyclasses) conducted at Terra Mining’s Björkdal mine:

Table 38: Characterization of CEMP for Björkdal Mine in Terms of Buyclasses

<table>
<thead>
<tr>
<th>Buyclass</th>
<th>Description</th>
<th>% of total CEMP purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>Buying capital equipment of a type not earlier purchased</td>
<td>100%</td>
</tr>
<tr>
<td>Modified-rebuy</td>
<td>Buying capital equipment that is based on a prior purchase of similar capital equipment, but differs in aspects such as quality, price, etc., and therefore includes the consideration of new alternatives.</td>
<td>0%</td>
</tr>
<tr>
<td>Straight-rebuy</td>
<td>Buying capital equipment as a direct replacement employing the same brand and supplier. Buying capital equipment as a direct replacement employing the same brand and supplier.</td>
<td>0%</td>
</tr>
</tbody>
</table>

Concerning the CEMP purchases corresponding to the mine-operating unit, 100 percent of the purchases are characterized as new task due to the fact that only during the year of 1996, capital equipment was purchased for mine operations. Prior to the present year, the mining operations were subcontracted, and thus the contractor was responsible for drilling, blasting, loading, transporting, and crushing. A major change in the company’s policy has occurred during the second half of 1996, as Terra Mining AB established a leasing agreement during three years, for 10 capital equipment items necessary for the running of the mine operations of...
blasting, loading, and transporting. Contractor’s responsibilities are reduced to drilling and crushing. This new regime started on January 1, 1997.

5.3.5.3.2 Other Product Specific Factors

*Time Pressure*

The time span needed to carry out the purchase of a CEMP at Terra Mining was not clearly defined. However, time was not perceived as a limiting factor. Such a new-task purchase of CEMP is expected to take somewhere in between 6-12 months and the different phases of the buying process are performed with no time pressure, from the development of technical specifications, search for potential supply sources, evaluation, negotiation, etc.

*Monetary Value*

Terra Mining’s monetary value associated to the described CEMP new-task purchase was concluded as a three-years leasing agreement. Terra Mining’s buying center composition or buying process phases would not have varied with the increase of the monetary value, both the managing director and board of directors participate in the process. In case the monetary value decreased considerably, the participation of ownership representatives would cease to be obligatory.

*Importance*

Terra Mining’s vision was expressed as follows:

*By the year 2000, Terra Mining shall operate at least three mines and produce at least 150,000-200,000 oz (4,500-6,000 Kg) of gold annually. Growth will be achieved maintaining healthy profitability and showing consideration for human health, safety, and the environment.*

Source: Annual Report 1995, inside of cover

This mining company’s mission is clearly production oriented, thus the selection of an optimal CEMP which will provide the means for the company to increase its profitability is paramount.
5.3.5.3.3 Organizational Factors

Terra Mining AB is clearly a small-sized (with an average number of 58 employees) production-oriented mining company. The buying decisions concerning the described new-task CEMP are done by the production personnel, represented by the mine manager. The degree of centralization of the production unit is also very high, thus decisions associated with the different buyphases are taken in many of the phases solely by the mine manager.

5.3.5.3.4 Inter-organizational Factors

Terra Mining is a relatively new production-oriented mining company (operations at Björkdal commenced 1988). At the time the date was collected for this study, mining operations were subcontracted, thus subcontractors were responsible for drilling, blasting, loading, transporting, and crushing. The first new-task CEMP purchase has been described for the present study and the outcome is a three-year leasing agreement, which contemplates 10 CEMP items which are necessary for the running of the mining operations of blasting, loading, and transporting. Hence, the characteristics of the relationship that Terra Mining will develop with the CEMP supplier are yet to be determined.

Terra Mining’s participants of the CEMP purchasing process (specially the mine manager and the external consultant) have a well-grounded know-how of the CEMP supplier market. This is due not only to their former experience within the mining field, but also to the fact that the number of potential vendors of CEMP is relatively small. Word-of-mouth communication concerning different manufacturers of CEMP is common and extremely important in a market where the number of buyers and sellers is relatively reduced and hence information and social exchanges are high. Problem-solving is adopted as a negotiation strategy.

5.3.5.3.5 Environmental Factors

Concerning environmental factors, economic factors such as gold price and the exchange rate SEK/USD are found highly influential in the new-task CEMP purchase. In fact, a weaker US Dollar and higher production costs due to lower grade and greater volumes of waste rock are in the origin of the company’s decision to lease CEMP.
5.4 Case 3: LKAB

5.4.1 Introduction - Background

LKAB was established in 1890 and is one of the worlds leading producers of upgraded iron ore products. The company operates underground mines and ore processing plants in Kiruna and Malmberget, Sweden, a pelletizing plant in Svappavaara, Sweden, and shipping ports in Luleå, Sweden, and Narvik, Norway. The rich iron ore deposits in northern Sweden have made LKAB the only remaining large iron ore exporter in Europe. The geographical proximity to the European steel industry has played an important role when competing with mines in Australia and Brazil where labor costs are considerably lower. Approximately 80 percent of LKAB’s products are delivered to steel mills in Europe. The remaining output is exported mainly to customers in the Middle East and the Far East. Figure 31 illustrates LKAB’s operational organization:

![LKAB Operational Organization Diagram](image_url)

Figure 31: LKAB’s Operational Organization.

LKAB produces two types of product categories: pellets and fines (low-phosphorus ore). Pellets are LKAB’s most highly upgraded product and have become something of a trademark for LKAB. It accounts for more than 61 percent of the production volume and 71 percent of iron ore sales. LKAB produces two grades of pellets: olivine pellets and dolomite pellets (DR pellets). The major portion of pellets produced are "olivine pellets", 


sold mainly to steel mills with blast furnaces in Sweden and the European Union (EU). The company’s market share in the EU was about 22 percent in 1995. Dolomite pellets are used in processes based on natural gas and are increasingly common in oil-producing countries. Presently, shipments of this product are mainly to the Middle East and Southeast Asia. LKAB’s world market share in 1995 accounted for about 16 percent. Fines, i.e. low-phosphorus ore, with less than 0.05 percent phosphorus are produced both in Kiruna and Malmberget. The major customers are located in Sweden, Finland and the EU. The company’s market share in the EU was about 5 percent in 1995.

Further processing (i.e. "upgrading") is a keyword and the motto for LKAB’s industrial future. LKAB’s deliveries of pellets are steadily increasing and the sales of this product category account today for 61 percent of shipments and 73 percent of iron ore sales. Demand for pellets is expected to increase with rapid expansion markets such as China raising their imports by more than 30 percent in 1996. It is projected that pellets will continue to be in short supply for the next two years, but if the capacity expansion plans are realized (e.g. new pelletizing plants being constructed in Brazil, Mexico, and India), supply will catch up with demand before the turn of the century. Some business figures are indicated in Table 39.

Table 39: LKAB, Key Indicators

<table>
<thead>
<tr>
<th>Group, MSEK</th>
<th>1994</th>
<th>1995</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Revenues</td>
<td>3,542</td>
<td>4,557</td>
<td>4,891</td>
</tr>
<tr>
<td>Operating Expenses</td>
<td>-3,061</td>
<td>-3,597</td>
<td>-3,942</td>
</tr>
<tr>
<td><strong>Operating income before depreciation</strong></td>
<td>481</td>
<td>960</td>
<td>949</td>
</tr>
<tr>
<td>Depreciation according to plan</td>
<td>-333</td>
<td>-475</td>
<td>-526</td>
</tr>
<tr>
<td><strong>Operating income after depreciation</strong></td>
<td>148</td>
<td>485</td>
<td>423</td>
</tr>
<tr>
<td>Financial income and expense</td>
<td>1,208</td>
<td>435</td>
<td>518</td>
</tr>
<tr>
<td><strong>Income after financial income and expense</strong></td>
<td>1,356</td>
<td>920</td>
<td>941</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td>1,143</td>
<td>657</td>
<td>670</td>
</tr>
<tr>
<td>Net investments</td>
<td>1,280</td>
<td>1,147</td>
<td>1,629</td>
</tr>
<tr>
<td>Number of employees 31 Dec.</td>
<td>3,244</td>
<td>3,241</td>
<td>3,285</td>
</tr>
<tr>
<td>Iron ore production, Mtonnes</td>
<td>19.9</td>
<td>21.7</td>
<td></td>
</tr>
<tr>
<td>Iron ore deliveries, Mtonnes</td>
<td>19.4</td>
<td>21.4</td>
<td>21.6</td>
</tr>
</tbody>
</table>

5.4.2 Objectives and Strategies

LKAB’s business concept is expressed as follows:

*LKAB shall - on a profitable, cost-effective and sustainable basis - market, manufacture and deliver upgraded, quality-assured iron ore products from the Orefields in Kiruna and Malmberget to selected customers*

Source: Annual Report 1995, p.8

The above business concept combines the three important pillars in which the mining company’s objectives and strategies are devised: (1) profitability, (2) upgrading and quality, and (3) long-term customer relationships. LKAB’s vision is that, "at least 75 percent of the delivery volume in the future should consist of pellets. A big step towards realizing this vision was taken with the expansion of capacity in Kiruna. In 1995, pellets comprised 61 percent of total deliveries" (Ibid). This commitment to upgrading and quality assurance has led to one of the biggest investment programs in the history of the company. The ongoing investment program of nearly SEK five billion includes:

- Kiruna’s new pelletizing plant, started production during 1995 and has a full capacity of 4Mt per year
- the construction of a new main level at a depth of 1,045 meters at the Kiruna underground mine which was put into operation by 1997
- the construction of a new harbor in Luleå (Sandskär), scheduled for completion by the end of 1996
- the establishment of a new ore transport company (MTAB) during 1996, between LKAB, Sweden’s SJ and Norway’s NSB, which is responsible for the entire ore transport chain from loading at the mines to unloading in the harbors

Concerning the latter, the objective is to create one of the most efficient ore transportation systems in the world, with internationally competitive freight costs.

5.4.3 The Company’s Mines

LKAB is presently operating two underground mines: Kiruna and Malmberget. The iron ore deposits at Kiruna have been known since the 17th century. However, due to it’s geographical location and access problems, only in the beginning of this century has the mining of the
deposits been implemented on a larger scale. Today, LKAB’s mine at Kiruna is the largest underground iron ore mine in the world. Nearly 770 million tonnes of ore have been mined at Kiruna. Nevertheless, the remaining reserves account for more than one billion tonnes. How much of these reserves that will actually be mined and during what period is only a question of economics and cost effectiveness.

The two types of product categories previously mentioned (pellets and fines) are produced at Kiruna, amounting to about 14.8 million tonnes of iron ore products per year (1995 values). This value represents a production increase of 13 percent or 1.7 million tonnes when comparing to the 1994 production values. This increase in production is mainly due to the start-up in production of the new pelletizing plant (officially opened on April 4, 1995). LKAB employs around 1,800 people at Kiruna, both at surface (processing operations and administrative functions) and underground (one third of the personnel).

Extraction of iron ore at the Malmberget deposit began in the late-1800’s. Still, known ore reserves account for 300 million tonnes and the extent of the ore bodies at depth remains unknown. Again, what is to be mined and within what period are both economic issues. Malmberget has a current annual production (1995) of nearly seven million tonnes of finished ore products. All ore mined at Malmberget is upgraded on-site. Two types of LKAB’s product categories are produced, namely pellets and sinter fines.

A new, large-scale project has commenced in Malmberget, i.e. the Malmberget Production System (MPS). The feasibility of opening a new main level in the mine, at a depth of 1,100 meters, is under study, together with a number of prospects for increasing pellet production to over 5 Mt per year. LKAB has around 900 employees at Malmberget.

5.4.4 The Organization and the Purchasing Department

LKAB’s purchasing function is organized in a central purchasing department (located at the company’s headquarters at Kiruna) and local purchasing departments (located at the mines Kiruna and Malmberget, and at the harbors Narvik and Luleå). Figure 32 illustrates how LKAB’s purchasing functions are organized:
Regarding the generic purchasing policy at LKAB, the motto is "the right quality at the right time to the right cost" (Inköpshandbok-LKAB, 1994, p.3). LKAB will define, in a precise way, the need for the "right" quality with clear specifications. The following guidelines are included in the company’s purchasing manual:

- LKAB will cooperate with suppliers who can fulfill LKAB’s needs and expectations regarding goods and services
- LKAB shall concentrate purchasing to a limited number of competent suppliers that actively can contribute to attaining the company’s objectives
- LKAB shall act business wise and follow ethics when working with it’s suppliers, and follow the contracts and agreements thoroughly
- LKAB’s relationships with suppliers shall be respectful, understanding, and straightforward from both sides, allowing for the possibility of developing profitability and competitive advantages to LKAB and LKAB’s suppliers

As mentioned, LKAB has a central purchasing department located at the company’s headquarters at Kiruna and local purchasing departments
located at the mines (Kiruna and Malmberget) and at the harbors (Narvik and Luleå).

As referred in the company’s purchasing manual (Inköpshandbok-LKAB, 1994, p.7), the central purchasing department is responsible for:

- coordinating the purchasing functions
- holding contact with external purchasing organizations, governmental institutions, etc., in questions which related to general company policy or those which relate to the company in general
- purchases of oil, electricity, coal, diesel, reagents, etc.
- general agreements concerning purchases of, e.g. bits, explosives, gas, consultancy services, chemical products, capital equipment (bigger machines), ore handling equipment, etc.
- follow-up EC regulations related to procurement, patents, standardization and energy
- delineating the company’s general purchasing strategies
- training of purchasing officers
- negotiations regarding big external contracts and investments

The local purchasing departments are responsible for:

- the purchases required for their correspondent production unit
- establishment of local ”general agreements”
- initiate the necessary changes concerning ”general agreements”
- analyze materials consumption and initiate contacts with new suppliers
- control the development of the suppliers market
- keep contact with the local governmental institutions and other organizations at the local level
- participate in project groups and search for information which eases purchasing
- inform the other purchasing departments within LKAB about the local purchases. When necessary, take contact with the central purchasing unit for special purchases, which requires the participation of the central organ
- coordinate, establish guidelines and follow-up of the local purchases

The organization chart of the purchasing department at Kiruna underground mine is the following (Figure 33):
Concerning the purchasing department at Kiruna, a total of 13 people is allocated to this department. Six handle the central purchasing functions and seven handle the local purchases (previous Figure 33). The background of the purchasing professionals is the following (Table 40):

Table 40: Background of Purchasing Professionals (Central and Local) at the Kiruna Mine.

<table>
<thead>
<tr>
<th>Title/Function</th>
<th>Background</th>
<th>Purchasing functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing Manager</td>
<td>Mine manager, vast professional experience within the mining industry. Mining engineer, 1958.</td>
<td>Responsible for all purchases related to LKAB’s central purchasing department and local purchasing department.</td>
</tr>
<tr>
<td>Five Purchasing Officers</td>
<td>Technical background, 3 engineers and 1 economics (MBA).Professional background within production, maintenance, workshops.</td>
<td>Handling purchases (administrative routines included) related to the central purchasing department (centralized general agreements, investments, standardization and patents, etc.).</td>
</tr>
<tr>
<td>Five Purchasing Officers</td>
<td>Technical background, engineers, with professional background within production (mine and pelletizing plant), maintenance, storage.</td>
<td>Handling purchases (administrative routines included) related to the local purchasing department, purchases related to Kiruna’s production units (mine &amp; pellets plant)</td>
</tr>
<tr>
<td>Two Purchasing Assistants</td>
<td>Administrative background</td>
<td>Assistance concerning mostly administrative routines.</td>
</tr>
</tbody>
</table>
Concerning the investment budget for LKAB, the following figures in Table 41 correspond to 1995:

Table 41: Investment Budget for LKAB Concern, 1995

<table>
<thead>
<tr>
<th>Item</th>
<th>MSEK</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary costs</td>
<td>1,050</td>
<td>30</td>
</tr>
<tr>
<td>Materials , production costs</td>
<td>735</td>
<td>21</td>
</tr>
<tr>
<td>Energy</td>
<td>455</td>
<td>13</td>
</tr>
<tr>
<td>External Services (contractors, transport, etc.)</td>
<td>560</td>
<td>16</td>
</tr>
<tr>
<td>Railway freight costs</td>
<td>525</td>
<td>15</td>
</tr>
<tr>
<td>Other costs</td>
<td>210</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,500</strong></td>
<td><strong>101</strong></td>
</tr>
</tbody>
</table>

Additionally, Table 42 below provides the 1995 purchasing budget for specified items:

Table 42: Purchasing Budget Specified by Item and Unit, LKAB, 1995

<table>
<thead>
<tr>
<th>Operating Unit/Item</th>
<th>Kiruna</th>
<th>Malmberget</th>
<th>Luleå</th>
<th>Narvik</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials, production costs</td>
<td>480</td>
<td>222</td>
<td>3.7</td>
<td>17</td>
</tr>
<tr>
<td>Energy</td>
<td>301</td>
<td>143</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>External Services</td>
<td>305</td>
<td>156</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Main Offices (advertising, etc.)</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.4.5 Industrial Buying Behavior of Capital Equipment for Mine Production

5.4.5.1 The Buying Process

In the buying process of capital equipment for mine production (CEMP) a first categorization is made at LKAB Kiruna. The purchases of CEMP fall into two categories in accordance to the demands (technical solutions needed) set by the company.

In the first category there are those relatively standardized purchases of CEMP, which can be used at the company without requesting specific technical modifications (i.e. equipment relatively standardized which can be found in several other mines).
A second category, called **prototype development of CEMP** includes those CEMP which are jointly developed (by LKAB and the suppliers) to meet the specific technical solutions required at the company’s mines. Development and testing of a prototype is done before the construction of other similar units. The purchasing manager provided several examples:

- trucks with 120 tonnes capacity (non standardized equipment, usually such trucks, can be bought with a capacity up to 40 ton)
- the biggest loaders working underground have been developed at LKAB together with Truckimport
- drilling rigs

The type of technical solution required will then determine the buying process and degree of involvement of the actors of the buying center.

**Category 1 - Buying Process of Relatively Standardized CEMP**

The buying process of relatively standardized CEMP follows the general pattern provided in the description of the following *seven* fundamental activities or *buyphases*:

**Phase 1 - Need recognition**

A need recognition initiates the buying process. Usually it is the production unit that recognizes the need for investment in CEMP due to a company’s expansion need or aiming at a decrease of existing operational costs. This item is then included in the investment budget for the year, and approval from the *production manager* is required.

**Phase 2 - Preparation of the Inquiry**

An inquiry is prepared by the *purchasing* department together with the *production* unit. The company sees the inquiry as, “a letter of invitation sent to a set of suppliers requiring them to answer with an offer/quotation within a specified time limit”. Therefore this inquiry should be built-up in such way that it allows the potential supplier to provide a detailed offer/quotation with a specified price. The formal issuing of this inquiry is usually done by the purchasing department in a written format. The functional characteristics are specified as the company wishes to buy a “function”, not a machine. Hence, the inquiry should include technical or other information needed to give an accurate description of the "function" that needs to be accomplished by the CEMP item. Additionally, the contact persons within the purchasing department (“Our purchaser”), and
production department ("Our technical") who are able to answer eventual questions that arise concerning the specific inquiry should be included. The closing date for acceptance of the offers/quotations is also specified. It is the purchasing department's duty to make sure that only quotations received within the specified time limit are accepted. When possible, the following material should be included in the inquiry:

- check list
- technical specifications and performance directions (prescriptions, conditions)
- maintenance program according to LKAB's standard
- eventual drawings relevant for the purchase
- specification for technical assistance to be provided by the supplier
- specification for eventual personnel training to be provided by the supplier

Phase 3 - Supplier search

Using the company's suppliers net, at least three suppliers are contacted. The number of potential suppliers is not a definite one and varies substantially in accordance to the type of purchase. The range of suppliers existing in the market that can provide the specific function sought by the company is usually limited. However, there are cases where up to 10-12 potential suppliers have been contacted at this phase. Supplier search is usually implemented by the purchasing department. Inquiries should not be sent to those companies that, due to special reasons (misguided pricing policy, previous relationship problems, etc.), are no longer regarded as potential suppliers.

Phase 4 - Acquisition and analysis of the quotations

Evaluation of the proposals is carried out by both the production unit and the purchasing department. The first analyzes the proposals in terms of the technical characteristics, the latter analyzes it from an economical point of view. Analysis of the quotations is a very important part of the purchasing duties. It is the purchasing department's responsibility to, together with the production unit, make sure that such a thorough analysis leads to a correct judgment of the quotations. Uncertainty, regarding such terms as price judgments may occur, especially when only one quotation is given. In such cases, the price judgment should be based upon quality, expected performance, function, etc. Besides the clear technical evaluation which must be emphasized at this phase (carried out by the production unit),
examples of economical considerations that are taken into account by the purchasing department include:

- is the given price "fixed" or index ruled (related to the time of delivery for the CEMP item)
- are cost related factors (such as materials and personnel wages included in the given price)
- are payment terms specified
- are interest rates considered

When purchasing CEMP price is not the most decisive evaluation factor, examples of important evaluation factors are:

- maintenance and operational costs, the LCC (life-cycle cost) of the CEMP
- reliability of the supplier
- long-term commitment directly related to the financial stability of the vendor
- fitness of the equipment towards the human and underground environment
- delivery time and ability of the supplier to match this date
- technical ability and expertise of the supplier
- possibility to provide technical assistance within Sweden
- supplier's installations and workshops

The purchasing department is responsible for receiving and further distributing the quotations to the parties involved. This distribution is limited to those involved in the specific buying process and the copies distributed are personally addressed to avoid unnecessary circulation (spreading) of the quotations.

Phase 5 - Selection of supplier and approval of investment proposal

A preliminary selection of a supplier is done in accordance to the criteria used during the previous phase (acquisition and analysis of the quotations) and an investment proposal is prepared by the production unit. This includes the evaluation of the different suppliers and the reasons that led to the selection of a specific one. Among the evaluation criteria, the following were mentioned, ranked in order of importance:
LKAB has an established net of "trustworthy" suppliers. Many of the suppliers are “home-suppliers” (i.e. firms that have established themselves in the community nearby and depend on LKAB as their major client). The company takes this fact into consideration, and therefore attempts to balance the purchases between these suppliers, as it is of LKAB’s interest from an economical point of view that competition exists. Past experience with major suppliers in the field such as Atlas Copco, ABB, Morgårdshammar, and Skega is also an important factor. A “good” contact net has been established over the years and preference is bound to be made if other potential suppliers are at the same price level. Long-term relationships are important for LKAB.

Approval from the production manager is always required. Approval from top management is required in case the value of the purchase is SEK three million bigger than the predicted value included in the investment budget. Those suppliers that have not been chosen are notified of such a decision in writing, however the reasons for why their quotations were not selected are not included.

Phase 6 - Negotiation process

The negotiation process is carried out between the potential supplier, LKAB’s purchasing department and the production unit. The negotiation process may be rather time consuming (one to two months). During this time, all the items specified in the inquiry and the quotation are thoroughly revised and discussed and an agreement should be reached. The scope of work, the payment and delivery terms, guarantees, after-sales support, etc. are examples of items of crucial importance that should not be neglected during the negotiation phase. The negotiation strategy selected is of a “integrative bargaining” nature, meaning that LKAB attempts to develop and evaluate alternative purchasing arrangements that have potential for reducing costs and/or increasing performance. At the negotiation phase it is still possible that two potential vendors are involved. When such is the case, the company usually makes each one aware of the existence of the other as a potential vendor source. In this way, LKAB expects to strengthen it’s position in the negotiation process.
Phase 7 - Contract

It is the responsibility of the purchasing department to confirm the agreement obtained during the former phase by issuing a purchase order or contract. A first confirmation is given to the supplier, by writing, in form of a "letter of intent". The latter should then be replaced, as soon as possible, by the final contract/purchase order. Contractual terms like payment and delivery terms are determined by the purchasing department. Whenever needed, legal assistance should be required both from the local legal expert and from the legal resources existing at the central purchasing department. When the supplier is foreign, additional financial assistance concerning currency exchange rates may be requested. No systematic performance evaluation is done by the company's purchasing department.

The flowchart presented in Figure 34 summarizes, in a sequential way, the phases which comprise the buying process of a relatively standardized CEMP at LKAB, Kiruna underground mine:

![Flowchart of a Relatively Standardized CEMP Purchase at LKAB](image)

**Category 2 - Prototype Development of CEMP (Buying Process of CEMP specially designed to meet LKAB's specific technical solutions)**

Most of the formal procedures implemented by the purchasing department mentioned in the former category (relatively standardized CEMP purchases) are applied similarly to this category and will therefore not be repeated in this presentation. Here the emphasis will be given to the
particularities (specificities) of this more elaborated buying process. Prototype development of CEMP follows the general pattern provided in the description of the following nine fundamental activities or buyphases:

Phase 1 - Need recognition

The need recognition initiates the buying process. Usually this need is identified by the production unit or the research & development unit, and is commonly due to a company’s expansion need or the need to decrease operational costs.

Phase 2 - Establishment of a "Project Group"

A project group is established, and a project manager is assigned. The number of individuals involved varies according to the type of purchase, but usually representatives from the following departments are included:

- production
- research & development
- maintenance
- purchasing department

Phase 3 - Preparation of the Inquiry

An inquiry is prepared by the project group. Characteristics and functions are specified to the extent possible at this phase. When developing specifications the same degree of accuracy that exists in the former category is usually not possible to attain. This is due to the specificity of the solution sought that will probably require innovative technology not possible to fully specify at this phase. The company wishes to buy a “function”, a “solution”, not a machine. Considerations concerning a “make-or-buy” decision are also taken during this phase. The company has many resources (human, workshops, etc.) and the extent to which these resources can be utilized is considered at this phase.

