Industrial Buying Behavior in the Purchasing of Maintenance, Repair, and Operation Services

Case Studies from the Scandinavian Pulp and Paper Industry

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Luleå, September 2005

Anneli Stenberg

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Abstract

This thesis has been completed at the Department of Business Administration and Social Science, Division of Industrial Marketing and e-Commerce, Luleå University of Technology. The work has been carried out at Metso Paper Service Center Sundsvall.

The aim with this thesis is to investigate the industrial buying behavior in Scandinavian pulp and paper mills. The focus in this industry, as well as in other asset-intensive industries, has shifted from buying and selling large machine installations to a more service-oriented perspective. An important part of industrial services is MRO services, and it is therefore an interesting area to investigate. The case study in this thesis has been conducted at five Swedish pulp and paper mills, considered to be representative for Metso Paper’s customers in Scandinavia. Data was collected through personal interviews with people at three different levels within each mill. The industrial buying behavior of Scandinavian pulp and paper mills when purchasing MRO services essentially corresponds to the theories about this area. The buying process follows the steps in the buy-phase model with only minor modifications. All roles in the buying center, except the gatekeeper, were detected and the most influential members were identified. The most important factor affecting the industrial buying behavior was found to be the relationships between the buyer and the seller. The purchase of MRO services differ from other types of industrial services, for instance audit services. No specific theories regarding MRO services have been found. General theories regarding industrial services are not applicable to MRO services, and therefore this is an area in which further research should be conducted.
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Chapter One: Introduction and Research Problem

This chapter will provide an introduction and background to this thesis, which will focus on the industrial buying behavior of maintenance, repair, and operation services in the pulp and paper industry. At the end of the chapter, the research problem and the research questions for this study are stated.

1.1 Introduction

According to Levitt (1969):

The new competition is not between what companies produce in their factories, but between what they add to their factory output in form of packaging, services, advertising, customer advice, financing, delivery arrangements, warehousing, and other things that people value.

This is still important in mature markets that have reached their saturation point. It is difficult to sell new physical goods in this type of market, and therefore the suppliers have to find new alternative ways if they want to keep their market shares and satisfy their customers’ needs. Another sign of the current validity of this statement is that no literature on industrial buying behavior implying otherwise has been found.

Products can be divided into three separate levels: core benefit, actual product, and augmented product. The most basic level is the core benefit, which addresses the question What is the buyer really buying? At the second level, product planners must turn the core benefit into an actual product. Finally, product planners must build an augmented product around the core benefit and actual product by offering additional consumer services and benefits (Kotler & Armstrong, 2004). This is visualized in figure 1.1.

![Figure 1.1: Three levels of product. Source: Kotler & Armstrong (2004), p. 253](image)

The literature review and database searches conducted during the work with this thesis showed no change in the fact that companies today still have to focus on the augmented product.
Czinkota and Ronkainen (2001) have the same definition of augmented product as Kotler and Armstrong (2004). They explain that augmented products can be installation, after-sale services, warranty, and delivery and credit.

Within asset-intensive industries, such as copper production and the pulp and paper\(^2\) industry, the focus has shifted towards after-sale services, for instance, preventing maintenance problems. An important part of after-sale services is maintenance, repair, and operation\(^3\) services (Laszkiewicz, 2003).

Understanding how companies and organizations behave when purchasing goods or services is of great importance, since effective marketing strategies rely on thorough knowledge about the buying behavior. According to Webster & Wind (1972a), industrial buying behavior can be defined as “the decision-making process by which formal organizations establish the need for purchase products and services and identify, evaluate, and choose among alternative brands and suppliers”.

Therefore, this study will focus on the new situation for the supplier to sell an augmented product or MRO services to customers who have already purchased machines from the supplier.

### 1.2 Background
The following sections will provide a background to the areas of industrial buying behavior, maintenance, repair, and operation services, and also the industry selected in this thesis.

#### 1.2.1 Industrial Buying Behavior
Industrial buying concerns the purchase of products and services for use in an organization’s activities (Jobber, 2001). Organizational buying behavior, or industrial buying behavior\(^4\), is the field of industrial marketing that focuses on the understanding of how companies and organizations buy goods and services (Wallström, 2002). IBB has been defined by Webster and Wind (1972a) 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”.

#### 1.2.2 Maintenance, Repair, and Operation Services
The purpose with MRO services is to ensure that all equipment – from plant machinery to automation components – run at full potential during scheduled production with the goal to reduce maintenance expenses and increase plant margins (Laszkiewicz, 2003).

Among the augmented products mentioned in section 1.1, MRO services is the most interesting area to develop for suppliers of equipment to asset-intensive customers. Here, suppliers can improve their services and create a strong connection to their customers since the expected lifetime of the machines is of considerable length. Installation, warranty, and delivery and credit are all services that work only over a short period of time, at most up to

\(^2\) Hereafter sometimes referred to as P&P.
\(^3\) Hereafter sometimes referred to as MRO.
\(^4\) In this thesis, the terms industrial buying behavior and organizational buying behavior will be used as synonyms and sometimes referred to as IBB.
two years. The machine manufacturer can gain large profits from supplying after-sale services, such as MRO services, for the whole life-span of products (Eklund, 2004).

When changing the offer from a product to a function, that is a machine with MRO services or offering MRO services to old customers with already installed machines, the decision-making process and those involved in the decision process in the buying organization might change.

1.2.3 Industry Selection and Targeting Area
As a result of the low growth rate in the P&P industry today, very few new pulp and paper lines are built in Europe and North America, and competition is therefore very tough for machine suppliers. Due to the long lifetime of the equipment, on average 20 – 30 years including upgrades and rebuilds, all large suppliers focus on the aftermarket in order to increase their profit (Eklund, 2004). It is difficult for the suppliers to shift industry since the investments in machine parks are substantial and as a result the barrier to exit is high.

The P&P industry has a long tradition in Scandinavia and several of the leading P&P companies in the world, paper producers as well as machine suppliers, are located here. These factors combined make this area particularly interesting to investigate (Metso, 2005, SCA, 2005). Many of these companies have a long tradition and have been a great asset to their surroundings during the last centuries. In both Sweden and Finland, cities have been built around the pulp and paper companies, and the companies are an important factor in the communities’ economy and welfare (Metso, 2005, Sundsvalls kommun, 2005). For instance, Sunds Bruk, the predecessor of Sunds Defibrator Industries AB, was established in Sundsvall, Sweden, in 1868. Sunds Defibrator later on became a part of Valmet and Metso was created through the merge of Valmet and Rauma in 1999. Valmet was a paper and board machine supplier, while Rauma’s operations were focused on fiber technology, rock crushing, and flow control solutions. The merge produced an equipment supplier serving the global process industry (Metso, 2005).

Metso is today a global supplier of process industry machinery and systems as well as know-how and aftermarket services. The company consists of Metso Paper, Metso Minerals, Metso Automation, and Metso Ventures. They have customers in the pulp and paper industry, rock and minerals processing, power, hydrocarbon and process industries, and panelboard production. For more information, see Appendix 1-3.

Metso Paper is the world’s leading company in pulp and papermaking equipment and processes. The company and its predecessors have had this position in Scandinavia during the last century, and during the last decades the company has expanded throughout the rest of the world. This has lead to a saturated market for large machines in Northern Europe and North America, whereas the markets in Asia, Africa, and South America are still growing (Metso, 2005). This can be seen in Appendix 2. Consequently, the P&P machine suppliers have been forced to find new ways of keeping their market shares, leading to a stronger focus on the aftermarket. One solution is to offer a wider range of services to customers, especially maintenance, repair, and operation services. It is within this area Metso Paper and its competitors have the most expertise and the largest competitive advantage (Eklund, 2005).
1.3 Research Problem
The transformation in asset-intensive industries from buying and selling mainly heavy machinery to a more service-focused perspective is of great importance today. In Scandinavia, the pulp and paper industry has always had a strong position, and therefore it is very interesting to study their changed behavior (Eklund, 2004). Based on the facts mentioned in the introduction and background above, the research problem of this master’s thesis has been chosen to be the following:

How can the industrial buying behavior of Scandinavian customers when purchasing maintenance, repair, and operating services from suppliers of large complex pulp and paper machine installations be characterized?

1.3.1 Research Questions
According to Johnston and Spekman (1982), it is essential for firms to have an understanding of how companies and organizations buy services in order to develop well-planned and executed marketing efforts. This understanding requires deeper knowledge about each of the three areas that constitute IBB; the buying process, the buying center, and the factors affecting the buying process and the buying center (Wind & Thomas, 1980). IBB is a vast and complex conception, and is therefore difficult to investigate. For that reason, the research problem has been divided into three research questions, each focusing on one of the previously mentioned elements in IBB. A full comprehension of each of these areas will lead to an understanding of the entire industrial buying behavior of a company.

1.3.1.1 Research Question One
The buying process can be described as the activities that take place from the time when a need arises leading to the purchase decision and the evaluation in between. It is a sequential process in which stages, steps, or phases can be identified (Wallström, 2002). This leads to the first research question.

How can the buying process of maintenance, repair, and operation services in Scandinavian pulp and paper companies be characterized?

1.3.1.2 Research Question Two
Wind and Thomas (1980) state that the buying center can be studied from different angles, such as the composition, roles, and influencing patterns. The participants in the buying center can change during the buying process, but the major buying roles are the same in all purchases (Johnston & Bonoma, 1981). The authors believe it is therefore important to identify different roles within the buying center and they emphasize the importance of understanding the influence in the buying center. This leads to the second research question.

How can the buying center in Scandinavian pulp and paper companies when purchasing maintenance, repair, and operation services be characterized?

1.3.1.3 Research Question Three
Several factors affect the industrial buying behavior. These factors can be divided into different categories: environmental factors, inter-organizational factors, organizational factors, interpersonal factors, individual factors, and buying situation (Webster & Wind,
1972a, Wind & Thomas, 1980). It is essential to identify these factors in order to understand the buying behavior of a company or organization. This leads to the third and final research question.

Which are the most significant factors affecting the buying process and buying center in Scandinavian pulp and paper companies when purchasing maintenance, repair, and operation services?
Chapter Two: Overview of Literature

This chapter contains an overview of literature on industrial buying behavior and maintenance, repair, and operation services.

2.1 Introduction
The literature has been chosen with respect to the research questions presented in Chapter One. The theories regarding the buying process, buying center, and affecting factors are all divided and presented in smaller parts.

2.2 Industrial Buying Behavior
Axelsson (1998) differentiates between transactional and relational buying behavior. Transactional and competitive buying behavior is referred to as “the classical buying philosophy”, and relational and cooperative buying behavior is called “the modern buying philosophy”.

<table>
<thead>
<tr>
<th>The classical buying philosophy</th>
<th>The modern buying philosophy</th>
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<tr>
<td>(Transactional and competitive directed)</td>
<td>(Relational and cooperative directed)</td>
</tr>
<tr>
<td>Many alternative suppliers (at least three)</td>
<td>One or few (or two alternative) suppliers</td>
</tr>
<tr>
<td>Exploit the potential of competition</td>
<td>Exploit the potential of cooperation</td>
</tr>
<tr>
<td>Short perspective – every purchase is seen as a new decision</td>
<td>Long-term perspective – problems will be solved within the relationship</td>
</tr>
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The philosophy is often congruent with a way of working in the company characterized by:

- Local problem solving, purchasing department solves problems related to buying
- Cooperative problem solving, buying department cooperates

The philosophy is clearly focused on something that can be summarized by the words:

| PRICE ORIENTATION | COST ORIENTATION |

Figure 2.1: Two ways of buying – a classical and a modern buying philosophy. Adapted from: Wallström (2002), p. 41

Axelsson (1998) claims that the attitudes about how companies should handle their buying have changed during the last decade, and these changes have been identified in both Sweden and the U.S. The modern buying philosophy has become widespread when it comes to attitudes about how a company “should” work. However, the classical buying philosophy still dominates the way in which most companies actually work. Which philosophy a company chooses to use depends on several factors, and there is no one right or wrong strategy. Companies can use different philosophies during different time periods. The philosophy selected may also depend on the type of services that are bought.

Wind and Thomas (1980) have suggested that industrial buying behavior can be divided into three different areas: buying process, buying center, and affecting factors. Each of these areas
consists of several parts, which can be seen in figure 2.2. The areas are in turn divided into smaller parts, making the complex concept of industrial buying behavior easier to grasp.

**Figure 2.2: Areas of industrial buying behavior. Adapted from Baptista and Forsberg (1997), p. 22**

### 2.2.1 Buying Process

Buying is not an event. Wind and Thomas (1980, p. 242) have described the industrial buying process in the following way: “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”. The elements in the buying process are, as mentioned in figure 2.2, overall buying process, identification of needs, identification of alternatives, set purchase and usage criteria, evaluate alternative buying actions, purchase decisions, and post-purchase evaluation.

#### Overall Buying Process

The goal with this model is to provide a useful technique of analysis for researchers interested in the theory of decision making as well as for business executives who may wish to review the decision making procedure of their own companies (Cyert et al., 1956).

#### Identification of Needs

The identification of needs is the initiator of the buying process, and can be originated from various sources, within or external to the buying organization (Baptista & Forsberg, 1997).

#### Identification of Alternatives

This particular aspect concerns the quotation selection process or rather the identification of alternative suppliers that are selected to submit their bidding, or alternative internal solutions. It also concerns the determination of attribute importance, which influences this process (Robinson et al., 1967). All these factors combined affect the “make or buy” decision.

#### Set Purchase and Usage Criteria

Once a set of potential suppliers is selected and the various offers/biddings are presented this phase takes place. “Set purchase and usage criteria” focuses mainly on the assessment of the relative importance of different purchase criteria (Baptista & Forsberg, 1997).
Evaluate Alternative Buying Actions
The evaluation of the offers/biddings presented by the potential suppliers takes place after an assessment of the different supplier criteria is conducted (Baptista & Forsberg, 1997).

Purchase Decision
According to Hillier (1975), “the essence of a decision is that the decision-maker should be able to exercise a conscious choice over a number of alternatives”. This stage 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 this preparation (Baptista & Forsberg, 1997).

