



Master's degree thesis

LOG950 Logistics

Small Buyer Perspective on Dependence in Buyer-Supplier Relationships and Purchasing Strategy: A Case Study

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Preface

This master thesis represents my last paper work of my master's program in Supply Chain Management at Molde University College, from August 2011 to June 2013. This research was started in December of 2012 and was completed in May of 2013.

I would like to thank Professor Berit Irene Helgheim for her kind guidance and advices during the process of my thesis.

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Summary

The buyer-supplier relationships have been viewed as the part of the purchasing decisions and have received much attention in the last decades. Based on the large amount of research on buyer-supplier relationships, small buyer relationships with its suppliers have also gained some attention recently. However, the dependence research on buyer-supplier relationships for a small buying company is limited. The objective of this master thesis is to identify the small buyer dependence towards its suppliers and accordingly suggest purchasing strategies for a small buyer to handle the dependence in buyer-supplier relationships. A case study is conducted to explore the various relationships between a small buyer and its suppliers and the related dependence in practice. Four factors that determine the small buyer dependence to its suppliers are described in this thesis, which are financial magnitude, need for technological expertise, availability of alternatives, and switching costs. Different suppliers and different sources of dependence are separated through purchasing portfolio. An overall buyer-supplier relationships and dependence in each category of purchasing portfolio are identified and tested by the case study. Various purchasing strategies in terms of relationships and dependence in each category of purchasing portfolio are available to small buyers. A small buying company should be sufficiently flexible in order to identify the appropriate supplier relationship so that it can handle the dependence in such buyer-supplier relationships.

Key words: buyer-supplier relationships, dependence, purchasing portfolio, purchasing strategy, small companies

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1. Introduction

The buyer-supplier relationship has been viewed as the part of procurement decisions and has received much attention in the last decades. Many researches have revealed a dramatic change in the nature of buyer-supplier relationships that is from pure transactions to collaborative partnerships(Frederick E. Webster 1992). Which of short-term competition or long-term collaboration is the most appropriate approach to achieve a buyer's goals(Laseter 1998)? This has been a debate since the Japanese long-term collaborative procurement approaches have been praised for its success. One argument is that both buyer and supplier can benefit from transparent, long-term and collaborative relationship. The other argument is that, rather than being based on trust and equity, the Japanese practices tend to be characterized by high level of buyer dominance over suppliers (Cox 2004). It is obvious that in reality, the high volume and highly standardized demand and rich supply market in the automobile industry are not replicated in all other type of industries (Cox 2004). If the order volume is low, or the demand is unstable, or the supply market is insufficient, the buyer-supplier relationships could be different.

Power and dependence are considered to be an important concept for analyzing buyer-supplier relationships. From the buyer perspective, purchasing power can enhance effective procurement and supply management. The size of a buyer has strong influence over the power and dependence in buyer-supplier relationships. For a large buyer, it is easy to build strong relationships with its suppliers in terms of transaction specific investment, technical coordination, or supply chain integration. The purchasing power of a buying company is one of the important factors influencing the buyer-supplier relationship. The stability and order volume gives the buying company purchasing power. Thus, in general, a large and well-known buying company should have strong purchasing power to control and supervise their suppliers, and their relatively smaller suppliers should have a high dependence to the buying company. In contrast, when a small buying company with unstable and low demand faces a relatively large supplier, which of short-term competition or long-term collaboration can be the appropriate relationship? The normal purchasing strategies to reduce dependence for the buying company may not apply well to small buyers.

In a broader perspective, in many countries, small companies have been playing an important role in the supply chain, since small companies are characterized by “knowledge intensive, flexible manufacturing of complex products in large varieties”(Ellegaard 2006). Research on

small companies purchasing has gained some attentions in the last two decades, but there are still limited researches on purchasing in small companies. Most research in the purchasing and relationship field benefits large and powerful companies and the findings of the research are from and for large company as well(Mudambi and Schründer 1996). Ellegaard (2006) examined 58 literatures associated with small companies and purchasing. The author found out the small company literature revealed a massive interest in supply relationship management. However, there is limited power and dependence research in buyer-supplier relationship for small companies. Some research found that the relationship between small buyer and large supplier is not cooperative and equal. Small buyers' position in competing for the long-term cooperation is therefore inferior, and as a result small buyers have to accept what the large suppliers leave for them(Mudambi and Schründer 1996).

In this paper, the above situations are going to be explored with respect to the buyer-supplier relationship from the small buyer perspective. The focus of this paper is to examine the small buyer dependence towards its suppliers. Thus unlike the other small companies purchasing papers, which examine mostly the supplier relationship and in particular network interaction and management, this paper looks specifically into the dependence in the buyer-supplier relationships from different aspects. Making the use of purchasing portfolio and dependence theory, the paper proposes a relationships guideline for small company purchasing and the result is empirically tested by a case study. The characteristics of small companies combining one specific industry of the case create an interesting research subject in this paper. The complete thesis aims at answering the following research questions:

- What factors contribute to small buyer dependence towards large suppliers in buyer-supplier relationships?
- How does dependence interfere in the relationships of small buyer verse large suppliers?
- What could be the purchasing strategies for small buyer in order to handle the dependence in buyer-supplier relationship?

To answer the above questions, the paper is going to explore the buyer-supplier relationship for a small company operating in hydropower industry and then study the dependence in the relationships between buyer and supplier. By using the dependence theory and purchasing portfolio model, various purchasing strategies will be suggested to improve the competitive position of a small buyer.

The structure of this paper comprises eight sections. After the introduction section, a brief case background is presented. Then, in section 3, an overview of relevant theory is given, including literature review of purchasing practices in small companies and buyer-supplier relationships, dependence theory and the purchasing portfolio. In section 4 the research methodology used in the paper is described. More specifically, it includes the case study design, sources of evidence and data collection. Section 5 introduces the case company and its supply chain, purchasing activities and characteristics as a small company. In section 6, the analysis of the case is conducted in five steps. The first step means classifying the commodities through the use of purchasing portfolio. Second is to identify the dependence factors. The third step finds out the sources of dependence in each category of the purchasing portfolio. Then, the following step gives the appropriate relationships and actions according to the previous analysis. A discussion is then made at the end of the analysis. After that, managerial implications are given in section 7. At last, section 8 concludes the work that has been done in this thesis and at the mean time indicates some limits for further research.

2. Case background

From theory to a specific case study, Europe has maintained the leading position in hydropower industry for the last 150 years. Even though there are approximately 50 hydro turbine manufacturers in Europe, the world hydro market is dominated by the three large global companies: Andritz, Alstom, and Voith (SETIS). The hydropower industry is a special business segment that functions differently from other major heavy industry sectors. It is a cyclical business that generally does not offer stable factory base load. Projects are mostly remote, leaving little possibility to guaranteeing continuous domestic manufacturing due to high transport cost. In addition, hydropower projects are largely customer driven, subject to demanding environmental regulations and largely influence by government policies, which affect the schedule and design and in turn translate into unpredictable order. Due to the above characteristics, there are not many suppliers that invest specifically for hydro business, which also increase the supply difficulties in hydro industry. Because of heavy industry nature, companies in this sector often compete for buying capacity at the same sub-contractors supplying other industrial sector such as thermal, nuclear or wind energy sector.

Rainpower ASA (RP) is one of these 50 hydropower equipment suppliers in Europe. It is a company group founded in 2007 and had 310 employees in 2012. It is a 100 percent Norwegian private company. Rainpower Norge AS (RPN) is one of the companies in RP group of companies supplying mainly Francis turbine, Pelton turbine and main inlet valve to hydro power plants, as shown in the pictures of figure 1. The major market segment operates in is medium and small hydro (small hydro is below 20 MW turbine, while medium is below 100 MW turbine). The office of RPN is located in Kjeller in Norway and its market in Europe, North America, South America and South Asia. RPN is making almost 100 percent of its products through suppliers and the purchasing expense is as high as 65% of the cost of goods sold. In this paper, the purchasing practices in RPN will be the case for the following study.



Figure 1. Major products supplied by RPN

The supply chain of hydro industry is simple. The turbine manufacturer is the central focal company for any given projects. There can be tier one or tier two suppliers upstream and the power plant owner as customer downstream. The value creation is mainly generated between upstream and the focal company. In the hydro sector, RPN is a relatively small company in two aspects: (1) it is smaller than many of its suppliers; (2) it is much smaller than its main competitors. Like its competitors, RPN offers engineer-to-order products to its customers and requires specialized suppliers that carry regular business in the hydropower industry. These qualified suppliers are often larger than RPN itself in terms of size or capital. The other problem RPN often faces is that most of their suppliers also supply to their competitors. Since RPN's competitors are much larger than RPN in terms of order volume and reputation, it is assumed that they capture higher purchasing power than RPN in the supply market and RPN itself has high dependence to its suppliers.

3. Theoretical Framework

3.1 Purchasing practices in small companies

Most researchers define the small companies exclusively by the number of employees, ranging from less than 500 employees to less than 100 employees. The turnover is also viewed as a criteria in some literatures, for example less than \$5 or \$20 million(Ellegaard 2006).

The review of scientific contributions from the purchasing and the small company literatures revealed the limited efforts on the subject related to purchasing in small companies(Ellegaard 2006). Small companies are characterized a different organization form and have a specific context to the purchasing practices. Ellegaard (2006) found that although the understanding of purchasing practices in small companies has improved in recent years, there are still many gaps to fill up for researchers. The subject of buyer-supplier relationship and dependence for small buying companies is one of the gaps in small company purchasing research.

Purchasing practices vary greatly across small companies(Pressey, Winklhofer, and Tzokas 2009). An empirical study concluded that in practice collaborative relationships are not widely used in small companies and consolidation of procurements amongst a common set of small companies helps to increase purchasing power(Bill and Luke 2004). Similarly, the buyer-supplier relationships managed by small buying companies tend to be uncooperative type, unless it is for the access to scare resources. As large companies, good relationship may allow them access to latest material, technology, process and other innovations. The founding of Pressey, Winklhofer, and Tzokas (2009) offered limited evidence to support that small companies practice strategic purchasing, while other studies of large companies found that strategic purchasing is widely adopted. Quayle (2002) found that a few small companies have separate purchasing function and a large number of small companies view purchasing as unimportant. Whatever, purchasing function in many small companies appears to be essential and small companies may benefit from strategic purchasing as large companies, because there have been extensive research demonstrating that strategic purchasing can significantly impact the profitability of companies.