Phase 4 - Supplier search

Using the company’s suppliers net, from three to 12 potential suppliers may be contacted. LKAB is interested, at this phase, in realizing which suppliers have the resources and are capable of developing a technical solution for the company. This phase is formally carried out by the purchasing department's representative in the project group.
Phase 5 - Acquisition and analysis of the quotations

Evaluation of the proposals is carried out by the *project group*. Evaluation of the potential suppliers is done thoroughly from a technical and economical viewpoint. Emphasis is given to the technical evaluation, as technical aspects assume a paramount importance in this category.

Phase 6 - Selection of supplier and approval of investment proposal

A preliminary selection of a supplier is done and an investment proposal is prepared. In the latter, the evaluation of the different suppliers and the reasons that led to the selection of a specific one are described. The selected supplier will commonly establish a long-term relationship with LKAB, aiming at the development of a technical solution/prototype. Technical specifications and characteristics of the CEMP item are developed by both the supplier and LKAB. The *project group* actually selects the supplier. *Management*’s approval, and even *top management*’s approval, is usually required at this phase due to the high investment values on such purchases.

Phase 7 - Negotiation process

This phase is of crucial importance in this buying process. A long-term relationship between LKAB and the supplier will be established as the result of the agreement is reached at this phase. It is therefore extremely important that all inquiry and quotation terms are thoroughly revised. All possible eventualities (not unusual in this category) should be previewed and the supplier’s scope of work should be defined in detail. This phase is carried out between the selected potential supplier and LKAB’s *project group*.

Phase 8 - Contract

The formal issuing of the contractual documents, where the agreement reached in the previous phase is specified, is the *purchasing* department’s responsibility. What was mentioned for this phase in the former category (relatively standardized CEMP) applies similarly for this category.

Phase 9 - Performance control and after-sales support

Once the development of the technical specifications of the CEMP item is a continuous process, this step assumes a vital importance in the buying
process. After-sales support and control of the “prototype” performance is usually a contractual obligation of the supplier. Follow-up is monitored by the project group.

The flowchart presented in Figure 35 presents the phases which comprise the project buying process of CEMP at LKAB, Kiruna underground mine:

![Flowchart of Prototype Development of CEMP at LKAB](image)

Figure 35: Flowchart of Prototype Development of CEMP at LKAB

5.4.5.2 The Buying Center

5.4.5.2.1 Composition of the Buying Center

The size of the buying center, meaning those individuals or groups who are directly related and participating in the purchasing process of a relatively standardized CEMP varies between two and five. The production manager and at least one purchasing officer are participating in the purchasing process. Among the eventual participants, the following are included: a
member of the production team; a purchasing officer from the central purchasing department (when legal assistance is required); and a member of the top management team (in cases where the purchase value exceeds by SEK three million the initially predicted value included in the budget).

Table 43 illustrates the correspondent participation in the different phases of the buying process:

Table 43: Functional Areas of LKAB Participating in the Buying Process of a Relatively Standardized CEMP

<table>
<thead>
<tr>
<th>Vertical Involvement</th>
<th>Top management</th>
<th>Function/Departmental Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Managing director</td>
</tr>
<tr>
<td></td>
<td>Upper level operating management</td>
<td>Production</td>
</tr>
<tr>
<td>1. Need Recognition</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2. Preparation of the Inquiry</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3. Supplier Search</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4. Acquisition and Analysis of the Quotations</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5. Selection of Supplier and Approval of Investment Proposal</td>
<td>X</td>
<td>(when I &gt; 3 MSEK than predicted)</td>
</tr>
<tr>
<td>6. Negotiation Process</td>
<td>X</td>
<td>X (eventual legal assistance)</td>
</tr>
<tr>
<td>7. Contract</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regarding the five dimensions of the buying center, data collected leads to the following characterization:

Vertical involvement: One hierarchical level exerts influence and communication within the buying center, namely the production and purchasing departments. In the case when the monetary value of the CEMP purchase exceeds by SEK three million the initially predicted value, top management’s approval is required and thus two levels of hierarchy are present.
**Function/Departmental involvement:** Two or three (for purchase values exceeding by SEK three million of the budget predicted investment) departments/functions within the organization are involved in the buying process. These are the production department, the purchasing department, and top management (for purchase values exceeding by SEK three million of the predicted budget value).

**Extensivity:** The total number of individuals involved in the buying process varies (as mentioned before when discussing buying center size) between three and five.

**Connectedness:** The degree to which the members of the buying center are linked to each other by direct communication concerning the purchase is relatively low in the initial phases of the buying process. During these phases, most of the activities are solely conducted by one of the departments (e.g. Phases 1 and 3). During the late phases, connectedness is high (Phases 4 and 6), and production and purchasing departments are actively communicating.

**Centrality:** Once the information flows through the purchasing manager, the centrality of the purchasing manager in the communication network can be exerted.

**Composition of the Buying Center in a Prototype Development CEMP Purchase**

The size of the buying center in a prototype development CEMP purchase is at least five. The four members of the project group belonging to the following functional areas: production, research & development, maintenance, and the purchasing department; and the top management member which is required for approval of the purchase. Table 44 illustrates the correspondent functional participation in the different phases of the buying process:
Table 44: Functional Areas of LKAB Participating in the Prototype Development Buying Process of CEMP.

<table>
<thead>
<tr>
<th>Vertical Involvement</th>
<th>Function/Departmental Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top management</td>
</tr>
<tr>
<td>Buying Phases of CEMP Prototype Development</td>
<td>Managing Director</td>
</tr>
<tr>
<td>1. Need Recognition</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>2. Establishment of a “Project Group”</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>3. Preparation of the Inquiry</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>4. Supplier Search</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>5. Acquisition and Analysis of the Quotations</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>6. Selection of Supplier and Approval of the Investment Proposal</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>7. Negotiation Process</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>8. Contract</td>
<td>X ( \times )</td>
</tr>
<tr>
<td>9. Performance Control and After-sales Support</td>
<td>X ( \times )</td>
</tr>
</tbody>
</table>

Regarding the five dimensions of the buying center, data collected leads to the following characterization:

**Vertical involvement:** Two hierarchical levels exert influence and communication within the buying center, namely the project group level and top management.

**Function/Departmental involvement:** Five different departments/functions within the organization are involved in the buying process, specifically, the
production department, the purchasing department, research &
development, maintenance, and top management.

**Extensivity:** The total number of individuals involved in the buying process
are, as mentioned before, at least five.

**Connectedness:** The degree to which the members of the buying center are
linked to each other by direct communication concerning the purchase is
high in all the phases of the buying process.

**Centrality:** Concerning centrality, the assigned project manager exerts
centrality, as he is responsible for linking the members of the buying center
in a communication network.

5.4.5.2.2 Roles of the Buying Center

**Category 1 - Purchase of relatively standardized CEMP**

The identification of roles in the buying center that was provided by the
interviewed purchasing manager include the following:

- **Initiator:** production department
- **Gatekeeper:** purchasing department
- **Decider:** top management
- **Influencer:** production manager
- **Buyer:** purchasing department
- **User:** mine production team

These roles are identified in terms of the different departments who
participate in the buying decision. The *initiator* is the production unit
which is responsible for the definition of the buying situation. The
purchasing department is acting as a *gatekeeper*, meaning that this
department controls all flow of information concerning the purchase. Top
management is the ultimate *decider* as correspondent approval is necessary
for the fulfillment of the buying process, items that were previously
included in the investment budget and those which exceed SEK three
million. The *influencer* role is conducted by the production department in
the person of the production manager, who can be identified as the main
influencer due to the technical expertise and know-how of the exact needs
that have to be satisfied through the purchase of such CEMP. The actual
*buyer*, meaning the department that executes the contractual arrangements,
is identified as purchasing. Finally, the role of *user* is performed by the
production department identifying those persons within the production unit who will actually operate the purchased CEMP.

**Category 2- Prototype Development of CEMP**

The identification of the roles of the buying center provided for this category of purchase is the following:

<table>
<thead>
<tr>
<th>Role</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>production</td>
</tr>
<tr>
<td>Gatekeeper</td>
<td>project group</td>
</tr>
<tr>
<td>Decider</td>
<td>top management</td>
</tr>
<tr>
<td>Influencer</td>
<td>project group</td>
</tr>
<tr>
<td>Buyer</td>
<td>purchasing</td>
</tr>
<tr>
<td>User</td>
<td>mine production team</td>
</tr>
</tbody>
</table>

The main difference from the identification given in Category 1 is the inclusion of the *project group*. As mentioned before it includes representatives from the following departments:

- **Mine Production**: a mining expert and the production manager are usually members of such a project group

- **Purchasing**: one purchasing officer or the purchasing manager himself takes part of the project group.

- **Maintenance**: includes usually an electrical and a mechanical expert

- **Research & Development**: a member from this department may also be part of the project group

The composition of the buying center varies in accordance to the category of the purchase. The differences are in the roles of the *gatekeeper* and the *influencer*.

In relatively *standardized CEMP*, the role of *gatekeeper* is performed by the purchasing department, which functions as an information filter. This department judges which information coming from the outside environment is relevant for the purchase at hand. The latter is then transmitted to the interested parties, in this case usually the production unit.

The production unit functions as the main *influencer*. Production possesses the technical know-how and the experience needed to evaluate the
potentialities of the CEMP item in question. It is production that prepares the investment proposal with clear directives towards a certain supplier.

In **prototype development of CEMP**, the above mentioned roles are conducted by the project group. The buying process is conducted as a “team-work” where both the project group and the supplier play an important role. The information is channeled to this group where relevance values are made, as they have the technical ability and have been involved in the process from its early phases. The **influencer** is again the project group, and this is due to the awareness of the buying process and the technical solutions developed. The project group prepares an investment proposal, usually with clear directives towards one supplier. Approval from management is often required due to the monetary value that is committed to such a purchase.

### 5.4.5.2.3 Influence in the Buying Center

Concerning influence, Table 43 (on p.216) provides the specification of the different departments of LKAB which are involved during the buyphases of **relatively standardized CEMP** purchase at Kiruna. The table shows that both the production and purchasing departments are involved in five of the seven buyphases. Thus, both these departments exert considerable influence during the buying process. However, the degree of involvement of the production department was referred to as higher than the one corresponding to the purchasing department. This is essentially due to the fact that production is the core function of the company. It is production that generates company's revenues, hence, it is production and the production manager who are most aware of the needs that must be fulfilled for the achievement of the production objectives. Ultimately, it is production that most influences the decision making process. In cases where the monetary value of the relatively standardized CEMP exceeds by SEK three million the predicted budget value, top management becomes involved in Phase 5 of the process, namely in the approval of investment proposal.

Regarding influence for the **prototype development purchases of CEMP**, Table 44 shows that the project group constituted by representatives of the four departments of production, research and development, maintenance, and purchasing, is simultaneously involved during most of the phases of the buying process (Phases 2,3,5,6,7, and 9). Thus, all these departments exert considerable influence during the buying process. However, following the influence pattern described for the relatively standardized
CEMP purchases, production was referred as the most influential department during the phases of the buying process in which it’s involvement is present.

5.4.5.3 Factors Affecting the Buying Process and the Buying Center

5.4.5.3.1 Buying Situation

Concerning the purchases of CEMP (relatively standardized and prototype development) the following generic characterization was provided (Table 45):

Table 45: Categorization of CEMP Purchases Regarding Buying Situation

<table>
<thead>
<tr>
<th>Category</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Requirements</td>
<td>≈0%</td>
<td>≈0-10%</td>
<td>≈90-100%</td>
<td>≈100%</td>
</tr>
<tr>
<td>Newness of the Problem</td>
<td>≈15%</td>
<td>≈50%</td>
<td>≈35%</td>
<td>≈100%</td>
</tr>
<tr>
<td>Consideration of New Alternatives</td>
<td>≈10%</td>
<td>≈20%</td>
<td>≈70%</td>
<td>≈100%</td>
</tr>
</tbody>
</table>

Again, concerning CEMP purchases, Table 46 provides the estimated percentage of the following purchasing situations (buyclasses) conducted at LKAB Kiruna:
Table 46: Characterization of CEMP for Kiruna Mine in Terms of Buyclasses.

<table>
<thead>
<tr>
<th>Buyclass</th>
<th>Description</th>
<th>% of total CEMP purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>Buying capital equipment of a type not earlier purchased</td>
<td>20%</td>
</tr>
<tr>
<td>Modified-rebuy</td>
<td>Buying capital equipment that is based on a prior purchase of similar capital equipment, but differs in aspects such as quality, price, etc., and therefore includes the consideration of new alternatives.</td>
<td>70%</td>
</tr>
<tr>
<td>Straight-rebuy</td>
<td>Buying capital equipment as a direct replacement employing the same brand and supplier. Buying capital equipment as a direct replacement employing the same brand and supplier.</td>
<td>10%</td>
</tr>
</tbody>
</table>

5.4.5.3.2 Other Product Specific Factors

*Time Pressure*

The time requested for a *relatively standardized CEMP* purchase varies in accordance to the complexity and availability of the equipment. Time intervals varying from 3-4 Weeks to 7-8 months (considering that the delivery time may be 3-4 months) were mentioned. In case of purchases of CEMP categorized as *prototype development*, the time span is usually wider than the previously mentioned. In the former case, this was mainly due to technological innovation and need to develop the prototype. The establishment of long-term relationships through the active collaboration between LKAB and the suppliers is also a way for LKAB to reduce risk. LKAB and it’s suppliers work extensively for the development of mutually beneficial objectives From the company’s perspective, and once most of these purchases are previewed in advance in the company’s yearly budget, time pressure is not perceived as a variable which strongly influences the buying process and buying center.
Monetary Value

The monetary value associated to both the relatively standardized and prototype development CEMP purchases varies considerably in accordance to the item in consideration. Annual investment budget values may also vary considerably from year-to-year. CEMP investments are normally included in the foreseen annual investment budget for LKAB. The monetary value will influence the composition of the buying center by imposing the inclusion of an extra hierarchical level (top management level) when the value under consideration has exceeded by SEK three million the predicted CEMP value.

Importance

LKAB has expressed its business concept as follows:

LKAB shall - on a profitable, cost-effective and sustainable basis - market, manufacture and deliver upgraded, quality-assured iron ore products from the Orefields in Kiruna and Malmberget to selected customers

Source: Annual Report 1995, p.8

LKAB’s mission is both production and distribution oriented. However, the continuous striving for lower production costs where the purchase and development of optimal CEMP solutions play a leading role, is the core concern of this mining company.

5.4.5.3.3 Organizational Factors

LKAB is a large corporation with an average number of 3,285 employees (1996’s data). The company is clearly production oriented and many of the buying decisions taken throughout the phases of CEMP purchases are done jointly by the production and purchasing departments (in the cases where relatively standardized CEMP purchases take place). The degree of centralization should also be discussed and analyzed conjointly regarding the two mentioned departments.

Concerning prototype development purchases of CEMP, from an organizational viewpoint, a project team consisting of production, R&D, maintenance, and purchasing representatives is constituted. Decisions are taken jointly and the degree of centralization should be discussed and analyzed in terms of the centralization of the project group.
5.4.5.3.4 Inter-organizational Factors

LKAB has strongly changed its policy towards a reduction of suppliers. During the last few years, the supplier's register has been reduced from 11,000 to 700. An updating of the suppliers of interest to the company was recently completed. The first criteria utilized for the elimination of many of the suppliers was whether LKAB had done business with them for the past two years. Factors, which most contribute to dissatisfaction with suppliers are spare-parts unavailability and misuse of price setting. It is also of the supplier's interest to keep LKAB as a satisfied customer. The company has a good reputation within the mining industry. It is good public relations for the suppliers to use LKAB as a reference. LKAB also tries to avoid an over-dependence of locally established suppliers, which only have LKAB as their sole customer.

Concerning the purchases of CEMP, the perceived product importance is considered high. This leads to the establishment of long-term relationships between LKAB and the suppliers. This is even more evident in the case of prototype development where commitment to the development of a new technical solution becomes paramount to LKAB. The establishment of long-term relationships and active collaboration between LKAB and the suppliers in developing mutually beneficial objectives was also mentioned as a way for LKAB to reduce risk.

The CEMP supplier market is usually limited in number, even on a global perspective. In other words, the number of vendors, which can provide (e.g. a certain type of drillrig) may be limited to three or four. This fact implicates that there is usually a high degree of knowledge among the buyers and sellers. Considering CEMP purchases, long-term relationships are usually established with the suppliers and high level of inter-firm cooperation is normally developed. LKAB's Research & Development area usually cooperates closely with CEMP suppliers, especially in the cases where project buying of CEMP is under consideration. Technical cooperation, reliability of supply, and fewer conflicts, are all advantages that were mentioned regarding long-term relationships.

LKAB tends to avoid single sourcing and attempts to have at least two potential suppliers when the negotiation process begins. Regarding the negotiation strategy selected, for both types of CEMP purchases, relatively standardized and project buying, integrative bargaining is applied, meaning that the buying firm encourages potential vendors to work with LKAB in a way that both parties will gain. Again, cooperation is a key motto.
5.4.5.3.5 Environmental Factors

The environmental factors which are found to influence LKAB’s CEMP buying behavior include higher levels of demand of iron ore. These higher levels can be translated into an higher demand for LKAB’s principal product (pellets). This enables iron ore producers to raise their prices and consequently their operating income. On-going and future investments are utterly dependent on the company’s financial situation. Both 1995 and 1996 were successful years for LKAB (e.g. price increases of 6 percent, an increased share of pellets, and a somewhat better dollar rate during 1996). Although certain optimism prevails in the iron and steel industry, uncertainty concerning the electric power in the future is a concern for the company. LKAB has a high electricity consumption (more than 1 percent of Sweden’s total consumption), and consequently the availability of electric power at competitive prices (governmental factor) is of crucial importance for LKAB.
5.5 Case 4: BOLIDEN MINERAL AB

5.5.1 Introduction - Background

Boliden Mineral AB is a mining and smelting company that owns and operates ten mines in northern and central Sweden, as well as the Rönnskär smelter. Mining operations began in 1925 in the Boliden mining area. Boliden Mineral AB is part of Boliden AB\textsuperscript{17}, a newly formed company (during the latter half of 1995) which operates in five business areas:

2. \textit{International Mines and Smelters}, which comprises Boliden’s two mining companies abroad Boliden Apirsa in Spain and the partly-owned Saudi Company for Precious Metals (SCPM) in Saudi Arabia, a gold and base metal project in Burkina Faso as well as the zinc smelter, Norzink in Norway.
3. \textit{Metal Processing}, consisting of five production units in Great Britain, the Netherlands, Belgium, and Sweden which produces copper-based semi-manufacturers.
4. \textit{Metal Recovery}, which includes four companies: Arv.Andersson, Boliden France, Boliden Metech, and Boliden Bergsöe. The first three companies provide the Rönnskär smelter with various forms of metal scrap, while the fourth is a secondary smelter which is the only plant in the Nordic countries recovering lead from spent car batteries.
5. \textit{Technology Sales}, includes Boliden Contech, which markets and sells technology developed within Boliden for efficient industrial processes in the mining, metallurgical and sulfuric acid areas, as well as on the production and environmental side.

Presently, the company under investigation, Boliden Mineral AB, is one of the biggest producers of metals and metal concentrates in Europe comprising five operating units: the Boliden area, Laisvall, Garpenberg, Aitik, and Rönnskär (Figure 36). The company’s operations include the exploration, mining and concentration of non-ferrous ores in Sweden, production of copper, lead, zinc, silver and gold metals as well as sulfur products.

\textsuperscript{17} Boliden AB is a member of the Trelleborg group. It is included in one of Trelleborg’s three main business sectors, namely Mines and Metals (which results from the recent merge of two business sectors, mines & smelters and metal processing). The other two main business sectors are Rubber Products and Distribution. All business sectors have strongly decentralized profit responsibility.
Figure 36: Boliden Mineral’s Operational Organization.

Table 47 illustrates the mine production figures for Boliden (1995):

Table 47: Summary of Boliden Mineral’s Mine Production Figures for 1995

<table>
<thead>
<tr>
<th>Concentrator</th>
<th>Production of concentrates (tonnes)</th>
<th>Metal contents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Milled ore (1000 tonnes)</td>
<td>Copper tonnes</td>
</tr>
<tr>
<td></td>
<td>Milled ore (1000 tonnes)</td>
<td>Lead tonnes</td>
</tr>
<tr>
<td></td>
<td>Milled ore (1000 tonnes)</td>
<td>Zinc tonnes</td>
</tr>
<tr>
<td></td>
<td>Milled ore (1000 tonnes)</td>
<td>Silver kilogram</td>
</tr>
<tr>
<td></td>
<td>Milled ore (1000 tonnes)</td>
<td>Gold kilogram</td>
</tr>
<tr>
<td>Aitik</td>
<td>17 500</td>
<td>210 000</td>
</tr>
<tr>
<td>Boliden</td>
<td>1 400</td>
<td>12 200</td>
</tr>
<tr>
<td>Laisvall</td>
<td>1 700</td>
<td>83 300</td>
</tr>
<tr>
<td>Garpenberg</td>
<td>750</td>
<td>19 000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21 350</td>
<td>114 500</td>
</tr>
<tr>
<td></td>
<td>250 300</td>
<td>184 200</td>
</tr>
<tr>
<td></td>
<td>68 800</td>
<td>83 400</td>
</tr>
<tr>
<td></td>
<td>204 000</td>
<td>4 230</td>
</tr>
</tbody>
</table>

Source: Brochure "Boliden Mineral Mines and Concentrators 96" (1996)

During 1995, a number of large investments have affected mainly three of Boliden Mineral’s operating units:
1. Rönnskär Smelter, with an investment of SEK 250 million which aims at the increase of copper production from 100,000 to 140,000 tons per year.

2. Garpenberg area, with an investment of SEK 90 million which involves the deepening of the North mine and a more efficient ore-hauling including a crushing plant at the 800 meter level.

3. Boliden area, with two major investments: SEK 140 million for the extension of the Petiknäs mine and SEK 12 million for the linking at the 800 meter level with the Renström mine.

The production of copper and lead is sold mainly to the electro-industry (in which cable manufacturing is dominant) and battery manufacturers in the Nordic countries. The zinc concentrate is transported to the Group's associate plant, Norzinc AS, in Odda, Norway, for refining into metallic zinc, and is further sold to customers in Finland and EC countries. The lead concentrate is sold to customers in Germany, Belgium, and France. Some business figures are indicated in Table 48.

Table 48: Boliden AB, Key Indicators

<table>
<thead>
<tr>
<th>Key Figures: Boliden AB</th>
<th>1994</th>
<th>1995</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invoiced sales, MSEK</td>
<td>7,728</td>
<td>8,675</td>
<td>7,893</td>
</tr>
<tr>
<td>Operating earnings after depreciation, MSEK</td>
<td>440</td>
<td>703</td>
<td>362</td>
</tr>
<tr>
<td>Operating margin, %</td>
<td>5.7</td>
<td>8.0</td>
<td>4.6</td>
</tr>
<tr>
<td>Return on capital employed, %</td>
<td>10.6</td>
<td>16.2</td>
<td>9.3</td>
</tr>
<tr>
<td>Investments in fixed assets, MSEK</td>
<td>438</td>
<td>790</td>
<td></td>
</tr>
<tr>
<td>Number of employees at 31 December</td>
<td>5,373</td>
<td>5,404</td>
<td></td>
</tr>
</tbody>
</table>

Source: Trelleborg Annual Report 1995

5.5.2 Objectives and Strategies

Boliden Mineral expresses its mission as follows:

*Boliden aims to be a reliable supplier of high quality metal products which meet the market's demands and which are produced - by global comparison - in cost-efficient processes.*

Source: Trelleborg Annual Report 1995, p.17
5.5.3 The Company's Mines

As previously mentioned, Boliden Mineral AB operates ten mines in northern and central Sweden which are comprised in four of the five mentioned operating units:

1. **Boliden area**: Långdal, Renström, Petiknäs, Åkerberg, Kristineberg, and Kankberg mines.
2. **Laisvall area**: Laisvall mine.
3. **Garpenberg area**: Garpenberg north and Garpenberg south mines.
4. **Aitik area**: Aitik mine.

The **Boliden** mining area is one of the company's oldest mining areas. It was in this area that the company first started operations in 1925 near the Boliden community, 30 km west of Skellefteå. The Boliden mine was Europe's largest and richest gold mine until the phase-out of operations in 1967 due to the exhaustion of the ore reserve. Presently, this area consists of six underground mines in production and a central concentrator located at Boliden. Approximately 1.4 million tonnes of ore are milled per year. As referred, two major investments are on-going in the Petiknäs and Renström mines.

The **Laisvall** area consists of the Laisvall underground mine and concentrator, which is Europe’s largest lead mine. It has been in operations since 1943 and the ore-type is lead dominated with zinc and silver. The annual production is around 1.7 million tonnes. This mine is the company’s biggest underground mine. The mine is partially located under lake Stor-Laisan, what makes water so abundant that four pumping stations are required.

The **Garpenberg** area consists of two underground mines, Garpenberg North and South, and a concentrator. Garpenberg North began operations in 1972. The ore-type is zinc dominated with silver. Garpenberg South or Garpenberg is an older mine which was acquired by Boliden in 1957 and the type of ore is a complex ore with copper, lead, zinc, and precious metals. The annual production of these two mines is situated around 750,000 tonnes of milled ore.