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 supplier has performed (Baptista & Forsberg, 1997).

2.2.1.1 Buy-grid Model
The buy-grid model, developed by Robinson, Faris, and Wind (1967), consists of two parts: the buy-phase model and the buyclass. This model has been and still is frequently used to describe the industrial buying process, and has shown a high level of accuracy. The buy-phase model suggests that companies go through eight steps when making a buying decision:

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

Dwyer and Tanner (2002) have modernized this model, suggesting that companies start with problem recognition, see figure 2.3 below. They then search for alternatives, evaluate the alternatives, and select a solution which is then implemented and evaluated. The buy-grid model is a commonly used theory in marketing to understand how the buying process can be performed in different companies.
According to Robinson, Faris and Wind (1967), three factors determine the buyclass for a certain purchase: the newness of the problem, the information requirements, and the consideration of new alternatives. The three buyclasses are new task, straight rebuy, and modified rebuy. The authors define the three buyclasses in the following way:

**New task**
- A requirement or problem that has not arisen before
- Little or no relevant past buying experience to draw upon
- A great deal of information is needed
- Must seek out alternative ways of solving the problem and alternative suppliers
- Occurs infrequently – but very important to marketers because it sets the pattern for the more routine purchases that will follow
- May be anticipated and developed by creative marketing

**Straight rebuy**
- Continuing or recurring requirement, handled on a routine basis
- Usually the decision on each separate transaction is made in the purchasing department
- Formally or informally, a “list” of acceptable suppliers exists
- No supplier not on the “list” is considered
- Buyers have much relevant buying experience, and hence little new information is needed
- Appears to represent the bulk of the individual purchases within companies
- Item purchased, price paid, delivery time, etc., may vary from transaction to transaction, so long as these variations do not cause a new source of supply to be considered
Modified rebuy
- May develop from either new task or straight rebuy situations
- The requirement is continuing or recurring or it may be expanded to a significantly larger level of operations
- The buying alternatives are known, but they are CHANGED
- Some additional information is needed before decisions are made
- May arise because of outside events, such as an emergency or by the actions of marketer
- May arise internally because of new buying influences, or for potential cost reductions, potential quality improvements or potential service benefits
- Marketers who are not active suppliers try to convert the customer’s straight rebuys into modified rebuys

Jobber (2001) has simplified the definition of the buyclasses:
- New task: refers to the first time purchase of a product or input by an organization
- Modified rebuy: where a regular requirement for the type of product exists and the buying alternatives are known but sufficient changes (for instance a delivery problem) have occurred to require some alteration to the normal supply procedure
- Straight rebuy: refers to a purchase by an organization from a previous approved supplier of a previously purchased item

Each buy-phase differs in existence and duration depending on the particular buyclass. The most complex buying situation is a new task, and in this situation the initial stages are very important. A new task situation is perceived to be totally different from previous needs, and a substantial quantity of information is necessary in order to investigate different alternative ways of satisfying needs and find potential suppliers (Robinson et al., 1967).

A more comprehensive model than the one presented here was made by Johnston and Lewin in 1996. It also includes factors such as environmental characteristics, participant’s characteristics, conflict/negotiation and informational characteristics. Another model covering a wider spectrum of factors was presented by Sheth in 1973.

2.2.2 Buying Center
Robinson, Faris, and Wind (1967), were the ones to introduce the concept “buying center”, but they called it the “decision making unit”. The name “buying center” was first introduced by Webster and Wind (1972b). According to the authors Robinson, Faris and Wind (1967) “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’”. The buying center can be divided into three different parts: the composition of the buying center, roles in the buying center, and influence in the buying center (Wind & Thomas, 1980).

2.2.2.1 Dimensions of the Buying Center
The composition of the buying center includes findings regarding size, hierarchical levels, and functional areas involved. To be regarded as a member of the buying center, an individual must have participated in the communication network concerning the specific purchase under investigation.
In a study made in 1981, Johnston and Bonoma mention five dimensions of the buying center. These dimensions and their operationalization are:

- **Extensivity** (number of people from the buying center involved in the buying communication)
- **Lateral involvement** (number of departments involved in the buying center)
- **Vertical involvement** (number of authority levels that influence the communication within the buying center)
- **Connectedness** (the degree to which buying center members are linked to each other by direct communications)
- **Centrality** (the degree to which the purchasing manager acts as a center of communication within the buying center)

According to Sheth (1973), the buying decisions are not solely in the hands of the purchasing agent. Usually there are at least three departments whose members are involved in different phases of the buying process. The most common are the personnel from the purchasing, quality control, and manufacturing departments. There is considerable interaction between the individuals from the three departments continuously involved in the buying process and often they are asked to decide jointly.

Many variables can influence the composition of the buying center and these can be divided into two groups: variables related to the organizational structure and variables related to the purchase situation (Wallström, 2002). According to Johnston and Bonoma (1981), there are four variables in organizational structure that can influence the buying center. These four variables and their operationalization are:

- **Size** (annual sales in dollars)
- **Complexity** (number of divisions/subsidiaries)
- **Formalization** (percentage of the buying process that is written)
- **Centralization** (organization and operation of the purchasing function of the firm: centralized, decentralized or a combination)

Furthermore, Johnston and Bonoma (1981) also mention four variables related to the purchasing situation that can have an influence on the buying center. These variables and their operationalization are:

- **Importance** (average of entire buying center’s perceived importance on a 1 – 10 scale)
- **Complexity** (time required to complete the buying process)
- **Novelty** (buy-grid categorization: new task, modified rebuy, and straight rebuy)
- **Purchase class** (type of purchase, for example capital equipment or industrial service)

The size of the buying center differs depending on the buyclass. In straight rebuy situations the buying center normally consists of two to three members whereas in new task and in modified rebuy situations the size of the buying center is larger with three to six members (Doyle et al., 1979).

Lynn (1987) made a study on industrial buying behavior of audit services. She found that the size of the buying center for professional services is usually smaller than buying centers for industrial products. Furthermore, more individuals and groups are involved in the earlier steps
of the selection process (recommending, providing information about, and evaluating service providers) than in later ones (making final formal recommendations, and selection of firms). She also states that larger businesses have larger buying centers for services.

According to Johnston and Bonoma (1981), there are some differences between the two purchase classes of capital equipment and industrial services. Services tend to have less extensive buying centers with lower vertical involvement. Industrial marketers will understand whom they should influence and they will be able to develop a more efficient communication strategy if they have an understanding of how the buying center is composed.

2.2.2.2 Roles in the Buying Center

According to Webster and Wind (1972b), several organizational members can occupy the same role; for instance, there may be more than one influencer. Also, one individual can occupy more than one role in a given buying center, for example the purchasing agent is often both buyer and gatekeeper. The authors suggest that five roles can be identified in the buying center. These roles are:

- **Users** (those who actually use the purchased products and services)
- **Deciders** (those who have the authority to choose among alternative buying actions)
- **Influencers** (those who influence the buying process directly or indirectly by adding information or decision criteria for the evaluation of alternative buying actions)
- **Buyers** (those with formal responsibility and authority to actually perform the contractual agreements)
- **Gatekeepers** (those who control the flow of information (and materials) into the buying center)

Bonoma (1982) adds a sixth role to the buying center, the initiator. The initiator recognizes that some company problem can be solved or avoided by acquiring a product, and initiates the process.

Sheth (1973) specifies five different areas, which create differential expectations among the individuals involved in the purchasing process: background of the individuals, information sources, active search, perceptual distortion, and satisfaction with past purchases. The first and probably most significant factor is the educational background of the people involved in the purchasing process, since it often generates different professional goals and values. The task expectations may also generate conflicting perceptions of one another’s role in the organization. The personal lifestyles of the decision-makers play an important role in developing differential expectations. The second and third factors, information sources and active search, affect the buying process. Normally the purchasing agents receive much more information than the engineering and production personnel, and therefore the engineering and production personnel have less knowledge of potential suppliers and products. The fourth factor, perceptual distortion, means that each individual interprets information based on his prior knowledge and expectations. This factor is the most difficult one to measure and the research done on this area has not been connected to industrial buying behavior. However, thorough research exists on cognitive consistency to explain its presence as a natural human tendency. The fifth and last factor, satisfaction with past purchases, directly influences the person’s expectations towards that supplier or brand. It is also related to the individual’s expectation on the supplier.
The members in the buying center interact, but they are likely to have different interests and perceptions of reality and therefore conflicts might exist. Individuals have different personalities, experience of their role, motivation, cognition of the problem, and expectations. The individuals’ predispositions, preferences, and methods of making decisions will affect the final outcome (Gummesson, 1979).

2.2.2.3 Influence in the Buying Center

Johnston and Bonoma (1981) state it is quite easy to identify the buying center participants in any given purchasing situation, but it is rather difficult to understand their dynamics and power relationships. Knowing who is the most influential party in the buying center, both during each stage of the buying process and in the process as a whole, is very important. Bellizzi (1981) defines buying influence as “the formal or informal power of a person to affect others or outcomes in buying situations whether or not exerted consciously”.

Researchers have found that the purchasing department usually has less involvement in the buying of services than in the buying of goods. Results from Fearon and Bales’ (1995) study of more than 100 companies show that the purchasing department is involved in more than 50% of the total spending on goods, but just over 25% of the total spending on services.

According to Lynn (1987), the CEO, the CFO, and the chairman of the board of directors are the most influential buying center members when purchasing audit services. Less influential buying center members include other board members, individuals at a user role, and outsiders. Lynn’s result also indicates that top management is more influential in smaller businesses.

Bonoma (1982) mentions five major basis of power in the corporation:

- Reward power refers to a manager’s ability to encourage purchases by providing others with monetary, social, political, or psychological benefits
- Coercive power refers to a manager’s ability to impose punishment on others. Several people may threaten to impose punishment, but this is not the same thing as having the actual power to do it
- Attraction power refers to a person’s ability to charm or otherwise persuade people to go along with his or her preferences
- Expert power refers to a manager’s ability to get others to go along with his judgment because of real or perceived expertise in some area. The person do not have to posses these skills, it is enough that others believe he has them or are willing to respect his opinion because of accomplishments in other fields
- Status power comes from having a high position in the company. It refers to the kind of influence a president has over a first-line supervisor and is more restricted than the other power bases

2.2.3 Factors Affecting the Buying Process and the Buying Center

The major determinants of industrial buying behavior can be divided into four groups of factors. These can influence the buying decisions both through a set of variables related to the buying “task”, and a set of variables not directly related to the task at hand (Webster & Wind, 1972a). The groups of factors mentioned by the authors are:

- Environmental factors (environmental determinants of buying behavior which include physical, technological, economical, political, legal, and cultural influences)
• Organizational factors (organizational determinants of buying behavior that include technology, structure, tasks, and people)
• Interpersonal factors (interpersonal relationships among the members in the buying center, that is, interpersonal determinants of buying behavior that include different roles played by the participants, how they influence each other, and their relationships)
• Individual factors (individual characteristics of the member, including motivation, cognitive structure, personality, learning processes, and perceived roles)

In 1980, Wind and Thomas added two more groups of factors to the model presented by Webster and Wind (1972a). The added factors are:

• Inter-organizational factors (these factors include factors related to the relationship between the buying and the selling firm)
• Buying situation (the buying situation refers to the three buyclasses: new task, modified rebuy, and straight rebuy)

A graphic overview of these factors can be seen in figure 2.4.

Environmental Factors
According to Webster and Wind (1972a), environmental factors influence the buying decision process in four rather distinct ways. First, they define the availability of goods and services to the buying organization. Second, they define the general business conditions within which the firm must operate. Third, they define the values and norms that provide an important set of criteria against which to evaluate alternative buying actions. Finally, the environment provides a flow of information to the buying organization and its members concerning both task and non-task communication on the availability of goods and services, general business conditions, and values and norms.

The environmental influences on organizational buying behavior can be divided into six areas: physical, technological, economical, political, legal, and cultural factors. Physical factors are climate, geographical location and the plant and equipment with which the organization is operating at. Technological factors are communication and transportation
systems available, electronic data processing capabilities, biological and medical knowledge and practice, metals, technologies, and energy conversion techniques. Economical factors are price and wage conditions, the availability of money and credit, the strength of demand in the consumer sector, and the inventory levels in key industry sectors. Political factors include governmental activities as well as relationships among governments at various levels. Legal factors may be government regulations used to determine specification for what is bought as well as the terms of sale. Cultural factors are the values, mores, customs, habits, norms, and traditions that characterize a society (Webster & Wind, 1972a).

**Inter-organizational Factors**
Inter-organizational factors include a wide number of variables related to the inter-organizational relationships between buying and selling organizations. These variables may include size, diversity, and network configuration (Wind & Thomas, 1980).

**Organizational Factors**
Organizations are multivariate systems composed of four sets of interacting variables: tasks, structure, technology, and people. The buying task consists of the following areas: whether the buying decision is routine or requires managerial attention at all decision stages, whether demand for the product is generated within the organization or by outside forces, and whether the responsibility for purchasing is centralized or not. The buying structure of the organization has five systems that influence the nature of the buying process: communication, authority, status, rewards, and workflow. Buying technology includes the physical equipment owned and used by the organization; it also includes the programs and procedures to manage the enterprise, and the various systems that are put in place to facilitate the functioning of the organization. The people involved in the buying process are a major determinant in the organizational buying process, both as individuals and as a social group whose members interact with one another and who develop norms, sanctions, and other devices for influencing members’ behavior (Webster & Wind, 1972a).

**Interpersonal Factors**
Interpersonal factors are linked to the roles in the buying center: initiator, user, decider, influencer, buyer, and gatekeeper. A large emphasis is normally put in the rational factors as the basis for industrial buyers’ decisions. Bonoma and Zaltman (1978) are critical against this behavior, claiming that “the major factors influencing the industrial purchasing decision are social ones, not rational economic ones. Friendship and reputational factors are the two most cited by experienced managers” (op. cit. p. 215).

**Individual Factors**
Organizational behavior is the behavior of the individuals in an organizational context. Individual behavior is a function of three factors: the person’s personality, motivation, cognitive structure, and learning; his interaction with the environmental situation; and his preference structure and decision model (Webster & Wind, 1972a).