Some potential reasons that supply chain management (SCM) and small companies fit poorly are suggested as following (Arend and Wisner 2005, Ellegaard 2006):

- Lack of resources to invest in buyer-supplier relationships
- High vulnerability with regards to holding specific assets or losing information
- Few historical basis upon which to build reputation and trust in supplier relationships
- Little purchasing experience to handle the complexity of supply relationships
- Put attention to exploiting internal rather than external knowledge

The resource above refers to the purchasing organization internally and the purchasing network externally. Due to the limited managerial and capital resources, Scully and Fawcett (1994) indicates that the purchasing in small companies is less internationally oriented. Professional management and formal organization are required for global purchasing, as well as marketing knowledge and investment capital (Scully and Fawcett 1994). Small companies often develop international purchasing as reactive and transaction-oriented purchasing (Scully and Fawcett 1994). Ellegaard (2009) displays some purchasing characteristics that would be expected in small companies, for instance, no explicit purchasing strategy, purchasing responsible actors with limited knowledge, and primitive information system. Although purchasing planning takes place in many small companies, the role of purchasing is still likely to be informal. The common example is the limited distinctions between different roles in small companies (Habershon 2006). In addition, small companies are lacking in purchasing formalization including supplier evaluation, solving supply issues procedure, and quality assessment procedure. Instead of a highly formal purchasing planning, small companies promote the importance of suppliers and supply relationships internally by using personal network (Pressey, Winklhofer, and Tzokas 2009). Small buying companies often act as loyal customers due to the limited resources to switch suppliers (Ellegaard 2009). Overall, the attributes of small company purchasing are listed as below:

- Less international orientation
- No explicit purchasing strategy
- Limited investment capital
- Limited purchasing knowledge
- Transaction oriented purchasing
- Limited resources
- Primitive information systems
- Informal purchasing activity
- Loyal customers

Small buying companies seem to be following the lead of the large companies in the relationship development. This view is shared by Mudambi and Schründer (1996) in the empirical research of buyer-supplier relationships for small companies. The authors also provide some evidence for two interesting insights associated with small companies in UK. First, small companies are not monolithic group in the area of partnering. The proposed large company partnership paradigm is also applicable to small companies. The company size affects differently to the adoption rates of partnership indicators. Second, each formal partnership indicators have different effects on the informal aspects of the buyer-supplier relationship. Long-term trading relationships and joint product development can foster trust significantly in small companies.

Tam et al. (2007) had an empirical study and concluded that small companies enjoy the advantages of great flexibility and high efficiency. Compared with large companies, small companies have less opportunity to benefit from economies of scale, insufficient production capacity, and inadequate resources. The authors believe that adopting purchasing strategy in a more cooperative manner is imperative.

3.2 Buyer-supplier relationships

Buyer-supplier relationships in supply networks are the fundamental to all business transactions in upstream supply chain(Cox 2004). Frederick E. Webster (1992) defined buyer-supplier relationships as the interaction between buyers and suppliers and it involves various marketing exchange activities. A continuum from pure transactions at one end to network organizations at the other end is introduced by Frederick E. Webster (1992) as the different stages of buyer-supplier relationships, seen the figure 2 below.



Figure 2. The range of buyer-supplier relationships (Frederick E. Webster 1992)

In the relationships continuum, the starting point is the transactions between two economic actors in pure market form. The pure transaction means a one-time exchange of value between the two actors with no prior or subsequent interaction(Frederick E. Webster 1992). Repeated

transactions, as the name implies, refers to more than one time exchange of value occurred between the two actors. Once the pure transaction is repeated, the importance of relationships between buyers and suppliers is more clearly seen and the relationships make transactions more cost efficient(Frederick E. Webster 1992). One step after repeated transactions along the continuum, buyer-supplier relationships involve relatively long-term commitments, but even here the long-term relationship is often adversarial and depends on market control(Frederick E. Webster 1992). A common practice is that a buyer maintains a number of qualified suppliers and invites them to bid for one particular purchase in order to attract maximum competition and achieve the best deal(Corey 1978). Therefore, long-term relationships can include two types: long-term relationship with contract and long-term relationship without contract. In this long term buyer-supplier relationships, prices are determined by negotiation process based on mutual dependence, instead of market forces, quality, and delivery(Frederick E. Webster 1992). The real partnerships come after long-term relationships, in which each partner approaches total dependence on the other in a certain field of activities and mutual trust replaces the adversarial assumptions(Frederick E. Webster 1992). In partner relationships, prices are an outcome of negotiation as well and subject to some market force(Frederick E. Webster 1992). Strategic alliances refer to a formation of a new entity that intends to move each of the partners toward the achievement of some long-term strategic goal(Frederick E. Webster 1992). Joint venture is one type of strategic alliance and is the formation of a new company. All strategic alliances are individual agreements and close collaborations among partners involving commitment of capital and management resources in a way to enhance the competitive positions in the market for each partner(Frederick E. Webster 1992). The last step is networks, which is complex and multifaceted organization structures. Networks result from multiple relationships, partnerships, and strategic alliances and usually combine with other forms of organization, such as divisions and subsidiaries, and value-added resellers(Frederick E. Webster 1992).

Repeated transactions and long-term relationships are the two common relationships before the buyer and supplier make a formal partner or alliance agreement. There are three variables to define the differences in these two relationships. Firstly, the number of trading years between the buyer and supplier as one variable can determine the relationship to be short-term or long-term. Secondly, the amount of purchased items and the percentage of purchased amount in the total cost determine the importance of the relationship. Strategic decision is the third variable complying with the buying company's strategy and main customers' preference.

Powers and Reagan (2007) summarize five stages of buyer-supplier relationships, including partner selection, defining purpose, setting relationship boundaries, creating value and relationship maintenance. In each stage of relationships, there is a distinct difference in the importance of the relationship factors. Performance satisfaction, trust and cooperation are the most important factors at the last two stages of buyer-supplier relationship. In general, mutual goals is the most important factor over all the stages of buyer-supplier relationships(Powers and Reagan 2007). Another finding is that buyers and suppliers not only have various incentives for developing close relationships, but also have different approaches to develop relationships(Heide and John 1990).

3.3 *Dependence theory*

In the research of buyer-supplier relationships, dependence is one of the most important variables. The following content will give a review of power dependence theory(Emerson 1962), resource dependence theory(Pfeffer and Salancik 1978), and sources of dependence(Hammervoll 2005).

3.3.1 Power dependence theory

The study of power and dependence in interfirm relationships has been focusing more on upstream than downstream in supply chain. Many of empirical researches have been described in the marketing channel literature and less literature is available in the in buyer-supplier relationship literature.

The early literature regarding power and dependence theory could be traced back to the 1960s. Emerson (1962) wrote an article named power-dependence relations in *American Sociological Review*. In this article, it says power is a property of the social relation; it is not an attribute of the actor and power resided implicitly in the other's dependency(Emerson 1962). That means the analysis focuses on the concept of dependence. In social relations, it is common to discuss mutual dependence among the parties. In other words, dependence is not isolated and it is a relative property. Emerson (1962) defined the dependence as below:

“The dependence of actor A upon actor B (D_{ab}) is (1) directly proportional to A's motivational investment in goals mediated by B, and (2) inversely proportional to the availability of those goals to A outside the A-B relation.”

Here, the goals of A have a broad meaning referring to gratifications consciously sought as well as rewards unconsciously obtained through the relationship (Emerson 1962). The goals or gratification of A is facilitated by appropriate actions on B's part. The motivational investment is the effort done by A to achieve the goals. The availability of these goals to A outside of the relation refers to alternative method for goal achievement (Emerson 1962), most likely other social relations. In addition, the cost associated with these alternatives for goal achievement should also be considered in the assessment of dependency (Emerson 1962). The two dimensions driving the dependence in the above definition are not independent (El-Ansary 1975).

Based on the explanation above, five variables are mentioned by Emerson in the definition of dependence: (1) an actor's goals, (2) the other actor's action which facilitates the achievement of the first actor's goals, (3) motivational investment in goals, (4) availability of alternative exchange partners, and (5) switching costs (Hammervoll 2005). The first two variables are nominal variables for identifying a source of dependence and the remaining three variables indicate to what extent a dependence type exists in a relation (Hammervoll 2005).

Power and dependence are close concept and power is defined by Emerson (1962) as a potential influence:

“The power of actor A over actor B (P_{ab}) is the amount of resistance on the part of B which can be potentially overcome by A.”

Emerson (1962) further cleared the definition of power. Power is normally not observable in every interaction between two parties. It exists to be explored and tested and it empirically appears only if one makes the demand, and only if the demand runs counter to other's desires. The power is defined as the “resistance”, because the resistance can be overcome without restricting it to any one domain of action (Emerson 1962). Power possessed by one actor is the potential power or influence to overcome resistance on the other part and is directly related to the dependence of the other actor (Emerson 1962). Emerson (1962) presented different power-dependence relations with equations.

The power of A over B is equal to the dependence of B upon A, as equation:

$$P_{ab} = D_{ba}, P_{ba} = D_{ab}.$$

A balanced relation between A and B is:

$$P_{ab} = D_{ba} = P_{ba} = D_{ab}.$$

Unbalanced relation between A and B is:

$$P_{ab} = D_{ba} > \text{or} < P_{ba} = D_{ab}.$$

The study done by Caniëls and Roeleveld (2009) illustrates that power and dependence plays an important role in the design and development of the buyer-supplier relationships. Buyers have stronger incentive to purchase from suppliers when they own a dominant power position. The dependence is frequently generated by the need for specific technological expertise and the lack of alternatives from the perspective of both buyers and suppliers(Caniëls and Roeleveld 2009).

Emerson (1962) introduced a conception of power network, which is defined as two or more connected power-dependence relations. In other words, when C-A relation is connected through A with the A-B relation, a simple linear network C-A-B is formed and at the mean time the properties of A-B are altered(Emerson 1962). After C is involved in A-B relation, the previous balance is broken and A gains power advantage through the relation with C(Emerson 1962).

3.3.2 Resource dependence theory

The organization requires resources which are controlled by other organizations. The interaction between the organization who requires resources and the others who control the resource generates resource dependence. Due to the resource property, the resource acquisition can be problematic and uncertain. The resource control provides other organizations with power over the organization that needs resources. This is the resource dependence perspective explained by Pfeffer and Salancik (2003, P258). The importance of a resource exchange is determined by two dimensions that are the relative magnitude of the exchange and the criticality of the resource(Pfeffer and Salancik 2003, P46). The relative magnitude of an exchange as one dimension to the importance of resource refers to the proportion of total inputs or the proportion of total outputs accounted for by the exchange(Pfeffer and Salancik 2003, P46). Criticality of the input and output to the organization as the other dimension to the importance of resource measures the ability of the organization to continue functioning in the absence of the resource(Pfeffer and Salancik 2003, P46). The two dimensions above are correlated.

Dependence defined by Pfeffer and Salancik (2003, P51) is

“...the product of the importance of a given input or output to the organization and the extent to which it is controlled by a relatively few organizations”.

The definition here emphasizes the combination of two conditions. One condition is the importance of the resources to the focal organization and the other condition is the concentrated control of discretion over resources. The two conditions together determine the dependence of focal organization on any given other organization. Without any one of them, the situation of dependence cannot exist.

Pfeffer and Salancik (1978) used a narrower conception of resource dependence than Emerson and established a framework for describing how organizations are dependent on others. Only resource transferring between organizations is considered by Pfeffer and Salancik, hence the range of actor's goals and exchange partner actions are limited(Hammervoll 2005).