The **Aitik** area consists of the open pit copper mine Aitik and concentrator, located in northern Sweden. The mine was discovered during the 1930's and operations started in 1968. The ore type is a low-grade copper ore containing precious metals. The annual production is around 17.5 million tonnes of milled ore.
5.5.4 The Organization and the Purchasing Department

A central purchasing department located at Boliden Mineral AB’s head office in Boliden is responsible for handling the purchasing for Boliden AB’s group, including the business area Swedish Mines & Smelters and thus Boliden Mineral AB. This new centralized purchasing policy has been implemented during the latter half of 1995. The functions of the central purchasing department include:

- handling all purchase within the business area of Boliden AB
- guiding the company in purchasing issues
- handling the buying process in the most effective way for the company
- the establishment of general agreements with vendors of supplies
- invoice register and control

There are 19 persons working at the purchasing department. These are responsible for logistics (four logistic officers), purchasing (seven purchasers and two assistants), invoice registering and administrative issues (four persons), and energy and computer (two persons). The following organization chart was provided (Figure 37):

Figure 37: Simplified Organization Chart of Boliden Mineral’s Purchasing Function.

Concerning the purchasing function the following is the background of the purchasing professionals (Table 49):
Table 49: Background of Purchasing Professionals at Boliden Mineral AB

<table>
<thead>
<tr>
<th>Title/Function</th>
<th>Background</th>
<th>Purchasing functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing manager</td>
<td>Technical, Production manager</td>
<td>Coordination and management.</td>
</tr>
<tr>
<td>Procurement Officer</td>
<td>Technical &amp; Procurement</td>
<td>Large investments in capital equipment for mine production both for mining and concentrator. Capital equipment for open-pit mines, trucks, loaders, etc.</td>
</tr>
<tr>
<td>Procurement Officer</td>
<td>Electrical engineer</td>
<td>Purchasing of floatation reagents for concentrator, explosives for mining, control systems, etc.</td>
</tr>
<tr>
<td>Procurement Officer</td>
<td>Mechanical engineer</td>
<td>Purchases related to mine shafts, machine spare parts for smelter, underground mine drifting.</td>
</tr>
<tr>
<td>Procurement Officer</td>
<td>Mechanical engineer, workshop chief</td>
<td>Purchases related to workshops, services, contractors, and diamond drilling.</td>
</tr>
<tr>
<td>Procurement Officer</td>
<td>Mechanical engineer, construction</td>
<td>Purchases of tools, spare parts, mobile equipment, drilling rigs for underground mining.</td>
</tr>
<tr>
<td>Procurement Officer</td>
<td>Electrical engineer, planning engineer</td>
<td>Purchases related to electrical issues, engines, etc.</td>
</tr>
</tbody>
</table>

Boliden Mineral’s annual budgets for the purchasing department are indicated in Table 50:

Table 50: Total Annual Budget for Boliden Mineral’s Purchasing Department.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual budget (MSEK)</td>
<td>=1,600</td>
<td>=1,500</td>
<td>=1,800</td>
<td>=2,200</td>
</tr>
</tbody>
</table>

Regarding the investment budgets for CEMP, strong variations occur from year to year, however, for 1995 it was indicated that between SEK 200 and 300 million (between 9 and 14 percent of the total investment budget) were allocated.
5.5.5 Industrial Buying Behavior of Capital Equipment for Mine Production

5.5.5.1 The Buying Process

A description follows of the eight fundamental activities or buyphases which comprise the buying process of CEMP at Boliden Mineral:

Phase 1 - Need recognition and Budget Approval

The production unit in any of the company’s operating mines recognizes the need for purchasing a CEMP item. The most common reason behind this fact is an expansion or reinvestment need. The production manager at the company’s mine then makes the need explicit within the organization by including the investment need in the long-term strategic planning.

A cost calculation of the expected value of the purchase is done by the production unit for further approval. The cost estimation is prepared taking into consideration possible price escalation effects, currency fluctuations, etc. Approval is required from the following actors in accordance to the estimated value of the purchase:

<table>
<thead>
<tr>
<th>Value of purchase</th>
<th>Approval from:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1 MSEK</td>
<td>Local/Division VD</td>
</tr>
<tr>
<td>1-5 MSEK</td>
<td>Management Boliden Mineral</td>
</tr>
<tr>
<td>&gt; 5 MSEK</td>
<td>Management Trelleborg</td>
</tr>
</tbody>
</table>

Once approval is granted for the CEMP item, it is included in the yearly budget of the correspondent operating mine that requires it's purchase.

Phase 2 - Technical Specifications

The company wishes to buy “a function” not a machine. The using department (production) prepares the performance specifications, which include statements of what the proposed product (CEMP) should do (e.g. load 3,500 tonnes/hour, availability at least 90 percent of the equipment’s lifetime, etc.). Then, the development of technical specifications takes place with the involvement of three departments: the production unit, the purchasing department, and the engineering department (required when the technical solution is complex).
An informal project group is established with representatives from the aforementioned departments. The actors involved are chosen in accordance to the expertise necessary to fulfill the technical requirements of the purchase. As an example, an electrically-driven equipment item will require the involvement of a purchaser with an electrical background, an electrical engineer (from the engineering side), and an electrical foreman/engineer (from the production side).

When the value of the purchase is > SEK 5-10 million a formalized project group is constituted within the production unit. This usually includes:

- the operator/driver
- one member from mine planning
- a production engineer
- one member from the maintenance department
- eventually one representative from the union

Phase 3 - Inquiry (Bid)

The preparation of the inquiry is done by the purchasing department and sent to at least 2 potential suppliers. The inquiry should be prepared in such a way that it allows the potential supplier to be able to reply with a detailed offer/quotation with a well-specified price. Inquiries should contain technical and commercial terms and should be exactly alike. All suppliers must receive the same terms at this phase of the buying process. It is also considered unethical for the company to make telephone inquiries, hence all official communication should be in writing. Reference to the contact persons in case of need for clarification is provided, as well as the closing date for receiving the bids. It is the purchasing department’s responsibility to issue the inquiries. The following documentation is commonly included in an inquiry:

- Letter of invitation
- Instructions to tenders
- Information to tenders
- General and Specific Conditions
- Technical Specifications
- Drawings
- Schedule
- Bills of quantities/Schedules of rates/Lump sum payments, etc.
- Other specific and relevant documentation
Phase 4 - Search for and Qualification of Potential Sources

Regarding the search for potential suppliers, there is usually a built-in "know-how" (within the constituted project group) of the vendors, which have the technology and means to match the company's requested performance specifications. Thus, this knowledge and experience of the CEMP vendor market limits the scope of the search in many occasions to the company's own supplier register. The project group is also very updated in what concerns technical improvements within their correspondent areas of expertise. Therefore, any revolutionary improvement or technical development does not bypass (as a rule) the buying process participants. For a vendor to be qualified as a potential supplier, it is essential that the company holds the technical capacity necessary to meet the performance specifications.

Presently, Boliden Mineral possesses a supplier's register of around 2,500 suppliers. When purchasing CEMP, at least two potential suppliers are contacted. Normally, the range of potential CEMP suppliers is limited, from three to four per equipment type. These potential suppliers are also commonly specialized to meet the demands of certain markets. Thus, an USA supplier is probably more specialized to meet the demands of the North American market, while a Finnish supplier is probably more specialized in meeting the demands of the Nordic market. However, when choosing a potential supplier, the company aims at disregarding geographical delimitations. Geographical distance is compensated when the technological solution is better, and service and spare-parts availability are guaranteed. Wherever the supplier originates from (in geographical terms), it is essential to test the equipment under arctic conditions and establish suitable contractual safeguards when purchasing CEMP.

Phase 5 - Acquisition and Evaluation of the Proposals (Quotations)

The quotations are prepared by the potential vendors and sent to Boliden Mineral's purchasing department. All quotations must be received by the due date. The purchasing department arranges for the quotations to be submitted for review regarding the technical content, as well as the economical, commercial, contractual and legal content. A thorough analysis of the received quotations is essential for the performance of an accurate evaluation. The economical, commercial, contractual and legal evaluation of the quotations is done by the purchasing department. The technical evaluation of the quotations is performed by the production unit/production project group (for investments superior to SEK 5 -10 million). When evaluating the quotations, production is unaware of the prices set by
the potential suppliers. The latter is covered to allow that the evaluation is 
fully carried out from a technical point of view. Spread-sheet analysis (i.e. 
listing the potential suppliers across the sheet and matters for review down 
the sheet are a common method utilized). Examples of considerations taken 
into account when implementing an economical evaluation include:

- which is the Life-Cycle Cost (LCC) of the equipment? This means 
  that all the costs associated to the operational lifetime of the 
equipment should be added to the given purchasing price (e.g. spare 
parts costs, associated maintenance costs, etc.)
- is the price given a fixed-price or is escalation together with 
eventual currency exchange rates considered

An addition to the inquiry may, at this point, be necessary. The purpose is 
to obtain further specifications/necessary adjustments from the potential 
supplier(s). In such cases, Phases 4 to 6 are repeated.

**Phase 6 - Negotiation process**

When the negotiation process starts, usually two or three suppliers are 
involved. A technical revision is done including the specification of all the 
items that should be included in the delivery. The payment and delivery 
terms are thoroughly discussed. Issues like spare-parts availability, 
guarantees, and after-sales support are of major importance. Everything 
that can be foreseen should be discussed and included in the contract before 
the final decision; in this way, the company expects to avoid possible 
future problems with the supplier. Negotiation is usually carried-out by the 
purchasing department. However, in major equipment items 
representatives from *production* may also participate. When payments in 
foreign currency (usually USDollars) are required, the financial department 
in Brussels may also participate. Common payment terms are:

- down payment of 30 – 40 percent
- shipping documents 60 – 40 percent
- equipment delivery 10 – 20 percent

The negotiation strategy is non-cohesive. Contractual obligations 
regarding repair and maintenance are of paramount importance for the 
decision concerning supplier selection.
Phase 7 - Supplier selection & Order/Contract

The supplier that best suits Boliden’s needs is selected by the production unit. The actual selection can be seen as the outcome of both previous phases, the evaluation and the negotiation process. The following criteria are determinant for the supplier selection (ranked in their correspondent order of importance):

1. Quality
2. Previous experience with supplier (compliance to delivery time)
3. Stability (financial, request for a bank guarantee is common)
4. Maintenance & Repair
5. Price

Considerations drawn when discussing the quality criteria include the compliance to the performance specifications, meaning that technical aspects and capacity availability are comprised in the quality criteria. Hence, the selected supplier’s CEMP must be able to perform the function expected (the company wishes to buy a function, not a machine) and the correspondent capacity availability is essential.

Previous positive experience with supplier considerably influences the selection decision. How has the supplier complied to previous contractual arrangements, after-sales support, technical documentation, technical assistance, etc.? Have conflicts been solved satisfactorily in the past? The following factors were mentioned as contributing considerably to a previous positive experience with suppliers (i.e. satisfaction), capacity compliance, match of operating costs, CEMP availability, after-sales support, technical documentation, and assistance. Dissatisfaction and consequent elimination of potential suppliers occurs commonly due to mismatches concerning the technical expectancies of the equipment, e.g. lower capacity, higher operating costs, less availability, lack of after-sales support, technical documentation, or assistance.

Concerning stability or supplier’s long-term reliability, it is essential for the buying company to have the certainty that the supplier will stay in business during the expected lifetime of the purchased CEMP. When the supplier is classified as a "question mark" regarding this factor, besides financial guarantees, safeguards are taken so that all "drawing-specifications" are sold together with the equipment. In this way, autonomy is created if the supplier “suddenly” ceases to exist.
Regarding the fourth and fifth mentioned criteria, maintenance and repair, and price, different aspects are taken into consideration. Connected to maintenance and repair, the issue of standardization of the equipment is contemplated. By seeking a certain standardization of the equipment between some of the company's mines (those where the geological environmental allows for a certain standardization), maintenance and repair costs and hence the Life-cycle cost of the CEMP can be lowered. This is mainly due to such things as decrease in training expenses, spare-parts availability, minimization of fixed capital at the local stores, in-built experience and expertise. Hence, many costs can be reduced when standardization (i.e. compatibility), exists. Connected with standardization, the equipment's residual value was also mentioned. When replacing a piece of equipment for a more recent model, when the same supplier is chosen, some form of compensation is usually considered in the agreement. Even when such doesn't occur, parts from the “old” equipment are still in condition to serve as spare-parts to other similar operational equipment.

Regarding the “purchasing price” (as it is referred in the quotations), in the opinion of the interviewee, this is “meaningless” and very misleading. Price has a relatively low priority when purchasing CEMP. What has to be considered is the LCC (Life-cycle cost) of the equipment in question. Thus, what should be taken into consideration when selecting CEMP is the cost/produced unit that is associated with this same equipment. Included in this cost are, for example: consumable costs, maintenance costs, spare-part costs, etc. (i.e. all costs that are connected with the functioning of the equipment during it's lifetime). All these costs should be estimated and added to the “purchasing price”. In this way the “real purchase price” is obtained, and only this price should serve as comparison term between potential suppliers.

The order/contract includes the formal issuing of the contractual documentation. A purchase order/contract is prepared by the purchasing department. The agreement reached through the negotiation process is formally written and signed by the parties. Technical specifications, quantities and characteristics, guarantees, commercial and delivery terms are always part of such a contract/order. The checking and further distribution of the contractual documentation is of the purchasing department's responsibility.

Phase 8 - Performance feedback and evaluation

Performance feedback and evaluation is common in Boliden Mineral's CEMP purchases. Follow-up and inspection requirements are usually
established as contractual obligations. The equipment is inspected to ensure that it is new (when applicable) and/or abides to specifications, and is suitable in every way for its function. Meetings with representatives from the supplier (purchasing and production) are scheduled to take place at the mine production sites where the CEMPs are operational. This may occur once every six months within the guaranteed life of the equipment. In this way the company "forces" the supplier to keep the client satisfied. When problems occur, production takes contact with purchasing that further communicates this to the supplier. In this way the purchasing department is kept informed about the performance of the CEMP purchases.

The flowchart presented in Figure 38 summarizes in a sequential way the phases, which comprise the buying process of a CEMP at Boliden AB:

![Flowchart of a Relatively Standardized CEMP Purchase at Boliden Mineral](image)

Figure 38: Flowchart of a Relatively Standardized CEMP Purchase at Boliden Mineral
5.5.5.2 The Buying Center

5.5.5.2.1 Composition of the Buying Center

The size of the buying center varies between three and four for CEMP purchases which do not exceed the monetary value of SEK one million. The following are the participants:

- one member of the production unit and/or the production manager himself/herself
- one member of the purchasing department
- one member of the engineering department

When the purchase value is situated between SEK one to five million, the size increases by one, as a member of Boliden Mineral’s top management becomes involved, thus varying between four and five. Finally, when CEMP purchases exceed SEK five million, a formal project group within the production unit is formed. Five members (one operator, one mine planner, one production engineer, one maintenance representative, and one union representative) constitute this group, and this implies that the size of the buying center increases considerably. Besides, one more level of management participates in the process, namely the top management of the holding company, Trelleborg AB, which at least implies the participation of one more member. Thus it’s size may vary between nine to eleven or even twelve.

Table 51 illustrates the correspondent functional participation in the different phases of the buying process:
Table 51: Functional Areas Participating in the Buying Process of CEMP at Boliden Mineral AB.

<table>
<thead>
<tr>
<th>Vertical Involvement</th>
<th>Function/Departmental Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board of Directors</td>
<td></td>
</tr>
<tr>
<td>Top management</td>
<td></td>
</tr>
<tr>
<td>Upper level operating</td>
<td></td>
</tr>
<tr>
<td>User (operator) level</td>
<td></td>
</tr>
<tr>
<td><strong>Buying Phases of</strong></td>
<td><strong>CEMP Buying Process</strong></td>
</tr>
<tr>
<td>1. Need Recognition</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>and Budget Approval</td>
<td><strong>X (1)</strong></td>
</tr>
<tr>
<td>2. Technical</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Specifications</td>
<td><strong>X (2)</strong></td>
</tr>
<tr>
<td>3. Inquiry (Bid)</td>
<td><strong>X (3)</strong></td>
</tr>
<tr>
<td>4. Search for and</td>
<td><strong>X (3)</strong></td>
</tr>
<tr>
<td>Qualification of</td>
<td><strong>X (3)</strong></td>
</tr>
<tr>
<td>Potential Sources</td>
<td></td>
</tr>
<tr>
<td>5. Acquisition and</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Evaluation of the</td>
<td></td>
</tr>
<tr>
<td>Proposals Quotations</td>
<td></td>
</tr>
<tr>
<td>6. Negotiation</td>
<td><strong>X (4)</strong></td>
</tr>
<tr>
<td>Process</td>
<td></td>
</tr>
<tr>
<td>7. Supplier Selection</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>&amp; Order/Contract</td>
<td><strong>X (5)</strong></td>
</tr>
<tr>
<td>8. Performance</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Feedback and</td>
<td><strong>X (5)</strong></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
(1) Approval required if purchase value is between SEK one and five million
(2) Approval required if purchase value is superior to SEK five million
(3) Participation required if purchase value is between SEK five and ten million
(4) Eventual financial aid
Regarding the five dimensions of the buying center, data collected leads to the following characterization:

**Vertical involvement:** The number of hierarchical levels included varies with the monetary value of the purchase. For CEMP purchases not exceeding SEK one million, *one* level exerts influence and communication within the buying center, the upper level operating managing represented by the production and purchasing departments. In the case when the monetary value of the CEMP purchase is situated between SEK one and five million, Boliden Mineral’s top management approval is required, and thus *two* levels are present. When the purchase value exceeds SEK five million, the number of levels increases by two, through the inclusion of the holding company’s board, and the participation of workers (non-management) representatives/clerical employees such as the CEMP operator and union. Thus, in such cases *four levels* are exerting influence and communication within the buying center.

**Function/Departmental involvement:** The number of different *departments, functions and/or functional* areas, involved in the purchase decision varies with the CEMP purchase value. For purchases with a value inferior to SEK one million, *three* departments are involved (purchasing, engineering, and production). Concerning the purchases whose monetary value is situated between SEK one to five million, the lateral involvement is *four*, as the top management of Boliden Mineral becomes involved in the process. Finally, regarding those CEMP purchases, which exceed SEK five million, the lateral involvement increases by three departments through the inclusion of the maintenance department, the union, and the board of directors of the holding company. Consequently, the number of departments involved is *seven:* purchasing, production, engineering, top management, board of directors, maintenance, and union.

**Extensivity:** The total number of individuals involved in the buying process varies (as mentioned before when discussing the buying center size) between *three to eleven/twelve,* in accordance to the monetary value of the CEMP purchase.

**Connectedness:** The degree to which the members of the buying center are linked to each other by direct communication concerning the purchase is perceived as *high* throughout most phases of the buying process. Boliden Mineral works on an informal or formal project basis (for purchases which exceed SEK five million) and thus direct communication between the members of the buying center concerning CEMP purchases is common.


Centrality: Information flows through the member of the purchasing department involved in the purchase. The centrality of the purchasing department in the communication network can be exerted.

5.5.5.2.2 Roles of the Buying Center

The identification of roles concerning the purchase of Capital Equipment for Mine Production (CEMP) is the following:

- **Initiator** - production manager at the operating mine which needs the CEMP
- **Gate-keeper** - purchasing department
- **Influencer** - the participant members of the engineering, production and purchasing departments (for CEMPs inferior to SEK five million); the former added by the representatives from the maintenance and union (for CEMPs that exceed SEK five million)
- **Decider** - (for CEMPs inferior to SEK one million); production manager (for CEMPs between SEK one and five million); production manager/approval from top management concerning the annual budget (for CEMP purchases that exceed SEK five million); production manager/approval from top management/approval from Trelleborg’s board of directors
- **Buyer** - purchasing department
- **User** - production team

The role of *initiator* is played usually by the production manager of any of the company’s operating mines who recognizes the need for a purchase of a CEMP item. The centralized purchasing department acts as the *gatekeeper* controlling the flow of information regarding the purchase. The *influencer* role is played by members of the production and engineering departments involved in the purchasing process, and this is due mainly to their technical expertise concerning the capital equipment purchase. As the purchase value increases the range of influencers becomes broader, thus including maintenance and union representatives when the monetary value exceeds SEK five million. The production manager, top management, and finally board members of the holding company, are identified as the *decider* respectively for purchases, which are inferior to SEK one million, are
comprising between SEK one to five million, and exceed SEK five million. The buyer role is performed by the purchasing department which holds the responsibility for the issuing and formal award of the contractual documents concerning the purchase. The role of user is attributed to those who actually make usage of the CEMP purchased item and are identified as the production team.

5.5.5.2.3 Influence in the Buying Center

Concerning influence, Table 51, which provides the specification of the different departments of Boliden Mineral AB which participate in the different phases of the buying process, shows that both the production and purchasing departments are involved in seven of the eight phases of the buying process. Thus, both these departmental areas exert considerable influence in the buying process. The purchasing department controls the flow of information throughout the CEMP buying process phases. Moreover, in those purchases where the monetary value does not exceed SEK five million, this department solely carries out the negotiation process. In major equipment items, normally CEMP purchases that exceed SEK five million, production becomes involved in the negotiation process. Moreover, production retains the technical expertise and know-how required for the technical evaluation and actual supplier selection.

The engineering department is involved in two of the phases of the buying process, namely Phase 2 (technical specifications), and Phase 4 (search for and qualification of potential sources). It’s degree of involvement and thus influence during these phases is high. This is mainly due to the expertise (technical and market know-how) needed to handle the CEMP purchase. For purchases which exceed SEK five million, representatives from the maintenance department and the union become involved during these two phases, however, it’s degree of involvement and thus influence is inferior to the other departments involved at these phases, namely production, purchasing, and engineering.

5.5.5.3 Factors Affecting the Buying Process and the Buying Center

5.5.5.3.1 Buying Situation

Concerning the purchase of CEMP the following is the company’s generic characterization regarding information requirements, newness of the problem, and consideration of new alternatives in terms of percentage of purchases (Table 52):
Concerning the total purchases of CEMP, Table 53 provides the estimated percentage of the following purchasing situations (buyclasses) conducted by Boliden Mineral AB:

Table 53: Characterization of CEMP in Terms of Buyclasses.

<table>
<thead>
<tr>
<th>Buyclass</th>
<th>Description</th>
<th>% of total CEMP purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>Buying capital equipment of a type not earlier purchased</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>Modified-rebuy</td>
<td>Buying capital equipment which is based on a prior purchase of similar capital equipment, but differs in aspects such as quality, price, etc., and therefore includes the consideration of new alternatives.</td>
<td>50%</td>
</tr>
<tr>
<td>Straight-rebuy</td>
<td>Buying capital equipment as a direct replacement employing the same brand and supplier.</td>
<td>40%</td>
</tr>
</tbody>
</table>

5.5.5.3.2 Other Product Specific Factors

*Time Pressure*

The time requested for a CEMP purchase may vary considerably in Boliden Mineral according to the function sought. A period of time mentioned as an example was between 8-10 weeks. However, in more technically-complex CEMP, this time span can be notably enlarged due to such factors as the search for and qualification of potential sources, which may include overseas workshop visits. From Boliden Mineral’s perspective, and due to the fact that most CEMP purchases have been previously included in the
"long-term strategic planning", time pressure is not considered as a variable which strongly influences the buying process and buying center.

**Monetary Value**

The monetary value associated with CEMP purchases at Boliden Mineral may vary greatly. CEMP are usually previewed in advance and included in the company’s long-term strategic plan. Monetary value is found to influence the composition of the buying center in the following way:

- CEMP purchases where SEK value is inferior to one million: *one* hierarchical level is present and *three* functional areas are represented
- CEMP purchases where SEK value is between one and five million: *two* levels of hierarchy are present and *four* functional areas are represented
- CEMP purchases where SEK value is superior to five million: *four* levels of hierarchy participate in the buying process and *seven* functional areas are represented

In summary, monetary value is found to greatly influence both the buying process, through the increase of formal approval of the purchase decision, and the composition of the buying center as specified above.

**Importance**

Boliden expresses its business mission as follows:

> Boliden aims to be a reliable supplier of high quality metal products which meet the market’s demands and which are produced - by global comparison - in cost-efficient processes.

Hence, Boliden’s mission is clearly production oriented, with considerable weight given to the necessity of cost-efficient production. Thus, the purchase of CEMP as an essential input for the optimization of the production process associated with mining is essential for this mining company.

**5.5.5.3.3 Organizational Factors**

Boliden Mineral AB is a large corporation with an average number of 5,404 employees (1995 data). The company is clearly production oriented
and many of the buying decisions taken throughout the buying phases tend to be taken jointly by the production and purchasing departments. Although purchasing has been identified as retaining the gatekeeper role, from an organizational viewpoint, centralization should be discussed conjointly regarding these two departments.

5.5.5.3.4 Inter-organizational Factors

Boliden Mineral AB has presently a supplier register of about 2 500 suppliers. Trends mentioned include lowering the number of suppliers in the company’s register and establishing electronic interchange data connections with suppliers, essentially those who provide the company with supplies and usually operate with general agreements.

Concerning purchases of CEMP the *product perceived importance* is high and long-term relationships with suppliers are common. The mining company has been in operations for more than 70 years (the company’s first mine started operations in 1925), and the CEMP supplier market is relatively small in terms of the number of sellers involved. Throughout the years, Boliden AB has done business with many of the CEMP suppliers and has developed long-term relationships where interfirm cooperation (e.g. technical cooperation agreements) and high levels of information exchange take place. Advantages provided from long-term relationships include increased technical cooperation, the ability to resolve conflicts in a satisfactory way, and delivery reliability.