**Buying Situation**
The buying situations can be characterized as new task, modified rebuy, and straight rebuy (Robinson et al., 1967).

**2.3 Industrial Services**
Industrial services have received limited attention in most marketing texts (Jackson & Cooper, 1988). Morris and Fuller (1989) claim this lack of attention is caused by two
conceptual problems. First, the extent to which industrial services are different from industrial products has not been well established in the research. Second, there is a tendency to aggregate industrial services with services in general and previous research has mostly been focused on consumer services.

However, Jackson and Cooper (1988) state that industrial services have six characteristics:

- Specialization: Industrial services can best be characterized by their customization to their customers’ needs, especially considering production services which are often specialized on a per job basis
- Heterogeneity: The variability of services performed is of particular concern to industrial buyers
- Inseparability: The production of a service often depends on the buyer to adequately describe what is needed and is often consumed as it is produced
- Perishability: Industrial services cannot be stored. However, this varies somewhat depending on the type of service
- Intangibility: Although there are tangible aspects of most industrial services, they are intangible for the most part
- Technology: Industrial marketing is cursed/blessed with the technological nature that prevails

Specialization and technology make a service very difficult to evaluate before a purchase; therefore industrial buyers are forced to rely heavily on the selling firm for advice and assistance (Jackson & Cooper, 1988).

Morris and Fuller (1989) also describe the special characteristics of industrial services. They state that industrial services are different from industrial products in a number of ways:

- Tend to be non-convenience type services
- Are transportable
- Usually are brought to the consumer
- Involve customer contact in delivery
- Are not as conducive to mass-production or mass-marketing
- Generally do not involve the customer as an individual becoming a part of the service; that is, the service is directed at things not people
- Frequently involve expensive equipment, but also tend to be people intensive, with an emphasis on people’s capabilities, experience, and background
- Involve customers with more precise service level expectations, which are more clearly communicated to the vendor
- Involve a fairly formal buying process, with a heavy emphasis on the tangible evidence of seller’s ability to provide the service
- Involve longer term, ongoing relationships with service providers
- Demonstrate demand patterns that are somewhat more stable and predictable

Furthermore, Morris and Fuller (1989) state that industrial services can be distinguished from products in a number of significant ways. Services are intangible, consumed at the time of purchase, can not be inventoried, do not lend themselves to production economies, must be customized to individual users, and tend to be consumed in irregular patterns. It is also said that loyalty to service providers is less long term than to product providers.
According to Flanagan (1994), the single largest expense in most non-service companies is the purchasing of goods and services from outside suppliers, yet little attention or recognition is given to those who handle procurement. Axelsson (1998) states that the purchasing of services is often integrated into the whole company. He also means that the buying of services is often handled without any participation from the purchasing specialists, even though services stand for a large part, most often dominating part, of the total purchasing in a company.

Industrial services also show important similarities with industrial products. They are often technical in nature, must meet user specification, are sold to customers who place a premium on quality, directly affect user operations, and frequently encounter demand which is fairly price inelastic (Morris & Fuller, 1989).

2.3.1 Maintenance, Repair, and Operation Services

There are few theories and little literature specifically focusing on MRO services. However, since MRO services are specific types of after-sale services, which in turn are part of industrial services, theories concerning industrial services and after-sale services in general will be applied to MRO services.

Extending after-sale services as a complement to products has been identified as a key driver for growth. After-sale services may involve a wide range of services that are provided in support of the sale of products, such as product installation, maintenance, repairs, extended warranty, and replacement parts services (nPhase, 2005).

According to Schulz (2001), a survey conducted by Entek found that 15 – 40% of the indirect costs of a manufacturing facility are devoted to maintenance, with about 50% of these costs estimated to be unnecessary. Almost half of all maintenance activity is corrective in nature, and corrective maintenance is ten times more costly than predictive maintenance activities. Similarly, 25% of all maintenance is preventive, even though preventive maintenance is five times more costly than predictive maintenance, and unnecessary 50 – 60% of the times.
3 Chapter Three: Frame of Reference

In this chapter, a frame of reference for this study is selected based on the research questions and theories presented in Chapter Two.

3.1 Research Problem
In section 1.3, the following research problem was presented:

How can the industrial buying behavior of Scandinavian customers when purchasing maintenance, repair, and operating services from suppliers of large complex pulp and paper machine installations be characterized?

Based on the research problem, three research questions have been formulated. The following sections will provide a selection of theories used as a guide for data collection and analysis. Each question regards MRO services, which has affected the selection of theories.

3.2 Industrial Buying Behavior
This section regards the four main areas in this thesis: buying process, buying center, influencing factors, and MRO services.

3.2.1 Buying Process
The elements in the buying process are: overall buying process, identification of needs, identification of alternatives, set purchase and usage criteria, evaluation of alternative buying actions, purchase decisions, and post-purchase evaluation.

The buy-grid model consists of two parts: the buy-phase model and the buyclass. The buy-phase model suggests that people in an organization go through a series of steps when making a decision, beginning with problem recognition. They then search for alternatives, evaluate the alternatives, and select a solution, which is then implemented and evaluated (Dwyer & Tanner, 2002). The three factors that determine the buyclass for a certain purchase are: the newness of the problem, the information requirements, and the consideration of new alternatives. The three buyclasses are: new task, modified rebuy, and straight rebuy (Robinson et al., 1967). The buy-grid model has been commonly used since 1967, and has shown a high level of accuracy. Therefore it can still be considered valid today.

3.2.2 Buying Center
The buying center can be divided into three different areas: composition of the buying center, roles in the buying center, and influence in the buying center (Wind & Thomas, 1980).

3.2.2.1 Dimensions of the Buying Center
Only individuals who have participated in the communication network during a specific purchase may be regarded as members of the buying center. The many variables that can influence the composition of the buying center can be divided into two groups: variables related to the organizational structure and variables related to the purchase situation (Wallström, 2002). The variables in organizational structure are: size, complexity, formalization, and centralization (Johnston & Bonoma, 1981).
According to Johnston and Bonoma (1981), there are five dimensions of the buying center: extensivity, lateral involvement, vertical involvement, connectedness, and purchasing managers’ centrality.

The size of the buying center depends on two factors: the buyclass, and if the purchase concerns a product or service. The size of the buying center increases with the complexity of the buy task (Doyle et al., 1979). Buying centers for services tend to be smaller than buying centers for products (Lynn, 1987).

### 3.2.2.2 Roles in the Buying Center

According to Webster and Wind (1972b), five roles can be identified in the buying center. These roles are: users, deciders, influencers, buyers, and gatekeepers. Bonoma (1982) adds a sixth role to the buying center, the initiator. All of the roles are involved in the buying process, but their respective influence differs. The individuals’ predispositions, preferences, and methods of making decisions will affect the final outcome (Gummesson, 1979).

### 3.2.2.3 Influence in the Buying Center

Knowing who is the most influential party in the buying center, both during each stage of the buying process and in the process as a whole, is very important. Among the variables that can influence the buying center, the two most important seem to be the degree of organizational formalization and the importance of the purchase situation (Johnston & Bonoma, 1981). According to Lynn (1987), the CEO, the CFO, and the chairman of the board of directors are the most influential buying center members when purchasing audit services. The expert power, i.e. the technical expertise of an employee, is an important factor in the buying center (Bonoma, 1982).

### 3.2.3 Factors Affecting the Buying Process and the Buying Center

The major determinants of organizational buying behavior can be divided into four groups of factors (Webster & Wind, 1972a). These factors are: environmental factors, organizational factors, interpersonal factors, and individual factors. Wind and Thomas (1980) added two more groups of factors to this model: inter-organizational factors and buying situation.

### 3.3 Industrial Services

Morris and Fuller (1989) state that industrial services can be distinguished from industrial products in a number of significant ways. Services are intangible, consumed at the time of purchase, cannot be inventoried, do not lend themselves to production economies, must be customized to individual users, and tend to be consumed in irregular patterns.

According to Axelsson (1998), the purchasing of services is often integrated into the whole company. He also means that the buying of services is often handled without any participation from the purchasing specialists.

#### 3.3.1 Maintenance, Repair, and Operation Services

As mentioned in section 2.2.1, there is little literature about MRO services and therefore industrial services and after-sale services will also be evaluated.

Both Flanagan (1994) and Axelsson (1998) state that the purchasing of services is a large expense in most non-service companies. A major part of these costs are unnecessary
maintenance costs (Schultz, 2001). MRO services can be seen as a complement to other after-sale services and is important for a company’s growth (nPhase, 2005). Just like other industrial services, MRO services have six characteristics: specialization, heterogeneity, inseparability, perishability, intangibility, and technology (Jackson & Cooper, 1988).

3.4 Research Questions

The three research questions are listed below. Together with each question is a table which shows how the theories are related to the question.

3.4.1 Research Question One

How can the buying process of maintenance, repair, and operation services in Scandinavian pulp and paper companies be characterized?

Table 3.1: Conceptualization of the buying process. Adapted from Wallström (2002), p.120

<table>
<thead>
<tr>
<th>Conceptual area</th>
<th>Concept</th>
<th>Conceptualization</th>
<th>Measure used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying process</td>
<td>Buying process</td>
<td>A process with several steps or phases that a company goes through when purchasing, based on the 8-step model adapted from Dwyer and Tanner (2002)</td>
<td>Description of the buying activities undertaken by Scandinavian pulp and paper mills when purchasing services</td>
</tr>
</tbody>
</table>
### Table 3.2: Conceptualization of the buying center. Adapted from Wallström (2002), p. 122

<table>
<thead>
<tr>
<th>Conceptual area</th>
<th>Concept</th>
<th>Conceptualization</th>
<th>Measure used</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions of the buying center</strong></td>
<td>Intensity</td>
<td>The individuals who are directly related to the purchasing process</td>
<td>Identifying the individuals who are commonly involved in the purchasing of MRO services</td>
</tr>
<tr>
<td><strong>Centrality</strong></td>
<td></td>
<td>An estimation of the number of people from the buying center involved in the buying communication</td>
<td></td>
</tr>
<tr>
<td><strong>Lateral involvement</strong></td>
<td></td>
<td>An estimation of the number of departments involved in the buying center</td>
<td></td>
</tr>
<tr>
<td><strong>Vertical involvement</strong></td>
<td></td>
<td>An estimation of the number of authority levels that influence the communication within the buying center</td>
<td></td>
</tr>
<tr>
<td><strong>Connectedness</strong></td>
<td></td>
<td>An estimation of the degree to which buying center members are linked to one another by direct communications regarding the purchase</td>
<td></td>
</tr>
<tr>
<td><strong>Roles in the buying center</strong></td>
<td>Initiator</td>
<td>Identify those who recognize that some company problem can be solved or avoided by acquiring a product, and initiates the process</td>
<td></td>
</tr>
<tr>
<td><strong>Initiator</strong></td>
<td></td>
<td>An estimation of the degree to which the purchasing manager acts as a center of communication within the buying center</td>
<td></td>
</tr>
<tr>
<td><strong>Users</strong></td>
<td></td>
<td>Identify those who actually use the purchased products and services</td>
<td></td>
</tr>
<tr>
<td><strong>Deciders</strong></td>
<td></td>
<td>Identify those who have the authority to choose among alternative buying actions</td>
<td></td>
</tr>
<tr>
<td><strong>Influencer</strong></td>
<td></td>
<td>Identify those who influence the buying process directly or indirectly by adding information or decision criteria for the evaluation of alternative buying actions</td>
<td></td>
</tr>
<tr>
<td><strong>Buyer</strong></td>
<td></td>
<td>Identify those with formal responsibility and authority to actually perform the contractual agreements</td>
<td></td>
</tr>
<tr>
<td><strong>Gatekeeper</strong></td>
<td></td>
<td>Identify those who control the flow of information (and materials) into the buying center</td>
<td></td>
</tr>
<tr>
<td><strong>Influence in the buying center</strong></td>
<td>The formal or informal power of a person to affect others or outcomes in buying situations whether or not exerted consciously</td>
<td>Identification of the most influential member in the buying center (based on the respondents perceptions)</td>
<td></td>
</tr>
</tbody>
</table>
3.4.3 Research Question Three

Which are the most significant factors affecting the buying process and buying center in Scandinavian pulp and paper companies when purchasing maintenance, repair, and operation services?

Table 3.3: Conceptualization of the factors affecting the industrial buying behavior. Adapted from Wallström (2002), p. 127

<table>
<thead>
<tr>
<th>Conceptual area</th>
<th>Concept</th>
<th>Conceptualization</th>
<th>Measure used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental factors</td>
<td>The most important environmental determinants affecting buying behavior</td>
<td>An estimation of the most important environmental determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td></td>
</tr>
<tr>
<td>Inter-organizational factors</td>
<td>The most important inter-organizational determinants affecting buying behavior</td>
<td>An estimation of the most important inter-organizational determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td></td>
</tr>
<tr>
<td>Organizational factors</td>
<td>The most important organizational determinants affecting buying behavior</td>
<td>An estimation of the most important organizational determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td></td>
</tr>
<tr>
<td>Interpersonal factors</td>
<td>The most important interpersonal determinants affecting buying behavior</td>
<td>An estimation of the most important interpersonal determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td></td>
</tr>
<tr>
<td>Individual factors</td>
<td>The most important individual determinants affecting buying behavior</td>
<td>An estimation of the most important individual determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td></td>
</tr>
<tr>
<td>Buying situation</td>
<td>The buying situation’s affect on buying behavior</td>
<td>An estimation of whether or how the buying situation has an affect on the buying behavior in the purchase of MRO services</td>
<td></td>
</tr>
</tbody>
</table>
4 Chapter Four: Methodology

In this chapter, the research methods and the classification of this thesis are presented.

4.1 Research Purpose

According to Marshall and Rossman (1999), the three major purposes of research are to explore, describe, or explain the phenomenon of interest. Scientific research can be classified on the basis of either technique or functions (Zikmund, 2000). Zikmund states that there are three different strategies to choose between when conducting a research, depending on how well the problem is defined. These strategies are:

- Exploratory research: initial research conducted to clarify and define the nature of a problem.
- Descriptive research: research designed to describe characteristics of a population or phenomenon.
- Explanatory research: research conducted to identify cause-and-effect relationships among variables.