3.3.3 Sources of dependence

Hammervoll (2005) used dependence theory from Emerson (1962) and resource dependence theory from Pfeffer and Salancik (1978) and explored seven different sources of dependence summarized in figure 3. The seven sources of dependence are building on different combinations of the two variables in different manners. The two variables are one actor's goals and the other actor's action which facilitate the achievement of the first actor's goals(Emerson 1962). The seven sources of dependence are including resources, operational effort, value creation bonding, partner development, exploitative learning, explorative learning, and joint development. These seven sources are divided into two groups. The first two sources of dependence exist in the situation that the focal actor's goals are related to resource-transferal. Resource and operational effort are the two different transactional sources of dependence, which has focus on contractual negotiation with regard to quantity, quality, delivery and payment(Hammervoll 2005). The other five sources of dependence exist when the focal actor's goals are related to value creation, which shift the focus from contractual negotiation to companies' competence(Hammervoll 2005). The implication of the two types of sources of dependence given by Hammervoll (2005) is that

“...transactional sources of dependence create dependence in procuring in-puts or disposing outputs in sufficient quantities, while value creation sources of dependence create dependence in developing competitive advantage”.

Thus he believes to focus on the source of dependence rather than dependence per se in buyer-supplier relationships and in a way to find solutions for governance issues. The content below gives the detail explanation of each source of dependence.

Resources

Actor A has resources dependence on actor B, when A's goal to obtain sufficient quantities of some input (or dispose of some output) is mediated by B's willingness to transact(Hammervoll 2005). The concept of resources refers to the magnitude of exchange as described by Pfeffer and Salancik (1978) in resource dependence theory. High probability of governance question is how to deal with the uncertainty created by this type of dependence(Hammervoll 2005).

Operational Effort

When actor B's operational effort (value-adding activities) has consequences for actor A's goal achievement regarding to meeting quality requirements, A depends on B and operational effort is the source of dependence(Hammervoll 2005). Refer to Pfeffer and Salancik (1978), this is behavioral interdependence. Governance questions can be how to deal with cheating or how to enhance performance in accordance with own preferences(Hammervoll 2005).

Bonding

If actor B initiates bonds to the potential partners and hence mediates actor A's goals on network expansion, A has bonding dependence on B to the extent that A's goals are important to A(Hammervoll 2005). The network expansion discussed here can create either new transactional opportunities or new collaborative opportunities(Hammervoll 2005). In other words, the bonding action can bring in either new exchange partners or access to new resources.

Partner Development

Actor A has partner development dependence to actor B, when A expects B to improve its performance and such improvement is beneficial to A(Hammervoll 2005). The expectation of performance is from two aspects - quality and cost. In order to mediate actor A's goals, actor B could conduct actions of learning knowledge and developing skills.

Own development: Exploitative and Explorative Learning

When actor A's goals regarding exploitative and explorative learning are mediated by actor B's action, the desire of A for own development is a source of dependence(Hammervoll

2005). Here, the exploitative learning put attention on resource utilization, such as exploiting current knowledge in transformation activities, while explorative learning focus on innovation, such as exploring new markets, products and technologies(Hammervoll 2005). The action of actor B could include either providing valuable inputs for actor A to broaden and deepen skills, or contributing to A’s development of new skills(Hammervoll 2005).

Joint Development

Joint development as source of dependence is similar as own development for actor A. In addition to own development, actor B’s activity includes both learning and stimulating partner learning simultaneously(Hammervoll 2005).

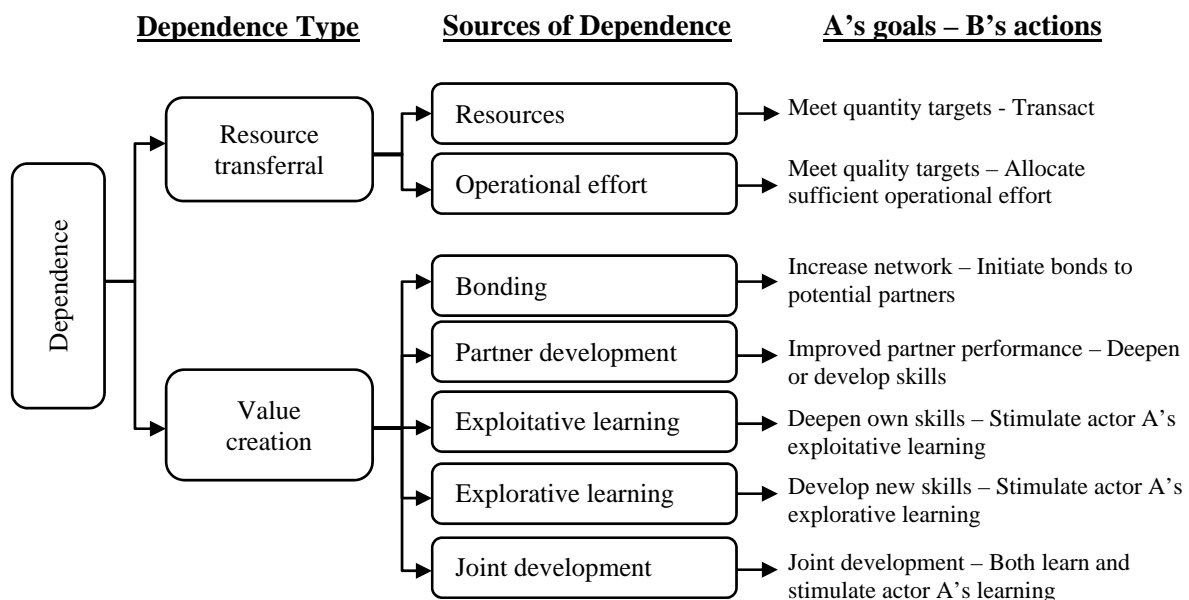


Figure 3. Seven sources of dependence (compiled by author based on (Hammervoll 2005))

3.3.4 The determinants of dependence

Caniëls and Gelderman (2007) summarized four key characteristics in the study of interfirm dependence based on the review of existing research and empirical studies.

- The financial magnitude of the exchanged resources
- The criticality of the resources
- The availability of alternative sources
- Switching costs, incurred when replacing a trading partner

By using the above characteristics, Caniëls and Gelderman (2007) set up constructs for buyer's dependence and supplier's dependence as showed in table 1. In resource dependence theory, the financial magnitude of the exchange resources has a positive influence on the relationship with mutual dependence of the trading partners(Pfeffer and Salancik 2003). Caniëls and Gelderman (2007) believes the financial magnitude has more impact to the supplier's dependence than buyer's dependence. In general, the financial magnitude can let the buyer gain purchasing power, but will not experience dependence if the buyer has alternatives. In resource dependence theory, the criticality of a resource is defined as the extent in which an organization is able to continue functioning in the absence of the resource(Pfeffer and Salancik 2003). Caniëls and Gelderman (2007) indicated the concept of criticality is related to the need for technological expertise of the partner and logistical indispensability. From the perspective of both the buyer and the supplier, the need for technological expertise has a positive impact to the dependence. It means technological expertise is a critical resource for both the buyer and the supplier and it is more and more required in the fast developing market. The buyer is more interested in logistical indispensability than the supplier, because the buyer's concern is the correct delivery of goods, while the supplier's concern is of financial in nature(Caniëls and Gelderman 2007). In power dependence theory from Emerson (1962), the availability of alternative sources and switching costs are both included in the assessment of the dependence. The dependence positions of the buyer and the supplier are symmetrical with these two aspects. Ganesan (1994) stated that diversity of supply market reduce dependence. There are a relatively small number of alternatives available when the supplier makes significant contributions to the buyer's goal attainment(El-Ansary 1975, Frazier 1983). The overall dependency of one party on the other is also included by Caniëls and Gelderman (2007) in the construct of dependence.

Buyer's dependence	Supplier's dependence
Logistical indispensability	Financial magnitude
Need for supplier's technological expertise	Need for buyer's technological expertise
Availability of alternative suppliers	Availability of alternative buyers
Switching costs buyer	Switching costs supplier
Overall buyer's dependence	Overall supplier's dependence

Table 1. Aspects that compose buyer's dependence and supplier's dependence (Caniëls and Gelderman 2007)

3.4 The purchasing portfolio

The purchasing portfolio has received growing attention from both academic researchers and business managers. The purpose of purchasing portfolio is to distinct the different purchasing and supplier strategies(Gelderman and Van Weele 2003). This section gives a brief literature review regarding purchasing portfolio. Firstly, the general idea of Kraljic’s purchasing portfolio (Kraljic 1983) is described, then the different level of power and dependence (Caniëls and Gelderman 2007) and sources of dependence(Hammervoll 2005) are explored in purchasing portfolio, at the last the purchasing strategies and directions in purchasing portfolio(Gelderman and Van Weele 2003) are proposed.

3.4.1 Kraljic’s purchasing portfolio

Kraljic (1983) introduced the purchasing portfolio approach for use in purchasing and supply management in his article “purchasing must become supply management” published in the *Harvard Business Review*. The idea of this approach is to develop differentiated purchasing strategies towards company’s supply market, since suppliers have various dependence and interest to the company for different commodities(Van Weele 2010). Nellore and Söderquist (2000) stated that the purchasing portfolio approach can also be used to optimize the use of capabilities of different suppliers and thereby to effectively manage them. It is an effective tool for discussing, visualizing, and illustrating the possibilities of various purchasing and supplier management strategies(Gelderman and Van Weele 2002).

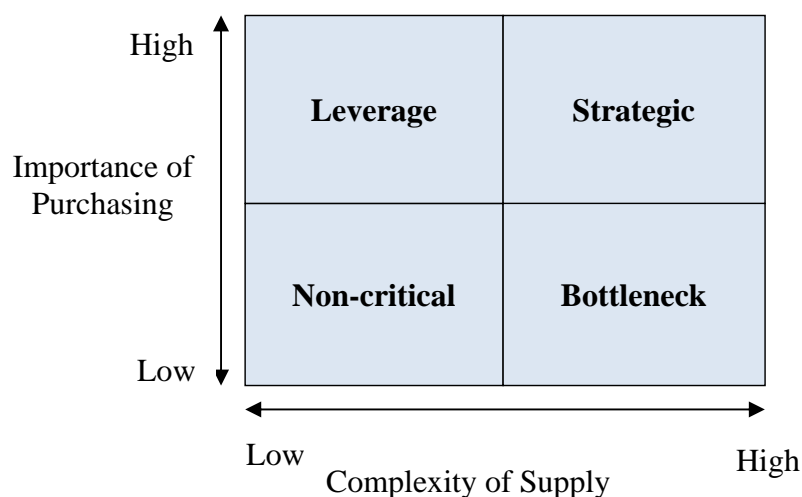


Figure 4. Kraljic portfolio matrix (Kraljic 1983)

Kraljic (1983) used two criteria to sort out the purchased items in a company, which are the importance of purchasing and complexity of supply market. The importance of purchasing is associated with the profit impact of a given purchased item and it can be determined by the percentage of the total costs, the purchased volume, value added profile, or the impact on product quality or business growth(Kraljic 1983). The complexity of the supply market is also related to the supply risk and it is measured against criteria such as the number of potential suppliers, available substitutes, entry barriers, logistics cost, complexity, supply market structure, and so on(Kraljic 1983). The combination of the two parameters generates a matrix dividing products into four categories as figure 4: strategic (high profit impact, high supply risk), bottleneck (low profit impact, low supply risk), leverage (high profit impact, low supply risk), and noncritical (low profit impact, low supply risk).