Concerning the *negotiation strategy* utilized, a non-cohesive style similar to the problem-solving strategy is selected, especially when suppliers with whom the company has done satisfactory purchases of CEMP in the past are the negotiation counterpart.

5.5.5.3.5 Environmental Factors

From the range of environmental factors which are likely to influence Boliden’s buying behavior of CEMP, in addition to the geological environment, metal prices and currency rates (economic factors), the suppliers’ geographical affinity in terms of Nordic countries were referred. The latter can be translated in a specialization and adaptation of CEMP to the company’s mines.
5.6 Case 5: KGHM POLSKA MIEDZ S.A.

5.6.1 Introduction - Background

KGHM was incorporated in 1961. The company is involved in copper mining and runs a smelting and refining combine, which was restructured in 1991 into KGHM Polska Miedz SA, a joint-stock, state-owned company. The company operates three underground mines, three concentrators, three smelting and refining plants, a precious metals plant (began operations in the fall of 1993), and one copper rolling mill in an area centered on Lubin in South West Poland. The core activities include mining and concentration of copper, production of electrolytic copper, refined silver and gold and crude selenium. The KGHM smelters and refineries have an annual capacity of 400,000 tonnes of electrolytic copper (which represent e.g. 4.1 percent of the world’s electrolytic copper in 1994). KGHM is Europe’s largest copper producer and the main product is copper cathodes, processed into wire rods, wire bars and billets. Apart from this, by-products of the smelting process are produced, such as anode slimes containing silver, sulfuric acid, crude lead, copper sulfate and nickel sulfate. KGHM produced e.g. in 1994, 8.7 percent of the world’s refined silver.

KGHM Polska Miedz, like all former combines in Eastern Europe, employs thousands of people in non-core activities. Among the non-core activities KGHM owns several companies with equipment and machinery production, banking, 21 holiday homes, 5,000 apartments, five schools and a hospital. A structural transformation of the company is on-going as part of the "Program of Development, Structural Transformation and Privatization of KGHM Polska Miedz S.A.". Within the frame of the program is the establishment of new legal entities to deal with areas outside the core activities of mining and smelting, which is paramount to the company. By following this policy, the group has managed to reduce it’s employees from around 45,000 (as a combine) to around 29,400. Figure 39 illustrates KGHM’s operating units:

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18 To exemplify, twelve ancillary divisions of the group employing around 10,000 have been transferred to separate legal entities and now serve the company as subcontractors.
The group’s sales of basic products, i.e. copper and silver, is effectuated by its own commercial and marketing department located in Lubin and through a wholly-owned London-based trading subsidiary. Export sales accounted for 71.6 percent of total sales in 1994, and exports are mainly directed to Germany, Great Britain, Hungary, The Czech Republic, Belgium and The Netherlands. Domestic sales accounted, between the period of 1992 to 1994, to around 34 percent. Some business figures are indicated in Table 54:

<table>
<thead>
<tr>
<th>Key Figures: KGHM Polska Miedz S.A.</th>
<th>1993</th>
<th>1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover, PLZ Million</td>
<td>16,403,534</td>
<td>26,061,099</td>
</tr>
<tr>
<td>- Domestic sales</td>
<td>6,029,111</td>
<td>7,399,584</td>
</tr>
<tr>
<td>- Export sales</td>
<td>10,374,423</td>
<td>18,661,515</td>
</tr>
<tr>
<td>Profit after taxation</td>
<td>1,882,690</td>
<td>3,803,601</td>
</tr>
<tr>
<td>Retained profit</td>
<td>1,148,988</td>
<td>3,511,271</td>
</tr>
<tr>
<td>Investments in fixed assets, PLZ Million</td>
<td>1,060,166</td>
<td>1,425,239</td>
</tr>
<tr>
<td>Number of employees:</td>
<td>28,982</td>
<td>28,883</td>
</tr>
</tbody>
</table>

Source: Annual Report 1994, p.16 and p.29
5.6.2 Objectives and Strategies

KGHM objectives are:
- to maintain production capacity at the existing level
- to improve the quality of products
- to reduce production costs
- to improve the safety and hygiene at work
- to prevent the damage of the natural environment

In order to achieve these objectives, KGHM is undergoing (since 1994) an organization and structural transformation determined in the "Program of Development, Structural Transformation and Privatization of KGHM Polska Miedz S.A.". Cost reduction through restructuring and modernization is central to KGHM's strategy. During 1994, 33 percent of the capital development expenditures were for the restoration and replacement of worn-out machinery and equipment. The technological modernization of mines and smelters enables a decrease in raw materials and energy consumption and thus a reduction in production costs. KGHM also carries on major capital developments of an environmental nature with expenditures due to research and development representing an amount of Polish Zloty (PLZ) 48,861 million in 1994.

The goal of improving the quality of products led the company to carry on various projects so as to meet world quality requirements. On March 17, 1995, KGHM-HG silver bars were granted the quality certificate of The London Bullion Market Association. Moreover, the company has also introduced a system of quality assurance complying with ISO 9002 standards concerning the copper wire rod production process in one of its smelters. A quality management system is also under implementation throughout the whole company.

Within the frame of the "Program of Development, Structural Transformation and Privatization of KGHM Polska Miedz S.A.", the company focuses on core businesses of metal production. New legal entities are being created to deal with areas outside the core activities of mining and smelting. In the near future KGHM is most likely to invest in copper processing companies producing for example cables or pipes, as part of their development strategy. Investments in foreign copper ore deposits to ensure steady production levels in the future are also under consideration by the company.

The company is currently undergoing privatization. The privatization ministry wants to sell stakes in KGHM in the third quarter of 1996 due to
the fact that it would be the time when the world’s financial markets would have the most cash for investment. The ministry wants to float up to 15 percent of KGHM on the London Stock Exchange and up to 10 percent on the Warsaw stock-market with 15 percent of the shares given to employees and five percent put aside for re-privatization claims. The likely investors in KGHM, which does not want a strategic investor, would be foreign investment funds. The ministry will keep a 56 percent stake in the company.

5.6.3 The Company’s Mines

KGHM Polska Miedz S.A. is currently operating three underground mines located in the mining area around Glogów and Lubin in Southwest Poland. Approximate figures concerning production at the company’s mines are presented in Table 55.

Table 55: KGHM’s Underground Mines’ Production.

<table>
<thead>
<tr>
<th>KGHM’s underground mines:</th>
<th>Ore mined (in M tonnes), 1994</th>
<th>Ore mined (in M tonnes), 1996</th>
<th>Average copper grade (% Cu)</th>
<th>Average silver grade (g/t Ag)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polkowice-Sieroszowice</td>
<td>≈9.3</td>
<td>≈9.2</td>
<td>1.84</td>
<td>34</td>
</tr>
<tr>
<td>Lubin</td>
<td>≈6.2</td>
<td>≈6.4</td>
<td>1.36</td>
<td>73</td>
</tr>
<tr>
<td>Rudna</td>
<td>≈9.95</td>
<td>≈10.4</td>
<td>2.08</td>
<td>49</td>
</tr>
<tr>
<td>Total:</td>
<td>≈25</td>
<td>≈26</td>
<td>1.82</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: KGHM Homepage

The company drives extensive, deep-mining operations, which require considerable revenue expenditures in order to provide the greatest possible assurance of safety (e.g. the depth of the Rudna mine is currently 1200 meters). KGHM’s engineering department plans every mining operation, which includes engineering forecasts, as to effects on the substratum. The assessments are subject to review and clearance by an independent body known as the "National Mining Council", which maintains a presence in each of the mines. Mining reserves account for 922 million tonnes containing 15.6 million tonnes copper. The total mineable area is around 412 km², and the expected life is more than 30 years.
5.6.4 The Organization and the Purchasing Department

KGHM has a differentiated purchasing policy, with one purchasing department located at each of the company's three mines, constituting also an individualized economic entity. Each purchasing department is responsible for the local purchases of raw materials, component parts, light equipment, capital equipment, etc., to the extent to which the purchases are not considered strategic investments. In the case of strategic investments, a central unit located at Lubin headquarters (so-called "agreement coordination") handles these purchases.

This study's data relates to the local purchasing department at Rudna underground mine. The human resources allocated to this purchasing department totals 14 persons. The background of the professionals who carry out the purchases related to the mine is summarized in Table 56:

Table 56: Background of the Purchasing Professionals at the Rudna Mine.

<table>
<thead>
<tr>
<th>Title/Function</th>
<th>Background</th>
<th>Previous experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing manager</td>
<td>Technical</td>
<td>Extensive experience, a total of 40 years in mining corporations, of these, 10 years within the metallurgical field.</td>
</tr>
<tr>
<td>Four Purchasing officers</td>
<td>Technical</td>
<td>At least 4 to 5 years previous experience in underground mining operations</td>
</tr>
<tr>
<td>Nine Purchasing officers</td>
<td>Economical and Administrative</td>
<td>In average, between 5 and 10 years experience in the company.</td>
</tr>
</tbody>
</table>

5.6.5 Industrial Buying Behavior of Capital Equipment for Mine Production

5.6.5.1 The Buying Process

Concerning the purchase of Capital Mining Equipment (CEMP) the following is the company's generic description of the eight fundamental activities or buyphases:
Phase 1 - Need Recognition

The production department at Rudna mine initiates the buying process. The need for investment in capital equipment goes hand-in-hand with the technological modernization of the mines, which is comprised in KGHM’s short-term objectives. The problem recognition and the awareness that the problem can be solved through the purchase of CEMP occur within production. This department further makes the need explicit within the organization by contacting the purchasing department.

Phase 2 - Specification and Characterization of the Technical Function

This phase aims at specifying and characterizing the problem that can be solved through a technical function. The company seeks a “technical function”, not a machine or a specific capital equipment item. The user department (production), prepares the performance specifications in terms of, e.g. loading of a certain amount of tonnes per hour, availability considerations, etc. This phase is usually carried-out by the production department with the eventual collaboration of the technical services department in such cases where the technical know-how required justifies it’s involvement. Normally, such participation of the technical department occurs when the technical function sought is of a more complex nature. In other cases, where the "technical function” sought is of a more familiar nature and previous experience has proven the satisfactory performance of a certain capital mining equipment item, the production department acts alone. In such cases the production department may even include in the “specification and characterization of the technical function” a potential supplier recommendation. The documentation produced during this phase is forwarded both to the purchasing and the agreement coordination departments.

Phase 3 - Search for Suppliers

The descriptive documentation concerning the specification and characterization of the technical function serves as the basis for the search for suppliers, which is implemented by both the purchasing department at Rudna mine and the agreement coordination department which is located at the company’s headquarters in Lubin. These two departments assist each other in the search activities. The complexity of the supplier search is dependent on the newness of the task. In the cases where a certain vendor has been recommended by the production department as a potential supply source, the search and qualification of potential suppliers is limited to the search of two or three alternatives. Although no specific procurement rule
states the requirement to have more than one potential vendor, the company has as a policy to search and contact more than one potential source of supply. This phase culminates in the identification of at least two potential vendors. KGHM also remarks that due to the nature of the "technical function" sought by the company, relatively few potential vendors of capital mining equipment are able to fulfill the company's needs and hence the search is limited.

KGHM is continuously searching for alternative ways to solve the "technical functions" sought by the company. Among others, company representatives (e.g. production, agreement coordination, technical services) frequently visit trade shows and exhibitions where new CEMP is presented. The company also arranges with certain regularity (once every second year or even once every year) different symposia where renamed manufacturers of capital mining equipment are invited to participate. Information acquired at these occasions allow KGHM's staff to be updated and develop the necessary "know-how" needed to implement effective comparisons between CEMP items manufactured.

**Phase 4 - Receiving Bids and Preliminary Evaluation**

Once a set of potential vendors is identified, formal request for quotations are prepared and issued by the purchasing department. Included in this documentation are the previously defined "specification and characterization of the technical function" prepared during Phase 2, together with documentation of a more commercial nature, such as instructions to tenders, letters of invitation, etc.

The purchasing department at Rudna mine then receives the quotations (bids). Thereafter, a preliminary evaluation of these bids takes place. A preliminary technical evaluation is implemented, primarily by the technical services department in such cases where it's technical expertise is required (namely in the more technically complex "solutions" sought). The production department is, at times, involved in the preliminary technical evaluation of the bids. The involvement of the technical services and/or the production department depends mainly on the routine character of the CEMP purchase at hand. Thus, when purchasing more standardized CEMP, the production department handles (by itself) the preliminary technical evaluation. In the more complex situations or tasks, as mentioned before, the technical services department is active. The economic and legal evaluation of the bids is handled by the purchasing department at Rudna mine. Assistance concerning legal aspects is provided by Lubin's headquarters agreement coordination department.
Phase 5 - Negotiation

Once the various proposals are evaluated (from technical, economic, and legal viewpoints), discussions and negotiations are conducted with the potential vendors which were ranked as most suitable and appropriate to satisfy the company’s need for purchase of CEMP. Normally, more than one potential vendor is still included in this phase, meaning the negotiation process takes place with at least two potential vendors at the same time. The negotiation strategy is non-cohesive and the participants from KGHM include the technical services department and the purchasing department at Rudna mine. The technical services department handles the discussions which concern the technical aspects, (e.g. maintenance and repair issues, training, spare parts availability, etc.), while the purchasing department conducts the negotiation needed for an agreement in terms of the commercial issues of the offers presented (e.g. payment terms, delivery, expediting, etc.).

Phase 6 - Supplier Selection

As an outcome of the negotiation phase, a supplier is selected by both the purchasing department and the technical services department. The following criteria were mentioned as those who weigh the most and become determinant for supplier selection:

1. Technical parameters
   • quality
   • delivery capability
   • technical capability
   • repair Services
2. Price
3. Payment Terms and Warranties
4. Delivery Terms

Thus, the selected supplier must, first of all, comprise to KGHM’s technical demands in terms of the performance of the CEMP sought. Included are quality, delivery, and technical capabilities, as well as repair services. The other presented criteria are ranked respectively as two, three, and four. Also mentioned as a prerequisite was that the manufacturers of CEMP should have a representative in Europe.
Phase 7 - Protocol Proposal for the Acceptance/Approval

Once an agreement has been reached, throughout the negotiation phase, and a specific supplier is selected, this next phase involves the preparation of the formal documentation (a purchase order or contract) where the agreement between the parties is thoroughly specified. Before a purchase order or contract can be issued and forwarded to the selected supplier, approval is required from the director of the Rudna mine or the finance vice-director. The preparation and issuing of this documentation is the responsibility of the purchasing department.

Phase 8 - Performance Feedback and Evaluation

Performance feedback and evaluation is of the responsibility of the technical services department, especially in those cases where a new CEMP has been purchased. The performance feedback is non-formalized in the sense that no formal appraisal reports are required within the organization. However, due mainly to the existent informal communication between the departments which participate in the buying process, the purchasing department considers itself well informed concerning the evaluation of the suppliers and performance of the purchased CEMP.

The following flowchart, presented in Figure 40, summarizes the phases of the buying process of CEMP at Rudna underground mine:
5.6.5.2 The Buying Center

5.6.5.2.1 Composition of the Buying Center

The size of the buying center in CEMP purchases at Rudna mine consists of five functional areas: the purchasing department, the production department, the technical services department, the agreement coordination, and top management. Table 57 illustrates the correspondent participation in the different phases of the buying process:
Table 57: Functional Areas of KGHM Participating in the Buying Process of CEMP

<table>
<thead>
<tr>
<th>Vertical Involvement</th>
<th>Function/Departmental Involvement</th>
<th>Mine Finance Director</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Agreement Coordination</td>
</tr>
<tr>
<td>Top Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper-level Strategic Management</td>
<td>Purchasing</td>
<td>Technical Services</td>
</tr>
<tr>
<td>Upper-level Operating Management</td>
<td>Production</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buying Phases of CEMP Buying Process</th>
<th>Function/Departmental Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Need Recognition</td>
<td>X</td>
</tr>
<tr>
<td>2. Specification and Characterization of the Technical Function</td>
<td>X</td>
</tr>
<tr>
<td>3. Search for Suppliers</td>
<td>X</td>
</tr>
<tr>
<td>4. Receiving Bids and Preliminary Evaluation</td>
<td>X</td>
</tr>
<tr>
<td>5. Negotiation</td>
<td>X</td>
</tr>
<tr>
<td>6. Supplier Selection</td>
<td>X</td>
</tr>
<tr>
<td>7. Protocol Proposal for Acceptance/Approval</td>
<td>X</td>
</tr>
<tr>
<td>8. Performance Feedback and Evaluation</td>
<td>X</td>
</tr>
</tbody>
</table>

Regarding the five dimensions of the buying center, data collected leads to the following characterization:

- **Vertical involvement**: Three hierarchical levels exert influence and communication within the buying center, namely: top management level impersonated by the mine director and/or the managing director of finance; upper-level strategical management level represented by the agreement coordination department; and upper-level operating
management represented by the production, technical services, and purchasing departments.

- **Function/Departmental involvement**: Five departments/functions within the organization are involved in the buying process, specifically, purchasing, production, technical services, agreement coordination, and top management.

- **Extensivity**: The total number of individuals involved in the buying process is at least five, meaning that at least one representative from each functional area is included. This number will increase with the degree of technological complexity of the CEMP purchase at Rudna mine. A precise number was not provided but variations between five and 10 were mentioned.

- **Connectedness**: The degree to which the members of the buying center are linked to each other by direct communication concerning the purchase is low throughout most phases of the buying process with the exception of Phases 5 and 6, the negotiation and supplier selection phases. During these phases, the purchasing and the technical services departments are highly linked through direct communication. During Phase 4, connectedness is also perceived as low, due to the fact that each participating department focuses on the evaluation area in which their expertise and know-how is superior.

- **Centrality**: Information flows through the member(s) of the purchasing department and the member(s) involved in the CEMP purchase, thus their centrality is heeded as high.

### 5.6.5.2.2 Roles of the Buying Center

The identification of roles concerning new-task and modified-rebuy CEMP purchases at Rudna mine include the following:

- **Initiator**: production department
- **Gatekeeper**: purchasing and technical services departments
- **Influencer**: technical services department
- **Decider**: top management (mine director/finance vice-director)
- **Buyer**: purchasing department
- **User**: mine production team
The role of *initiator* is assumed by the production department at Rudna mine. The latter is also responsible for making the need explicit within the organization by communicating the need to purchase CEMP to the purchasing department. The traditional *gatekeeper* role does not exist, as both the technical services and purchasing information obtain information directly. Production has no direct contact with potential vendors, however, they may suggest a particular supplier. The role of *influencer* is performed by the technical services department, by those participants who retain the technical expertise and know-how concerning CEMP. Regarding the *decider* role, the actual formal approval of the purchase is done by the top management, impersonated by the mine director or the finance-managing director. The purchasing department is responsible for handling most of the formal documentation and issuing the order, thus assuming the role of *buyer*. Considering the *user* role, the CEMP item is utilized by the production team at Rudna underground mine.

### 5.6.5.2.3 Influence in the Buying Center

With regard to influence (Table 57), the participation of the different KGHM's functional areas during the buyphases is obvious. It can be observed that both the technical services and the purchasing departments are involved in five of the eight phases. The production department is solely involved in the two initial phases of the buying process, need recognition and the specification and characterization of the technical function. Thereafter, it is the technical services department, which mainly influences the process from a technical viewpoint. Concerning the purchasing department, it's degree of involvement during Phases 3 (search for suppliers), to 7 (protocol proposal and acceptance/approval) is high. Both purchasing and the technical services departments handle the flow of information, and this is due, to their respectively, correspondent expertise in the economic and technical areas. Both departments are main influencers during the CEMP purchase.

### 5.6.5.3 Factors Affecting the Buying Process and the Buying Center

#### 5.6.5.3.1 Buying Situation

Concerning the purchase of CEMP, no generic characterization regarding information requirements, newness of the problem, and consideration of new alternatives was provided for CEMP purchases related to the Rudna
mine. With regard to the purchases of CEMP, Table 58 provides the estimated percentage of the following purchasing situations (buyclasses) conducted at KGHM’s Rudna mine:

Table 58: Characterization of CEMP in Terms of Buyclasses

<table>
<thead>
<tr>
<th>Buyclass</th>
<th>Description</th>
<th>% of total CEMP purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Task</td>
<td>Buying capital equipment of a type not earlier purchased</td>
<td></td>
</tr>
<tr>
<td>Modified-rebuy</td>
<td>Buying capital equipment which is based on a prior purchase of similar capital equipment, but differs in aspects such as quality, price, etc., and therefore includes the consideration of new alternatives.</td>
<td>100%</td>
</tr>
<tr>
<td>Straight-rebuy</td>
<td>Buying capital equipment as a direct replacement employing the same brand and supplier.</td>
<td>0%</td>
</tr>
</tbody>
</table>

Capital mining equipment purchases are characterized as new-task or modified-rebuy buying situations. In both situations, the buying process follows the generic description provided previously by the interviewees of the purchasing department at Rudna mine. The major difference between the new-task and the modified-rebuy situations concerns the existence of a test period in the new-task situation. Finally, the size of the buying center does not vary between the new-task and the modified-rebuy buying situations.

5.6.5.3.2 Other Product Specific Factors

*Time pressure*

The duration of the buying processes of CEMP varies in accordance to the importance, complexity, perceived risk, and the degree of standardization of the purchase in consideration. The period lasts from six months to two years or even up to three to four years.

The buying process of relatively standardized CEMP in a modified-rebuy situation usually takes around six months. This duration is considered as quite normal for items of a fairly standardized nature (e.g. drillrigs, loaders,
etc.). In some cases, due mainly to standardization (spare parts, service, developed know-how of the CEMP, etc.), it may be desirable to maintain the same supplier of a certain CEMP item whose life time has expired. This implies an early recommendation/selection of the supplier, what in turn will decrease the duration of the buying process in terms of time range to below six months.

In the new-task CEMP purchases, the duration may vary from six months to two years, in cases where specific adaptations are required due to e.g. factors such as the geological/mining environment. This time span may even be extended to three or four years in cases where the developing of tailor-made prototypes are necessary to accomplish the needs required by the mining company. From KGHM’s perspective, time pressure is not considered as a variable that strongly influences the buying process and buying center.

**Monetary Value**

The monetary value associated with CEMP purchases at KGHM may vary considerably. Concerning it’s direct influence in the buying center and buying process, no specific value was referred to as leading to the e.g. inclusion of an additional hierarchy level. As mentioned previously, three hierarchy levels and five departments/functional areas are represented in the buying center. The buying center’s composition will not change due to the CEMP’s differences in monetary value.

**Importance**

Within the frame of KGHM’s "Program of Development, Structural Transformation and Privatization", the following objectives are expressed:

- maintaining production capacity at the existing level
- improving the quality of products
- the reduction of production costs
- the improvement of safety and hygiene at work, and
- the prevention of damage to the natural environment

Moreover, it has been mentioned that the company focuses on the core businesses of metal production. Thus, KGHM’s is clearly a production-oriented company where cost efficient production processes are essential for the company’s future profitability. Hence, CEMP purchases are determinant for the company, and the importance assessed by KGHM is considered to be high.
5.6.5.3.3 Organizational Factors

KGHM is a large mining and metallurgical combine with an average of 28,883 employees (data from 1994). The company is production oriented, yet production personnel does not participate in many of the decisions taken throughout different buyphases. Decision-making is taken in many cases jointly by the technical services department and the purchasing department. Regarding the degree of centralization, once again these two departments should be considered. No formal project team is constituted to handle KGHM CEMP’s purchases.

5.6.5.3.4 Inter-organizational Factors

KGHM’s organizational buying behavior affects and is affected by buyer-seller interactions and relationships. KGHM has the habit of developing enduring, long-term relationships with their suppliers, especially when CEMP purchases are under consideration. This fact is mainly due to the high-perceived product importance of CEMPs. Examples are provided regarding several suppliers that the company has had for more than 20 years. The term “in-house servicing” is used to describe these long-term relationships. When searching for suppliers, a wide range of suppliers is covered (not only Polish but foreign representatives established in Poland). Geographical proximity is taken into consideration, as it is a request for the manufacturers to have representatives in Europe. Hence, cultural affinity and geographical proximity were referred as preferential factors for supplier selection.

KGHM’s mining combine is a important reference within the Polish mining industry. Consequently, it is of extreme importance for CEMP suppliers to have good references from this customer. Commitment from suppliers’ and inter-firm cooperation are essential for KGHM, which holds a very strong position as a powerful buyer. There is well-developed know-how of the CEMP supplier market within KGHM members of the buying center. This is due to the limited number of potential suppliers, which is usually under consideration, even on a global perspective, and the built-in experience in the mining field. Negotiation is non-cohesive and is of a problem-solving type.
5.6.5.3.5 Environmental Factors

Within the wide range of environmental factors which influence buying behavior at KGHM, besides the uncontrollable factors of the geological environment, metal prices and currency rates, the following factors were identified:

1. Economic, political, and legal factors are interconnected and highly influence KGHM's buying behavior. These are the factors which underlie the establishment of the "Program of Development, Structural Transformation and Privatization of KGHM Polska Miedz S.A.". The on-going adaptation to a market-led economy leads to the present privatization process of KGHM. The establishing of new legal entities to deal with the areas outside the core activities of mining and smelting are also important.