Exploratory research is commonly used to clarify ambiguous problems, or when the available knowledge is not absolute (Patel & Tebelius, 1987). According to Zikmund (2000), the purpose of the exploratory research process is a progressive narrowing of the scope of the research topic and a transformation of the discovered problems into defined ones, incorporating the specific research topic.

Descriptive research aims to provide an accurate picture of some aspects of the market environment (Aaker & Day, 1990). It is appropriate to use descriptive research when the problem is well-structured and the purpose is not to investigate cause-and-effect relations (Eriksson & Wiedersheim-Paul, 1999).

Explanatory research attempts to describe the cause-and-effect relationships between variables in a problem model (Eriksson & Wiedersheim-Paul, 1999).

The ambition with this thesis is to investigate how the industrial buying behavior of Scandinavian companies in purchasing of maintenance, repair, and operating services from suppliers of large complex pulp and paper machine installations can be characterized. In line with the research problem and research questions of this study, a descriptive research method is the most appropriate one to use. The study is also exploratory to some extent.

4.2 Research Strategy

A researcher can choose between five distinctive strategies when conducting an investigation: experiment, survey, archival analysis, history, or case study (Yin, 1994). An overview of the strategies and their characteristics can be found in table 4.1.
Table 4.1: Relevant situations for different strategies. Source: Yin (1994), p. 6

<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>

When selecting a research strategy, the purpose of the study must be taken into consideration. In this thesis, the research questions are formulated with “how”, and therefore experiment, history, and case study are possible alternatives. Since it is difficult to have control over behavioral events, history and case study are the two remaining options. In this study, the focus lies on contemporary events, and therefore case study is the most suited research strategy.

4.3 Research Approach

The research problem constitutes of a scientific approach, where the inductive or deductive way of treating the problem is decided. It also constitutes of the qualitative or quantitative method used (Holme & Solvang, 1997).

Inductive reasoning is used at the empirical level, and is the logical process of establishing a general proposition on the basis of observation of particular facts. By drawing conclusions that is only founded on empirical data, the researcher establishes theories and models that are based on a phenomenon in reality (Zikmund, 2000).

Deductive reasoning is used at the abstract conceptual level and is the logical process of deriving a conclusion from a known premise or something known to be true (Zikmund, 2000).

Qualitative studies are conducted when the researcher collects, analyzes, and interprets detailed data concerning ideas, feelings, and attitudes. The qualitative methods are often related to case studies, where the aim is to receive thorough information and in that way obtain a deep understanding for the research problem (Yin, 1994).

Quantitative research is often formalized and well-structured (Holme & Solvang, 1997). It is in general associated with the natural science model of research where data is quantitative, obtained from samples and observations seeking for relationships and patterns that can be expressed in numbers rather than words (Tull & Hawkins, 1990).

This study is based on theories about industrial buying behavior and all the research questions can be related to the theories, which make the study deductive. The purpose with this thesis is to analyze data related to attitudes and behavior. The data will be gained through case studies, and therefore the approach of the study is qualitative.
4.4 Sample Selection

We wanted to examine four to six P&P mills which would be representative for Metso Paper’s customers in Scandinavia. After consultation with Metso Paper, five mills were selected. The criteria for the selected mills were that they should differ in size and location, see figure 4.1. The distance is measured in kilometers from Metso Paper Sundsvall.

![Figure 4.1: Company selection matrix](image)

- Rottneros Utansjö: The smallest mill in the study with 143 employees. The distance to Metso Paper Sundsvall is approximately 70 kilometers. Utansjö produces pulp for sale.
- SCA Ortviken: A large mill with 930 employees. It is located only a few kilometers from Metso Paper Sundsvall. Ortviken produces both pulp and newsprint.
- SCA Östrand: A small mill with 430 employees, located approximately five kilometers north of Sundsvall. The mill produces pulp for sale, mostly to other mills within the SCA group.
- Stora Enso Hylte: A large mill with 930 employees. Hylte is located in the south of Sweden, 820 kilometers from Metso Paper Sundsvall. The mill produces both pulp and newsprint.
- Stora Enso Skoghall: The largest mill in the study with 1200 employees. Skoghall is located 560 kilometers southwest of Sundsvall. The mill produces pulp and cardboard.

According to Metso, these mills can be considered representative for their customers in the Scandinavian market. All the mills have the same basic structure and are part of larger international groups. In our selection we have covered all aspects that may differ between mills, such as size, production capacity and distance from supplier. For a map with all the mills marked, see Appendix 4.

4.4.1 Selection of Respondents

To get an overall picture of each company’s buying behavior, we wanted to interview people at three different levels: managerial, production management, and technical maintenance personnel. Since the respondents at the three levels have different experience and influencing factors we assumed they would provide different answers to our questions.
4.5 Data Collection
Data has been collected through personal interviews with people at three different levels at each company. The interview guides were designed in cooperation with both our supervisor at Luleå University of Technology as well as representatives from Metso Paper Sundsvall. The interviews were conducted in Swedish. The interview guides can be found in Appendix 5 and 6, both the Swedish version used in the interviews as well as an English translation. The companies studied in this thesis were selected by Metso Paper Sundsvall to be representative for their customers in Scandinavia.

Data can be divided into two types: primary data and secondary data (Saunders et al., 2003). Primary data is data collected by the researcher for the purpose of this study. It can be collected by observations or query techniques. Query techniques can be divided into three different approaches: surveys, personal interviews, and telephone interviews. Secondary data is data collected by someone else for a different purpose. The collection of secondary data is often cheaper and less time consuming than the collection of primary data, but the quality might be slightly lower since it is not as well adjusted for the purpose and it can be out of date.

We chose to make personal interviews since it has the advantage of interacting with the respondent and the researcher can clarify any misunderstandings by asking follow-up questions. The downside with collecting data this way is that it is very expensive and time consuming, but the advantage of having accurate and reliable primary data was more important. There are no secondary data available in this case; therefore we had to collect our own.

4.6 Validity and Reliability
The validity measures the absence of systematic measure errors. There are two types of validity, internal and external. The internal validity shows if the measuring instruments have been used correctly and if accurate theories have been used. The external validity concerns the answers, if they are trustworthy. Good validity shows if the findings really are what they appear to be, if the correct objects have been measured (Saunders et al., 2003).

The reliability measures the absence of random measure errors and its purpose is to get invariable results. Measurements should not be affected by the circumstances during which they are made. When a high reliability is reached, other researchers should come to the same conclusions when conducting the same observations at another time (Saunders et al., 2003).

To secure the validity the interview guides were reviewed by several people at Metso Paper Sundsvall as well as by our supervisor at Luleå University of Technology, to ensure that they were easy to understand and that a correct terminology was used. Five companies were selected to be representative for the whole industry. At each company, interviews were conducted with three different representatives at different levels. The respondents were given a guide to the areas the interview would cover beforehand, and had the opportunity to review the compiled answers afterwards.

To ensure a high reliability, the interviews were conducted in a calm environment. Notes were taken by both authors to minimize the loss of data. To further secure the accuracy of the data a more detailed compilation was made as soon as possible after the interviews were completed.
Chapter Five: Case Studies

In this chapter, the data collected from the case studies will be presented.

5.1 Introduction
The case study has been conducted at five different pulp and paper mills representative for Metso Paper Sundsvall’s customers. The data was collected through personal interviews, and the aim was to interview representatives at three different levels: manager, maintenance engineer and production engineer. Due to certain circumstances this was not possible in all cases. All the mills are part of larger international groups; therefore the basic organization is the same. However, all the mills have their own different organizational schedules, but since that was not the focus of this study, data has not been collected about this area. The selected mills are:

- Rottneros Utansjö
- SCA Ortviken
- SCA Östrand
- Stora Enso Hylte
- Stora Enso Skoghall

5.2 Case 1: Rottneros Utansjö

5.2.1 Background Rottneros Utansjö
Rottneros is one of the world’s leading specialist companies within development and production of pulp for sales. The production and development is done at five mills in Sweden and Spain, and Rottneros is one of the smallest P&P groups in Europe. Rottneros has market corporations in Germany and Belgium, as well as units for obtaining raw material in Latvia and Portugal. The group has approximately 850 employees and had a turnover of circa 2 400 MSEK in 2004 (Rottneros, 2005).

The mill in Utansjö, Sweden, is considered to be a small mill with no more than 143 employees. Utansjö is located approximately 70 kilometers north of Metso Paper Sundsvall. The mill was founded in 1900 and has recently (March, 2005) been modernized with a new CTMP\(^5\) line. It produces only pulp and the yearly production is 160 000 ADMt\(^6\). Utansjö’s production limit is 200 000 ADMt per year.

5.2.2 Buying Process at Rottneros Utansjö
The production department is essential since it operates the equipment. The maintenance department detects 99 % of the malfunctions. Anyone at the production or maintenance department can place an order, but a foreman usually does it. Each department supervisor has a financial responsibility and a set budget for the department. The supervisor is responsible for each order. The engineering manager decides whether the department should repair the equipment itself or if external help should be hired. He checks the storage for spare parts and searches for different suppliers. When an order has been placed, the purchasing department

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5\(^5\) Chemi-thermomechanical pulping
6\(^6\) Air-dried metric ton
handles the administrative work. At least two people have to sign the order. When making very large purchases, such as new refiners, an external project group is hired. The project manager applies for money from the Rottneros group. The basic data for decision-making is prepared at the mill, but the final decision is made at group executive level.

Evaluations are not made on a regular basis. Today, the mill does not have any routines for follow-ups. The current maintenance manager is the driving force behind the evaluations that are actually made.

Information about new products and suppliers is mostly spread through personal contacts. The person who is contacted calls a meeting with the supplier and interested parties at the mill.

Table 5.1 shows the normal buying process for MRO services. In case of larger investments the decision has to be made by an executive group. With smaller parts held in stock the production manager can place an order himself without the involvement of the purchasing department.

<table>
<thead>
<tr>
<th>Step in the buy-phase model</th>
<th>Description</th>
<th>Who does it (title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of a need</td>
<td>Error in production line</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Definition of the product-type needed</td>
<td>An MRO service is needed</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Development of detailed specifications</td>
<td>Specification of needed MRO service</td>
<td>Maintenance engineer</td>
</tr>
<tr>
<td>Search for qualified suppliers</td>
<td>Machine manufacturer or other</td>
<td>Maintenance department and/or purchasing department</td>
</tr>
<tr>
<td>Acquisition and analysis of proposals</td>
<td>Possible suppliers</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of proposals and selection of a supplier</td>
<td>Lowest price in relation to performance</td>
<td>Maintenance department and/or purchasing department</td>
</tr>
<tr>
<td>Selection of an order procedure</td>
<td>Specification of price, time, and installation</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of product performance</td>
<td>Evaluation of performance</td>
<td>Production department and maintenance department</td>
</tr>
</tbody>
</table>

5.2.3 Buying Center at Rottneros Utansjö
The composition of the buying center depends on the cost of the purchase. For smaller purchases, the department manager and the engineering manager form the buying center. For larger investments, up to ten people from different departments can be involved. However, the cost of MRO services never reaches that amount of money.
5.2.4 Factors Affecting the Buying Process and the Buying Center at Rottneros Utansjö

Competence, personnel, and money are the most important influencing factors when purchasing MRO services. Since Utansjö is a small mill, the resources in form of available personnel are also small. Therefore the mill often has to hire entrepreneurs when larger jobs are to be made.

The three representatives were asked to rank some factors regarding the purchasing of MRO services on a 1 through 10 scale, 1 being the most important factor. The result is listed in table 5.2.

Table 5.2: Ranking of factors regarding the purchasing of MRO services at Rottneros Utansjö

<table>
<thead>
<tr>
<th>Factors</th>
<th>Manager*</th>
<th>Maintenance engineer</th>
<th>Production engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low initial price</td>
<td>2</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>High availability on spare parts</td>
<td>3</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Guarantees for high machinery availability</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Set annual price</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to Metso Paper’s competence</td>
<td>5</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Avoid unplanned stops</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Delivery of spare parts within a set time</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Access to updates of machinery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guarantees on spare parts from date of installation</td>
<td>7</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Complete machine history with automatic surveillance</td>
<td>8</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

* The manager at Utansjö only wanted to rank the five most important factors.

During the interviews it was clear that the ranking was based on personal perceptions and opinions as well as facts. For example the importance of low initial price is strongly connected to the respondent’s financial responsibility. On the other hand, avoiding unplanned stops is of importance at all levels since it affects all personnel at the mill.

5.3 Case 2: SCA Ortviken

5.3.1 Background SCA Ortviken

SCA group produces hygiene products, packaging solutions and publication papers. The group is represented in 50 countries in all the continents, and has about 50 000 employees. Annual sales in 2004 were amounted to 10 billion EUR (SCA, 2005). For approximately 30 years, from about 1950 to 1987 the SCA group owned Sunds Defibrator, which later became Metso Paper (Fredriksson, 2005).

SCA Ortviken was founded in the early 1900s. It is located in Sundsvall only a few kilometers from Metso Paper Sundsvall. Today the mill has 930 employees. It produces 630 000 ADMt pulp per year and purchases 120 000 ADMt from other producers. The pulp is used to produce newsprint.
5.3.2 Buying Process at SCA Ortviken

A need is often detected by the production department, when it notices a disturbance in the production. The production department alerts the maintenance department, and together they decide what actions to take. The maintenance department at SCA Ortviken performs almost all the necessary maintenance itself, since the competence within the mill is very high. It is only in very difficult cases that they contact the supplier for expert knowledge. At SCA Ortviken, the expert is always a person from Metso Paper. The company has contracts with a number of approved entrepreneurs, a number that has decreased from over 100 to around 10 during the last years. The departments can choose freely among the approved entrepreneurs when outsourcing a job. Once an entrepreneur is chosen, the errand is handed over to the purchasing department, which coordinates the purchase. For more costly purchases, for instance a new refiner, the decision has to go further up the corporate chain. Evaluation of the purchase is made by those involved in the project.