The decisions based on Kraljic matrix are proven to be sensitive to the selections of dimensions, factors, and weights(Gelderman and Van Weele 2003). The theory does not provide prescriptions or procedures for the measurement of the two dimensions. Gelderman and Van Weele (2003) examined three distinctive measurement methods through the investigated cases, including consensus method, one-by-one method, and weighted factor score method. Consensus method accumulates opinions of purchasing professionals based on a process of reasoning and discussing with respect to all the relevant factors. One-by-one method is easy in practice, which means one key variable is selected per dimension in the matrix. Weighted factor score method considers a number of weighted factors and calculates the total scores per dimension.

Each category of items offers different interests to the company and each requires a distinctive purchasing approach explained in table 2. The decisions about strategic items may need a full analysis including market, risk, price, economic, supply and demand. For leverage items, the decision requires supplier analysis and price forecasting models. Specific market analysis is needed for bottleneck items. Simple market analysis and inventory optimization are required for the decision making of non-critical items(Kraljic 1983). Shifts in supply or demand patterns can alter the category or directions of purchase items(Kraljic 1983).

Procurement focus	Main tasks	Required information
Strategic	Accurate demand forecasting. Detailed market research. Development of long-term supply relationships. Make-or-buy decisions. Contract staggering. Risk analysis. Contingency planning. Logistics, inventory, and vendor control.	Highly detailed market data. Long-term supply and demand trend information. Good competitive intelligence. Industry cost curves.
Bottleneck	Volume insurance (at cost premium if necessary). Control of vendors. Security of inventories. Backup plans.	Medium-term supply/demand forecasts. Very good market data. Inventory costs. Maintenance plans.
Leverage	Exploitation of full purchasing power. Vendor selection. Product substitution. Targeted pricing strategies/negotiations. Contract/spot purchasing mix. Order volume optimization.	Good market data. Short-to-medium-term demand planning. Accurate vendor data. Price/transport rate forecasts.
Non-critical	Product standardization. Order volume monitoring/optimization. Efficient processing. Inventory optimization.	Good market overview. Short-term demand forecast. Economic order quantity inventory levels.

Table 2. Classifying purchasing materials requirements (Kraljic 1983)

3.4.2 Purchasing portfolio and dependence

Kraljic (1983) stated that the idea of purchasing portfolio is to help supply management to determine the type of supply strategy for the company needs and thereby exploit its purchasing power and minimize supply risk. After classification of items, Kraljic focuses on the strategic items and positions them in the purchasing portfolio matrix, which indicates the relative power and dependence situation of the company in the corresponding supply market (Caniëls and Gelderman 2007). Three purchasing strategies are identified by (Kraljic 1983) based on the power dependence dimension in the buyer-supplier relationship. When it is buyer dominance, an aggressive strategy (“exploit”) is introduced. In the case of balanced relationship, the buyer and supplier should pursue a well-balanced intermediate strategy (“balance”). When the supplier dominance, the buyer should look for “diversify” strategy. Caniëls and Gelderman (2007) extended the power and interdependence issues on each category in Kraljic portfolio matrix, and identified the expected and observed results of power-dependence relationship after examining 250 purchasing professionals. The findings of this research illustrate a comparison of relative power and total interdependence in the purchasing portfolio matrix as showed in the table 3 below. With regard to the relative power, the observed results are almost consistent with the expected except the strategic category, in

which it is expected to be balanced while observed to be supplier dominance. The total interdependence has no change before and after observed for each category of items in Kraljic matrix.

Either the buyer or the supplier has incentive to be in dominance position. But in reality, it is not possible to be dominance for both buyers and suppliers. The buyer should shift the current supply relationships either towards buyer dominance or, if it is not possible, towards an alternative position that provides for a more effective leverage of quality and cost(Cox 2001). Cox (2001) stated that it is important to understand the power or dependence attributes available to buyers and suppliers can be double-edged.

	Relative power		Total interdependence	
	Expected	Observed	Expected	Observed
Strategic	Balanced	Supplier dominance	Highest	Highest
Bottleneck	Supplier dominance	Supplier dominance	Moderate	Moderate
Leverage	Buyer dominance	Buyer dominance	Moderate	Moderate
Non-critical	Balanced	Balanced	Lowest	Lowest

Table 3. The comparison of relative power and total interdependence in the Kraljic matrix: theory and practice (Caniëls and Gelderman 2007)

3.4.3 Sources of dependence in purchasing portfolio

Purchasing practices contains various buyer-supplier relationships, and the management of these relationships is often based on purchasing portfolio matrix(Caniëls and Gelderman 2007). Power and dependence is considered to be important for understanding buyer-supplier relationships and is examined from a purchasing portfolio perspective by Caniëls and Gelderman (2007). Based on the review of the existing literatures and theory including power dependence, resource dependence, sources of dependence and purchasing portfolio and dependence, the seven sources of dependence are attempted to be applied in the four categories of the purchasing portfolio. As showed in figure 5 below, each category in purchasing portfolio has different types of dependence. There is no overall source of dependence for each category of purchasing portfolio.

Strategic category

The strategic category comprises the items that are strategically important to the company, have high supply risk and require long-term supply. In order to reduce supply risk and

uncertainty, buying companies are looking for a stable material flow and a good information flow with suppliers. In practices, the purchase should be managed by buyers through building a close relationship with suppliers, focusing on prior supplier involvement and joint development of products and services, keeping a long-term value focus and decreasing poor performance cost(Olsen and Ellram 1997). Therefore, basic transactional relationship is not a competence solution to the buying company. Instead strategic relationships resulting in value creation dependence are valuable in the strategic category. Transactional source of dependence still exists in the strategic category, but it is less important than the value creation dependence. The level of dependence is determined by the importance of purchasing and the complexity of supply market.

Leverage category

The leverage category includes the items that have high profit impact and low supply risk. In other words, the leverage items are strategically important to the buying company and easy to purchase. Thus for leverage items, it is important to lower total cost by identifying the value added in the purchase and leveraging the purchase volume. The buyer's goal is to create mutual respect in supplier relationship and a good two-way communication(Olsen and Ellram 1997). Large quantity and high quality are the basic requirement from the buyer; accordingly the type of buyer dependence is resource transferal. In addition, expanding the network and improving the partner's performance are another two approaches to manage leverage items.

Bottleneck category

The items in the bottleneck category have low profit impact, but are difficult to supply. Often these items comprise of scarce material, advance technology or complex process. Therefore, quality is more critical than quantity for bottleneck items. The strategy to manage bottleneck items is to standardize the design or look for substitutes. Regardless of the substitutes, the buying company should try to establish some sort of relationship with specific suppliers focusing on concurrent engineering and involving them in value analysis(Olsen and Ellram 1997). A certain bonding relationship might be needed to make sure the security of resources and lower the cost of operation.

Non-critical category

Non-critical category normally includes the items that have low profit impact and low supply risk, such as standard bolts and steel plates. In general, since these items are standard and low value products with plenty of supply in the market, quantity requirement is more critical than

quality requirement. Standardization and consolidation are two effective approaches to manage non-critical items. Hence the buying company should try to reduce the number of duplicate products/services (standardization) and the number of suppliers (consolidation) (Olsen and Ellram 1997). The buyer-supplier relationship is only based on resource transaction and the relationship basically manages itself. There is more flexibility for the buying company to purchase due to the low supply risk, but there should be focus on reducing total administrative costs.

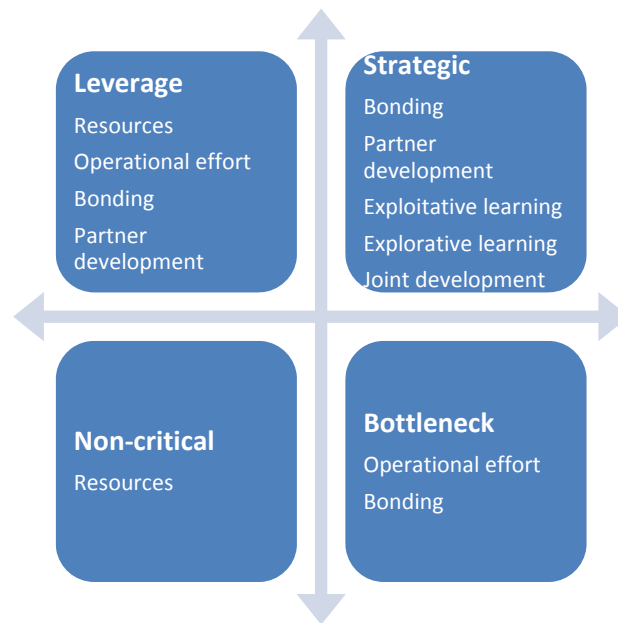


Figure 5. Various sources of dependence in purchasing portfolio

3.4.4 Strategic directions in purchasing portfolio

Some researchers have done further analysis on purchasing portfolio and indicate that there is no overall strategy for each category. Gelderman and Van Weele (2003) stated that the positions in Kraljic matrix are alterable to the dynamics of buyer-supplier relationships. Figure 6 below provides an overview of the strategic directions for all categories. Two different general directions are distinguished by Gelderman and Van Weele (2003) first:

- actions to hold the same positions in the matrix, and
- actions to pursue other positions in the matrix.

In general, strategic and bottleneck items are positioned at the right side of the matrix, the movements towards the left side are pursued to reduce supply risk. Non-critical items can be moved upwards and leverage items can be changed to strategic category. The context below describes briefly the purchasing strategies in each category.

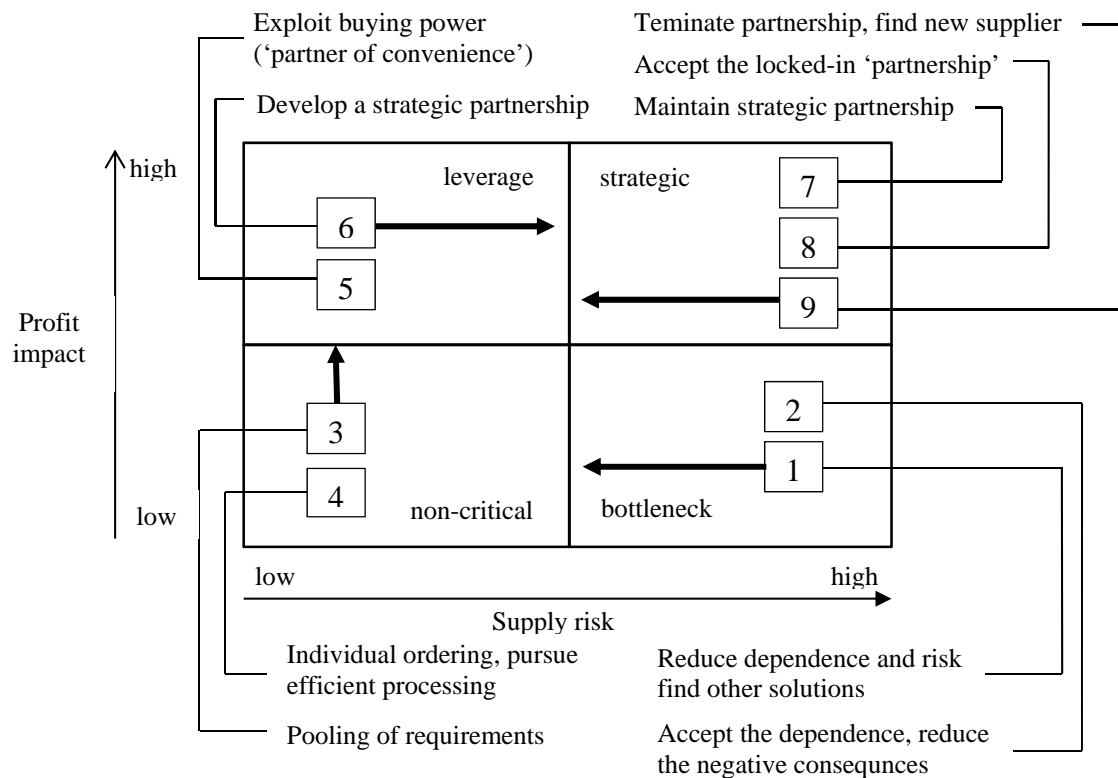


Figure 6. Overview of strategic directions for all categories(Gelderman and Van Weele 2003)

Bottleneck category

- (1) Moving towards non-critical quadrant: ‘decomplex the product, find a new supplier’ (Gelderman and Van Weele 2003). The purpose is to reduce dependence and supply risk, and search for other solutions. The common approaches are either to decomplex the products design or requirements or to develop new suppliers.
- (2) Holding the position in bottleneck quadrant: ‘accept the dependence on a supplier, assurance of supply’(Gelderman and Van Weele 2003). If no other choices are available, the items remain the position in bottleneck quadrant. The common response is to have contingency plan to assure the quality and supply.