2. The issue of preserving "hard currencies" (primarily Western currencies) was also identified as an influencing factor. KGHM has its own subsidiary, MERCUS, which is a trading bureau. The influence of Polish foreign trade enterprises is thus strong when importation of goods from foreign nations is under consideration, and this is due mainly to the know-how developed during the past economic system. The availability of hard currency is also mentioned as a limiting factor towards CEMP purchases from suppliers that do not have representatives in Poland.
6 Chapter Six: Analysis

6.1 Introduction

In the former chapter, data collected in the Swedish metal mining companies (Ammeberg Mining, Terra Mining, LKAB, and Boliden Mineral), and the Polish metal mining company (KGHM Polska Miedz) were presented. As mentioned in the methodology chapter, data is qualitative and was collected through focused personal interviews and documentation. Hence, we have collected data based on the perceptions of local actors in the metal mining companies and we strive to attain an "holistic", encompassing overview of the industrial buying behavior of the metal mining companies when purchases of CEMP occur.

In this chapter, the collected evidence is analyzed by applying the general analytical strategy, "Relying on theoretical propositions", meaning that the analysis is conducted based on the frame of reference of this study. The collected evidence is analyzed by applying sequentially a within-case analysis, a cross-case analysis, and a comparative analysis. Analysis is conducted at each of the embedded units of analysis level, namely the buying process, the buying center, and the factors that affect the buying process and buying center. Specifically, analysis will be conducted as follows:
1. **Within-case Analysis**: analysis is conducted within each case, at each unit of analysis level, and data is interpreted at a single-level case with a pattern-matching logic against the conceptual framework of the study. Schematically it can be represented as shown Figure 41:

![Figure 41: This Study’s Within-case Analysis](image)

Legend:

- Case1 = Ammeberg Mining AB
- Case2 = Terra Mining AB
- Case3 = LKAB
- Case4 = Boliden Mineral AB
- Case5 = KGHM Polska Miedz

Figure 41: This Study’s Within-case Analysis
2. **Cross-case Analysis**: a comparison across cases is conducted, at each unit of analysis level, based on the findings originated from the implemented within-case analysis. Hence, cross-case comparisons are approached with a variable-oriented strategy. This means that the findings derived from the within-case analysis for each unit of analysis are compared and the identification of patterns, which cut across cases, are sought, following a replication mode for multiple cases (Figure 42):

![Cross-case Analysis Diagram]

**Legend:**
- Case1 = Ammeberg Mining AB
- Case2 = Terra Mining AB
- Case3 = LKAB
- Case4 = Boliden Mineral AB
- Case5 = KGHM Polska Miedz

Figure 42: This study’s Cross-case Analysis
3. **Comparative analysis**: a comparison between the findings derived from the Swedish cases versus the Polish case is also implemented. Schematically shown in Figure 43:

![Comparative Analysis Diagram](image)

Figure 43: This study’s Comparative Analysis

### 6.2 Within-Case Analysis

Evidence collected and presented in chapter five is systematized and displayed in a matrix format. As mentioned previously, data is interpreted at a single-level case with a pattern-matching logic against the conceptual framework of this study. Similarities and dissimilarities against the conceptual framework are sought and analytical considerations are drawn.

#### 6.2.1 The Buying Process

Data collected concerning the buying process of CEMP in the Swedish and Polish metal mining companies can be systematically visualized as shown in Table 59:
Table 59: Buyphases of the Industrial Buying Process of CEMP Purchases

<table>
<thead>
<tr>
<th>Frame of Reference: Buyphases in the Buying Process</th>
<th>Case #1(Sweden) Ammeberg Mining</th>
<th>Case#2(Sweden) Terra Mining</th>
<th>Case #3 (Sweden) LKAB Relatively Standardized</th>
<th>Case#4(Sweden) Boliden Mineral</th>
<th>Case#5(Poland) KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) Determination of Characteristics and Quantity of Needed Item</td>
<td>2) Incorporation in Long-Term Plan or One-Year Budget</td>
<td>2) Search for Potential Supply Sources</td>
<td>2) Preparation of the Inquiry</td>
<td>2) Establishment of a “Project Group”</td>
<td>2) Technical Specifications</td>
</tr>
<tr>
<td>3) Description of Characteristics and Quantity of Needed Item</td>
<td>3) Technical or Functional Specifications</td>
<td>3) Technical Specifications</td>
<td>3) Supplier Search</td>
<td>3) Preparation of the Inquiry</td>
<td>3) Inquiry</td>
</tr>
<tr>
<td>4) Search for and Qualification of Potential Sources</td>
<td>4) Search for Potential Supply Sources (not always executed)</td>
<td>4) Acquisition and Evaluation of Budget Proposals</td>
<td>4) Acquisition and Analysis of the Quotations</td>
<td>4) Supplier Search</td>
<td>4) Search for and Qualification of Potential Sources</td>
</tr>
<tr>
<td>5) Acquisition and Analysis of Proposals</td>
<td>5) Invitation to Suppliers to Demonstrate Interest</td>
<td>5) Inquiry</td>
<td>5) Selection of Supplier and Approval of Investment Proposal</td>
<td>5) Acquisition and Analysis of the Quotations</td>
<td>5) Acquisition and Evaluation of the Proposals</td>
</tr>
<tr>
<td>7) Selection of an Order Routine</td>
<td>7) Initial Negotiation and Selection of Supplier</td>
<td>7) Initial Negotiation</td>
<td>7) Contract</td>
<td>7) Negotiation Process</td>
<td>7) Supplier Selection &amp; Order Contract</td>
</tr>
<tr>
<td>9) Evaluation and Feedback</td>
<td>9) Final Negotiation and Contract</td>
<td></td>
<td>9) Performance Control and After-Sales Support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Data collected at *Ammeberg Mining* shows that the industrial buying process of CEMP fundamentally follows the eight fundamental activities, (buyphases), described in the “buygrid” framework. However it should be noted that, although mentioned during Phase 2 (Incorporation in Long-term Plan or One-year Budget), approval for the CEMP purchase is actually done previously to the initiation of the buying process. Moreover, negotiations are included in two buyphases, initial negotiations that take place in Phase 7 and lead to the selection of a supplier, and final negotiation which occurs as a separated buyphase (Phase 8) and terminates in a contractual arrangement.

The buying process of CEMP at *Terra Mining AB* follows the eight buyphases described in the buygrid framework. Discrepancies, which can be identified against the buygrid framework, include the reversed order of Phase 2 (search for potential supply sources) and Phase 3 (technical specifications). Respecting the buygrid framework, search for and qualification of potential sources takes place after the technical specifications phase is accomplished. Moreover, negotiation, as one of the fundamental buying activities, is subdivided at Terra Mining as initial negotiation (included in Phase 7) and final negotiation and contract (Phase 9), in contrast to the buygrid framework where negotiations are included in buyphase six. Finally, the non-existence of buyphase eight of the buygrid, performance feedback and evaluation needs also to be remarked.

At *LKAB*, two buying processes were described, the first was referred to as “purchase of relatively standardized CEMP”, and the second as “prototype development of CEMP”. The core difference between these two buying processes regards the formal “establishment of a project group” in the latter, usually purchases which involve the development of special technical solutions tailor-made for LKAB’s underground mines. Another difference between the two concerns the existence of an extra buyphase in the latter, namely performance control and after-sales support. Hence, the project buying CEMP purchases consist of two more buyphases than the “relatively standardized CEMP” purchases.

Analyzing the data against the buygrid framework it can be remarked that for *relatively standardized purchases* the buygrid framework is followed except for the individualization of the negotiation as a buying activity in a specific buyphase (six), and the non-existence of the buygrid’s eighth phase (performance feedback and evaluation).

For *prototype development of CEMP* the activities described in the buygrid framework are followed, except for the existence of the establishment of a
project group as a separated buying activity during buyphase two and the individualization of negotiation as a buying activity in a specific buyphase (Phase 6).

Concerning the described purchasing process of CEMP at Boliden Mineral it can be noted that it follows basically the activities included in the eight buyphases of the buygrid framework. A remark is made towards the existence of a negotiation phase as a separate buyphase (Phase 6).

With regard to the information obtained in the Polish metal mining company, KGHM, it can be observed that it essentially follows the conceptualized framework. It can also be remarked the existence of a negotiation phase as a separate buyphase (Phase 5).

In summary, the analytical considerations drawn are presented in Table 60:

Table 60: Within-case Analysis of the Buying Process

<table>
<thead>
<tr>
<th>Buygrid Framework (Conceptual frame of reference)</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB Standardized</th>
<th>LKAB Prototype</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Anticipation or Recognition of a Problem (Need) and a General Solution</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Determination of Characteristics and Quantity of Needed Item</td>
<td>1</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Description of Characteristics and Quantity of Needed Item</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Search for and Qualification of Potential Sources</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Acquisition and Analysis of Proposals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Evaluation of Proposals and Selection of Supplier(s)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7. Selection of an Order Routine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Performance Feedback and Evaluation</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: 

- No observation contrasts with the theoretical framework
- Reversed order against buyphases two and three of the buygrid
- Negotiation as a differentiated buyphase in contrast to the buygrid where it's included in buyphase six
- Non-performance of the eighth buyphase of the buygrid
- Formal establishment of a “project group” as a buyphase
6.2.2 The Buying Center

Following the conceptual framework of this study, information collected regards three aspects of the buying center: (1) the identification of the composition; (2) the roles; and (3) the influence. The within-case analysis will address each of these aspects.

6.2.2.1 Composition of the Buying Center

Data collected regarding the composition of the buying centers can be systematically visualized as follows in Table 61:
Table 61: Dimensions of the Buying Centers of CEMP Purchases

<table>
<thead>
<tr>
<th>Frame of Reference: Buying Center Dimensions</th>
<th>Measure / Operationalization</th>
<th>Case#1 (Sweden)</th>
<th>Case#2 (Sweden)</th>
<th>Case #3 (Sweden)</th>
<th>Case#4 (Sweden)</th>
<th>Case#5(Poland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Involvement</td>
<td>number of levels of the organization’s authority hierarchy exerting influence and communication</td>
<td>Three levels (project group): 1. upper level operating management 2. top management 3. user (operator) level. Four: $\geq 1.5$ MSEK (*)</td>
<td>Two levels: 1. upper level operating management 2. top management</td>
<td>One level: 1. upper level operating management Two: $\geq 3$ MSEK predicted value (*)</td>
<td>Two levels: 1. project group 2. top management</td>
<td>One level: $\leq 1$ MSEK (<em>): 1. upper level operating management Two levels: $\leq 1$ MSEK 2. top management Four: $\geq 5$ MSEK (</em>)</td>
</tr>
<tr>
<td>Function / Departmental Involvement</td>
<td>number of different functions/departments and divisions involved in the buying center</td>
<td>Four: 1. Production 2. Maintenance 3. Safety 4. Top Management</td>
<td>Three: 1. Production 2. Top Management 3. External Consultant</td>
<td>Two: production; purchasing Three: $\geq 3$ MSEK predicted value (<em>): Managing director Five: production; purchasing; engineering Four: $\leq 5$ MSEK (</em>): top management Seven: $\geq 5$ MSEK (*): board (holding); maintenance; union</td>
<td>Five: production; purchasing; engineering</td>
<td>Five: production; purchasing; engineering</td>
</tr>
<tr>
<td>Extensivity (size)</td>
<td>total number of individuals involved in the buying process</td>
<td>Three to five</td>
<td>Three</td>
<td>Two to (five)</td>
<td>At least five</td>
<td>Three to (eleven), in accordance with the monetary value of the purchase. At least five Increase with the higher degree of technology complexity.</td>
</tr>
<tr>
<td>Connectedness</td>
<td>degree to which the members of the buying center are linked to each other by direct communications (high versus low)</td>
<td>high during phases 1-3 decreasing phase 4-5 high phases 6-7 low phase 8</td>
<td>low phases 1 - 6 high late phases 7-9</td>
<td>low, initial stages 1-3 high late phases 4-6 high in all stages</td>
<td>high during all stages of the buying process</td>
<td>high during all stages of the buying process low, initial stages high, solely during phases 5&amp;6 (negotiation &amp; supplier selection)</td>
</tr>
<tr>
<td>Centrality</td>
<td>function or position acting as center of communication</td>
<td>Maintenance manager</td>
<td>Mine manager</td>
<td>Purchasing manager</td>
<td>Assigned project manager</td>
<td>Purchasing representative</td>
</tr>
</tbody>
</table>

Legend: (*) I stand for investment.
Data collected at *Ammeberg Mining AB* that leads to the characterization of the dimensions of the buying center shows agreement with previous theory. Regarding *vertical involvement*, it is shown that an increase in the number of hierarchy levels is required for CEMP when investment is superior to SEK 1.5 million. Also, the *size* of the buying center is shown to increase with the monetary value of the CEMP investment.

Regarding the other dimensions, dissimilarities with theory are identified: The *function/departmental involvement* is basically invariable concerning CEMP purchases, as representatives from the same four departments constitute the project group. The *centrality* of the maintenance manager is in contrast to what is commonly found in theory, where the purchasing manager or purchasing representative act as a center for communication. Finally, it is observed that *connectedness* varies throughout the buyphases of the buying process.

Data collected at *Terra Mining* concerns the first new-task CEMP purchase in the company’s history. It can be noted that the dimensions of *vertical involvement*, *function/departmental involvement*, and *size* are predicted as invariable in CEMP purchases. Moreover, only three persons (one from outside the company) are involved in an important, complex, high-investment CEMP purchase. *Connectedness* is low throughout most of the phases of the buying process, with the exception being during negotiations and actual supplier selection (this corresponds to the last three phases of the CEMP buying process at Terra Mining). The mine manager, as a member of the buying center, performs the first six phases of the buying process alone. The *centrality* of the mine manager is unequivocal.

Data collected at *LKAB* which leads to the characterization of the dimensions of the buying center both for relatively standardized and project buying CEMP purchase, shows agreement with previous theory. *Vertical involvement*, *function/departmental involvement*, and *size*, in both cases, increase with the value and complexity of the CEMP investment. Higher hierarchical levels are included when the investment exceeds by SEK three million the initially predicted value. The technical complexity of prototype development CEMP purchases requires the formal establishment of a specific project group, which handles all buying activities.

Concerning *connectedness*, for relatively standardized purchases, this dimension is relatively low (Phases 1 to 3) and high during the other phases. For project buying, direct communication within the project group is intense, hence, connectedness is high throughout the buying process.
Regarding centrality, the assigned project manager (for prototype development CEMP purchases) acts as the center of communication.

Regarding the characterization of Boliden Mineral's buying center dimensions, agreement with the theoretical framework is essentially attained. The CEMP's investment value is shown to considerably influence the three dimensions of size, vertical involvement and function/departmental involvement. As it can be observed in Table 61, the increase in the number of hierarchical levels varies considerably with the investment levels. Also, the number of departments involved may vary between three and seven. In accordance to our frame of reference, the purchasing representative retains centrality. Finally, it should be remarked that connectedness is high during all the phases of the buying process.

With respect to KGHM it should be remarked that data collected follows basically the theoretical framework. As for extensivity, it is shown to increase with an higher degree of technology. Additionally, the purchasing representative gathers, processes, evaluates, and distributes information (centrality). Regarding connectedness, this dimension is low during all phases of the buying process, with the exception for Phases 5 and 6 (negotiation and supplier selection). Finally, the dimensions of the buying center do not change with the monetary value of the CEMP purchase.

Table 62 summarizes the within-case analysis of this study's data regarding the buying center dimensions.
Table 62: Within-case Analysis of the Buying Center Dimensions

<table>
<thead>
<tr>
<th>Dimensions of the Buying Center</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Involvement</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Function/Departmental Involvement</td>
<td>2</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Extensivity (size)</td>
<td></td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Connectedness</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Legend:  
- No observation contrasts with the theoretical framework  
- Dimension is predicted as invariable with the monetary value of the CEMP purchase  
- Dimension is predicted as invariable with the monetary value and the complexity of the CEMP purchase  
- Connectedness is shown to vary throughout the buying process  
- Centrality of other than the purchasing manager

6.2.2.2 Roles in the Buying Center

Data collected respecting the roles in the buying centers can be systematically visualized as shown in Table 63:
Table 63: Roles in the Buying Centers of CEMP Purchases

<table>
<thead>
<tr>
<th>Frame of Reference</th>
<th>Measure/Operationalization</th>
<th>Case #1 (Sweden)</th>
<th>Case #2 (Sweden)</th>
<th>Case #3 (Sweden)</th>
<th>Case #4 (Sweden)</th>
<th>Case #5 (Poland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>person or function who initiates the process</td>
<td>Production department</td>
<td>Mine manager</td>
<td>Production department</td>
<td>Production department</td>
<td>Production manager at the operating mine</td>
</tr>
<tr>
<td>Gatekeeper</td>
<td>person or function who controls information to decision makers</td>
<td>Maintenance manager</td>
<td>Mine manager</td>
<td>Purchasing department</td>
<td>Project Group (assigned project manager)</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Decider</td>
<td>person or function that makes the formal decision (yes or no) concerning vendor and product</td>
<td>Managing director</td>
<td>Mine manager/managing director</td>
<td>Top management</td>
<td>Top management</td>
<td>Production manager (I&lt;1MSEK) (<em>); +top management (I&lt;5, &gt;1MSEK) (</em>)+ board of directors (I&gt;5MSEK) (*)</td>
</tr>
<tr>
<td>Influencer</td>
<td>person or function who &quot;have a say&quot; concerning the purchase</td>
<td>Production department; Maintenance manager</td>
<td>Mine manager</td>
<td>Production manager</td>
<td>Project Group</td>
<td>Engineering, Production, Purchasing; I&lt;5 MSEK(<em>) +union rep. I&gt;5 MSEK(</em>)</td>
</tr>
<tr>
<td>Buyer/Purchaser</td>
<td>person or function who obtains the product</td>
<td>Maintenance manager</td>
<td>Mine manager, external consultant, managing director</td>
<td>Purchasing department</td>
<td>Purchasing department</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>User</td>
<td>person or function who is the actual user (consumer) of the product</td>
<td>Production manager</td>
<td>Mine production team</td>
<td>Production team</td>
<td>Production team</td>
<td>Production team</td>
</tr>
</tbody>
</table>

Legend: (*) I stand for investment.
Regarding the identification of the buying center roles at Ammeberg Mining, the production department assumes the roles of initiator, influencer and user. This is in accordance with previous theory. For example, the roles of initiator and user as exerted by the same functional area. Concerning the roles of gatekeeper and buyer, these are played by the maintenance manager, what can be identified as a discrepancy, because previous studies have essentially identified representatives from purchasing as exercising the gatekeeper and buyer roles. Finally, the mine’s managing director is the purchase decider. This basically agrees with other results which identify senior (top) managers as purchase deciders.

In Terra Mining’s case the mine manager assumes all roles in the buying center, however, the managing director partially assumes the role of decider. These results contrast with previous results which preview the involvement of, for example, three levels of management and seven different people filling the six buying roles in a typical capital equipment purchase.

At LKAB, for relatively standardized CEMP purchases, production assumes all three roles of initiator, influencer, and user. The gatekeeper and buyer roles are assumed by purchasing, and top management is the actual decider. For prototype development of CEMP, production assumes the roles of initiator and user; the project group performs the gatekeeping and influencer roles; top management is the actual decider; and purchasing carries out the buyer role. Hence, results obtained are basically in agreement with other studies’ results.

Concerning Boliden Mineral, production is the initiator, sole decider (for CEMP purchases when the investment value is inferior to SEK one million), as well as the influencer and the user. Purchasing acts as the gatekeeper and actual buyer, and engineering participates as an influencer. It should be remarked the non-involvement of top management for certain CEMP. This finding can be identified as a difference versus previous results.

Finally, concerning the roles in the buying center for the Polish metal mining company, KGHM, production is the initiator and user; purchasing carries out the gatekeeping and buyer roles; top management is the decider; and the technical services department assumes the influencer role. Hence, results obtained are very similar to results of previous studies except for the existence of the influencer role by the technical services department, which is differentiated from actual production.
The identification of the roles in the buying center of the studied cases can be summarized in Table 64:

Table 64: Within-case Analysis of Roles in the Buying Center

<table>
<thead>
<tr>
<th>Roles in the Buying Center</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gatekeeper</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Decider</td>
<td>3</td>
<td>1; 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Influencer</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Buyer/Purchaser</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>User</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Legend:
1 = Production
2 = Purchasing
3 = Top management
4 = Engineering
5 = Technical Services
6 = Maintenance
7 = Project Group

6.2.2.3 Influence in the Buying Center

Data connected with influence in the buying center is compiled and systematically presented in Table 65. When analyzing the data collected, one should be reminded about the previously mentioned difficulties in accurately measuring influence. In our study, we have opted to measure influence as the degree of involvement in the different phases. However, what we have obtained is the degree of involvement of different functions/departments in the whole of the buying process. Analytical considerations concerning departmental and informational power are also drawn as connected to influence.
Table 65: Influence in the Buying Centers of CEMP Purchases

<table>
<thead>
<tr>
<th>Frame of Reference: Influence in the Buying Center</th>
<th>Measure/Operationalization</th>
<th>Case#1 (Sweden)</th>
<th>Case#2 (Sweden)</th>
<th>Case #3 (Sweden)</th>
<th>Case#4 (Sweden)</th>
<th>Case#5 (Poland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Influence</td>
<td>The degree of involvement in the different stages of the buying process, based on the interviewees perceptions</td>
<td>Ammeberg Mining</td>
<td>Terra Mining</td>
<td>LKAB Relatively Standardized</td>
<td>LKAB Prototype Development</td>
<td>Boliden Mineral</td>
</tr>
<tr>
<td>1. Production</td>
<td>Production is involved in <em>six</em> of the <em>nine</em> buyphases of the CEMP buying process. It’s influenced is perceived as <em>high</em> due to the fact it exerts both the expert and user roles.</td>
<td>1. Production</td>
<td>1. Production</td>
<td>1. Project group which is constituted by the production, research &amp; development, maintenance, and purchasing is involved <em>eight</em> of the <em>nine</em> stages of the buying process. Moreover, <em>production</em> is involved in all of the stages.</td>
<td>1. Production is involved in <em>seven</em> of the <em>eight</em> stages of the buying process.</td>
<td>Technical services is involved in <em>five</em> of the <em>eight</em> stages of the buying process. Influence is perceived as <em>high</em> due to technical expertise and know-how.</td>
</tr>
<tr>
<td>2. Maintenance manager also perceived as influential due to it’s centrality (gatekeeping), and boundary role as deputy manager of the mine.</td>
<td>Maintenance manager also perceived as influential due to it’s centrality (gatekeeping), and boundary role as deputy manager of the mine.</td>
<td>2. Purchasing</td>
<td>2. Purchasing</td>
<td>2. Purchasing is involved in <em>seven</em> of the <em>eight</em> stages of the buying process.</td>
<td>2. Purchasing is involved in <em>five</em> of the <em>eight</em> stages of the buying process.</td>
<td>2. Purchasing is involved in <em>five</em> of the <em>eight</em> stages of the buying process.</td>
</tr>
<tr>
<td>2. Managing director and external consultant are perceived to exert a relative influence.</td>
<td>2. Managing director and external consultant are perceived to exert a relative influence.</td>
<td>2. Purchasing is involved in <em>five</em> of the <em>seven</em> buyphases.</td>
<td>2. Purchasing is involved in <em>five</em> of the <em>seven</em> buyphases.</td>
<td>2. Purchasing is involved in <em>seven</em> of the <em>eight</em> stages of the buying process.</td>
<td>2. Purchasing is involved in <em>seven</em> of the <em>eight</em> stages of the buying process.</td>
<td>2. Purchasing is involved in <em>five</em> of the <em>eight</em> stages of the buying process.</td>
</tr>
<tr>
<td>3. Engineering is involved in <em>two</em> of the <em>eight</em> stages of the buying process.</td>
<td>3. Engineering is involved in <em>two</em> of the <em>eight</em> stages of the buying process.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At *Ammeberg Mining*, the production department exerts a major influence throughout the purchasing process. Production holds both the expert and user roles concerning CEMP purchases. Its affect on buying-related activities and decisions is thus considered to be high. Moreover, production holds the departmental power. The maintenance manager also exerts influence (perceived as relatively high) due primarily to his gatekeeping role, where information power exists. The latter also has a boundary role as deputy manager of the mine. These results are in agreement with previous studies which have identified the need to go beyond the purchasing manager to reach the decision-makers.

Regarding *Terra Mining*, production exerts the major influence in the CEMP purchases. Expertise, experience, and know-how are the bases for this influence. Production has both the departmental and informational power. The mine manager is by-far the most influential person in the CEMP purchase. This is in agreement with other studies that have found that the most influential person is the one who will be affected to the largest extent by the purchase decision.

At the mining company, *LKAB*, in what regards *relatively standardized CEMP purchases*, production exerts the major influence. This is due to its know-how and expertise. The status of the production department in the organization is also high, hence, production holds considerable departmental power in the CEMP purchases. The purchasing department’s influence is perceived as relatively high, its involvement is present in most of the phases of the buying process, and information is fundamentally controlled by this department. During the negotiation and contract phases, it’s influence is perceived as even higher than production. This to is in accordance with results of other studies.

Regarding the *prototype development* CEMP purchases, the project group, in which know-how and expertise from representatives of the different departments within the company is gathered, exerts the major influence during the entire buying process. The project group holds the information power, and within the project group, production yields departmental power. In this case, viscidity (i.e. the extent to which the members act together as a team) is high. The experts will probably exert the major influence in the purchases. These results are in accordance with previous studies considering relatively large buying centers, which are not under time pressure.