For long-term decisions, investment and interval meetings are held four times per year. At these meetings, a three-year maintenance plan is made. The meetings are a cooperation between production and maintenance. The decisions regarding next year’s maintenance should be made no later than August this year.

The information from suppliers and entrepreneurs is received mainly through personal contact and visits. Other important sources of information are trade fairs, e-mail, regular mail, and flyers. The person who receives the information is responsible for spreading it to others that it might concern. Some information is delivered directly to the maintenance and production departments; other is delivered to the purchasing department.

Table 5.3 shows the normal buying process for MRO services at SCA Ortviken. In case of larger investments, the decision has to be made by an executive group.
Table 5.3: Performed buying process at SCA Ortviken

<table>
<thead>
<tr>
<th>Step in the buy-phase model</th>
<th>Description</th>
<th>Who does it (title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of a need</td>
<td>Error in production line</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Definition of the product-type needed</td>
<td>An MRO service is needed</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Development of detailed specifications</td>
<td>Specification of needed MRO service</td>
<td>Maintenance engineer</td>
</tr>
<tr>
<td>Search for qualified suppliers</td>
<td>Machine manufacturer or other</td>
<td>Maintenance, production, and/or purchasing department</td>
</tr>
<tr>
<td>Acquisition and analysis of proposals</td>
<td>Possible suppliers</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of proposals and selection of a supplier</td>
<td>Lowest price in relation to performance</td>
<td>Maintenance, production, and/or purchasing department</td>
</tr>
<tr>
<td>Selection of an order procedure</td>
<td>Specification of price, time, and installation</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of product performance</td>
<td>Evaluation of performance</td>
<td>Production department and maintenance department</td>
</tr>
</tbody>
</table>

5.3.3 Buying Center at SCA Ortviken
The composition of the buying center depends solely on the size of the purchase. Depending on the cost of the item or service to be purchased, the size of the buying center can vary from two to over one hundred people. The decision chain is roughly: production or maintenance personnel – production or maintenance supervisor – production or maintenance department manager – division manager pulp production – production executives – business executives – group executives. For small purchases, only the first one or two steps are involved. For larger investments, the decision has to go all the way up to the top.

5.3.4 Factors Affecting the Buying Process and the Buying Center at SCA Ortviken
The single most important influencing factor is competence. If the competence is found within the mill, Ortviken always tries to solve the problem internally. The other two important factors found influencing the buying decision are time and money. If the mill does not have the time and/or personnel to take care of the maintenance, it is outsourced to the approved entrepreneurs.

The four representatives were asked to rank some factors regarding the purchasing of MRO services on a 1 through 10 scale, 1 being the most important factor. The result is listed in table 5.4.

The respondents at Ortviken also let personal perceptions and opinions as well as facts matter when ranking the factors. All the respondents ranked avoiding unplanned stops highest, access to Metso Paper’s competence fairly high, and price quite low.
Table 5.4: Ranking of factors regarding the purchasing of MRO services at SCA Ortviken

<table>
<thead>
<tr>
<th>Factors</th>
<th>Manager</th>
<th>Maintenance engineer</th>
<th>Production engineer 1*</th>
<th>Production engineer 2*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low initial price</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>High availability on spare parts</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Guarantees for high machinery availability</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Set annual price</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Access to Metso Paper’s competence</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Avoid unplanned stops</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Delivery of spare parts within a set time</td>
<td>5</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Access to updates of machinery</td>
<td>7</td>
<td>10</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Guarantees on spare parts from date of</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>installation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete machine history with automatic</td>
<td>8</td>
<td>3</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>surveillance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* We interviewed two production engineers, one more than planned, since it turned out that he had been involved in developing a system interesting for our case.

5.4 Case 3: SCA Östrand

5.4.1 Background SCA Östrand
SCA Östrand is part of the same group as SCA Ortviken. For information about the group, see section 5.3.1.

Östrand mill was founded in 1931, and is today one of the smaller mills in the SCA group with only 430 employees. The mill is located in Timrå, a few kilometers north of Sundsvall. The yearly production is 470 000 ADMt pulp, of which the majority is sulfate and the rest is CTMP. 60 % of the production is sold to other mills within the SCA group and the rest to external companies.

5.4.2 Buying Process at SCA Östrand
The production department detects a need. The maintenance engineer initiates the process which is then forwarded to the purchasing department. Each division makes its own orders, and the purchasing department handles the administrative process. Meetings about larger investments are held four times per year. At these meetings, the maintenance engineer, production manager, automation manager, project manager, and general manager for maintenance and engineering participate. The mill executives make the decisions. The managers for production and maintenance evaluate the performance. This is done during morning meetings three times per week. Approximately 10 people participate at these meetings.

Information about new products is gained through good connections with suppliers. The mill also does some form of benchmarking to stay up-to-date with new technique. Other sources of information are trade fairs and magazines connected to the pulp and paper industry.
Table 5.5 shows the normal buying process for MRO services at SCA Östrand. For larger purchases, the decision has to be made by an executive group.

**Table 5.5: Performed buying process at SCA Östrand**

<table>
<thead>
<tr>
<th>Step in the buy-phase model</th>
<th>Description</th>
<th>Who does it (title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of a need</td>
<td>Error in production line</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Definition of the product-type needed</td>
<td>An MRO service is needed</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Development of detailed specifications</td>
<td>Specification of needed MRO service</td>
<td>Maintenance engineer</td>
</tr>
<tr>
<td>Search for qualified suppliers</td>
<td>Machine manufacturer or other</td>
<td>Maintenance department and/or purchasing department</td>
</tr>
<tr>
<td>Acquisition and analysis of proposals</td>
<td>Possible suppliers</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of proposals and selection of a supplier</td>
<td>Lowest price in relation to performance</td>
<td>Maintenance department and/or purchasing department</td>
</tr>
<tr>
<td>Selection of an order procedure</td>
<td>Specification of price, time, and installation</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of product performance</td>
<td>Evaluation of performance</td>
<td>Production department and maintenance department</td>
</tr>
</tbody>
</table>

5.4.3 Buying Center at SCA Östrand

The composition of the buying center depends on the size of the purchase. For smaller purchases, two to three people are sufficient. For larger investments, the decision may have to be made by the mill executives. The purchasing department is always involved in the buying process.

5.4.4 Factors Affecting the Buying Process and the Buying Center at SCA Östrand

Money, competence, and personnel are the three most important influencing factors when purchasing MRO services.

The three representatives were asked to rank some factors regarding the purchasing of MRO services on a 1 through 10 scale, 1 being the most important factor. The result is listed in table 5.6.

Personal perceptions and opinions as well as facts affected the respondents when ranking the factors. The three respondents had quite different answers but all of them ranked avoiding unplanned stops high and price in general low.
Table 5.6: Ranking of factors regarding the purchasing of MRO services at SCA Östrand

<table>
<thead>
<tr>
<th>Factors</th>
<th>Manager</th>
<th>Maintenance engineer</th>
<th>Production engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low initial price</td>
<td>7</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>High availability on spare parts</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Guarantees for high machinery availability</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Set annual price</td>
<td>8</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Access to Metso Paper’s competence</td>
<td>4</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Avoid unplanned stops</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Delivery of spare parts within a set time</td>
<td>6</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Access to updates of machinery</td>
<td>5</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Guarantees on spare parts from date of installation</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Complete machine history with automatic surveillance</td>
<td>9</td>
<td>9</td>
<td>4</td>
</tr>
</tbody>
</table>

5.5 Case 4: Stora Enso Hylte

5.5.1 Background Stora Enso Hylte

Stora Enso is an integrated paper, packaging and forest products company producing publication and fine papers, packaging boards and wood products, areas in which the group is a global market leader. Stora Enso sales totaled EUR 12.4 billion in 2004. The group has some 45 000 employees in more than 40 countries in five continents (Stora Enso, 2005).

Stora Enso Hylte was founded in 1910. The mill is located in the south of Sweden, 820 kilometers from Metso Paper Sundsvall. A few years ago, the mill had over 1200 employees, but today that number has decreased to 930. In 2004, the production was 800 000 tons paper (newsprint) made from pulp produced at the mill.

5.5.2 Buying Process at Stora Enso Hylte

The person who detects a need places an order and contacts the supplier to invite tenders. The tender is then approved by the maintenance engineer and thereafter sent to the purchasing department. The purchasing department contacts the supplier again and negotiates the price and specifications. The person who detects a need can be anyone from the production or maintenance departments. For smaller items kept in stock, there is a set ordering level. When the level is reached the store staff contacts the purchasing department and places an order. Each department is responsible for the technical specifications, and evaluates the suppliers and entrepreneurs. Three departments: production, maintenance, and purchasing, searches for new suppliers. The decisions regarding purchase of maintenance are often made during monthly meetings with representatives from the different departments.

Suppliers often contact the mill to present their company and products. Each department has personal contact with the suppliers and entrepreneurs. The production and maintenance departments handle the technical communication. The purchasing department handles negotiations and contracts. Information is also spread through mail, e-mail, trade fairs, and word-of-mouth.
Table 5.7 shows the normal buying process for MRO services. With smaller parts held in stock the production manager can place an order himself without the involvement of the purchasing department. In case of larger purchases, the decision has to be made by an executive group.

Table 5.7: Performed buying process at Stora Enso Hylte

<table>
<thead>
<tr>
<th>Step in the buy-phase model</th>
<th>Description</th>
<th>Who does it (title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of a need</td>
<td>Error in production line</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Definition of the product-type needed</td>
<td>An MRO service is needed</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Development of detailed specifications</td>
<td>Specification of needed MRO service</td>
<td>Maintenance engineer</td>
</tr>
<tr>
<td>Search for qualified suppliers</td>
<td>Machine manufacturer or other</td>
<td>Maintenance, production, and/or purchasing department</td>
</tr>
<tr>
<td>Acquisition and analysis of proposals</td>
<td>Possible suppliers</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of proposals and selection of a supplier</td>
<td>Lowest price in relation to performance</td>
<td>Maintenance department and/or purchasing department</td>
</tr>
<tr>
<td>Selection of an order procedure</td>
<td>Specification of price, time, and installation</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of product performance</td>
<td>Evaluation of performance</td>
<td>Production department and maintenance department</td>
</tr>
</tbody>
</table>

5.5.3 Buying Center at Stora Enso Hylte

The composition of the buying center depends on the costs. Each level within the organization has the right to authorize invoices up to a certain amount. The larger the cost, the more people are involved in the buying process. For smaller items, there are normally only two people involved: maintenance engineer and maintenance supervisor. For larger items, production engineer, maintenance engineer, maintenance supervisor, and production manager constitute the buying center. The purchasing department is also involved. It handles service agreements, contracts, and searches for new alternative suppliers.

5.5.4 Factors Affecting the Buying Process and the Buying Center at Stora Enso Hylte

Competence and money are the two most important influencing factors when purchasing maintenance. Time is also important, but since Stora Enso Hylte is a rather large mill they can afford to have a break-down on one refiner for a couple of hours without any production loss.

The four representatives were asked to rank some factors regarding the purchasing of MRO services on a 1 through 10 scale, 1 being the most important factor. The result is listed in table 5.8.
Table 5.8: Ranking of factors regarding the purchasing of MRO services at Stora Enso Hylte

<table>
<thead>
<tr>
<th>Factors</th>
<th>Manager</th>
<th>Maintenance engineers*</th>
<th>Production engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low initial price</td>
<td>3</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>High availability on spare parts</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Guarantees for high machinery availability</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Set annual price</td>
<td>6</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Access to Metso Paper’s competence</td>
<td>7</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Avoid unplanned stops</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Delivery of spare parts within a set time</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Access to updates of machinery</td>
<td>10</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Guarantees on spare parts from date of install</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Complete machine history with automatic surveillance</td>
<td>9</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Function – performance*</td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

* The maintenance engineer we were suppose to interview was unavailable, so she was replaced by two male engineers who added one factor, “function-performance”.

The respondents at Hylte ranked both avoiding unplanned stops and guarantees for high machinery availability high. Personal perceptions and opinions mattered but not as much as facts.

5.6 Case 5: Stora Enso Skoghall

5.6.1 Background Stora Enso Skoghall
Stora Enso Skoghall is part of the same group as Stora Enso Hylte. For information about the group see section 5.5.1.

Stora Enso Skoghall was founded in the 1930s. It is located in the south of Sweden just outside Karlstad, 560 kilometers from Metso Paper Sundsvall. The mill has 1200 employees including research and development and plastic covering. In 2004, the production was 230 000 ADMt pulp and 665 000 tons cardboard. The pulp production limit is 250 000 ADMt per year.

5.6.2 Buying Process at Stora Enso Skoghall
Production or maintenance department detects a need for maintenance, either due to lower availability or after inspection. The maintenance department decides whether to perform the action itself or turn to an expert based on competence and time available. The manufacturer of the equipment is considered to be the expert, and external supervisors are used when needed. The department manager has a set budget for maintenance. He or she can use this budget to choose freely among the entrepreneurs approved by the mill. If a job is expected to cost more than the budget allows, a higher executive has to give permission. When an entrepreneur has been chosen, the purchasing department places the order and handles the payment. The production department evaluates the performance of the machine, and the maintenance department inspects sealings and vibrations. Each department evaluates the entrepreneurs and
manufacturers with a point system based on a number of different factors. These factors include everything from performance and quality to the level of service given by the supplier. Finally, the maintenance and production departments together create an overall image of the performed action.

Sales people from suppliers and entrepreneurs often contact representatives at the departments directly. The person who receives the information is in charge of distributing it to others who may be interested in it. Other channels of information are e-mail, trade fairs, mail and flyers. Information about new products from current suppliers is often received from the supplier’s service personnel when making repairs and new installations.

Table 5.9 shows the normal buying process for MRO services at Stora Enso Skoghall. In case of larger purchases, the decision has to be made by an executive group.