Non-critical category

- (3) Moving towards leverage quadrant: ‘pooling of requirements’(Gelderman and Van Weele 2003). It is aiming for increasing purchasing power and reducing direct and indirect purchasing costs. The actions are to put non-critical items together in large quantities and make framework agreement with a preferred supplier.
- (4) Holding the position in non-critical quadrant: ‘individual ordering, efficient processing’(Gelderman and Van Weele 2003). Individual ordering is the only choice,

when it is not possible to pool the purchasing requirements for non-critical items. The target is to pursue efficient purchasing and reduce indirect purchasing costs accordingly.

Leverage category

- (5) Holding the position in leverage quadrant: ‘exploit buying power, maintain a partnership of convenience’(Gelderman and Van Weele 2003). It is to execute aggressive supplier management. The dominant power position allows for competitive bidding and short-term contracts.
- (6) Moving towards strategic quadrant: ‘develop a strategic partnership’(Gelderman and Van Weele 2003). The precondition for the shift from leverage to strategic is that the supplier is willing and capable of contributing to the competitive advantage of the buying company. The case studies revealed that this shift should be considered as an exception to the rule.

Strategic category

- (7) Holding the position in strategic quadrant: ‘maintain a strategic partnership’(Gelderman and Van Weele 2003). Strategic relationship with key suppliers should always contribute to the competitive advantage of the buying company. A successful partnership can yield value creation for both the buyer and the supplier. However, strategic relationship means high mutual dependence between the two parties. Even in a strategic relationship, the buying company still tries to restrict or reduce the dependence on the suppliers involved(Gelderman and Van Weele 2002).
- (8) Holding the position in strategic quadrant: ‘accept a locked-in partnership’ (Gelderman and Van Weele 2003). In some situations, there is no option other than the position in strategic quadrant. This ‘locked-in’ situation is normally caused by supplier’s technical advantage, monopoly position, high switching costs, or the customer preference(Gelderman and Van Weele 2003).
- (9) Moving towards leverage quadrant: ‘terminate a partnership, find a new supplier’ (Gelderman and Van Weele 2003). When the supply performance become unacceptable or the buyer shows more dependence to the supplier, the partnership may become undesirable. When this situation starts, the buying company may have to search for alternatives and develop other supply channels, while ending the ineffective relationship. Pursuing standardization and simplification on the products is also an effective method to move strategic items to leverage quadrant and reduce supply risk.

Caniëls and Gelderman (2005) indicated that each purchasing strategy above was characterized by a unique power and interdependence in buyer-supplier relationships.

4. Research Methodology

4.1 *Research design*

A research design provides a framework for collecting and analyzing a set of data. The decisions about the priority being given to a range of dimensions of the research process are reflected by a choice of research design (Bryman and Bell 2011, 40). Quantitative and qualitative are the two research strategies in research design, in which quantitative research emphasizes quantification in the collection and analysis of data using statistical and mathematical methods and qualitative research usually emphasizes words and theory (Bryman and Bell 2011, 26-27). However, research studies may select various strategies, for instance, having the broad characteristics of one research strategy and a characteristic of the other, or completely combining the two research strategies (Bryman and Bell 2011, 28). In this thesis, the research strategy is towards qualitative research and using quantitative evidence for some analysis.

4.1.1 Classification of research methods

Summarized from previous literatures, Ellram (1996) made a table listed four different objectives with the relevant research methods as table 4. The four objectives of research include exploration, explanation, description and prediction. Each objective focuses on various forms of research questions, each of which relates to different research methods. The objective of this thesis is more towards exploration. Exploration objective with “how” and “why” research questions match with qualitative research strategy with methodologies of experiment, case study, and participant observation. Case study approach is implemented for the research in this thesis. More information regarding case study approach is elaborated in the next section.

Objective	Question	Examples of appropriate methodologies
Exploration	How, why	Qualitative <ul style="list-style-type: none"> • Experiment • Case study • Participant observation
	How often, how much, how many, who, what, where	Quantitative <ul style="list-style-type: none"> • Survey • Secondary data analysis
Explanation	How, why	Qualitative <ul style="list-style-type: none"> • Experiment • Case study • Grounded theory • Participant observation • Ethnography • Case survey
Description	Who, what, where, how many, how much	Quantitative <ul style="list-style-type: none"> • Survey • Longitudinal • Secondary data analysis
	Who, what, where	Qualitative <ul style="list-style-type: none"> • Case study • Experiment • Grounded theory • Participant observation • Ethnography • Case survey
Prediction	Who, what, where, how many, how much	Quantitative <ul style="list-style-type: none"> • Survey • Longitudinal • Secondary data analysis
	Who, what, where	Qualitative <ul style="list-style-type: none"> • Case study • Experiment • Grounded theory • Participant observation • Ethnography • Case survey

Table 4. Classification of research methods according to key research objectives and questions (Ellram 1996)

4.1.2 Case study

The case study is a very popular and broadly used research design approach. The basic idea of case study is to make the detailed and intensive analysis of a single case (Bryman and Bell 2011, 59). A definition of case study is given by Yin (2003, 13) as:

“...an empirical inquiry that that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”.

A case can be a single organization; a single location; a person; or a single event(Bryman and Bell 2011, 59). However, Yin (2003) indicated that case study research can be carried out as single- or multiple- case studies and can be based on any mix of quantitative and qualitative evidence. The research strategy of a case study comprises the logic of design, data collection techniques, and specific approaches to data analysis (Yin 2003). In a case study, five important components of research design are indicted by Yin (2003):

- a study's questions
- its propositions, if any
- its unit of analysis;
- the logic linking the data to the propositions
- the criteria for interpreting the findings

This paper focuses on one small buying company and explores the buyer-supplier relationship from the buyer perspective. So a single-case study is carried out for this research. The single-case research is an appropriate design under several circumstances, and five rationales are given by Yin (2003, 39) as following:

- The critical case. When the single case represents the critical case, the single case can then be used to test the theory or find some alternative set of explanations.
- The extreme case or unique case. The kind of case happens so rare that any single case is worth documenting and analyzing.
- The representative or typical case. The representative case study is to explore the circumstances and conditions of frequent time or commonplace situation.
- The revelatory case. This type of case exists when an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation.
- The longitudinal case. The type of case is to study or examine certain conditions change over time.

Using case study approach, one of the reasons is that the power-dependence issue regarding the relationship between small buying company and large suppliers is typical in hydro industry. Another reason is that this case has much similar phenomenon to the small companies in other industries. Based on above explanation, the case studied in this paper is more about representative type.

4.2 Sources of evidence

Sources of evidence	Strengths	Weaknesses
Documentation	<ul style="list-style-type: none"> • Stable—can be reviewed repeatedly • Unobtrusive- not created as a result of the case study • Exact—contains exact names, references, and details of an event • Broad coverage—long span of time, many events, and many settings 	<ul style="list-style-type: none"> • Retrievability—can be low • Biased selectivity, if collection is incomplete • Reporting bias—reflects (unknown) bias of author • Access—may be deliberately blocked
Archival Records	<ul style="list-style-type: none"> • (same as above for documentation) • Precise and quantitative 	<ul style="list-style-type: none"> • (same as above for documentation) • Accessibility due to privacy reasons
Interviews	<ul style="list-style-type: none"> • Targeted—focuses directly on case study topic • Insightful—provides perceived causal inferences 	<ul style="list-style-type: none"> • Bias due to poorly constructed questions • Response bias • Inaccuracies due to poor recall • Reflexivity—interviewee gives what interviewer wants to hear
Direct Observations	<ul style="list-style-type: none"> • Reality—covers events in real time • Contextual—covers context of event 	<ul style="list-style-type: none"> • Time—consuming • Selectivity—unless broad coverage • Reflexivity—event may proceed differently because it is being observed • Cost—hours needed by human observers
Participant Observations	<ul style="list-style-type: none"> • (same as above for direct observations) • Insightful into interpersonal behavior and motives 	<ul style="list-style-type: none"> • (same as above for direct observations) • Bias due to investigator’s manipulation of events
Physical Artifacts	<ul style="list-style-type: none"> • Insightful into cultural features • Insightful into technical operations 	<ul style="list-style-type: none"> • Selectivity • Availability

Table 5. Six sources of evidence: strengths and weaknesses (Yin 2003)

Yin (2003) lists six sources of evidence for case study may come from, including documentation, archival records, interviews, direct observation, participant-observation, and physical artifacts. Each source above calls for the knowledge of various methodological procedures. Each source of evidence has different strengths and weaknesses, which are given

in the table 5. Ellram (1996) think that direct observation, indirect observation and interviewing are techniques for qualitative data collection. For quantitative data, it may include observing the number of occurrences of a particular phenomenon; determining the degree or level of occurrence of an activity; and asking participants to complete questionnaires or scales related to a particular phenomenon(Ellram 1996).

In this research paper, both primary and secondary data are collected to develop a detail understanding of the buyer-supplier relationship and purchasing activities in RP Group. The great portion of primary data is collected through questionnaires and unstructured interview with the managers and employees responsible for purchasing activities. A small part of primary data is from my own knowledge and experiences, which can be looked as participant observation. Three years’ working experiences in RP Company and six years’ experiences in the hydro industry give me a great advantage for understanding the components purchase and the supply market, and access to the information needed to my research. The secondary data related to the organization structure, products, and purchasing is collected through company website, documentation and archival records.

4.3 *Research process and data collection*

In the following case analysis section, the process of research is defined as the figure 7 below. First of all, the attributes of RPN organization and purchasing practices are listed to match the small company definition. Second step is to classify the commodities into four categories by using purchasing portfolio. The next step is to analyze the company’s current supplier relationships and figure out the determinants of dependence. The forth step look close to strategic and leverage suppliers and make further analysis on sources of dependence. The last step is to propose different buyer-supplier relationships for each category from small buying company perspective and at the mean time develop and discuss appropriate actions regarding how to improve the existing supplier relationships.