At *Boliden Mineral*, production exerts the major influence throughout most of the phases of the buying process. Regarding purchasing it is observed
that this department exerts considerable influence and holds the information power. The engineering department’s influence is assessed as medium and this is due mainly to the technical know-how and expertise. During the negotiation phase, purchasing alone influences the process, and this is basically in agreement with other studies’ results. Regarding the other phases, the need to go beyond purchasing and identify the decision-makers within production is remarked.

In regard to the data collected at KGHM, it should be mentioned that technical services yield the major influence, due to the technical expertise and know-how of the CEMP. Purchasing exercises a relatively high degree of influence and retains the information power. The production department’s influence is perceived as relatively low, due to the fact that it’s involvement is present only during the two first phases of the buying process, initiation and characterization of the technical function. Hence, although the buying center’s viscosity is apparently low and time pressure does not influence the CEMP purchase, the power of influence by the technical experts is high.

The previous observations concerning influence in the buying centers are summarized in Table 66:

Table 66: Within-case Analysis of the Influence in the Buying Center

<table>
<thead>
<tr>
<th>Influence in the Buying Center</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Department Exerting Major Influence</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Functional Department Exerting Relatively High Influence</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Functional Department Retaining Departmental Power</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Functional Department Retaining Information Power</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Legend: 1 = Production 3 = Maintenance 5 = Technical Services
2 = Purchasing 4 = Project Group

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6.2.2.4 Summary of the Within-case Analysis Concerning the Buying Center

Within-case analysis has led to the identification of a certain number of discrepancies with the theoretical framework, and the identification of a certain number of observations. In summary:

1. At Terra Mining and KGHM, vertical, function/departmental involvements, and extensivity are all found to show no change due to the monetary value of the purchase. Moreover, at Terra Mining, the three dimensions are also invariable with the complexity of the CEMP purchase. At Ammeberg, function/departmental involvement is found invariable with both monetary value and complexity of the CEMP purchase.

2. In all of the mining companies, with the exception for Boliden Mineral, connectedness is found to vary throughout the buying process.

3. The purchasing manager does not hold centrality in two of the companies studied (Ammeberg and Terra Mining), and in LKAB when purchasing prototype development CEMP.

4. Production is found to exert the roles of initiator, influencer, and user in the following cases: Ammeberg, Terra Mining, LKAB, and Boliden.

5. Except for KGHM’s case, production is perceived as the major influencer in the buying centers.

6.2.3 Factors Affecting the Buying Process and the Buying Center

Following the conceptual framework of this study, the information collected regards the following factors: (1) buying situation; (2) other product specific factors; (3) organizational factors; (4) inter-organizational factors; and (5) environmental factors. The conducted within-case analysis will address each of these aspects.

6.2.3.1 Buying Situation

Data collected concerning this first set of factors is summarized in Table 67:
Table 67: Buying Situation That Affects the BP and BC

<table>
<thead>
<tr>
<th>Frame of Reference: Factors that Affect BP &amp; BC</th>
<th>Measurement/Operationalization</th>
<th>Case #1(Sweden) Ammeberg Mining</th>
<th>Case #2(Sweden) Terra Mining</th>
<th>Case #3(Sweden) LKAB</th>
<th>Case #4(Sweden) Boliden Mineral</th>
<th>Case #5(Poland) KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying Situation</td>
<td>Information Requirements</td>
<td>(low, medium, high) (10-20%, 10-20%, 70%)</td>
<td>(low, medium, high) (0%, 50%, 50%)</td>
<td>(low, medium, high) (0%, 0-10%, 90-100%)</td>
<td>(low, medium, high) (10%, 10%, 80%)</td>
<td>No data was provided.</td>
</tr>
<tr>
<td></td>
<td>Newness of the Problem</td>
<td>(low, medium, high) (50%, 25%, 20-25%)</td>
<td>(low, medium, high) (10%, 60%, 30%)</td>
<td>(low, medium, high) (15%, 50%, 35%)</td>
<td>(low, medium, high) (80%, 10%, 10%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consideration of New alternatives</td>
<td>(low, medium, high) (30%, 30%, 30%)</td>
<td>(low, medium, high) (0%, 30%, 70%)</td>
<td>(low, medium, high) (10%, 20%, 70%)</td>
<td>(low, medium, high) (80%, 10%, 10%)</td>
<td></td>
</tr>
<tr>
<td>Buyclass</td>
<td>New task</td>
<td>15%</td>
<td>100%</td>
<td>20%</td>
<td>&lt;10%</td>
<td>100% (both categories)</td>
</tr>
<tr>
<td></td>
<td>Modified-rebuy</td>
<td>60%</td>
<td>0%</td>
<td>70%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Straight-rebuy</td>
<td>25%</td>
<td>0%</td>
<td>10%</td>
<td>40%</td>
<td>0%</td>
</tr>
</tbody>
</table>
At *Ammeberg Mining* data collected concerning the buying situation indicates that 15 percent of the CEMP purchases were classified as new tasks, 60 percent as modified-rebuy and 25 percent as straight-rebuys. It should be noted that in 70 percent of the CEMP purchases, information requirements are considered as high, although in most of the cases the newness of the problem is considered as low (50 percent) or medium (25 percent). Regarding the consideration of new alternatives, data obtained indicates that approximately one-third of the time no alternatives are considered, another third limited consideration is given towards opting for a new alternative, and the other third important consideration is given. Attending to the aforementioned, it should be remarked that there is a considerable percentage of CEMP purchases that are classified as straight-rebuys (25 percent), and this contrasts with theory, which tells us that capital equipment purchases can seldom be classified as straight-rebuys. Further, although most of the CEMP purchases are classified as either new-task or modified-rebuys (together representing 75 percent of the company's purchases) the newness of the problem is in 50 percent of the cases considered as low and only 30 percent of the time are new alternatives carefully considered.

At *Terra Mining* all the CEMP purchases are classified as new-task. A simple reason explains this fact. The CEMP described for this study has been the mining company's first CEMP. Concerning the distinguishing characteristics of buying situations, the data collected shows that information requirements are considered to be between moderate to maximum, the newness of the problem as medium, and finally the consideration of new alternatives as important or high. When comparing to the conceptual framework, it should be noted that, although the buying situation is classified as new-task, the newness of the problem is not considered as high (as classified in theory), but only medium.

Data obtained on *LKAB*'s CEMP purchases show that most purchases (70 percent) are classified as modified-rebuys of the rest, approximately 20 percent, are classified as new-task, and around 10 percent as straight-rebuys. Regarding the distinguishing characteristics of the buying situations, information requirements are almost always considered as high (maximum). The consideration of new alternatives in 70 percent of the cases is also important. Concerning the newness of the problem, half of the times (50 percent) is regarded as medium, while in 35 percent of the cases it is high. It should be mentioned that although classified as modified-rebuys, in most cases information requirements are considered as maximum and the consideration of new alternatives is also important in many of the modified-rebuys.
As to data collected at *Boliden Mineral*, around 50 percent of the CEMP purchases are classified as modified-rebuys, while 40 percent are new-task, and less than 10 percent are straight-rebuys. Newness of the problem and the consideration of new alternatives are considered as low in most of the CEMP purchases (80 percent). Regarding information requirements, the opposite occurs (in 80 percent of the CEMP purchases it is considered as high). It should be noted that although 90 percent of the CEMP purchases are classified as new-tasks and modified-rebuys, the newness of the problem and the consideration of new alternatives are in 80 percent of the cases considered to be minimal.

At *KGHM*, all CEMP purchases are classified as either new-task or modified-rebuys, which fundamentally follows the theoretical framework. Regarding the distinguishing characteristics of the estimate of the information requirements, newness of the problem, and consideration of new alternatives, no data was provided by the company.

The remarks presented for each of the mining companies concerning identified discrepancies and/or peculiarities can be summarized in Table 68:

**Table 68: Within-case Analysis of the Buying Situation**

<table>
<thead>
<tr>
<th>The Buying Situation</th>
<th>Ammehberg</th>
<th>Terra Mining</th>
<th>I.KAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEMP purchases are classified as straight-rebuys</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>In many occasions, although the CEMP purchase is a new-task, the newness of the problem is regarded as medium or low.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>✓</td>
</tr>
<tr>
<td>In many occasions, although the CEMP purchase is a modified-rebuy, the newness of the problem is regarded as medium or low.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>In many occasions, although the CEMP purchase is a new-task or modified-rebuy, the consideration of new alternatives is limited (medium) or even none (low).</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Information requirements are considered as maximum or high even in many of the CEMP modified-rebuys.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
- ✓ = No observation contrasts with the theoretical framework
- 1 = Identified contrast with the theoretical framework
- ✓ = No data is available

6.2.3.2 Other Product Specific Factors

Data collected concerning this first set of factors is summarized in Table 69:
Table 69: Other Product Specific Factors That Affect the BP and BC

<table>
<thead>
<tr>
<th>Frame of Reference: Factors That Affect BP &amp; BC</th>
<th>Measure /Operationalization</th>
<th>Case #1 (Sweden) Ammeberg Mining</th>
<th>Case #2 (Sweden) Terra Mining</th>
<th>Case #3 (Sweden) LKAB</th>
<th>Case #4 (Sweden) Boliden Mineral</th>
<th>Case #5 (Poland) KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Product Specific Factors:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Time Pressure:</td>
<td>Perception of the lack of time constitutes a limiting factor in performing the buying task.</td>
<td>Investment issues included previously in investment budget, non-relevant.</td>
<td>Not perceived as a limiting factor. Between 6-12 months.</td>
<td>From 3-4 weeks to 7-8 months, varying with the CEMP’s complexity. Not a limiting factor. Project buying, development of prototype requires a wider time span.</td>
<td>To conduct purchase e.g. 8-10 weeks, longer with the increase of technology complexity. Not perceived as a limiting factor. Previously included in long-term strategic planning.</td>
<td>From 6 months (standard) to 2 or even 3-4 years (complex tailor-made prototypes). Time pressure is not considered as a limiting factor.</td>
</tr>
<tr>
<td>• Monetary Value:</td>
<td>The actual price of the equipment, or the cost of investment (monetary value platforms).</td>
<td>I (*) &gt; 1.5MSEK imply an increase of one hierarchy level (North group management).</td>
<td>Three-year leasing agreement. Non-variation of buying center composition with higher monetary value.</td>
<td>Annual investment budgets vary from year to year. When the investments exceed by 3MSEK the previewed value, an higher hierarchy level is added.</td>
<td>I (<em>) &lt; 1MSEK: 1 hierarchy level and 3 departments involved. 1 &lt; I (</em>) &lt; 5MSEK: 2 hierarchy levels, 4 departments I (*) &gt; 5MSEK: 4 hierarchy levels, 7 departments</td>
<td>Varies considerably. No change due to differences in the monetary value.</td>
</tr>
<tr>
<td>• Importance</td>
<td>How vital the proper function, i.e. the fulfillment of the specified need, is to the production system.</td>
<td>CEMP purchases perceived as important.</td>
<td>CEMP purchases perceived as important.</td>
<td>CEMP purchases perceived as important.</td>
<td>CEMP purchases perceived as important.</td>
<td>CEMP purchases perceived as important.</td>
</tr>
</tbody>
</table>
At Ammeberg time pressure is not considered to influence the industrial buying process and buying center. This is essentially due to the fact that CEMP purchases are usually planned and are included in the company’s investment budget well in advance (in terms of time). Regarding the monetary value, and as previewed in theory, it is found that this variable influences the composition of the buying center through the increase of one hierarchy level when the investment platform of SEK 1.5 million is passed. Finally, all CEMP purchases are regarded as vital (important) for the proper running of the company’s production cycle. Information requirements to effectuate CEMP purchases are usually (at least in 70 percent of the cases) considered as high, and this fact is related to the importance of this type of purchase to the mining company.

Regarding Terra Mining’s data, time pressure is found not to affect the industrial buying process and buying center. The width of the time-span to carry out the CEMP purchase varies usually between six to 12 months. However, this variation depends essentially on the technological complexity of the CEMP under consideration. Regarding monetary value, it is found not to influence the composition of the buying center, in contrast to what was found in theory. Finally, CEMP purchases are regarded as vital (important) for the company’s profitability, however, no variation is predicted regarding the composition of the buying center due to this factor, at least in regards to this product type.

At LKAB, time pressure is not considered to influence the industrial buying process and buying center. The time-span to carry out the CEMP purchases may vary from three - four weeks up to seven - eight months, depending on the technical complexity of the equipment. As predicted in theory, the monetary value is found to influence the composition of the buying center, through the inclusion of an higher hierarchy level when the investments exceed by SEK three million the previewed budget monetary value. Concerning importance, CEMP purchases are regarded as vital for the company’s low cost production policy.

Connected with the other product specific factors included in our theoretical frame of reference, data collected at Boliden Mineral shows that time pressure is not considered to influence the industrial buying process and buying center. The time-span to carry out the CEMP purchases may vary considerably in accordance to the technical complexity of the equipment. Monetary value is found to considerably influence the composition of the buying center. Three investment platforms are established (less than one, between one and five, and superior to SEK five
million) implying the participation of higher hierarchical levels. Finally, CEMP purchases are regarded as vital (important) for the company.

In respect to the data collected at the Polish mining company KGHM, time pressure is not considered to influence the industrial buying process and buying center. The time-span required for purchasing a CEMP item varies considerably and it’s increase is mainly due to the increase in the technological complexity of the equipment. Monetary value is found not to influence the composition of the buying center, which is in contrast to previous theoretical results. Finally, CEMP purchases are regarded as vital (important) for the company’s low cost production policy.

Table 70 summarizes the comments regarding time pressure, monetary value, and importance:

Table 70: Within-Case Analysis of Other Product Specific Factors

<table>
<thead>
<tr>
<th>Other product specific factors</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time pressure</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Monetary value</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Importance</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Legend:
1 = Time Pressure is not an influencing factor
2 = Monetary value influences the composition of the buying center
3 = Monetary value does not influence the composition of the buying center
4 = Importance of the CEMP purchase is perceived as high

6.2.3.3 Organizational Factors

Three variables are included in the organizational factors: orientation, size, and number of plants and separate operating locations. Table 71 summarizes this information.
Table 71: Organizational Factors That Affect the BP and BC

<table>
<thead>
<tr>
<th>Frame of Reference: Factors that Affect BP &amp; BC</th>
<th>Measure /Operationalization</th>
<th>Case #1 (Sweden) Ammeberg Mining</th>
<th>Case #2 (Sweden) Terra Mining</th>
<th>Case #3 (Sweden) LKAB</th>
<th>Case #4 (Sweden) Boliden Mineral</th>
<th>Case #5 (Poland) KGHIM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Orientation</td>
<td>Determination of the company’s mission as an indication of who in the buying firm will be interested in the buying decision-making process.</td>
<td>&quot;shall continue to be a low cost (&lt;25% world zinc producing mines) producer of high quality zinc and lead concentrates&quot;</td>
<td>&quot;By the year 2000 Terra Mining shall operate at least three mines and produce at least 4,5-6 ton of gold annually...&quot;</td>
<td>&quot;LKAB shall - on a profitable, cost-effective and sustainable basis - market, manufacture, and deliver quality assured iron products&quot;.</td>
<td>&quot;Boliden aims to be ... high quality metal products which meet the market's demands and which are produced by global comparison-in cost-effective processes&quot;</td>
<td>&quot;company's focus in the core business of metal production&quot;</td>
</tr>
<tr>
<td></td>
<td>Whether the company is production, distribution, or service oriented as an indication for which department holds decision power</td>
<td>Production oriented</td>
<td>Production oriented</td>
<td>Production oriented</td>
<td>Production and distribution oriented</td>
<td>Production oriented</td>
</tr>
<tr>
<td>• Size and Centralization</td>
<td>Number of employees</td>
<td>Medium-sized (320), joint</td>
<td>Small-sized (58), autonomous buying centralized in mine manager, decisions taken throughout most of the buyphases solely by mine manager.</td>
<td>Large corporation (3,241); joint decision making in relatively standardized CEMP, purchasing + production. Prototype buying, project group, joint (team) decision-making</td>
<td>Large corporation (5,404); joint decision-making between purchasing + production</td>
<td>Huge combine (28,883); jointly (non-production) technical services + purchasing. No formal project group.</td>
</tr>
<tr>
<td></td>
<td>Joint versus autonomous decision-making</td>
<td>&quot;Informally&quot; organized project group cross-functional communication and cooperation</td>
<td>&quot;Informally&quot; organized project group cross-functional communication and cooperation</td>
<td>&quot;Informally&quot; organized project group cross-functional communication and cooperation</td>
<td>&quot;Informally&quot; organized project group cross-functional communication and cooperation</td>
<td>&quot;Informally&quot; organized project group cross-functional communication and cooperation</td>
</tr>
<tr>
<td>• Differentiation</td>
<td>Number of operating mines and concentrators</td>
<td>One Zinkgruvan mine and concentrator.</td>
<td>One Björkdal mine and concentrator. Operations in Pahtavaara predicted for 1997.</td>
<td>Two underground mines and concentrators: Malmberget and Kiruna.</td>
<td>Ten mines in four operating units.</td>
<td>Four underground mines and three concentrators.</td>
</tr>
</tbody>
</table>

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Ammeberg's company mission indicates that the mining company is clearly production oriented, and, as previewed in theory, this fact explains the major involvement and influence of the production department in the buying activities. The company has 320 employees and can thus be considered as a medium-sized company. Complying with theory, decision-making is joint and the involvement of higher hierarchical levels is present (for investments superior to SEK 1.5 million, the holding company needs to approve the purchase). Further, the informal constitution of a “project group” strengthens joint decision-making as cross-functional communication and cooperation increase. Finally, the number of operating mines and concentrators leads to classify the company as having a low degree of differentiation.

Terra Mining is distinctly production oriented, and as expected, the production department holds the decision-making power in CEMP purchases. The company is small-sized (320 employees) and, as theory leads us to understand, decision-making is autonomous and higher hierarchical levels exert the decision-making. Concerning differentiation, the number of operating mines and concentrators leads to classifying the company as having a low degree of differentiation.

LKAB is both distribution and production oriented, as indicated in it’s mission, and production plays a major role in CEMP purchases (through it’s high degree of involvement and influence). The corporation is large and decision-making is joint. In prototype project CEMP purchases, the formal constitution of a project group emphasizes even more the joint decision-making. The number of operating mines and concentrators leads to classify the company with a low degree of differentiation.

Regarding Boliden Mineral's organizational factors, included in the theoretical framework of our study, the mining company is clearly production oriented and it is also production that exerts the major influence and decision-making power. The corporation is large (approximately 5,400 employees), decision-making is joint, and for investments up to SEK one million the involvement of higher hierarchical levels (i.e. top management and board of directors) is not required. Finally, the number of operating mines and concentrators leads to classifying the company as having a high degree of differentiation.

Concerning KGHM, it has been found that the mining company is clearly production oriented, however, it is not production that exerts the major influence and who retains the decision-making power. The corporation is

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19 Within the context of this study, companies with less than 200 employees are considered as small-sized, 200 - 500 employees as medium-sized, and more than 500 employees as large.
extensive (approximately 28,800 employees) and decision-making is joint, in accordance to previous theoretical studies. Although the organizational size is considerable and thus it could be expected a decrease in the higher hierarchical level’s participation, top management and even upper-level strategic management are involved in CEMP purchases. The number of operating mines and concentrators leads to classifying the company as having a high degree of differentiation.

The previous observations drawn from the within-case analysis regarding the organizational factors are summarized in Table 72:

Table 72: Within-case Analysis of the Organizational Factors

<table>
<thead>
<tr>
<th>Organizational factors</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Orientation</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>• Size</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>• Number of Plants and Separate Operating Locations</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Legend:
1 = Production oriented
2 = Small organizations tend to have autonomous decision-making
3 = Medium and large organizations tend to have joint decision-making
4 = Organization has a low degree of differentiation
5 = Organization has a high degree of differentiation

6.2.3.4 Inter-organizational Factors

Four aspects were pursued in our conceptual framework, namely:

1. the classification of buyer-seller relationships;
2. the influence of perceived product importance in the establishment of long-term relationships;
3. the perceived advantages with long-term relationships; and
4. the characterization of the negotiation strategies.

Data collected is summarized in Table 73:
Table 73: Interorganizational Factors That Affect the BP and BC

<table>
<thead>
<tr>
<th>Frame of Reference; Factors that Affect BP &amp; BC</th>
<th>Measure /Operationalization</th>
<th>Case #1 (Sweden) Ammeberg Mining</th>
<th>Case #2 (Sweden) Terra Mining</th>
<th>Case #3 (Sweden) LKAB</th>
<th>Case #4 (Sweden) Boliden Mineral</th>
<th>Case #5 (Poland) KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-organizational</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Interaction aspects</td>
<td>Classification of Buyer-Seller Relationships</td>
<td>Interdependent (domesticated market)</td>
<td>Interdependent (domesticated market)</td>
<td>Interdependent (domesticated market)</td>
<td>Interdependent (domesticated market)</td>
<td>Interdependent (domesticated market)</td>
</tr>
<tr>
<td>• High perceived product importance</td>
<td>Leads to complexity, relationship, cooperation / high level of interfirm cooperation, information exchange, social exchange</td>
<td>High perceived product (CEMP) importance, long-term relationships common (search for alternative sources bypassed when satisfied).</td>
<td>High perceived product importance, well-grounded know-how of the domesticated market.</td>
<td>High perceived product importance, long-term relationships.</td>
<td>High perceived product importance, long-term relationships (e.g. some more than 20 years)</td>
<td></td>
</tr>
<tr>
<td>• Perceived advantages with long-term relationships</td>
<td>Based on the interviewee perceptions.</td>
<td>Cooperation, when satisfied with suppliers, search for alternative sources is by-passed.</td>
<td>Yet to be determined.</td>
<td>In standardized CEMPs: risk reduction, technical cooperation, reliability of supply, less conflicts. In project buying, cooperation is essential, due to common technology development, high levels of communication and interdependence. Interfirm cooperation.</td>
<td>Inter-firm cooperation (e.g. technical cooperation agreements), high levels of information exchange. Technical cooperation. Ability to solve conflicts in a satisfactory manner. Delivery reliability.</td>
<td></td>
</tr>
<tr>
<td>• Negotiation behavior /strategy</td>
<td>Two basic negotiation strategies of problem solving (integrative bargaining) and aggressive bargaining.</td>
<td>Scope of contractual agreements is limited to equipment, no maintenance &amp; service due to financial situation of the company.</td>
<td>Problem-solving</td>
<td>Integrative bargaining (problem solving, cooperation is a key motto)</td>
<td>Problem solving</td>
<td>Non-cohesive, problem solving type</td>
</tr>
<tr>
<td>• Other aspects</td>
<td>Fewer suppliers? Trends? Based on the respondents answers.</td>
<td>No leasing agreements. Fewer suppliers, also due to financial situation, service and maintenance in-house servicing.</td>
<td>First new-task purchase of CEMP. No trend, to be determined</td>
<td>Avoid single sourcing; avoid over dependence of local suppliers on LKAB; reduction of suppliers from 11,000 to 700 in a couple of years.</td>
<td>Extremely powerful buyer; Moving stocks towards suppliers.</td>
<td></td>
</tr>
</tbody>
</table>
At Ammeberg, the type of CEMP market is classified as an interdependent, domesticated market where the number of actors involved, even on a global perspective, is limited. The degree of knowledge between the buyers and sellers of CEMP is high. The frequency of purchase is relatively low and investment and maintenance costs are high. Moreover, the high perceived product importance leads to long-term relationships with CEMP suppliers. The results regarding the advantages with long-term relationships (interfirm cooperation and common development of technical solutions) follow basically what has previously been presented in theory. Finally, the negotiation strategy adopted is problem-solving.

At Terra Mining the market is clearly classified as an interdependent, domesticated market, where the degree of knowledge between the actors is high and social interactions are common. Also, the high perceived product importance is viewed as a factor which leads to long-term relationships and the negotiation strategy is of a problem-solving type.

Regarding the inter-organizational factors at LKAB, the type of CEMP market is classified as a domesticated market. Besides a high degree of knowledge between buyers and sellers, LKAB is a powerful, well-known buyer with whom sellers are interested to have a smooth and satisfactory relationship. Highly perceived product importance leads to long-term relationships and the advantages include risk reduction, reliability of supply, inter-firm cooperation. For prototype development, long-term technical cooperation arrangements are common. The negotiation strategy selected is of a problem-solving type.

Boliden Mineral classifies the CEMP market as domesticated where a high level of knowledge exists among the few actors (buyers and sellers) in the market. Again, high perceived product importance leads to long-term relationships, and perceived advantages include the technical cooperation agreements, ease in conflict resolution, higher levels of information exchange, and delivery reliability. Finally, the negotiation strategy used is problem-solving.

At KGHM, the CEMP market is classified as domesticated with a high degree of knowledge between the active firms. The high perceived product importance leads to long-term relationships (some having lasted more than 20 years) and inter-firm cooperation was emphasized as an advantage. Finally, the adopted negotiation strategy is problem-solving.
With respect to the inter-organizational factors, no dissimilarities with the theoretical framework were found and the observations are summarized in Table 74:

Table 74: Within-case Analysis of the Inter-organizational Factors.