<table>
<thead>
<tr>
<th>Step in the buy-phase model</th>
<th>Description</th>
<th>Who does it (title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of a need</td>
<td>Error in production line</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Definition of the product-type needed</td>
<td>An MRO service is needed</td>
<td>Production engineer</td>
</tr>
<tr>
<td>Development of detailed specifications</td>
<td>Specification of needed MRO service</td>
<td>Maintenance engineer</td>
</tr>
<tr>
<td>Search for qualified suppliers</td>
<td>Machine manufacturer or other</td>
<td>Maintenance, production, and/or purchasing department</td>
</tr>
<tr>
<td>Acquisition and analysis of proposals</td>
<td>Possible suppliers</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of proposals and selection of a supplier</td>
<td>Lowest price in relation to performance</td>
<td>Maintenance department and/or purchasing department</td>
</tr>
<tr>
<td>Selection of an order procedure</td>
<td>Specification of price, time, and installation</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>Evaluation of product performance</td>
<td>Evaluation of performance</td>
<td>Production department and maintenance department</td>
</tr>
</tbody>
</table>

5.6.3 Buying Center at Stora Enso Skoghall
Personnel from the maintenance and production departments have regular meetings every fortnight to discuss the situation at the mill. The composition of the buying center varies depending on the size of the purchase to be made. The managers of the maintenance and production departments respectively can make decisions up to a certain amount. If the purchase exceeds that limit, the decision has to be made by the production executives.

5.6.4 Factors Affecting the Buying Process and the Buying Center at Stora Enso Skoghall
The factors that influence the buying decision are time, money, competence and personnel available. Among these, the most important ones are time and personnel available. This is due
to the fact that one of the refiners, the reject refiner, is extremely sensitive and affects the whole production line. If this refiner brakes down, it is only a matter of hours before the mill starts losing big money. If there is any doubt whether or not they can solve the problem themselves, an expert is always contacted. The money spent on an expert is earned in 5 hours, whereas the minimum time for repairing this type of equipment is 6 hours.

The two representatives were asked to rank some factors regarding the purchasing of MRO services on a 1 through 10 scale, 1 being the most important factor. The result is listed in table 5.10.

Table 5.10: Ranking of factors regarding the purchasing of MRO services at Stora Enso Skoghall

<table>
<thead>
<tr>
<th>Factors</th>
<th>Ranking</th>
<th>Manager</th>
<th>Production engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low initial price</td>
<td>8</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>High availability on spare parts</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Guarantees for high machinery availability</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Set annual price</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Access to Metso Paper’s competence</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Avoid unplanned stops</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Delivery of spare parts within a set time</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Access to updates of machinery</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Guarantees on spare parts from date of installation</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Complete machine history with automatic surveillance</td>
<td>10</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

Note: The maintenance engineer we were supposed to meet could not make it to the interview.

Personal perceptions and opinions as well as facts mattered to the respondents at Skoghall. They both ranked avoiding unplanned stops, guarantees for high machinery availability and high availability on spare parts very high. Access to Metso Paper’s competence was also ranked high. Price was ranked very low.
6 Chapter Six: Analysis

In this chapter, the analysis of the case studies is presented.

6.1 Introduction
In this section the data from the case studies is analyzed and the results are discussed. The data has been collected through personal interviews, performed at three different levels at five P&P mills. Analysis of the data is done with within-case analysis as well as cross-case analysis. The within-case analysis is compared with the frame of reference, to detect any differences, and the cross-case analysis compares the cases with one another to find similarities and dissimilarities.

6.2 Within-Case Analysis
The data collected is analyzed and interpreted case by case.

6.2.1 Buying Process
A framework for the buying process has been presented earlier in this thesis. It identifies eight steps in the buying process: recognition of a need, definition of the product-type needed, development of detailed specifications, search for qualified suppliers, acquisition and analysis of proposals, evaluation of proposals and selection of a supplier, selection of an order procedure, and evaluation of product performance. The within-case analysis has been conducted with regard to these steps.

Data collected regarding the buying process of MRO services in Scandinavian pulp and paper mills can be systematically visualized in table 6.1.

Rottneros Utansjö
The buying process at Utansjö fundamentally follows the steps in the buy-phase model. However, a clear separation between the first step “recognition of need” and the second step “definition of product type” cannot be recognized. The third step in the mill’s buying process takes a position in between the first two steps in the buy-phase model. At Utansjö the sixth step is split up into two parts. The purchasing department is more influential in the first part, “evaluation of offers”, than in the second part. The last step is not performed at Utansjö due to lack of routines and time.

SCA Ortviken
At Ortviken the first and second step in the buy-phase model is performed in the same manner as at Utansjö. The mill only has a previous approved selection of suppliers to choose from in the fourth step. The involvement from the purchasing department is more notable in the first part of the sixth step than in the second. The maintenance department performs the second part, “selection of supplier”.

SCA Östrand
Since Östrand and Ortviken is part of the same group (SCA) the buying processes at the two mills are the same. The close geographically location has resulted in a corporation in the selection of suppliers; the list of approved suppliers is the same at both mills.
### Table 6.1: Analysis of the buying process of Scandinavian P&P mills when purchasing MRO services

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recognition of a need</td>
<td>1. Identify a need</td>
<td>1. Identify a need</td>
<td>1. Identify a need</td>
<td>1. Identify a need</td>
<td>1. Identify a need</td>
</tr>
</tbody>
</table>

**Note:** X means that the mill does not perform this stage.
Stora Enso Hylte and Stora Enso Skoghall
The buying process at Hylte and Skoghall mainly follows the buy-phase model with the exception of step one and two. These steps are performed in the same way as at the other mills.

6.2.2 Buying Center
According to the frame of reference used in this study the buying center can be divided into three areas: the dimensions of the buying center, the roles in the buying center, and the influence in the buying center. All these aspects will be addressed in the following within-case analysis.

6.2.2.1 Dimensions of the Buying Center
Data collected regarding the dimensions of the buying centers can be systematically visualized in table 6.2 on the next page.

Rottneros Utansjö
Data collected at Utansjö that leads to the characterization of the dimensions of the buying center shows agreement with previous theory. Regarding vertical involvement, it is shown that when purchasing MRO services over a certain amount a higher hierarchy level is required. The size of the buying center also increases with the monetary value of the MRO service purchased.

Regarding the other dimensions, dissimilarities with the theory are identified. The connectedness between the members in Utansjö’s buying center is high throughout the entire buying process. All members are linked to one another through direct communication. The maintenance department has a central role in the buying center, and is in charge of most of the purchases needed. The purchasing department only handles the administration part, which is in contrast to what is commonly found in theory. The dimension of lateral involvement does not vary with the size of the MRO services purchased.

SCA Ortviken
The data collected at Ortviken, which leads to characterization of the dimensions of the buying center when purchasing MRO services, shows agreement with previous theory. The dimensions of vertical involvement and size vary with the monetary value of the service purchase. All MRO service purchases are handled by the maintenance and purchasing departments. All purchases, regardless of size and matter, go through the purchasing department, which has a central role.

As for the other dimensions, dissimilarities with the theory are identified. The connectedness between the members in Ortviken’s buying center is high during all stages in the buying process. All members have a direct and constant communication with one another. The dimension of lateral involvement is always the same regardless of the size of the purchase.

SCA Östrand and Stora Enso Hylte
The data collected at Östrand and Hylte gave the exact same result as for Ortviken. The only exception in the answers was for the vertical involvement at Hylte, where top management always is involved when the price of the MRO services is high.
Table 6.2: Analysis of the dimensions of the buying center in Scandinavian P&P mills

<table>
<thead>
<tr>
<th>Dimensions of the buying center</th>
<th>Measure used</th>
<th>Case 1: Utansjö</th>
<th>Case 2: Ortviken</th>
<th>Case 3: Östrand</th>
<th>Case 4: Hylte</th>
<th>Case 5: Skoghall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extensivity (size)</strong></td>
<td>Number of people from the buying center involved in the buying communication</td>
<td>2 – 5</td>
<td>3 – 5</td>
<td>3 – 5</td>
<td>3 – 5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Lateral involvement</strong></td>
<td>Number of departments involved in the buying center</td>
<td>2 Production Maintenance</td>
<td>3 Production Maintenance Purchasing</td>
<td>3 Production Maintenance Purchasing</td>
<td>3 Production Maintenance Purchasing</td>
<td>3 Production Maintenance Purchasing</td>
</tr>
<tr>
<td><strong>Vertical involvement</strong></td>
<td>Number of authority levels that influence the communication within the buying center</td>
<td>3 User Upper level operating management Top management</td>
<td>3 – 4 User Supervisor Upper level operating management (Top management)</td>
<td>3 – 4 User Supervisor Upper level operating management (Top management)</td>
<td>2 User Upper level operating management Top management</td>
<td>4 User Supervisor Upper level operating management Top management</td>
</tr>
<tr>
<td><strong>Connectedness</strong></td>
<td>The degree to which buying center members are linked to each other by direct communications</td>
<td>High during all stages</td>
<td>High during all stages</td>
<td>High during all stages</td>
<td>High during all stages</td>
<td>High during all stages</td>
</tr>
<tr>
<td><strong>Centrality</strong></td>
<td>The degree to which the purchasing manager acts as a center of communication within the buying center</td>
<td>The purchasing department’s position in the buying center is not well defined. However, the maintenance department has a central role.</td>
<td>All purchases regardless of size go through the purchasing department</td>
<td>All purchases regardless of size go through the purchasing department</td>
<td>All purchases regardless of size go through the purchasing department</td>
<td>All purchases regardless of size go through the purchasing department</td>
</tr>
</tbody>
</table>
Stora Enso Skoghall
Data collected at Skoghall concerning the purchase of MRO services shows high accordance with theories regarding the dimensions of centrality and size. All purchases regardless of size and matter go through the purchasing department. The size of the buying center increases with the size of the investment when purchasing MRO services.

Regarding the other dimensions, dissimilarities with the theory are identified. The connectedness is high during all stages in the buying process. All members in the buying center at Skoghall are linked to each other through direct communication. The dimensions of vertical involvement and lateral involvement are the same throughout the entire buying process and are not affected by the size of the purchase.

6.2.2.2 Roles in the Buying Center
Data collected regarding the roles in the buying centers can be systematically visualized in table 6.3 on the next page.

Rottneros Utansjö
Regarding the identification of the buying center roles at Utansjö, the maintenance engineer is the initiator. Production engineers and maintenance engineers can influence the purchase through their ability to add information or decision criteria into the process. The buyers are the same as the deciders. Whoever receives the information plays the role of gatekeeper. Anyone at the mill can play that role and is in charge of distributing the flow of information to the deciders. Production and maintenance departments are the users of MRO services. Deciders at Utansjö are the department manager and the engineering manager.

SCA Ortviken
At Ortviken, the maintenance engineer is the initiator. Production, maintenance and purchasing departments act as influencers. The role of buyer is played by the maintenance manager. There is no clear gatekeeper; this role is played by many different people at the mill. The users of MRO services are the production and maintenance departments. Both the maintenance supervisor and the maintenance manager play the role of the decider.

SCA Östrand
At Östrand, the initiator’s role is played by the maintenance engineer. Production, maintenance and purchasing departments act as influencers. Both the technical manager and the maintenance manager play the buyer’s role. Anyone at the mill can play the role of the gatekeeper. The production and maintenance departments are the users of MRO services and the technical manager plays the role of decider.

Stora Enso Hylte
In the case of Hylte, the maintenance engineer is both the decider and the buyer. The main influencers are the production, maintenance and purchasing departments. The initiator at Hylte is partly the same as the buyer; the role is played by both the production engineer and the maintenance engineer. The production and maintenance departments are the users. The purchasing department has an important role as gatekeeper of the mill.
### Table 6.3: Analysis of the roles in the buying center in Scandinavian P&P mills

<table>
<thead>
<tr>
<th>Roles in the buying center</th>
<th>Measure used</th>
<th>Case 1: Utansjö</th>
<th>Case 2: Ortviken</th>
<th>Case 3: Östrand</th>
<th>Case 4: Hylte</th>
<th>Case 5: Skoghall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiator</td>
<td>Person or function who initiates the process</td>
<td>Maintenance engineer</td>
<td>Maintenance engineer</td>
<td>Maintenance engineer</td>
<td>Production engineer and maintenance engineer</td>
<td>Maintenance engineer</td>
</tr>
<tr>
<td>User</td>
<td>Person or function who is the actual user of the product</td>
<td>Production and maintenance department</td>
<td>Production and maintenance department</td>
<td>Production and maintenance department</td>
<td>Production and maintenance department</td>
<td>Production and maintenance department</td>
</tr>
<tr>
<td>Decider</td>
<td>Person or function who makes the formal decision concerning vendor and product</td>
<td>Department manager and engineering manager</td>
<td>Maintenance supervisor and maintenance engineer</td>
<td>Technical manager</td>
<td>Maintenance engineer</td>
<td>Maintenance manager</td>
</tr>
<tr>
<td>Influencer</td>
<td>Person or function who “have a say” concerning the purchase</td>
<td>Production and maintenance departments</td>
<td>Production, maintenance, and purchasing departments</td>
<td>Production, maintenance, and purchasing departments</td>
<td>Production, maintenance, and purchasing departments</td>
<td>Production, maintenance, and purchasing departments</td>
</tr>
<tr>
<td>Buyer</td>
<td>Person or function who obtains the product</td>
<td>Department manager and engineering manager</td>
<td>Maintenance manager and purchasing department</td>
<td>Technical manager, maintenance manager, and purchasing department</td>
<td>Maintenance engineer and purchasing department</td>
<td>Maintenance manager, production manager, and purchasing department</td>
</tr>
<tr>
<td>Gatekeeper</td>
<td>Person or function who controls information to decision makers</td>
<td>The person who receives the information is in charge of distribution</td>
<td>The person who receives the information is in charge of distribution</td>
<td>The person who receives the information is in charge of distribution</td>
<td>The person who receives the information is in charge of distribution</td>
<td>The person who receives the information is in charge of distribution</td>
</tr>
</tbody>
</table>
Finally, at Skoghall, the maintenance engineer acts as an initiator. The production, maintenance and purchasing departments play the role of influencer. Maintenance and production managers are the buyers of MRO services. As for the position of gatekeeper, anyone has the authority to play this role. The production and maintenance departments are the users at Skoghall. The maintenance manager plays the role of decider.