Figure 7. The process of research design

The company's procurement situation is explored through interview which is performed with open questionnaire first. Five people identified as expertise to the subject area have answered the questions, including three managers and two sourcing employees in Norway. In addition to the questionnaire, the face to face interview was conducted individually with a few key questions after evaluating the answers of questionnaire.

The components for turbine and valve products are collected according to company's index documentation. The components are grouped into commodities with my own experiences and some advises from relevant engineers. For the purchase value ranking in last five years, the data is collected in Microsoft Navision (NAV) system. NAV searches all the purchases done by RPN and ranks the top 100 companies with the total transaction value in five years. The total purchase amount to the top 100 companies takes 91.9% of total purchase in RPN. So the list of suppliers should be valid for the further research. In these 100 suppliers, some companies are irrelevant and are removed from the list, for instance, the internal purchase to company in RP Group, the banks, the consultants companies, the transportation companies etc. Only the suppliers for turbine and valve hardware supply are kept for the final data. Regarding all the purchase in China, the data of each purchase activities are not recorded in NAV system in Norway. All the information is offered by the sourcing team in China.

In further analysis, the major buyer-supplier relationships are falling on eleven fabrication suppliers, three machining workshop and five foundries. Purchase value and order frequency are selected as two important parameters to explore the dependence and relationship. The data for both parameters are also collected in NAV and archive record from China.

5. RP introduction and current situation

5.1 *Rainpower history and introduction*

The beginning of Rainpower (RP) is Kværner Brug established in 1853. In 1999, the workshop in Sørumsand and Kværner Energy were both sold to GE Energy. Eight years later, the Norwegian company NLI bought the workshop and launched RP Group in 2007 together with the Norwegian hydropower activity purchased from GE Energy(Rainpower 2013a). In five years, RP Group has gradually assembled a broad range of competence comprising technology development, engineering, hydropower laboratory testing, governor and manufacturing. The source of the company is traditional hydropower technology developed in Norway over 150 years, and the company is characterized by constant technological progress with new and effective products and solutions for hydropower(Rainpower 2013d). RP supplies small and medium-sized hydropower equipment and services to hydropower plants in the market of Norway, Europe, South America, and Asia.

RP Group consists of nine operating companies with approximately 300 employees in total. RPN is the largest branch in RP group which is operating market segment of medium and small hydro turbines and main inlet valves. RPN is located at Kjeller in Norway, headquarter of RP Group. RPN has annual revenue around 650mill NOK(Rainpower 2011). In the world of hydro power, there are three giants supplying hydro turbine and generator to hydro power plants: Andritz, Alstom and Voith. These three global companies are often the main competitors to RP in both large and small hydro market. Compared with the three large companies - Andritz, Alstom and Voith, RPN is too young and twenty to forty times smaller than the first major supplier. RP is a small company focusing on niche market of Francis and Pelton hydro turbines, while the other three large companies operate all the products ranges present in hydro market (including other products such as Kaplan, Propeller, Bulb, etc.). In this niche market of Francis and Pelton turbines, RP owns a world class hydraulic laboratory, and has develop some of the most efficient turbines, a critical factor in allowing RP to maintain its competitive position in this market. A wide range of other components are offered by RP to various power plants including control system, valves, governors, valve, gate, and penstock(Rainpower 2013c).

One heavy mechanical workshop in Norway is owned by RP Group with a total area of 10800m². Due to the high Norwegian labor cost, only high head Francis runners and Pleton

injectors are assembled in this workshop, as seen in the pictures below. In addition, much of the service and refurbishment work for Norwegian hydropower industry is done in this workshop as well. Since it is located closely to RP headquarter office, the cooperation between manufacturing and engineering becomes fast and convenient(Rainpower 2013b). The company has one limited manufacturing facilities to make its own complete products. Hence, the company has to turn suppliers to manufacture the product design by RP. Thus the purchasing expenses are as high as 70% of the cost of goods sold and the role of purchasing is critical to the success of the business.



Figure 8. Rainpower Sørumsand workshop and products manufacturing

At present, RP Group operates five procurement offices outside of Norway(Rainpower 2013d). One office in Hangzhou supervises the supply market in China. One is present in Sweden for the Swedish market. One office in Peru controls the projects in South America. One office in Turkey manages the projects and supply in Turkey. One office in Switzerland promotes sales in west Europe. However, except for Sweden, Turkey and China, all the purchasing and quality control is carried out from Norway and all the evaluation and

inspection jobs are done by Norway. It implies that there are limited resources of purchasing to control the supply market in Europe.

5.2 RPN supply chain

The supply chain with RPN as a focal company is not complicated as illustrated in the figure 9 below. Horizontally the material flows from sub-suppliers, passing through suppliers to the sourcing or production section in RPN, and finally to the hydro power plants owned by customers. The sub-suppliers here are mainly raw material supply, while the suppliers are normally fall into four categories including foundries, machining workshop, fabrication workshop and standard accessories supply. Vertically, the work flow in RP is following from the top of research & development, passing engineering, sourcing or production and to installation.

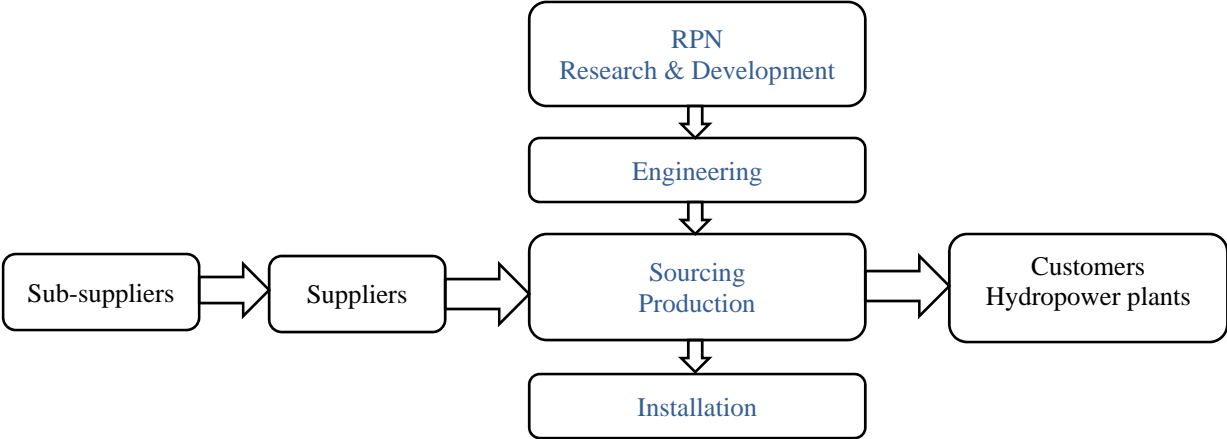


Figure 9. The supply chain of hydropower

In the supply chain of the hydropower industry, customers are playing an important role in the relationships between focal company as RPN and its suppliers. The information flow between RP, suppliers and customers creates an overlapping relationship as showed in figure 10. RP sends product design to customers for approval and the customers give feedback to RP. RP engineering provides technical specifications to suppliers and suppliers provide documentation associated with the products supplied to RP. Both RP and customers attend final acceptance test (FAT) at the suppliers’ workshop and the suppliers get final approval for delivery. The direct information flow between suppliers and customers exists in RP supply chain. In hydro power, the customers often have significant influence on the selection of suppliers, sometimes even sub-suppliers. Normally, the customers have knowledge of large

suppliers and they prefer large suppliers to small suppliers due to the good impression of process, quality and delivery from large suppliers. A few of RP suppliers are also RP's competitor in certain market. Hence, these suppliers have direct contact with RP's customers in some cases.



Figure 10. The information flow in supply chain of hydropower industry

5.3 RPN purchasing activities

In the past five years, the total quantity of turbine and valve hardware purchased by RPN is shown in the world geo-chart, see figure 11. Illustrated in the geo-chart, the supply market of RPN is concentrated in China and Europe. The total value of purchase amount in each country is illustrated by different colors. Dark blue color represents the highest purchase value in one country, while light grey color represents the lowest purchase value. The column chart in figure 12 shows clearly the difference of purchase amount between each country. As illustrated in the table 6, the highest purchase made by RPN is in China counting 63% of total turbine and valve hardware purchase and Norway is the second which has 14%. The purchase in Spain takes 10%. It is easy to see that the magnitude of transaction in China is much higher than the other countries. More than 85% of purchasing activities occur in China, Norway and Spain.

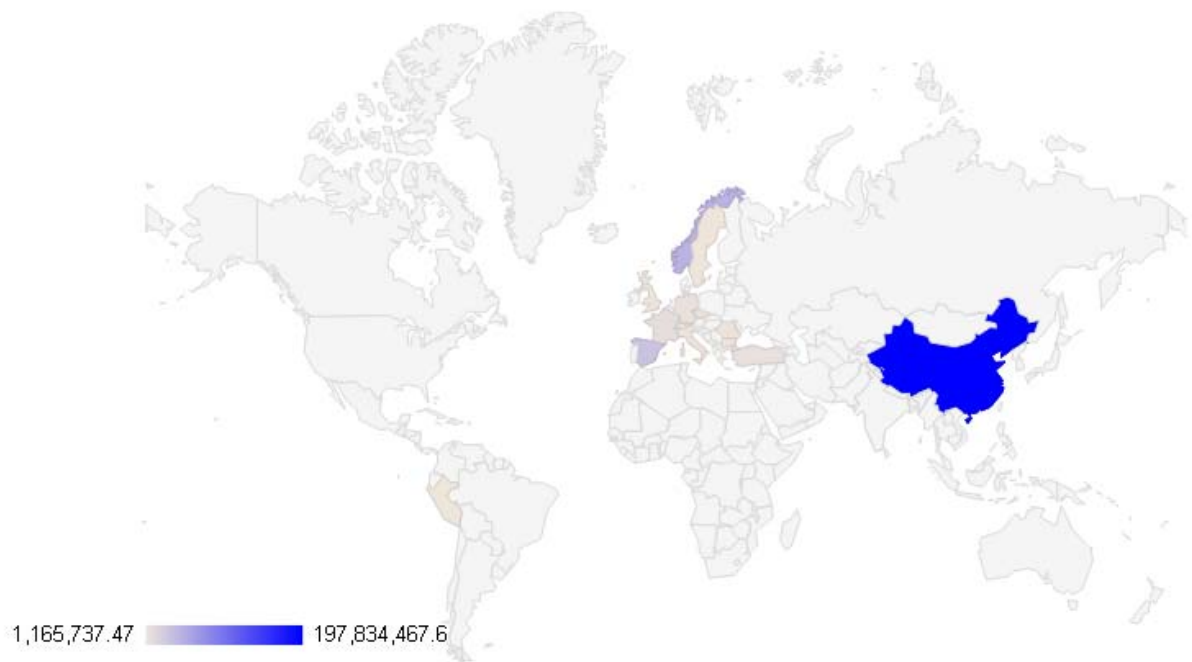


Figure 11. RPN last five years' purchase value in different countries (geo chart)