<table>
<thead>
<tr>
<th>Inter-organizational factors</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Classification of Buyer-Seller Relationships</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>• High Perceived Product Importance</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>• Advantages with Long-term Relationships</td>
<td></td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>• Negotiation Strategy</td>
<td></td>
<td></td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Legend:
1 = Interdependented, domesticated market
2 = High perceived product importance leads to long-term relationships
3 = Advantages with long-term relationships include inter-firm cooperation
4 = Negotiation Strategy is problem-solving
\(_\) = No data provided

6.2.3.5 Environmental Factors

The environmental factors included in our theoretical frame of reference were the economic, the political, the legal and the social factors. Data collected is summarized in Table 75:
<table>
<thead>
<tr>
<th>Frame of Reference; Factors that Affect BP &amp; BC</th>
<th>Measure /Operationalization</th>
<th>Case #1 (Sweden) Ammeberg Mining</th>
<th>Case #2 (Sweden) Terra Mining</th>
<th>Case #3 (Sweden) LKAB</th>
<th>Case #4 (Sweden) Boliden Mineral</th>
<th>Case #5 (Poland) KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>Political</td>
<td>Political: nuclear power station shutdown implies higher energy costs, 10% costs of mining company</td>
<td>No impact reported.</td>
<td>Political: electrical power prices, at competitive levels is essential.</td>
<td>No impact reported</td>
<td>Economic, political, social and legal interconnected and highly influential underlie the program; adaptation to market led economy, privatization, establishment of new legal entities; issue of &quot;preserving hard currency&quot; (representatives in Poland); power of foreign trade subsidiaries.</td>
</tr>
<tr>
<td>Economic</td>
<td>No impact reported.</td>
<td>Gold price, exchange rate USD/SEK (economic) are in the origin of the purchase process.</td>
<td>Economic factors: higher levels of iron ore demand, raise of prices, raise of operating income.</td>
<td>Economic factors (geological, metal prices, currency rates).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Social affinity, personnel policy (area employer).</td>
<td>No impact reported.</td>
<td>No impact reported.</td>
<td>Suppliers' geographical affinity in terms of Nordic countries, specialization and adaptation to the specificity of the environment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>No impact reported</td>
<td>No impact reported</td>
<td>No impact reported</td>
<td>No impact reported</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As presented, Table 75 indicates that the environmental factors emphasized as major influencers of Ammebergs's industrial buying behavior regard political and social environmental factors. At Terra Mining, the economic factors were emphasized, while at LKAB both the political and economic factors were mentioned. Regarding Boliden Mineral, the environmental factors mentioned which most concern the company include the economic and to a lesser degree social factors. Concerning the environmental factors at the Polish metal mining company, KGHM, a higher degree of influence in the company’s industrial buying behavior is perceived. The economic, political, and legal factors are highly interconnected and all were emphasized. Only at KGHM was the impact of the legal factors mentioned.

The observations put forward regarding the environmental factors are provided in Table 76:

Table 76: Within-case Analysis of the Environmental Factors

<table>
<thead>
<tr>
<th>Environmental factors</th>
<th>Ammeberg</th>
<th>Terra Mining</th>
<th>LKAB</th>
<th>Boliden</th>
<th>KGHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Political</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Social</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Legal</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Legend:
1 = Economic factors constitute a major influence
2 = Political and legal factors constitute a major influence
3 = Social factors constitute a major influence
4 = No impact was mentioned

6.2.3.6 Summary of the Within-case Analysis Concerning Factors Affecting the Buying Process and the Buying Center

The within-case analysis has led to the identification of many similarities with the theoretical framework, some dissimilarities, and the identification of a certain number of observations. In summary:

1. In all the four Swedish metal mining companies, differences with the conceptual framework concerning the incorporation of the CEMP purchases in buying situations were identified.
2. Regarding the other product-specific factors, all the studied mining companies perceive time pressure as non-influential. Consensus among the companies is also attained concerning the consideration of CEMP purchases as important for the mining company. Regarding monetary value, discrepancies against theory are remarked in two of the mining companies, Terra Mining and KGHM.

3. In respect to the organizational factors, all companies are production-oriented, and except for Terra Mining, which exerts autonomous decision-making, the rest have joint decision-making. Boliden and KGHM have a high degree of differentiation.

4. With regards to the inter-organizational factors, all of the metal mining companies classify the CEMP market as domesticated. The high perceived product importance is found to be one of the factors which contributes to long-term relationships, and among others a common advantage is inter-firm cooperation. Finally the negotiation strategy selected by all of the companies is the cooperative, problem-solving type.

5. Finally, connected with the environmental factors, economic factors were mentioned as extremely relevant by four of the companies, with the exception of Ammeberg, which mentioned primarily the political, legal, and the social factors. Political and legal factors are found to influence all of the mining companies.

6.3 Cross-Case Analysis

The cross-case analysis of this study is conducted based on the previously performed within-case analysis. Hence, the findings attained from the within-case analysis are presented and cross-case comparisons are carried-out with a variable-oriented strategy, meaning that the findings derived from the within-case analysis for each unit of analysis are compared. The identification of patterns which cut across cases and differences are put forward and discussed.

6.3.1 The Buying Process

Regarding the buying process of CEMP at the metal mining companies, it can be observed that each of them basically follow the eight buyphases as they are described in our conceptual framework. An identified common discrepancy among all cases concerns the existence of an individualized negotiation buyphase. Hence, all the metal mining companies regard
negotiations as an extremely important buying activity, in contrast to the buygrid framework where negotiation is scarcely mentioned and included during buyphase six (evaluation of proposals and selection of supplier). Moreover, in two of the studied companies, Ammeberg and Terra Mining, negotiation is differentiated in two buyphases, initial negotiation and final negotiation.

6.3.2 The Buying Center

Cross-case analysis is conducted on the buying center dimensions, roles, and influence.

The vertical involvement dimension of the buying centers is found to vary between one level (for LKAB and Boliden when the investment value is inferior to SEK one million) to three or even four, when the monetary value of the investment justifies it for certain companies (Ammeberg and Boliden). Concerning this dimension, a discrepancy with results from previous studies is found at Terra Mining and KOHM, namely the invariability of this dimension with the increase in monetary value of the purchase.

The dimension of function/departmental involvement is found to vary considerably among the cases, between two departments/three functions (at Terra Mining) to seven departments (in the more costly CEMP investments at Boliden Mineral). A department, which is always present in CEMP purchases, is the production department.

Extensivity among the companies is not found to vary considerably, and the minimum number of persons involved in a CEMP purchase is two (at Terra Mining). A commonly-indicated size for the buying center was between three and five (in the other four mining companies).

Connectedness, is found to vary considerably during the different buyphases and among the buying companies. Two companies (Boliden Mineral, and LKAB when carrying out prototype development) perceive connectedness as high during all phases of the buying process. Regarding the other companies, variations occur: Ammeberg perceives connectedness as high during the initial phases of the buying process. On the other hand, Terra Mining, LKAB (in relatively standardized), and also KGHM perceive it as in general low.
Regarding centrality, different functions retain this dimension in the mining companies depending on the size of the company. In Terra Mining and Ammeberg, the comparatively smaller mining companies, the purchasing functions are exercised by other than the purchasing department. In LKAB’s project buying, the “assigned project manager” holds centrality.

When implementing a cross-case analysis regarding which functional department carries out different roles in the buying centers, the dominance of the production department is clear among all the Swedish mining companies. The involvement of top management as the decider is common in all the companies. Moreover, with the exception for the smaller companies (Ammeberg and Terra Mining) purchasing performs the roles of gatekeeper and buyer.

A cross-case analysis concerning influence in the buying center shows a clear dominance of the production department in all the Swedish companies, in contrast to the Polish case where the Technical Services department exerts the major influence. Comparisons between the smaller mining companies (Ammeberg and Terra Mining) and the larger Swedish mining companies (LKAB and Boliden) show that purchasing exerts a relatively high influence in the latter companies while in the former, technical departments (production and maintenance, in Ammeberg’s case) exert the major influence.

6.3.3 Factors Affecting the Buying Process and Buying Center

A cross-case analysis is performed for each of the set of factors: (1) the buying situation; (2) the other product specific factors; (3) the organizational factors; (4) the inter-organizational factors; and (5) the environmental factors.

6.3.3.1 The Buying Situation

Regarding the buying situation, three of the mining companies (Ammeberg, LKAB, and Boliden) classify some of their CEMP purchases as straight-rebuys. Terra Mining is the only company, which does not classify any of the CEMP purchases as straight-rebuys. In this case all CEMP purchases are classified as new-taks and this is due to the fact that it is the first time that the company conducts CEMP purchases. The rest of the studied mining companies classify between 10 and 20 percent of their CEMP purchases as
new-task. Hence, all companies classify the greatest majority of the CEMP purchases as modified-rebuy purchases.

Regarding the distinguishing characteristic of information requirements, a consensus among the Swedish metal mining companies is attained, as they all consider that moderate to maximum information requirements are needed when conducting CEMP purchases. As to newness of the problem and consideration of new alternatives, data obtained at Terra Mining and LKAB contrast with the data obtained at Ammeberg and Boliden. In the last named two mining companies, the newness of the problem is essentially considered as low and new alternatives are seldom taken into account when purchasing CEMP. As mentioned previously in the within-case analysis, this fact is also in contrast with the theoretical framework concerning the newness of the problem and consideration of new alternatives in modified-rebuy purchases.

6.3.3.2 Other Product Specific Factors

Concerning the other product specific factors, it was found that all metal mining companies agree on perceiving time pressure as a non-influencing factor and the importance of CEMP purchases as high. Regarding the monetary value, Terra Mining and KGHM differ from the other mining companies as the value of the investment will basically not influence the composition of the buying center.

6.3.3.3 Organizational Factors

Regarding the organizational factors, it can be asserted that all mining companies are mainly production oriented, which is found to influence considerably the buying processes and buying centers of the metal mining companies when purchasing CEMP. Regarding size, it can be observed that all of the medium-sized (Ammeberg) and large companies (LKAB, Boliden, and KGHM) exert joint-decision making. Concerning the number of plants and separate operating locations, which indirectly serve as an indicator of organizational differentiation, it can be remarked that two of our cases concern differentiated organizations, with many different operating units (Boliden and KGHM) while the other three are not differentiated.
6.3.3.4 Inter-organizational Factors

In respect to the inter-organizational factors, all companies clearly classify the CEMP market as a domestic market, where a high degree of interdependency between buyers and sellers is present. Consensus is also found in what concerns the high perceived importance of CEMP. Also common among all the companies is the fact that all of them perceive high product importance as one of the factors which leads to the establishment of long-term relationships with suppliers of CEMP. Additionally, although different aspects are mentioned by the interviewees, inter-firm cooperation, delivery reliability, and ability to solve conflicts satisfactory are common advantages with long-term relationships. Finally, all the mining companies selected the same type of negotiation strategy, i.e. the problem solving type.

6.3.3.5 Environmental Factors

Political factors are referred to by three of the mining companies (Ammeberg, Terra Mining, and KGHM) as having considerable influence on the buying behavior. Ammeberg and LKAB both mentioned the political decision of nuclear power shutdown, which will indirectly lead to higher energy costs in Sweden. Ammeberg’s sensitivity in terms of it’s financial situation, which induces a personnel reduction policy, lifts the social factors of affinity as more or less the sole main employer of the area. In the Polish case, political, legal, and economic aspects are extremely important and highly interconnected.

6.4 Comparative Analysis Between the Swedish Cases and the Polish Case

This specific cross-case analysis examines if patterns of similarities or dissimilarities can, in some way, be identified among the Swedish cases in contrast to what is obtained for the Polish case.

Considering the buying process of CEMP, extensive similarities are found in the buying activities among the Swedish and the Polish cases. Hence, a match is found regarding the identification and description of the sequence of buyphases implemented among all the companies in this study, regardless of their country of origin.
In respect to the *buying center*, the major differences, which can be identified between the Polish, and the Swedish cases are:

1. The monetary value of the CEMP purchase at KGHM is found not to influence the vertical involvement, the function/departmental involvement, and the extensivity (size) dimensions of the buying center.

2. Centrality of the purchasing manager is clearly identified at KGHM, which contrasts with some of the Swedish cases where technical functions hold centrality.

3. The involvement of a centralized functional department at KGHM (agreement coordination) in the buyphase of search of suppliers and preliminary evaluation of bids contrasts with the Swedish cases, where no such functional department handling such strategic investments exists.

4. At KGHM, the technical services department (which in fact is a support/staff function) exercises the role of influencer and has a major impact on the buying decision-making, which contrasts with the Swedish cases where the functional area of production holds the major influence. Moreover, purchasing still influences the buying process in a heavier way than the production department. This clearly goes against the Swedish findings where production retains, in most cases, both the informational (i.e. the ability to control the flow of information) and departmental powers (i.e. the relative power of the department to the organization in general).

Finally, focusing on *the factors that affect the buying process and buying center*, the following differences are identified:

1. Regarding the *buying situation*, the Swedish cases of Ammeberg, LKAB, and Boliden differ from the Polish case and the theoretical framework when classifying CEMP purchases as straight-rebuys. All CEMP purchases at KGHM are classified as either new-task or modified-rebuys.

2. Consensus is attained concerning *time pressure* and *importance* of the purchase among all the metal mining companies (Swedish and Polish).

3. Regarding *monetary value*, the Polish case differs from the Swedish cases as there are no stipulated monetary platforms that will imply the involvement of higher hierarchical levels.
4. Concerning the *organizational factors* of size and differentiation, it is shown that the Polish case differs from the Swedish cases. As to size, the company is characterized as a extensive former eastern combine (with around 28,000 employees and more than 26 million tonnes of copper ore extracted) which is undergoing a major restructuring program and a privatization process. Hence, the organizational characteristics of this metal mining company are highly differentiated from the Swedish organizations. KGHM’s organization is also highly differentiated in contrast to the Swedish cases (exception made for Boliden Mineral AB).

5. In respect to the *inter-organizational* factors, a thorough consensus is attained by all the mining companies. Data obtained leads to the classification of buyer-seller relationships as interdependent. High perceived product importance leads to long-term relationships and the negotiation strategy adopted by the companies is basically the same.

6. Finally, in the Polish case, the relative importance attributed to the different *environmental* factors is found to be higher than what was observed in the Swedish cases. In a period of environmental turbulence, where the adaptation to a market-led economy is occurring at a rapid pace, economic, political and legal, as well as social factors are all perceived as extremely important by the Polish company. Another fact that can be taken into consideration is the fact that the Polish firm is apparently more constrained in buying CEMP from external manufacturers (when they don’t have representatives in Poland), due to national policy regarding the importation of goods from Western nations in order to preserve “hard currencies”.

### 6.5 Summary

During this chapter the within and cross-case analysis of this study were implemented, based on a variable-oriented strategy, for each of the embedded units of analysis of this study. First, a within-case analysis was conducted against the theoretical frame of reference of this study. Second, a cross-case analysis was performed based on the findings derived from the within-case analysis. Finally, a comparative analysis of the Swedish cases versus the Polish case was carried out.
Chapter Seven: Findings and Conclusions

7.1 Introduction

The research problem of this study has been defined as:

“How can the industrial buying behavior of Swedish and Polish metal mining companies be characterized concerning the purchase of capital equipment for mining production (CEMP)?”

Thereafter, and based on the literature survey conducted in Chapter Two, three major components of IBB were identified and subsequently served as a basis for the development of this study’s research questions:

RQ1: How can the industrial buying process of CEMP in Swedish and Polish metal mining companies be characterized?

RQ2: How can the buying center of Swedish and Polish metal mining companies be characterized when purchasing CEMP?

RQ3: Which are the most significant factors that affect the buying process and buying center in Swedish and Polish metal mining companies concerning the purchase of CEMP?

Afterwards, a theoretical frame of reference was developed and the methodological path was outlined. This study’s empirical data, the case studies, were then presented in Chapter Five. Chapter Six provided a within, a cross-case, and a comparative analysis. In the subsequent sections we will answer the posed research questions, present the findings and draw this study’s major conclusions.

7.2 Findings Relevant to the Buying Process

In respect to the first research question of this study, the empirical data obtained at the investigated metal mining companies has shown that the described buying processes of CEMP basically follow the eight buyphases proposed in the buygrid conceptual framework. The only anomaly observed regards the emphasis on negotiation as a buying activity, described as a separate phase in all organizations. In two of the cases,
Ammeberg and Terra Mining, negotiation was even subdivided in two buyphases, an initial negotiation prior to the supplier selection and a final negotiation in connection with the contractual arrangements. This observation is in agreement with other authors who have studied purchases of capital equipment (cf. Salehi-Sangari, 1991, p.214). Between the countries, more similarities than dissimilarities occur, and the buying process is viewed in a similar fashion as a series of phases that are handled subsequently in both countries.

A number of reasons underlie the relevance of negotiation in CEMP purchases. First of all, the nature of the product under consideration, capital equipment, which due to its relatively high monetary value and technological complexity, motivates the emphasis in establishing the most favorable decisions for the buying company. Another factor emphasized by all the companies, with exception to the Ammeberg case, concerns the importance of the supporting services connected with the capital equipment items (specified in the maintenance and repair agreement), which is always thoroughly contemplated and included in the final contract.

7.3 Findings Relevant to the Buying Center

Regarding the buying center, the empirical data obtained has led to the identification of a number of similarities and dissimilarities with the theoretical frame of reference.

The first aspect focused on was the composition of the buying center. The four dimensions of the buying center as proposed by Johnston and Bonoma (1982) together with the function/departmental involvement were investigated. Concerning vertical involvement, results have shown that monetary value is the major determinant when it comes to the involvement of higher hierarchical levels. In general, this is an effect emerging from formalized rules within the buying companies. Regarding the Polish case, a specific level is added, the upper-level strategic management, which is involved in two of the phases of the buying process (search for suppliers and receiving bids and preliminary evaluation). Existence of this additional level is probably due to the organizational characteristics of the KGHM’s combine, more centralized and planning-oriented, which induces the existence of a central strategic management functional area (the agreement coordination department), whose responsibilities include supporting the different production units with CEMP purchases. A similar function is not found in the Swedish metal mining companies.
Function/Departmental involvement varies between three and seven, depending on the companies’ organizational size (total number of departments). Therefore, the relative function/departmental involvement (ratio between involved and total possible number of departments in the organizations) is found to be rather constant. Most literature states that the function/departmental involvement tends to increase with the complexity of the product. In our particular study, the product category (CEMP) is highly complex, hence, variations which could be found when studying different products with different degrees of complexity will not be that evident. This study’s observations of considerable increases of function/departmental involvement (e.g. LKAB’s prototype development buying purchases) are related to situations where a large number of departments are affected by the purchase.

Extensivity is found to be highly constant regarding the majority of CEMP purchases. Only in those cases where the monetary value implicates the involvement of higher hierarchical levels does the size increase. A divergence from the theoretical framework is thus identified as the absence of influence regarding the organizational size and the extensivity of the buying center.

Connectedness has been measured in a subjective manner, however, it can be remarked that in those cases where formal and informal project groups are established, connectedness is basically high throughout all of the phases of the buying process. This can be easily predicted, as the reason that underlies the formation of project groups is usually the intent to establish closer communication links.

Regarding centrality, organizational size is apparently affecting this dimension. In the small- and medium-sized mining companies (Terra Mining and Ammeberg), the purchasing function is exercised by other than the purchasing department. In both cases, operational managers were responsible for the mines’ CEMP purchases and retained centrality.

The second aspect covered regards the roles of the buying center. Clear dominance of production is apparently not valid for Poland in contrast with the results attained at all of the Swedish mining companies. In the Swedish cases, production was found to exert the roles of initiator, influencer, and user. In the Polish case, our results are in accordance to the results obtained by Banting, Beracs and Gross (1991) in a comparative study between Hungary and Canada concerning the industrial buying process. The identified technical services department in our study corresponds to “Design and Development Engineering” in Banting et al.’s study, and both
exert the role of influencer, which is typically conducted by the production department in the Swedish cases. This is due to differences in functional responsibilities exerted by the production departments in Sweden and in Poland. Apparently in Poland, the production department is responsible for the operational functions while technical services is responsible for capital equipment’s technical specifications as well as the planning and support activities related to mining production. In the Swedish cases, the production department is responsible for carrying out both these functional responsibilities.

The third aspect concerns the influence in the buying center. Again, and in contrast to the Swedish cases, results showed that the functional department exerting the major influence in Poland due to its in-house departmental expertise and know-how was technical services. In the Swedish cases, a clear dominance of the production department is observed. In the Polish case it is also found that purchasing exerts a relatively higher influence than the purchasing department’s in the Swedish cases (when this particular function exists in the companies). This is due to the fact that, in the Polish case, purchasing retains both informational and departmental power.

Although influence has been measured in a relative way, it is apparent that different functions/departments in the buying organizations retain more influence than others during different phases of the buying process (cf. Banting, Ford, Gross and Holmes, 1985, p.143-144). However, results are not always consistent and differ between the studied buying organizations.

Consensus is attained regarding the major influence of production for the initiation of the CEMP buying process. Thereafter, the development of the technical specifications and characterization of the needed CEMP is the production department’s responsibility in the Swedish cases (with eventual aid from the engineering department). However, in the Polish case the technical services department carries out this buying activity. In Sweden, top management is involved relatively soon (when the purchases’ monetary value is considered as high) in two of the cases studied (Ammeberg and Boliden). However, influence is perceived as relatively low (i.e. more as a sign-off of the purchase).

During inquiry preparation and the search for potential vendors, purchase becomes involved and somehow assumes the responsibility for carrying out this buynphase (except for Ammeberg and Terra Mining where no such individualized function exists). In the smaller mining companies, operational managers (the maintenance manager at Ammeberg, and the
mine manager at Terra Mining) exert this function. During supplier selection and negotiations, both purchasing and production are present and exert considerable influence in the Swedish cases. In the Polish case, technical services influences instead of production, although the purchasing department also exerts considerable influence and retains both information and departmental power.

7.4 Findings Relevant to Factors Affecting the Buying Process and the Buying Center

In regard to this study’s third research question, results obtained concerning the five sets of factors considered have led to the identification of a number of similarities and discrepancies with the theoretical frame.

The first set of factors under consideration was the buying situation. Within the theoretical frame of reference, three distinguishing characteristics were selected for investigation as providing the means for categorizing the CEMP purchases as new-task, modified-rebuy, or straight-rebuy buying situations. Regarding this aspect, this study’s results are inconsistent with the theoretical framework. As mentioned previously during the discussion held when selecting the theoretical tools, more emphasis was placed on buyers perceptions of information requirements and consideration of new alternatives, than on the newness of the problem.

The newness of the problem in CEMP purchases was considered in most of the cases as medium or low. Only in a relatively low percentage of the purchases (between 10 percent and 30 percent) was the newness of the problem considered to be high. Thus, most CEMP purchases are regarded, to a great extent, as similar to other purchases that have arose in the past. With this in mind, most of the purchases would fall in the modified-rebuy category, which agrees with the study’s results.

Two reasons that underlie the low assessment of the newness of the problem are first, the function-oriented approach employed by the companies, and second, the long and relevant experience retained by those involved in the decision making. By function oriented approach it is meant that mining production is seen as a chain of functions (e.g. drilling, loading, blasting, transport, etc.), which requires capital equipment that may have different technological and complexity aspects but which is basically intended to fulfill the same functions. As an example, drilling can be

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20 Discussion provided in chapter 3, p.141.
performed by handheld equipment or with highly sophisticated computer-aided multi-boom (multiple drill-heads) machines. However in both examples, the function is basically the same, and hence newness of the problem is regarded as low. The long-term experience of the decision-makers within this line of industry is also contributing to the fact that a great deal of previous experience is accumulated and thus newness is considered to be low.

Regarding the consideration of new alternatives, results obtained at two of the Swedish cases, Ammeberg and Boliden Mineral, contrast with theory. These companies consider few alternatives when purchasing CEMP, classifying them as either modified-rebuys or new-tasks. In Boliden's case this fact is most likely due to the organizational differentiation. Several different mines (with different adaptation needs) are operated, however, centralized purchasing emphasizes cost benefits arising from standardization, and hence the consideration of new alternatives is reduced. With respect to Ammeberg, the organization strives for low-cost production, hence in those areas where new alternatives are perceived as leading to increased cost effectiveness new, potential CEMP is continuously scrutinized, whereas in other areas the consideration of new alternatives is restricted aiming at cost reductions from standardization. Concerning the results attained at Terra Mining, the effect of an on-going strategic investment phase leads to the observed results showing a high consideration of new alternatives. In LKAB's case, the high-technology orientation of the company is reflected in the high number of alternatives commonly contemplated.

As to information requirements, common results are attained at the Swedish companies as they all perceive the need of information as high regardless of categorizing the buying situation as modified-rebuy or new-task. This finding, to a certain degree, contrasts with the theoretical frame. These results can partially be explained by the already mentioned functional orientation of the CEMP purchases.

The second set of factors investigated related to the other product specific factors. Results obtained concerning time pressure and importance are common to all of the studied companies. Time pressure is perceived as a non-influential factor and this is due to the fact that all companies are including their capital equipment investments in annual investment budgets. Regarding importance, all companies perceived CEMP purchases as highly important to the companies long-term profitability. This is in line with previous considerations drawn in this study concerning the set of controllable (selection of mining equipment and technology) and
uncontrollable factors (geological environment, metal price and currency rates) which are influencing the profitability of the mining companies.\textsuperscript{21}

Monetary value is a factor whose influence is perceived differently by the companies. In the Polish case and in the smallest Swedish mining company studied (Terra Mining), monetary value is not influencing the composition of the buying center, which contrasts with results obtained in other empirical studies. This fact is probably due to the more centralized and planning-oriented organizational characteristics of the Polish company, which requires higher hierarchy involvement in decision making regardless of the investment value of the CEMP. In Terra Mining’s case, those involved in the decision-making of CEMP are always representatives from the highest hierarchy levels (upper level operating management and top management). This is due to the fact that we’re dealing with a small-sized mining company. Regarding the other cases, monetary value is found to be highly influential implying the higher hierarchy levels involvement.