6.2.2.3 Influence in the Buying Center

Data collected regarding the influencing factors in the buying centers can be systematically visualized in table 6.4.

Data obtained during the interviews showed a high consistency between all the mills. The purchasing department has a small influence in the buying of MRO services, and individuals in a user role have a very high influence in the buying center, which is all consistent with previous theory. The influence of top-level management is less significant. This is the opposite of what is stated in previous theory.
### Table 6.4: Analysis of the influence in the buying center in Scandinavian P&P mills

<table>
<thead>
<tr>
<th>Influence in the buying center</th>
<th>Measure used</th>
<th>Case 1: Utansjö</th>
<th>Case 2: Ortviken</th>
<th>Case 3: Östrand</th>
<th>Case 4: Hylte</th>
<th>Case 5: Skoghall</th>
</tr>
</thead>
<tbody>
<tr>
<td>The formal or informal power of a person to affect others or outcomes in buying situations whether or not exerted consciously</td>
<td>Identification of the most influential member in the buying center (based on respondents perceptions)</td>
<td>The maintenance department decides whether to solve the problem internal or purchase the service externally</td>
<td>Maintenance supervisor and maintenance manager decides whether to solve the problem internal or purchase the service externally</td>
<td>Technical manager decides whether to solve the problem internal or purchase the service externally</td>
<td>The maintenance engineer decides whether to solve the problem internal or purchase the service externally</td>
<td>Maintenance engineer decides whether to solve the problem internal or purchase the service externally</td>
</tr>
<tr>
<td>Department manager and engineering manager decide which supplier to use</td>
<td>Department manager and engineering manager decide which supplier to use</td>
<td>The Technical manager decides which supplier to use</td>
<td>The Technical manager decides which supplier to use</td>
<td>The technical manager decides which supplier to use</td>
<td>The maintenance engineer decides which supplier to use</td>
<td>The maintenance manager decides which supplier to use</td>
</tr>
<tr>
<td>Everyone at the mill can affect the purchase through information to the deciders</td>
<td>Everyone at the mill can affect the purchase through information to the deciders</td>
<td>Production, maintenance and purchasing departments can all affect the purchase through information to the deciders</td>
<td>Production, maintenance and purchasing departments can all affect the purchase through information to the deciders</td>
<td>Production, maintenance and purchasing departments can all affect the purchase through information to the deciders</td>
<td>Production, maintenance and purchasing departments can all affect the purchase through information to the deciders</td>
<td>Production, maintenance and purchasing departments can all affect the purchase through information to the deciders</td>
</tr>
</tbody>
</table>
6.2.3 Factors Affecting the Buying Process and the Buying Center

The factors affecting industrial buying behavior will be discussed in this section. Previous research has shown that the factors can be divided into six groups: environmental factors, inter-organizational factors, organizational factors, interpersonal factors, individual factors, and buying situation. The following within-case analysis will discuss each of these groups.

6.2.3.1 Factors Affecting the Industrial Buying Behavior

Data collected regarding the factors that affect the industrial buying behavior can be systematically visualized in Table 6.5.

Since the pulp and paper industry is very energy intense, the price of electricity is a crucial factor in the mills’ economies (Eklund, 2005). The production level is limited by governmental regulations based on location and affects the surrounding environment. However, this has no immediate effect on the purchases of MRO services.

**Rottneros Utansjö, Stora Enso Hylte, and Stora Enso Skoghall**

At Utansjö, Hylte, and Skoghall, no environmental, inter-organizational, organizational, or individual factors affecting the purchase of MRO services were found. The only interpersonal factor affecting the industrial buying behavior was the professional relationship between the people at the buying and selling firm. The relationships at these three mills are connected to a person’s position within the mill. This factor was very important to all representatives for the mills. The buying situation when purchasing MRO services affects the buying process. Due to the complexity of MRO services the purchase is always considered to be a new task or modified rebuy, and therefore all the steps in the buy-phase model are conducted.

**SCA Ortviken and SCA Östrand**

At the two mills Ortviken and Östrand, the geographic location in relation to Metso Paper Sundsvall plays an important role. Ortviken and Östrand have gained from their closeness to Metso. Both Ortviken and Östrand have very good relations with Metso Paper Sundsvall, much due to the fact that the SCA group once owned Sunds Defibrator, the predecessor to Metso Paper. But also due to the close location which has resulted in many non work-related relationships. In many cases the relationship is first and foremost at a private level. The affect of the buying situation on the buying process is the same here as previously stated. No organizational or individual factors affecting the buying behavior were found.
Table 6.5: Analysis of the factors affecting the industrial buying behavior in Scandinavian P&P mills

<table>
<thead>
<tr>
<th>Affecting factors</th>
<th>Measure used</th>
<th>Case 1: Utansjö</th>
<th>Case 2: Ortviken</th>
<th>Case 3: Östrand</th>
<th>Case 4: Hylte</th>
<th>Case 5: Skoghall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental factors</td>
<td>The most important environmental determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td>X</td>
<td>Geography</td>
<td>Geography</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inter-organizational factors</td>
<td>The most important inter-organizational determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td>X</td>
<td>Corporation</td>
<td>Corporation</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Organizational factors</td>
<td>The most important organizational determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Interpersonal factors</td>
<td>The most important interpersonal determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td>Professional</td>
<td>Personal</td>
<td>Personal</td>
<td>Professional</td>
<td>Professional</td>
</tr>
<tr>
<td>Individual factors</td>
<td>The most important individual determinants affecting industrial buying behavior in the purchase of MRO services</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Buying situation</td>
<td>Whether or how the buying situation has an effect on the buying behavior in the purchase of MRO services</td>
<td>Always new task or modified rebuy</td>
<td>Always new task or modified rebuy</td>
<td>Always new task or modified rebuy</td>
<td>Always new task or modified rebuy</td>
<td>Always new task or modified rebuy</td>
</tr>
</tbody>
</table>

Note: X means that no influence was found
6.3 Cross-Case Analysis

The cross-case analysis is based on the previous performed within-case analysis. The cross-case analysis follows the same patterns as the within-case analysis and is divided into three parts: the buying process, the buying center and factors affecting the industrial buying behavior. Differences and similarities between the cases are discussed and analyzed.

6.3.1 Buying Process

Regarding the buying process of MRO services at Scandinavian pulp and paper mills, data showed that it basically follows steps in the buy-phase model with a few minor modifications. Some of the steps where divided into smaller parts and one of the mills, Utansjö, did not perform the evaluation step. The mills within the SCA group have a list with previously approved suppliers to choose from when making purchases.

6.3.2 Buying Center

The cross-case analysis of the buying center is divided into three parts: the dimensions of the buying center, the roles in the buying center, and the influence in the buying center.

The extensivity of the buying centers is rather small, varying between two and five members. The lateral involvement does not vary considerably. All mills except for Utansjö had three departments involved in the buying process. Utansjö had only two; the purchasing department was not involved. As for the vertical involvement, significant differences were found. The number of authority levels varies from two to four. User and upper level operating management is involved at all mills. Utansjö and Hyle were the only two mills where top-management always was part of the buying center. The connectedness between the members in the buying center was found to be high during all stages in the buying process at all the mills. Regarding the centrality the purchasing department has a significant role in all cases except for Utansjö. At that mill the maintenance department has a central role.

A cross-case analysis of the roles in the buying center shows that people from the production and/or maintenance department dominate the roles in the buying center. Both purchasing department and upper-level management have very little participation in the buying centers. An interesting aspect is that all mills lack a formal gatekeeper. Due to the organizational structure, it is impossible for one single person to play the role of the gatekeeper and be in charge of all information.

The data collected shows that the most influential members in the buying centers are the production and maintenance departments. This was true for all the mills in this study.

6.3.3 Factors Affecting the Buying Process and the Buying Center

A cross-case analysis has been performed on each of the factors affecting the industrial buying behavior where influence was found. These factors are: environmental, inter-organizational, and interpersonal factors and the buying situation. The geographical distance to the supplier, in this case Metso Paper Sundsvall, was only important for the mills located close to Metso.

Both Ortviken and Östrand highly stressed the importance of having good relations with the supplier. This was the only inter-organizational factor that affected the buying process.
All the mills stated that personal relationships between individuals in the buying and selling firm are an important factor when deciding which supplier to use. This was the only interpersonal factor found.

Due to the complexity of services the purchase of services is always considered to be a new task or modified rebuy. The buying situation clearly affects the buying process, since both the numbers of steps performed in the buy-phase model and the number of individuals in the buying center increases.
Chapter Seven: Findings, Conclusions, and Recommendations

In this chapter, the findings from the within-case and cross-case analyses are presented and conclusions are drawn. In addition, suggestions for further research are made.

7.1 Introduction
Data has been collected through interviews with representatives from five pulp and paper mills in order to understand the industrial buying behavior in Scandinavian pulp and paper companies. This chapter will discuss the findings made from the within- and cross-case analysis of the data. The discussion is based on the research problem formulated in Chapter One: How can the industrial buying behavior of Scandinavian customers when purchasing maintenance, repair, and operating services from suppliers of large complex pulp and paper machine installations be characterized?

Industrial buying behavior can be divided into three areas: the buying process, the buying center, and the factors affecting the buying process and buying center. Each area is covered by one of the three research questions stated in this thesis.

7.1.1 Research Question One
How can the buying process of maintenance, repair, and operation services in Scandinavian pulp and paper companies be characterized?

7.1.2 Research Question Two
How can the buying center in Scandinavian pulp and paper companies when purchasing maintenance, repair, and operation services be characterized?

7.1.3 Research Question Three
Which are the most significant factors affecting the buying process and buying center in Scandinavian pulp and paper companies when purchasing maintenance, repair, and operation services?

This study has focused on Scandinavian pulp and paper mills’ buying behavior in the purchase of MRO services.

7.2 Findings and Conclusions
The findings and conclusions regarding the research problem and the research questions will be presented in this section. This section is divided into three different parts: buying process (Research Question One), buying center (Research Question Two), and factors affecting the buying process and the buying center (Research Question Three).

7.2.1 Findings Regarding Research Question One
Findings from this study show that the buying process at Scandinavian P&P mills basically follows the steps in the buy-phase model suggested by Dwyer and Tanner (2002). The only divergence found was that the P&P mills perform the first two steps in a different way,
combining the two and dividing them into three instead. However this is not enough to suggest a change to the buy-phase model. No differences where found based on size and distance to supplier. All P&P mills appear to follow the same buying process, except for Utansjö, which does not perform the last step “evaluation of product performance” due to lack of routine.

Since the buying process for MRO services at the selected P&P mills follows the theory for purchase of products, the buy-phase model, an assumption is made that the buying process at Scandinavian mills is the same when purchasing MRO services.

7.2.2 Findings Regarding Research Question Two
The buying center at the Scandinavian P&P mills has been investigated with respect to its dimensions, roles, and influence.

The first part focuses on the findings relating to the dimensions of the buying center. Some clear differences from the previous mentioned theory could be found. The size of the buying center does not appear to differ depending on which MRO service is purchased. The amount of the purchase however can affect the size of the buying center. The size of the buying center increases with the monetary value of the purchase. Top level management is usually not involved in the purchasing of MRO services. Whether they are involved or not depends on the size of the purchase, not on what is purchased.

The second part concerns the roles in the buying center. In the visited mills the initiator is never found at top-level. Rather the opposite, the initiator is often found at lower levels in the organization. Lower level engineers can be found in almost all the roles in the buying center. The user and the initiator is often the same person, which is natural since they are the ones operating the equipment. It has been difficult to identify a specific person that controls the information flow at the mills. Many contacts are made at personal level and therefore anyone can play the role of the gatekeeper. The purchasing departments play a very low-keyed role. They often perform the actual purchase, signing papers and administration, but are not involved in any decision making.

The last part focuses on the influence in the buying center. The maintenance department is the most influential of departments. It has a represent at almost all levels in the buying centers at the mills. The influence of top-level management is almost insignificant. Individuals in a user role on the other hand have a very high influence in the buying centers.

Findings from this study show that the composition of the buying center in Scandinavian P&P mills differ from general theories. Differences were found in all categories: dimensions in the buying center, roles in the buying center, and influence in the buying center. These differences cannot be linked to any specific factors, such as, location, age, size, or group belonging. Therefore general theories regarding the buying center may not be applied to Scandinavian P&P mills when purchasing MRO services.

7.2.3 Findings Regarding Research Question Three
The most important factor affecting the industrial buying behavior is the relationships between the buyer and the seller. This relationship can be strictly work related or based on personal acquaintance. This is an important aspect for suppliers to consider when attempting to establish long-term contact with mills. Personal contacts and connections can be as
important as having the best product/service and lowest price. In this industry all suppliers offer equal products and therefore they have to specialize in some other way, usually by close personal contacts and good relations. The supplier list used by two of the mills has great impact on the relation with the supplier. It is essential for a supplier to be on this list since at these paper mills it is the only way to be purchased from.

Depending on the person’s financial responsibility the importance of the cost of the purchase was ranked differently. People at higher level with more economical responsibility tended to rank factors as initial low price high, whereas maintenance engineers cared more about performance and guarantees. The supplier has to be aware of the financial responsibility of the different represents for the mills. Depending on which level the purchase is discussed at, different aspects have to be highlighted.

7.2.4 Conclusions Regarding the Research Problem

The industrial buying behavior of Scandinavian pulp and paper mills when purchasing MRO services basically follows the previous theories. The differences in the IBB are more related to the personality of the employees at the P&P mills that to company characteristics. The dissimilarities detected regarding the buying process and buying center are not significant enough to suggest a change to the theories.