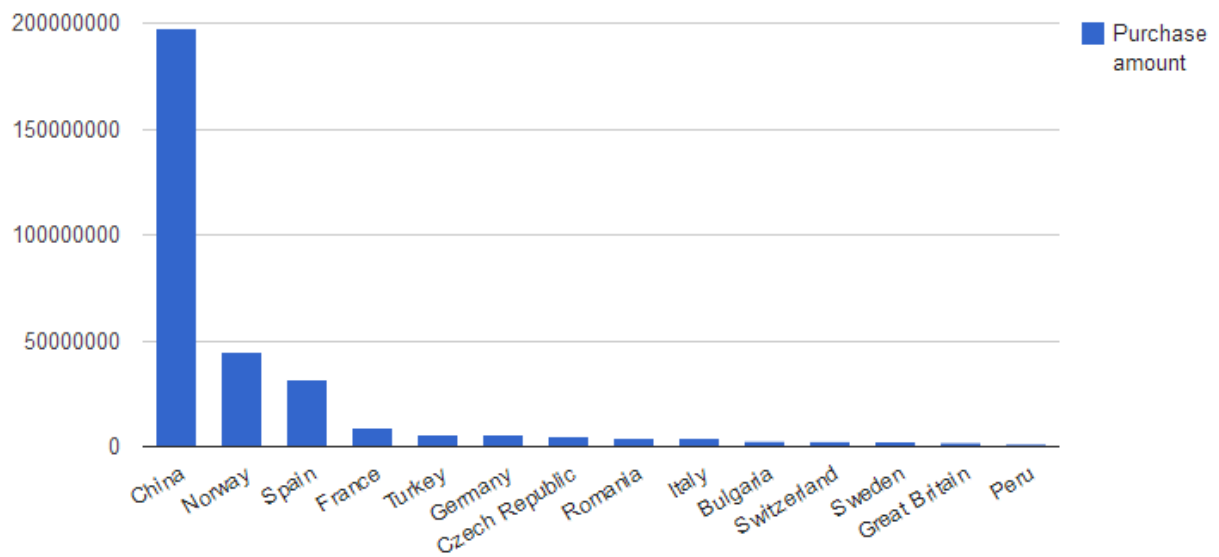


Figure 12. RPN last five years' purchase value in different countries (column chart)

Country	Purchase value	Percentage of total purchase value
China	197834468	63%
Norway	43777957	14%
Spain	31470786	10%

Table 6. Three top countries of purchase value in RPN

On further examination based on the above data, another geo chart zooming at Europe is made, see the figure 13. The size of the marker represents the number of suppliers that have

been used by RPN in one country and the color represents the purchase amount. The biggest marker and dark blue color in Norway refers to the highest purchase amount and the largest number of suppliers. Spain is the second country but much lower compared to Norway, counting for 10% of total turbine and valve hardware purchasing in RPN. There is a big drop from Norway to the remaining countries in terms of either purchase value or number of suppliers. In other words, most purchasing activities in Europe are done inside of Norway. In other European countries, the smallest green marker represents only one supplier used by RPN and slightly bigger markers indicate two or three suppliers. In addition, the chart below implies that RPN has mainly developed the supply market in around 12 countries in Europe. In other words, RPN has limited knowledge of the complete supply market in Europe.

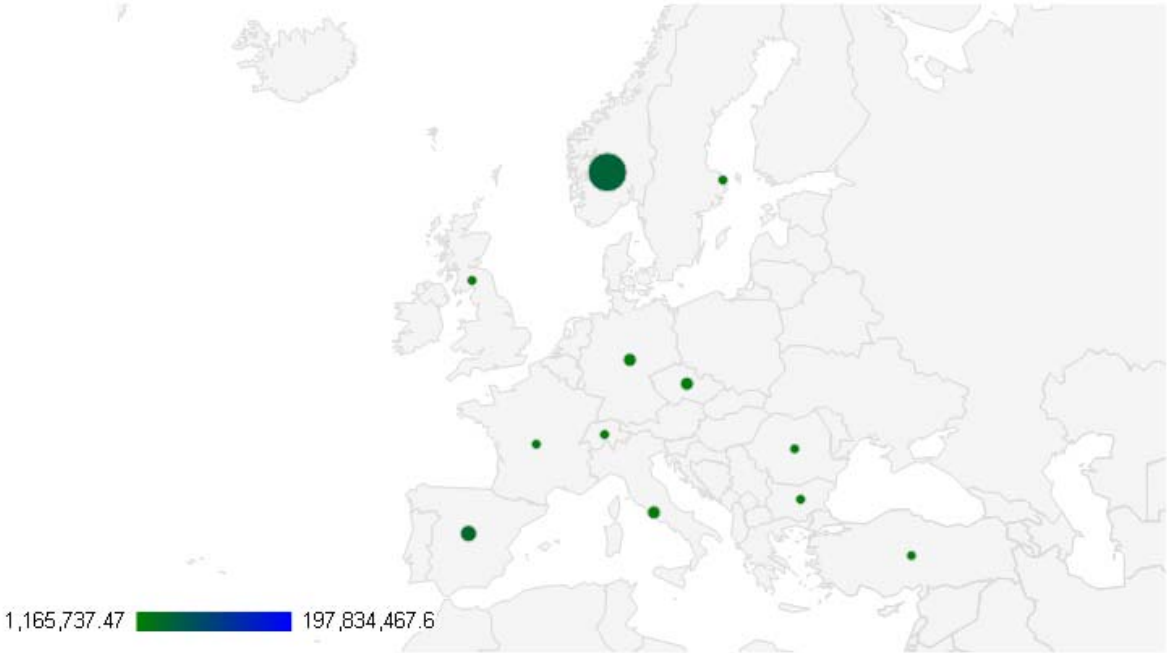


Figure 13. RPN last five years’ purchase in Europe

5.4 RPN characteristics

According to the definition of small companies, RP shall be ranged in the category of small company from the respect of the total number of employees. The current situation of RP is also consistent with the attributes of small company, as follow:

- No explicit purchasing strategy

Different answers are received after the questionnaire regarding the purchasing strategy in RP. It implies that there is no clear and consistent purchasing strategy in RPN. The company has no overall business strategy either, which is a typical feature to small companies.

- Limited investment capital

RP has limited manufacturing facilities and has not done any investment in its suppliers. RP is a limited company with sole ownership to NLI. The owner has not invested capital for the development of new manufacturing capacity, solely relying on sub-contractors mainly in China. Because of high operating costs, the company was not profitable enough to invest in manufacturing, preferring to focus on fundamental research and development (R&D) and the development of new products without investing in manufacturing.

- Limited purchasing knowledge

The general procedure of purchasing in RP is in three steps: first is to ask a few quotations, second is to compare the price and have negotiation based on the lowest price, and third is to place order to the preferable supplier. RP spends little time to communicate with suppliers and understand their capacity or concern which might include technical understanding, limitation, terms and condition, etc. RP often underestimates the amount of effort to work with a supplier and maintain good purchasing behavior.

- Transaction oriented purchasing

RP sourcing and engineering department are working separately. This separation of functions is highly noticeable during project execution. There is no sharing of information between engineering, sourcing and suppliers, only within the given group. RP has little cooperation with its suppliers on value creation, working with suppliers to reduce cost or developing new manufacturing technology for example. Since RP has a limited work backlog, RP gives little attention to order planning and information sharing with its suppliers. The information could include demand, forecast, suppliers' capacity and supplier skill development. RP communicates poorly with suppliers, since purchasing decision is often taken far inside RP's organization.

- Limited resources

RP has had long term relationship with approximately ten suppliers for major commodities, including runner machining, turbine and valve fabrication. However, only a few of them have formal relationship with RP. RP, as a small company, has highly diversified products offered to customers. It increases the purchasing work and reduces the purchase amount to each supplier. That is also a reason why RP with 650mNOK revenue, which is as high as many medium size of RP's suppliers, is not able to make a high volume order to any single supplier. For this reason, RP is still a small customer and 100% reliant on its suppliers, long term or

short term. As a result of this, being a small customer, to get priority is always a challenge. Customers are another factor in influencing suppliers' selection. As the customers often want to qualify the suppliers, it requires that the suppliers are impressive. Sometimes supplier selection is driven by the customer.

- Primitive information systems

RP supplies a large variety of products to customers, but there is no integrated system to control the information flow in the whole supply chain. For instance, the information transferred from engineering to purchasing is through email and excel sheet. NAV is the only computer system for the basic usage of placing orders and paying invoices. This prevents RP to manage effectively orders between suppliers, and requires extra work from RP to ensure scope of works is complete.

6. Case Study Analysis

6.1 *Commodity classification*

RPN supplies to its customers a wide range of products from huge turbine fabrication to small instruments, and from mechanical to electrical equipments. Francis turbines, Pleton turbines and main inlet valves are the major products supplied by RPN and will be studied in the following analysis. In this sector, the Kraljic matrix is used to narrow down the list of purchased components for further analysis. The major components purchased by RPN are collected and grouped into commodities. By applying the Kraljic's portfolio, the commodities in the current purchasing portfolio of RPN are sorted into the four categories. In practice, the rationale behind the two dimensions in purchasing portfolio is experience-based (Nellore and Söderquist 2000). In other words, the criteria of the two dimensions are reflecting the accustomed thinking from purchasing and the position is reflecting the real purchasing situation of each commodity in one company. This paper adapts the consensus method examined by Gelderman and Van Weele (2003) for dimension measurement. Consensus method accumulates opinions of purchasing professionals based on a process of reasoning and discussing with respect to all the relevant factors. There are competence factors and economic factors associated with the positioning for the first dimension of importance of purchasing. It is assessed through the percentage of purchased items as part of total cost, the competence of the items, and the impact on the buying company's profitability. Regarding the second dimension of supply risk, the positioning depends on product novelty and complexity, supply market developed and external environment.

The result of the commodity classification is the consensus made by the relevant expertise in the company as showed in table 7. The commodities of standard accessories and servomotor are grouped in non-critical category, which means low value in the total purchasing and easy to supply. Since servomotors have higher value and relatively less supply alternatives than standard accessories, it is located closely to the border of non-critical items. Turbine fabrication (simple) and raw material are in the category of leverage which has high profit impact and low supply risk. Raw material purchased by RPN is normally casted or forged products from foundries, which are the core components and takes a high percentage of total purchase cost. There are a number of foundries supplying these products to hydropower either in Chinese or European market. Turbine fabrication (simple) cost is largely driven by heavy carbon steel, but the fabrication is simple to make. Turbine runner, injector, complex turbine

and valve fabrication and special alloy machining parts are the core commodities to RPN. Due to the high quality and technical requirements, there are a limited numbers of workshops which are competent to do these jobs. Surface treatment here refers to hard coating that is a special and advanced surface treatment on core hydro components. It is a high cost work and associated with the life of the products. There are few suppliers doing this job in Europe. However, it is not often required by customers, so for further analysis it will be skipped. Coupling bolts are important components on turbine, but it is considered relatively small in the total hardware cost. Often they are purchased together with turbine fabrication from one fabrication supplier. Only for refurbishment projects, it is needed to be purchased separately. Due to the small amount of work and high quality requirement, a few suppliers are available for this job. Coupling bolts and some other small machining components with similar condition are all defined as commodity of small machining parts.