The third set of factors studied concern the organizational factors of orientation, size and number of plants and separate operating locations as an indicator of organizational differentiation. It has been observed that all companies are production oriented, which greatly influences all of the three aspects covered when studying the buying center, namely composition, roles, and influence. As mentioned previously, the dominance of the production function is evident, with the exception of the Polish case, where the technical services department played a considerable role. In the Swedish cases, departmental power is clearly retained by production (i.e. the department which holds the greatest relative importance within the organizations). On the other hand, in the Polish case, the similarity with the results obtained by Banting, Beracs, and Gross (1991) is evident. In this case, “Design and Development Engineering” is equivalent in function to this study’s “Technical Services” function, which assumes a much stronger influence in the CEMP decision-making. We adopt Banting et al.’s explanation of this fact, “by noting that the technical staff traditional exerted a major role in the running of socialist enterprises” (p.109).

Regarding organizational size, in small organizations (Ammeberg) decision making was found to be autonomous, whereas in the other organizations it was joint. In contrast to results attained by other studies, extensivity is not apparently affected by organizational size. In the two smaller mining organizations investigated (Ammeberg and Terra Mining), there is not an

\textsuperscript{21} Simplified framework provided in chapter 1, figure 2, p.9.
individualized purchasing department. As previously stated, technical managers carry out the purchasing function and hold centrality.

Among the companies which can be considered as differentiated (i.e. with a considerable number of operating mines and concentrators, Boliden and KGHM), a growing trend of having a centralized purchasing entity which handles, for example, capital investments, which are considered as strategic investments is identified. Additionally, issues such as standardization of CEMP in the different mines affects certain buying activities during the buying process (e.g. limit the search for potential supply sources and/or supplier selection). Finally, in terms of the companies’ organizational charts, a clear differentiation in purchasing areas is present according to specialization areas (e.g. electrical, mechanical as individualized purchasing areas handled by it’s own purchasing specialist which holds a technical background).

Regarding the fourth set of factors, the inter-organizational factors, similar results were obtained at all the studied metal mining companies. The high-perceived product importance together with an interdependent, domesticated market where few actors are active, forms the basis for the characterization of buyer-seller relationships. In fact, all companies strive for long-term relationships where the motto of inter-firm technical cooperation and mutual development is present. The technical complexity of many of the solutions sought by the mining companies indirectly requires an interdependence from the buying and selling companies in the capital equipment manufacturing market. Perceived advantages with long-term relationships identified by the companies include, for example, inter-firm technical cooperation, risk reduction, reliability of supply, and less conflicts. All the mining companies commonly adopted the negotiation strategy of problem solving. A common aspect among the companies regards the identified trend of moving inventory towards the supplier, made explicit in the maintenance and repair agreement.

A common ingredient that needs to be included when characterizing buyer-seller relationships regards the contrasting wishes of the buyers to establish long-term relationships with their suppliers of capital equipment while a degree of independence is still desired. For example, avoidance of single-sourcing is maintained through practices such as the support of at least two alternative sources of supply. Hence, over-dependence is avoided and rivalry between potential supply sources is preferred as a way to create benefits for the buying company due to the fact that the competitors create pressures on each other to improve and bring forward better solutions.
A particular aspect which needs to be mentioned regarding the Polish mining company is the fact that a prerequisite for a CEMP manufacturing company to be considered as a potential supplier was that the company had a representative in Europe.

The fifth, and final set of factors considered in this study, concerns the environmental factors. Results obtained were of a general nature ranging from political (governmental) to economical and social. These factors were identified as those which basically set the general scenario in which the buying behavior of Swedish and Polish mining companies occur. Results obtained showed that the Polish firm is more heavily influenced by the environmental context, which in fact was expected due to the wide range of structural modifications which occur at a high pace within the Polish system at all levels (e.g. economical, political, and legal). The on-going privatization process of the Polish combine is one of the factors which most influences, directly and indirectly, the buying behavior of capital equipment at KGHM. A specific aspect, which requires attention in the Polish environment, is connected to the existence of foreign trade subsidiaries that become involved when foreign currency is at stake.

Results obtained at the Swedish firms showed a common concern of two of the mining companies on energy-related political decisions such as the nuclear power station shutdown. This is perceived as leading to a boost in the energy costs of the metal mining companies with all the related problems for the companies’ profitability. Another aspect focused at Ammeberg relates to the social concern of the mining company with its situation of almost sole local employer.

7.5 Conclusions and Managerial Implications

A number of conclusions are drawn from this study:

1. The buygrid conceptual framework has proven to be an applicable analytical tool, with the exception of the comparatively little emphasis given to negotiation as a buying activity.

2. It is paramount to investigate and understand all three components of the buying center: composition, roles, and influence. Results have shown that:
• top management becomes involved, in the Swedish cases, when the monetary value of the capital equipment is considered as high, however, decision-making power lies in the upper-level operating management
• the more high-level centralized and planning-oriented organizational characteristics of the Polish company leads to the fact that decision-making is taken to comparatively higher hierarchy levels (upper level strategic management and top management) than in the Swedish cases
• the formation of project groups and high connectedness in the buying center go hand-in-hand
• organizational size is not influencing the buying center’s extensivity
• production is the core functional area (in the Swedish cases) which holds departmental, informational, and thus decision-making power
• operational functional areas have more influence in the Swedish cases whereas in the Polish case the technical staff functions show comparable influence

3. Regarding the buying situation operationalized with the three buyclass variables (newness of the problem, search for information, and consideration of new alternatives), collected evidence indicates that there is no clear impact on the buying behavior of the mining companies. Other researchers (cf. Anderson, Chu and Weitz, 1987; McQuiston, 1989) have identified the same pattern of inconclusive impact on the buying behavior.

4. The investigated metal mining companies are highly production oriented and they all attribute great importance to CEMP purchases. Hence, the perceived impact of CEMP purchases on organizational profitability and productivity is high and is a determinant of the composition, roles, and influence of the buying center.

5. The domesticated nature of the CEMP market and the high-degree of knowledge between the buyers and sellers is determinant for the buying behavior of the metal mining organizations. Each specific CEMP purchase must be considered in terms of the buyer-seller relationship in which it is inserted. History of the relationship is of a determinant influence. However, although long-term relationships are common, intended, and valued, competition between potential supply sources is instigated.
6. To study the environmental variables is extremely important as it forms the basis for understanding the context in which the buying behavior of the mining companies occur. In this study it is shown that certain environmental aspects (e.g. energy-related political decisions) may have a major influence in the company’s profitability and hence indirectly in the companies’ buying behavior.

Finally, the results obtained from this study indicate that among the factors studied, some are found to affect the buying process and/or buying center while others are regarded as non-influential. Essentially, more factors were found to affect the buying center than the buying process. The factors under investigation were inserted on four levels (the environmental, the inter-organizational, the organization, and the product\textsuperscript{22}).

Regarding the *environmental* factors, it was found that these factors are directly affecting the profitability of the metal mining companies (exchange rates, energy policy, etc.) and thus indirectly affect the decisions to purchase CEMP. These factors characterize the general scenario in which the metal mining company is placed, but no direct affects on the buying process and buying center were found.

The *inter-organizational* factors were found to be major determinants of the metal mining companies’ buying behavior when purchasing CEMP. The domesticated nature of the CEMP market leads directly to the establishment of long-term relationships and a high degree of interdependency between buyers and sellers. It’s affect on the buying process regarding the adoption of a problem-solving negotiation strategy is supported by this study’s results.

At the *organizational* level, all the factors studied (size, orientation, and differentiation) were found to affect the buying behavior of the buying organizations. *Orientation* was found to affect, to a considerable degree, the influence and roles of the buying center, and production was identified as the core functional area within the production-oriented companies (exception being the Polish case). *Size* was found to affect autonomous versus joint decision-making while it's affect on the buying center's extensivity was not asserted. Organizational *differentiation* was found to affect the buying process, for example in phases such as search for potential supply sources (limited due to the need to comply with standardization) or supplier selection.

\textsuperscript{22} The conceptual framework is presented in chapter 3, Figure 22, p.146.
At the product level, the high importance attributed to the CEMP purchases clearly affects the extensivity and function/departmental involvement in the buying center. The technological complexity of the CEMP purchase is also connected to importance and is shown to influence the composition of the buying center. The monetary value was also found to affect the vertical involvement and the extensivity of the buying center. Time pressure was found not to affect the CEMP purchases.

This study has solely investigated five metal mining organizations at a particular point in time, hence the conclusions that can be drawn are naturally tempered by these limitations. However, the findings of this study suggest the following implications for manufacturers of capital equipment for mine production:

1. Start by establishing contacts and channel information regarding the CEMP to the mine production functional areas in Sweden. In Poland, the first approach should concern the technical services department. To create an image of high technological improvement and innovation is praised by all the mining companies.

2. Poland offers considerable opportunities for suppliers of capital equipment for mine production. However, representatives in Europe may be a prerequisite. The market penetration process may not be simple due to the complex nature of the structural changes in the Polish environment. Commitment to attain long-term relationships is an essential element.

3. The purchases of CEMP are perceived as extremely important investments for all of the mining companies investigated. An essential component of the contractual arrangements is the maintenance and repair agreement, therefore, supplying companies should strategically prepare their offers in terms of these elements. An apparent trend identified concerned the moving of the stocks towards the supplier, hence, this aspect should also be contemplated as a potential advantage in a vendor’s offer. Price was shown to be a non-determinant factor when selecting suppliers.

7.6 Suggestions for Further Research

- to investigate the nature and characterization of long-term relationships within a context where competitiveness between CEMP potential supplier sources is instigated
• to implement a more thorough study on the different aspects of the buying center, which would allow a deeper insight and knowledge on this buying behavior component which has shown itself determinant for the metal mining companies when purchases of CEMP occur

• to implement longitudinal research to examine the degree to which the manner in which, for example, patterns of influence endure or shift over time

• to extend the comparative aspect of this study by analyzing other mining companies in different countries, adding cultural factors into the conceptual frame of reference

• to extend the study to other product categories such as materials and components within the mining industry
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APPENDICES

Appendix I:
Semi-Structured Interview Guide in English

Appendix II:
Semi-Structured Interview Guide in Swedish

Appendix III:
General Description
Appendix I: Semi-Structured Interview Guide in English

**Topic 1 - General Company Characteristics**

1. What is the total number of people working for your company?

2. What's your company organization chart?  
   (Please provide information in Appendix)

3. What's the total production of the company's mines?

4. What are your company's major objectives in a short-term perspective? And in a long-term perspective?
Appendix I: Semi-Structured Interview Guide in English

Topic 2 - Purchasing Department Characteristics

1. Does your company have one purchasing department which centrally handles all purchasing for the company or does the company have several (two or more) purchasing departments located at the different production units who handle the correspondent local purchases?

2. What are the human resources allocated to the purchasing department?

3. What is their professional and educational background?
4. How long have they worked for the company?


5. What type of goods are bought by your company’s purchase department?

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td></td>
</tr>
<tr>
<td>Components</td>
<td></td>
</tr>
<tr>
<td>Standard Equipment</td>
<td></td>
</tr>
<tr>
<td>Capital equipment</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

6. Concerning the category Capital Equipment, what is the correspondent % of capital mining equipment (specific for usage in mining operations)?

   Capital mining equipment .......% 

7. What is the annual budget for the purchasing department?

If possible, provide values for the following years:

1) 1992

2) 1993

3) 1994

4) 1995

5) 1996
Appendix I: Semi-Structured Interview Guide in English

Topic 3 - Characteristics of the Capital Mining Equipment Purchase

1. Concerning the purchase of Capital Mining Equipment (CME) how would your company characterize it, in generic terms, regarding information requirements, newness of the problem, and consideration of new alternatives. Please fill in the following table with in terms of percentage of purchases:

[ Please indicate percentage of total purchase of Capital Mining Equipment that belongs to the different categories in the following table ]

<table>
<thead>
<tr>
<th>Categories</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Requirements</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>= 100%</td>
</tr>
<tr>
<td>Newness of the Problem</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>= 100%</td>
</tr>
<tr>
<td>Consideration of New Alternative</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>= 100%</td>
</tr>
</tbody>
</table>

2. Concerning the total purchases of Capital Mining Equipment (CME) please provide an estimated percentage of the following purchasing situations conducted by your company:

1. Buying capital equipment of a type not earlier purchased: %

2. Buying capital equipment which is based on a prior purchase of similar capital equipment, but differs in aspects such as quality, price, etc. and therefore includes the consideration of alternatives: %

3. Buying capital equipment as a direct replacement employing the same brand and supplier: %
**Appendix I: Semi-Structured Interview Guide in English**

**Topic 4 - Characteristics of the KGHM’s purchasing process concerning Capital Mining Equipment.**

A purchase can be seen as a sequence of steps / decision stages where different actions are taken by the company. Examples include "product related issues" (specifications, etc.), "search for potential suppliers" or "proposal solicitation". Can you please identify the "steps" in KGHM’s purchase of Capital Mining Equipment and provide a brief description of the activities connected to these steps:

Note: The number of steps varies from company to company, some may have 4 to 5 formal general steps, others up to 12.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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</tbody>
</table>

335
### Topic 5 - Identification of the Departments / Units / Functional Areas involved in the purchase of Capital Mining Equipment at KGHM.

1. Which departments in your company participate in one or more of the steps of the decision making process concerning Capital Mining Equipment?

2. Please specify in which steps of the process the different departments / units are involved:

<table>
<thead>
<tr>
<th>Steps</th>
<th>Departments involved:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>
Appendix I: Semi-Structured Interview Guide in English

3. Concerning the purchase of Capital Mining Equipment please identify the person(s) who usually...

<table>
<thead>
<tr>
<th>Position / Title</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>... initiates the purchase.</td>
<td></td>
</tr>
<tr>
<td>... takes the decision to buy.</td>
<td></td>
</tr>
<tr>
<td>... has the major influence.</td>
<td></td>
</tr>
<tr>
<td>... issues the order.</td>
<td></td>
</tr>
<tr>
<td>... handles most of the information regarding the purchase</td>
<td></td>
</tr>
<tr>
<td>... person who uses the CME.</td>
<td></td>
</tr>
</tbody>
</table>

**Topic 6 - Quotation and Supplier Selection**

1. Please indicate the prerequisites that a company should have in order to be included as a potential supplier source for a purchase of Capital Mining Equipment.
Appendix I: Semi-Structured Interview Guide in English

2. When evaluating proposals and bids from potential suppliers of Capital Mining Equipment, which are the factors that your company most takes into consideration for a final supplier selection.
**Appendix I: Semi-Structured Interview Guide in English**

**During Interview:**

Provide 2-3 Examples of recent purchases of Capital Mining Equipment and describe it in terms of:

- Product / function sought
- Stages in the Buying Process
- Buying Center: composition, involvement and influence, roles, communication, power, conflict
- Supplier selection
- Interaction Buyer-Seller
- Environmental factors
### Område 1 - Allmänna företags data

1. Totalt antal anställda i företaget?

   

2. Organisations schema för företaget?

   (Om möjligt lämna som bilaga)

3. Produktions data för företagets gruvor?

   

4. Företagets huvudsakliga mål på lång respektive kort sikt?

   

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Område 2 - Data angående företagets inköpsfunktion

Hur är företagets inköpsfunktion organiserad? Finns central och/eller lokala inköpsavdelningar? Hur är inköpsfunktionen fördelad mellan dessa?

Data angående inköp vid ............-gruvan

1. Vilka personalresurser har inköpsfunktionen?

2. Vilken bakgrund avseende arbete och utbildning har personalen?
3. Hur lång anställningstid har de i företaget / vid inköpsfunktionen?


4. Vilka typer av produkter köps av ert företag (andel av totalt inköpspris)?

<table>
<thead>
<tr>
<th>Typ</th>
<th>Andel (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Råmaterial</td>
<td>___%</td>
</tr>
<tr>
<td>Komponenter</td>
<td>___%</td>
</tr>
<tr>
<td>Standardutrustning</td>
<td>___%</td>
</tr>
<tr>
<td>Investeringsutrustning</td>
<td>___%</td>
</tr>
<tr>
<td>Tjänster</td>
<td>___%</td>
</tr>
<tr>
<td>Övrigt</td>
<td>___%</td>
</tr>
</tbody>
</table>

5. Avseende kategorin investeringsutrustning hur stor andel (i % av inköpspris) utgörs av utrustning för gruvbrytning (dvs sådan utrustning som används i produktionen innan malmen når anrikaingsverket)?

Investeringsutrustning för gruvbrytning ....___% 

6. Totala inköpsvolymer för inköpsavdelningen /Årsbudget?

<table>
<thead>
<tr>
<th>År</th>
<th>Värde</th>
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<tbody>
<tr>
<td>1) 1992</td>
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<tr>
<td>2) 1993</td>
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<td>3) 1994</td>
<td></td>
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<td>4) 1995</td>
<td></td>
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<td>5) 1996</td>
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</table>
APPENDIX II: Semi-Structured Interview Guide in Swedish

Område 3 - Data avseende inköp av investeringsutrustning för gruvbrytning

1. Angående inköp av investeringsutrustning för gruvbrytning hur fördelar sig inköpen mellan olika kategorier avseende informationsbehov, hur nytt inköpsproblemet är samt i vilken omfattning olika alternativ undersöks. Använd nedanstående tabell för att ge en översikt.

[ Ange för varje rad procentuell andel för respektive kolumn av totala inköp av investeringsutrustning för]

<table>
<thead>
<tr>
<th>Kategori</th>
<th>Litet</th>
<th>Medel</th>
<th>Stort</th>
<th>Totalt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informations behov</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>= 100%</td>
</tr>
<tr>
<td>Inköpsproblems nyhet</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>= 100%</td>
</tr>
<tr>
<td>Undersökning av olika (nya) alternativ</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>= 100%</td>
</tr>
</tbody>
</table>

2. Utifrån det totala antalet inköp som avser investeringsutrustning för gruvbrytning ange en uppskattad procentuell siffra för andelen av följande inköpssituationer:

1. Inköp av utrustning av ny typ (inga tidigare inköp):

   %

2. Inköp av utrustning av motsvarande / likartad typ som tidigare har inköpts, men där skillnader finns avseende kvalitet, pris etc. och som därför innebär att flera alternativ övertägs:

   %

3. Inköp av utrustning som utgör direkt ersättning av tidigare utrustning (samma märke / tillverkare och leverantör):

   %
Ett inköp kan ses som ett antal på varandra följande steg eller beslutssituationer där olika aktiviteter genomförs och beslut fattas. Exempel på sådana är produktrelaterade avgöranden som t.ex. "upprättande av tekniska specifikationer", "sökande efter möjliga leverantörer", "utvärdering av offerter", etc. Ange nedan de olika "steg" som ert företag genomgår i samband med ett inköp av investeringsutrustning för gruvbrytning samt ge en kort beskrivning av respektive "steg":

Anmärkning: Antalet steg kan variera från företag till företag, vissa urskiljer 4 till 5 medan andra urskiljer upp till 12.

<table>
<thead>
<tr>
<th>Steg</th>
<th>Beteckning</th>
<th>Beskrivning</th>
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</table>
**APPENDIX II: Semi-Structured Interview Guide in Swedish**

**Område 5 - Identifiering av avdelningar / enheter / funktionella områden som deltar i inköpsprocessen avseende investeringsutrustning för gruvbrytning.**

1. Vilka avdelningar inom ert företag deltar i ett eller flera steg av beslutsprocessen avseende inköp av investeringsutrustning för gruvbrytning?

<table>
<thead>
<tr>
<th>Deltagande avdelningar:</th>
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</table>
APPENDIX II: Semi-Structured Interview Guide in Swedish

3. Angående inköp av investeringsutrustning för gruvbrytning ange nedan den / de som vanligtvis ...

<table>
<thead>
<tr>
<th>Befattning / Titel</th>
<th>Avdelning</th>
</tr>
</thead>
<tbody>
<tr>
<td>... initierar inköpet.</td>
<td></td>
</tr>
<tr>
<td>... tar beslutet om inköpet.</td>
<td></td>
</tr>
<tr>
<td>... har det avgörande inflytandet.</td>
<td></td>
</tr>
<tr>
<td>... upprättar inköpsorder.</td>
<td></td>
</tr>
<tr>
<td>... hanterar / kontrollerar det mesta av informationen som berör inköpet</td>
<td></td>
</tr>
<tr>
<td>... använder utrustningen.</td>
<td></td>
</tr>
</tbody>
</table>

Område 6 - Offertförfrågan och val av leverantör

1. Vilka förutsättningar skall ett företag uppfylla för att betraktas som en möjlig leverantör vid inköp av investeringsutrustning för gruvbrytning.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
2. Vid utvärdering av offerter och anbud från möjliga leverantörer av investeringsutrustning för gruvbrytning, vilka faktorer har störst / avgörande inflytande på det slutliga valet av leverantör.
**Vid Intervju:**

Använd 2-3 exempel på (nyligen) genomförda inköp av investeringsutrustning för gruvbrytning avseende:

- Produkt / sökt funktion
- Inköpsprocessen och dess beslutssteg
- Inköpsgrupp: sammansättning, deltagande, inflytande, roller, kommunikation, makt, konflikt
- Val av leverantör
- Samverkan köpare-säljare
- Omgivningsfaktorer
Appendix III: General Description

Description of general area of interest.

The purpose of our study is to characterize the industrial buying behavior of metal mining companies concerning the purchase of capital equipment for mine production. The problem that is addressed can be summarized in the following three major questions:

What is the industrial buying decision process in mining companies concerning the purchase of capital equipment for mine production?

This question includes sub-questions concerning which decision "steps" are recognized from the recognition of a need that can be solved through a purchase until the final stages of the transaction and subsequent evaluation of the purchase from technical, economic and other viewpoints. The answers will establish the description of a process that can be regarded as some sort of a "backbone" for the following questions.

Who is involved in the purchase of capital equipment for mine production and who are the most influential in the decision process?

The description of the process that was established in the preceding question will be populated with the persons involved in the process. Sub-questions will include the roles played by functional areas and individuals. Roles will include: Deciders, Buyers, Influencers, etc. Other factors that will be concerned is communication between the participants and functional areas, the influence that individuals or functional areas will have on outcomes of decisions. Finally, dimensions of the "buying group" will be considered in terms of total number of people involved, lateral and vertical dimensions (number of hierarchical levels involved and number of functional areas involved).

Which are the most significant factors that influence the industrial buying behavior of the mining companies when purchasing capital mining equipment?

The last of the major questions will include sub-questions concerning how and why different factors will or might influence the process from question number one and the "buying group" mapped in question number two. Factors that will be considered include: Environment, Interorganizational (between companies, buyers - sellers and others), Organizational, Situation of the purchase (newness etc.), Product type, Time pressure, Perceived Risk (technical, economic, etc.), Importance and Monetary Value.
Appendix III: General Description

Allmän beskrivning av intresseområde.

Syftet med vår undersökning är att beskriva och karaktärisera industriellt inköpsbeteende hos gruvföretag avseende inköp av gruvustrutning av investeringskaraktär. De problem områden som berörs kan summeras i följande tre huvudfrågor:

Hur ser beslutsprocessen ut inom gruvföretag avseende inköp av gruvustrutning av investeringskaraktär?

Denna fråga innefattar delfrågor avseende vilka beslutssteg som förekommer från konstaterandet av att ett behov som kan lösas genom ett inköp föreligger fram till den slutliga transaktionen med efterföljande utvärdering av inköpet avseende tekniska, ekonomiska och andra aspekter.
Svaren på dessa frågor kommer att beskriva en process som kan betraktas som en ram för de följande frågorna.

Vilka deltar i inköpsprocessen avseende gruvustrutning av investeringskaraktär och vilka har mest inflytande i beslutsprocessen?

Den beskrivning av processen som blev resultatet av den föregående huvudfrågan kommer i denna huvudfråga att befolkas med de personer/representanter för olika delar inom verksamheten som deltar i processen. Delfrågor innefattar vilka roller som deltagarna i processen innehar. Med roller avses: Beslutsfattare, Inköpare, Påverkare etc. Andra faktorer som kommer att beaktas är kommunikation mellan deltagare respektive mellan funktionella områden samt det inflytande som deltagare respektive funktionella områden har på fattade beslut. Sluttiden kommer dimensionerna på ”inköpsgruppen” att beskrivas i termer av totalt antal deltagare, horisontell och vertikal utsträckning (antal organisationsnivåer respektive antal funktionella områden).

Vilka faktorer är de mest betydelsefulla vad gäller påverkan av inköpsbeteendet inom gruvföretag avseende inköp av gruvustrutning av investeringskaraktär?

Den sista av de tre huvudfrågorna innehåller delfrågor avseende hur och varför olika faktorer kommer att eller kan komma att påverka processen från huvudfråga ett respektive "inköpsgruppen" som kartlats i huvudfråga två. Faktorer som kommer att behandlas omfattar: Omgivningsfaktorer, mellan-organisationella faktorer (mellan företag, köpare - säljare och andra), organisationella faktorer, inköpsfaktorer (tidigare erfarenheter etc.), produkttyp, tidspress, upplevd risk (teknisk, ekonomisk, etc.), ???? och inköpskostnad.