7.3 Further Research and Recommendations

The findings from this study showed no agreement with findings concerning the purchase of audit services. The study shows that MRO services are significantly different from other types of services. It is also an area that has not been thoroughly investigated and therefore we believe that more research should be done in order to comprehend this particular type of purchase. The factors affecting the buying center may vary between the different mills as well as between the individuals at the same mill. We have not found any common nominators stating how these factors can differ, and therefore this is another area that should be further researched.
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**Internet**


**Interviews and Personal Communication**

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Fredriksson, Lars, Engineer at Metso Paper Sundsvall Service Center, 2005-08-04

Rottneros Utansjö

Nyberg, Olle, Maintenance Manager, 2005-06-08

Olsson, Stefan, Engineering Manager, 2005-06-08

Svanholm, Lars-Olov, Project Manager, 2005-06-08

SCA Ortviken

Benner, Stefan, Maintenance Supervisor, 2005-06-02

Lahtinen, Hans, Production Engineer Inspector, 2005-06-01
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Svensson, Christer, Maintenance Engineer, 2005-04-14

Åhlund, Anders, Production Manager, 2005-06-01

SCA Östrand
Björck, Gunnar, Technical Manager, 2005-06-09

Kolar, Milan, Maintenance Supervisor, 2005-06-16

Westerlund, Sven-Erik, Engineering Supervisor, 2005-06-09

Stora Enso Hylte
Carlsson, Raimo, Maintenance Supervisor, 2005-05-31

Ferman, Anders, Production Engineer, 2005-05-31

Källström, Johan, Production Engineer, 2005-05-31

Nennesson, Håkan, Maintenance Manager, 2005-05-31

Stora Enso Skoghall
Dufva, Johan, Maintenance Engineer, 2005-06-03

Johansson, Jan, Production Engineer, 2005-06-03
Appendix 1: Metso’s Global Operations

Metso has sales, offices and service units in more than 50 countries. The production facilities are located in Australia, Belgium, Brazil, Canada, Chile, China, Finland, France, Germany, India, Italy, Mexico, New Zealand, Norway, Peru, South Africa, Sweden, United Kingdom and USA.
Appendix 2: Different Regional Market Drivers

Process improvements, machine and equipment rebuilds and aftermarket operations are a growing area of focus in Europe and the United States, where less new production capacity is being built. Metso Paper is developing new products and services needed in that area. The goal is to efficiently maintain Metso’s own large installed machine base close to the customer.

In South America and Asia-Pacific, especially in China, the demand for new production capacity is growing fastest. In these areas, Metso Paper is strengthening its local capabilities and resources related to new installations.
Overview of a pulp and paper mill. The image illustrates the entire production line in a pulp and paper mill, from wood handling to paper production. The refiners can be found in the chemical pulping and mechanical pulping sections.

This picture shows a cross-section of an RGP68DD refiner. This particular refiner is a “double disc”, which means that it has two rotating discs opposite of each other.
Appendix 4: Map of Visited Mills

1. Rottneros Utansjö
2. SCA Östrand
3. Metso Paper Sundsvall
4. SCA Ortviken
5. Stora Enso Skoghall
6. Stora Enso Hylte
Appendix 5: Interview Guides in English

Interview Guide – Manager

1. How many employees does this mill have?

2. How many refiners does this mill have?
   How many are made by Metso Paper?
   How many are made by other manufacturers?

3. Are you planning to expand the machine park within the next five years?

4. What are your annual costs for maintenance?
   Please specify. How much can be related to planned and unplanned maintenance respectively.

5. Do you have any kind of service agreement today?
   With who?
   What products are included in the agreement?
   What is your opinion about the agreement?

6. Do you experience any need of condition monitoring on refiners?

The following questions regard maintenance

7. Please describe the steps in your company’s buying process for maintenance and state who is involved in each step.

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Who does it (title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of a need</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definition of the product-type needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of detailed specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Search for qualified suppliers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition and analysis of proposals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of proposals and selection of a supplier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selection of an order procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of product performance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Where are the decisions for improving maintenance made?
   On what level?

9. How do you identify a need of maintenance from the OEM supplier?

10. How do you decide whether to do the maintenance yourself or to outsource it?

11. How many people are involved in the buying process for improving maintenance?

12. Please describe the administrative process when purchasing services.

13. Is there someone in particular who controls the information flow?
14. Please rank the following factors after their importance when purchasing services. The most important factor gets number 1, the second 2 and so on.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low initial price</td>
<td></td>
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<tr>
<td>High availability on spare parts</td>
<td></td>
</tr>
<tr>
<td>Guarantees for high machinery availability</td>
<td></td>
</tr>
<tr>
<td>Set annual price</td>
<td></td>
</tr>
<tr>
<td>Access to Metso Paper’s competence</td>
<td></td>
</tr>
<tr>
<td>Avoid unplanned stops</td>
<td></td>
</tr>
<tr>
<td>Delivery of spare parts within a set time</td>
<td></td>
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<tr>
<td>Access to updates of machinery</td>
<td></td>
</tr>
<tr>
<td>Guarantees on spare parts from date of installation</td>
<td></td>
</tr>
<tr>
<td>Complete machine history with automatic surveillance</td>
<td></td>
</tr>
</tbody>
</table>

The following questions regard remote support
15. What is your opinion about remote support on refiners?

16. Do you have any system for remote support today?
   If so, what system?

17. If remote support does not exist, could you consider implementing it?

The following questions regard MRO services and maintenance
18. How do you perform your improving maintenance?
   With your own personnel or outsourcing?
   If outsourced, to who?

19. What is your opinion of outsourcing of maintenance?

20. Would you consider allowing the OEM supplier to take a larger responsibility for optimized maintenance planning?

21. Would it be of interest with an expanded service agreement with Metso Paper?
   If yes, what do you want to be included?

22. How would you like to pay for an agreement of that sort?
   Set sum per year, based on production, based on availability, etc.
Appendix 5: Interview Guides in English

Interview Guide – Maintenance Engineer

1. How many employees does the maintenance department have?

2. How many refiners does this mill have?
   How many are made by Metso Paper?
   How many are made by other manufacturers?

3. How many production lines does this mill have?

4. What is the yearly production (tons of pulp)?

5. Do you experience any need of condition monitoring on refiners?

6. How do you register unplanned stops?
   How many of the total number of stops are unplanned?

7. Do you have any key machine that affects the entire production?

8. How many hours can you handle an unplanned stop before it starts affecting your customers?

9. How much does it cost to have an unplanned production halt for one hour?

The following questions regard maintenance

10. Please describe the steps in your company’s buying process for maintenance and state who is involved in each step.

<table>
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11. Where are the decisions for improving maintenance made?
   On what level?

12. How do you identify a need of maintenance from the OEM supplier?

13. How do you decide whether to do the maintenance yourself or to outsource it?

14. How many people are involved in the buying process for improving maintenance?

15. Please describe the administrative process when purchasing services.

16. Is there someone in particular who controls the information flow?
17. Please rank the following factors after their importance when purchasing services. The most important factor gets number 1, the second 2 and so on.

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The following questions regard remote support
18. What is your opinion about remote support on refiners?

19. Do you have any system for remote support today?
   If so, what system?

20. If remote support does not exist, could you consider implementing it?

21. Do you believe that remote support can be a tool for securing the production level at refiners?

22. What parameters would be interesting to supervise?

The following questions regard MRO/maintenance
23. How do you perform your improving maintenance?
   With your own personnel or outsourcing?
   If outsourced, to who?

24. What is your opinion of outsourcing of maintenance?
Interview Guide – Production Engineer

1. How many employees does the production department have?

2. What responsibilities are connected to this department?

3. How is surveillance of bearings on refiners performed?

4. Do you experience any need of condition monitoring on refiners?

5. How do you register unplanned stops?
   - How many of the total number of stops are unplanned?

6. Do you have any key machine that affects the entire production?

7. How many hours can you handle an unplanned stop before it starts affecting your customers?

8. How much does it cost to have an unplanned production halt for one hour?

The following questions regard remote support

9. What is your opinion about remote support on refiners?

10. Do you have any system for remote support today?
    - If so, what system?

11. Do you believe that remote support can be a tool for securing the production level at refiners?

12. What parameters would be interesting to supervise?

The following questions regard services

13. Do you have any kind of service agreement on refiners today?
    - What is your opinion about it?

14. Please rank the following factors after their importance when purchasing services. The most important factor gets number 1, the second 2 and so on.

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<tr>
<td>Complete machine history with automatic surveillance</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6: Interview Guides in Swedish

Intervjuguide – Manager

1. Hur många anställda finns vid det här bruket?

2. Hur många raffinörer har ni?
   Hur många från Metso Paper?
   Hur många från andra tillverkare?

3. Planerar ni att utöka maskinparken inom de närmsta fem åren?

4. Hur stora är era årliga underhållskostnader?
   Specificera! Hur mycket kan hänföras till planerat respektive oplanerat underhåll?

5. Har ni något serviceavtal idag?
   Med vem?
   Vilka produkter omfattas av avtalet?
   Vad tycker ni om avtalet?

6. Upplever ni något behov av tillståndsövervakning på raffinörer?

Följande frågor gäller underhåll

7. Beskriv stegen i ert företags inköpsprocess för underhåll samt ange vilka som är inblandade i respektive steg.

<table>
<thead>
<tr>
<th>Steg</th>
<th>Beskrivning</th>
<th>Vem gör detta (titel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifiering av behov</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generell behovsbeskrivning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Produktbeskrivning</td>
<td></td>
<td></td>
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<tr>
<td>Sökande efter leverantörer</td>
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<tr>
<td>Anbud</td>
<td></td>
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</tr>
<tr>
<td>Val av leverantör</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orderbeskrivning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utvärdering</td>
<td></td>
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</tbody>
</table>

8. Var fattas beslutet för förbättrande underhåll? På vilken nivå?

9. Hur identifierar ni ett behov av underhåll från OEM-leverantörer?

10. Hur bestämmer ni om ni ska göra underhållet själva eller låta någon annan utföra det?

11. Hur många personer är involverade i er inköpsprocess för förbättrande underhåll?


13. Finns det någon som styr informationsflödet?

<table>
<thead>
<tr>
<th>Faktorer</th>
<th>Rankning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lågt initialt pris</td>
<td></td>
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Följande frågor gäller fjärrsupport
15. Vad anser ni om fjärrsupport av raffinörer?

16. Har ni något system för fjärrsupport idag?
   I så fall, vilket?

17. Om det inte finns fjärrsupport, kan ni tänka er att implementera det?

Följande frågor gäller MRO/underhåll
18. Hur ser ert förbättrande underhåll ut?
   Egen personal eller outsourcing?
   Om outsourcing, till vem?

19. Hur ställer ni er till outsourcing av underhåll?

20. Kan ni tänka er att låta leverantören ta ett större ansvar för optimerad underhållsplanering?

21. Skulle det vara intressant med ett utökat serviceavtal med Metso Paper?
    Vad vill ni i så fall ska ingå?

22. Hur vill ni betala för ett sådant avtal?
    Fast summa per år, baserat på produktion, baserat på tillgänglighet, etc.
Intervjuguide – Produktionschef

1. Hur många är anställda inom produktion?

2. Hur många raffinörer har ni?
   Hur många från Metso Paper?
   Hur många från andra tillverkare?

3. Hur många produktionslinjer har ni?

4. Hur stor är er årliga produktion (ton massa)?

5. Upplever ni något behov av fjärrsupport?

6. Hur registrerar ni oplanerade stopp?
   Hur stor andel av era stopp är oplanerade?

7. Har ni någon nyckelmaskin som måste vara igång konstant för att produktionen ska gå?

8. Hur lång tid klarar ni er vid ett oplanerat stopp innan det börjar påverka era kunder?

9. Hur mycket kostar det att stå stilla per timme?

Följande frågor gäller underhåll

10. Beskriv stegen i ert företags inköpsprocess för underhåll samt ange vilka som är inblandade i respektive steg.

<table>
<thead>
<tr>
<th>Steg</th>
<th>Beskrivning</th>
<th>Vem gör detta (titel)</th>
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<tbody>
<tr>
<td>Identifiering av behov</td>
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<td>Generell behovsbeskrivning</td>
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11. Var fattas besluten för förbättrande underhåll?
    På vilken nivå?

12. Hur identifierar ni ett behov av underhåll från OEM-leverantörer?

13. Hur bestämmer ni om ni ska göra underhålllet själva eller låta någon annan utföra det?

14. Hur många personer är involverade i er inköpsprocess för underhåll?

15. Beskriv den administrativa processen vid inköp.

16. Finns det någon som styr informationsflödet?
17. Ranka följande faktorer efter hur viktiga de är när ni ska köpa in tjänster. Den viktigaste faktorn får nummer 1, sedan i fallande skala ner till 10.

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Följande frågor gäller fjärrsupport av raffinörer

18. Vad anser ni om fjärrsupport av raffinörer?
19. Har ni något system för fjärrsupport idag?
   I så fall, vilket?
20. Om det inte finns fjärrsupport, kan ni tänka er att implementera det på raffinörer?
21. Skulle fjärrsupport av raffinörer kunna vara ett instrument för att säkra produktionen?
22. Vilka parametrar skulle ni då vara intresserade av att mäta?

Följande frågor gäller MRO/underhåll

23. Hur ser ert underhåll ut?
   Egen personal eller outsourcing?
   Om outsourcing, till vem?
24. Hur ställer ni er till outsourcing av allt underhåll?
Intervjuguide – Tekniker

1. Hur många är det som arbetar med underhåll?

2. Vad ingår i era arbetsuppgifter?

3. Hur sker mätningar av lager på raffinörer?

4. Upplever ni något behov av fjärrsupport?

5. Hur registrerar ni oplanerade stöp?
   Hur stor andel av era stöp är oplanerade?

6. Har ni någon nyckelmaskin som måste vara igång konstant för att produktionen ska gå?

7. Hur lång tid klarar ni er vid ett oplanerat stöp innan det börjar påverka era kunder?

8. Hur mycket kostar det att stå stilla per timme?

Följande frågor gäller fjärrsupport av raffinörer

9. Vad anser ni om fjärrsupport av raffinörer?

10. Har ni något system för fjärrsupport idag?
    I så fall, vilket?

11. Skulle fjärrsupport kunna vara ett hjälpmedel för er att säkra produktionen?

12. Vilka parametrar skulle ni då vara intresserade av att mäta?

13. Finns det något serviceavtal på raffinörer idag?
    Vad tycker ni om det?

Följande frågor gäller underhåll


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