Category	Commodity	Components
Non-critical	Standard accessories	Instruments Tools
	Servomotor	Servomotor
Leverage	Turbine fabrication (simple)	Penstock Inlet pipe Spiral casing Draft tube Turbine housing and pit liner Inspection platform
	Raw material	Casting Forging
Strategic	Turbine runner	Francis runner Pelton runner
	Turbine fabrication (complex)	Tower assembly Shaft seal Guide bearing Distributor pipe
	Injector	Turbine injector
	Special alloy machining parts	Guide vanes Labyrinth ring
	Valve fabrication	Main inlet valve
	Surface treatment	Hard coating
Bottleneck	Small machining parts	Coupling bolts

Table 7. Category of components and commodity

Following the criteria defined by Kraljic, each commodity purchased by RPN is positioned in a matrix. As seen in the figure 14, the horizontal axis represents the complexity of supply

market and the vertical axis represents the importance of purchasing. In the above matrix, the commodities are located in different categories and at the mean time the commodities in the same category appear in different features. The above matrix demonstrates a preliminary position for each commodity defined earlier. The commodities could move across categories and locate at different position in the matrix when some conditions change, for example the external market environment, the incentive of suppliers and the requirements from buyers. For instance, servomotors may become bottleneck items when they are purchased in China. The reason is that each turbine only needs one or two servomotors and Chinese suppliers are too large to have willingness of taking such small purchase order. While in Europe, there are many small workshops supply this kind of commodities. Due to this reason, RPN purchases most of the servomotors in Europe. There are three commodities in non-critical and bottleneck categories and the cost of these three commodities only takes 5% of the total hardware cost in one project. Later in the analysis, the attention will be on strategic and leverage items.

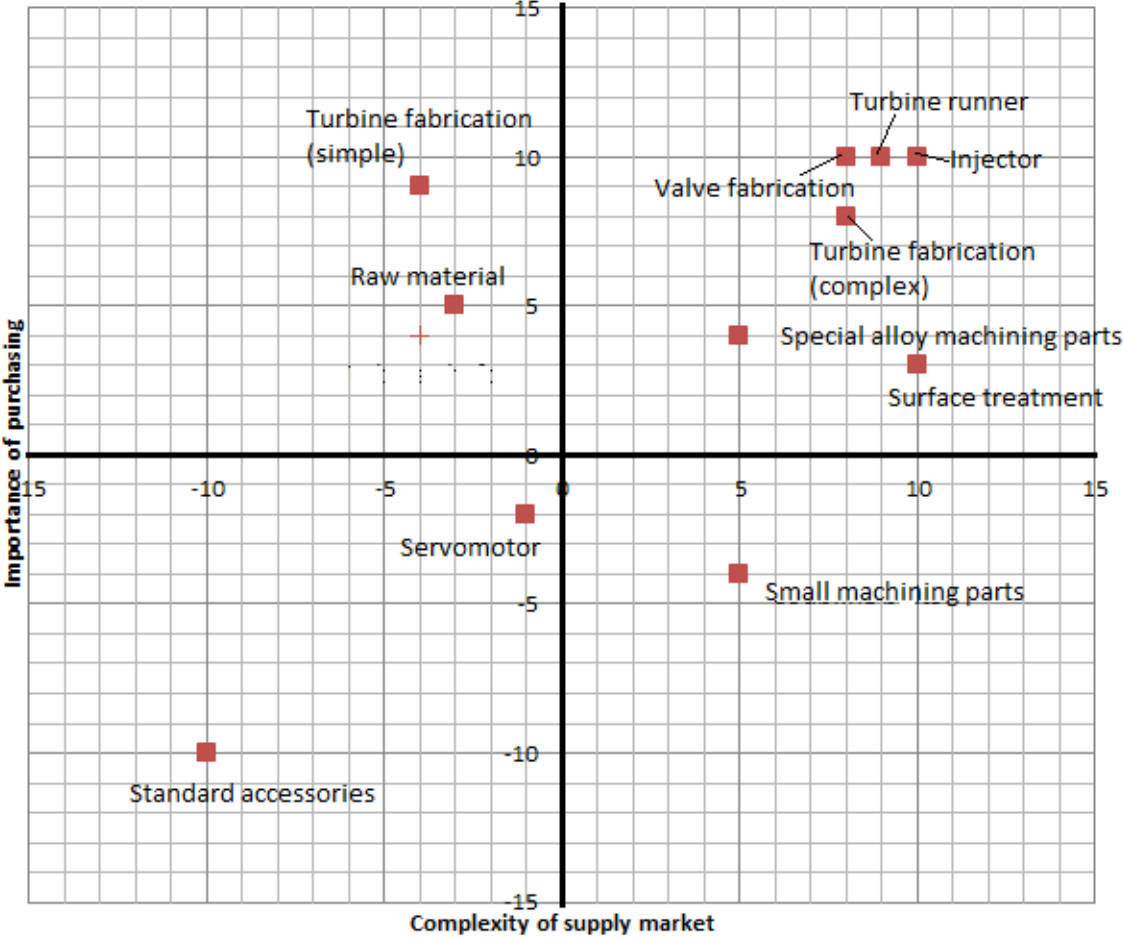


Figure 14. RPN’s commodities classification in Kraljic matrix

6.2 *Determinants of dependence*

The dependence position of small buyer towards large supplier is not occurring in all circumstances. For instance, small buyer has no dependence to non-critical suppliers as the products have a small value per unit and many alternatives are available. Caniëls and Gelderman (2007) observed that the strategic and bottleneck quadrant of the Kraljic matrix is characterized by supplier dominance. From a small buyer perspective, supplier dominance may appear in the strategic, leverage, and bottleneck quadrants. The factors that contribute to small buyer dependence towards its suppliers will be discussed in the following context.

Complying with the dependence construct summarized by Caniëls and Gelderman (2007), four aspects are suitable for the buyer-supplier relationships analysis of the case company including financial magnitude, need for technological expertise, availability of alternatives and switching costs. The dependence is explored from the above four aspects for strategic, leverage and bottleneck categories.

- Financial magnitude

When the buyer has one single supplier, financial magnitude of the exchange resources has significantly positive effect to the dependence on this supplier. For the buyer with multiple suppliers for one primary resource, the financial magnitude of the transaction will have less influence to the dependence position. For small companies, financial magnitude is the most critical issue since small companies have relatively small revenues, and consequently generate small purchase volume. Irrespective of the communication or understanding, a purchase order is essential to keep the supplier relationship.

In China, there are three primary turbine fabrication suppliers, which count for more than 80% of RPN's purchases in China. China GH and China ZF are very large suppliers, which are around three or four times of RPN on size and revenue. Their relationships with RPN are long-term with contracts, but the number of contracts has decreased in last two years. Because the order volume from RPN is only a small percentage of their total revenue, these two large suppliers have no dependence to RPN at all. In opposite, RPN maintains another supplier, China UR, which is relatively smaller than the other two large ones with long-term relationship and keeps filling it with most of the turbine and valve fabrication jobs, using financial magnitude to catch a power position in the purchasing with this supplier. In the European market, RPN maintains the relationship with around five fabrication suppliers, two

machining suppliers and about four foundries. However, the purchased volume in Europe, which counts for only 18% of total purchasing in RPN, is often too small to attract these suppliers, unless the suppliers have small work load to full fill their capacity. If customers ask for European manufacturing, RP definitely will be in a position of high dependence to its suppliers in Europe. Due to this reason, the most common issue RPN facing is to get priority in obtaining resources.

- Need for technological expertise

Technology is one of the most important factors in market competition. With the rapid updating of technology, each company invests in order to remain competitive. Technological expertise becomes important both to buyers and suppliers. In order to get a competitive position, the buyer needs suppliers with proper skills and equipment to reach quality and cost requirements. The supplier expects buyers to support their investment and give technical guidance. In heavy industry, upgraded manufacturing process, worker skills, new technology and advance equipment are changing the industry world day by day from the aspects of enhancing quality, reducing cost and shortening lead time.

Hydropower is a specialized industry and requires strong technological expertise from suppliers. Because of technical issue and intellectual property, the three large hydro competitors of RP make the most critical components and assembly in their own factories. RPN has to use a limited number of qualified suppliers in long-term relationship for each major commodity. In result, RPN as a buying company depends on its suppliers, due to the needs of technological expertise and the number of available competence suppliers. As most of the suppliers that RPN is using are capable to work in hydro, they have less need for technological expertise. RPN as a small buyer is not able to invest to any its suppliers; in consequence the suppliers do not depend on the buyer at all from this perspective.

- Availability of alternatives

In the resource dependence theory, dependence is determined by the importance of resources and the extent to which the resources are controlled by other organizations. Resources that are important creates dependence situation to an organization. Regardless of the importance of resources, the focal organization also depends on the relatively few resources controller. In other words, the availability of alternatives in terms of either resources or resources controller positively affects the dependence situation.

Hydropower industry is a special business segment different from the other heavy industry. It is cyclical business that generally does not offer stable factory base load. In general, hydro project is customer driven, environment regulated and government policy determined, which affect the schedule and design and in turn translate into unpredictable order. Due to the high technological requirements and the characteristics of hydro industry, the number of suppliers working completely in the hydropower industry is limited and all of them supply to RPN's competitors. Many of hydro suppliers not only work in hydro sector but also other sectors, such as nuclear or oil. Therefore, RPN as a buying company has relatively small amount of selection, which results in the dependence to suppliers. The suppliers own a wide selection of alternative customers and thereby have almost no dependence to a small customer like RPN. In addition, the size of project and process complexity affects the availability of supply. The larger the project or the more complex of the process is, the less availability of supply.

- Switching costs

Switching cost should be considered as one determinant of dependence. If a buyer has specific investment to a supplier, the buyer dependence to the supplier is increased accordingly, because the cost is too high to change suppliers. If a supplier invests too much for one specific buyer, consequently the supplier will also have more dependence on the buyer.

For RPN, there are no specific investments that create dependence to suppliers, but there are other switching costs that generate dependence. In general, for RPN the cost of switching suppliers can include audit cost, extra following up cost and high risk cost, as well as inspection cost if there are too many suppliers in different places to do final test.

6.3 *Sources of dependence in purchasing portfolio*

If we look more closely at the leverage and strategic categories, the suppliers that have been used by RPN during the last five years are collected and a column chart is made to demonstrate the total purchase value and order frequency to each of the suppliers. Since the purchases done in Norway are mainly for either standard or low cost components belonging to non-critical and bottleneck categories, such as instruments and piping, the Norwegian suppliers are not listed in the column chart. Some suppliers with only one time order before 2012 are discarded as well. These suppliers are not considered for future jobs mainly due to the qualification issue.

Category	Supplier	Commodity	Country	Order Frequency
Strategic	China GH	Turbine fabrication	China	13
	China UR	Turbine fabrication	China	67
	China ZF	Turbine fabrication	China	5
	Spain FA	Turbine fabrication	Spain	11
	Spain TG	Turbine fabrication	Spain	4
	Turkey GH	Turbine fabrication	Turkey	2
	Bulgaria VA	Turbine fabrication	Bulgaria	14
	China LE	Runner machining	China	26
	Spain TA	Runner machining	Spain	17
	Czech CT	Runner machining	Czech Republic	10
	China HC	Valve fabrication	China	15
Leverage	Germany SA	Raw material	Germany	1
	Italy SA	Raw material	Italy	3
	Sweden KG	Raw material	Sweden	2
	Germany SC	Raw material	Germany	1
	Romania SC	Turbine fabrication simple	Romania	13

Table 8. Commodity purchase and order frequency to strategic and leverage suppliers in five years

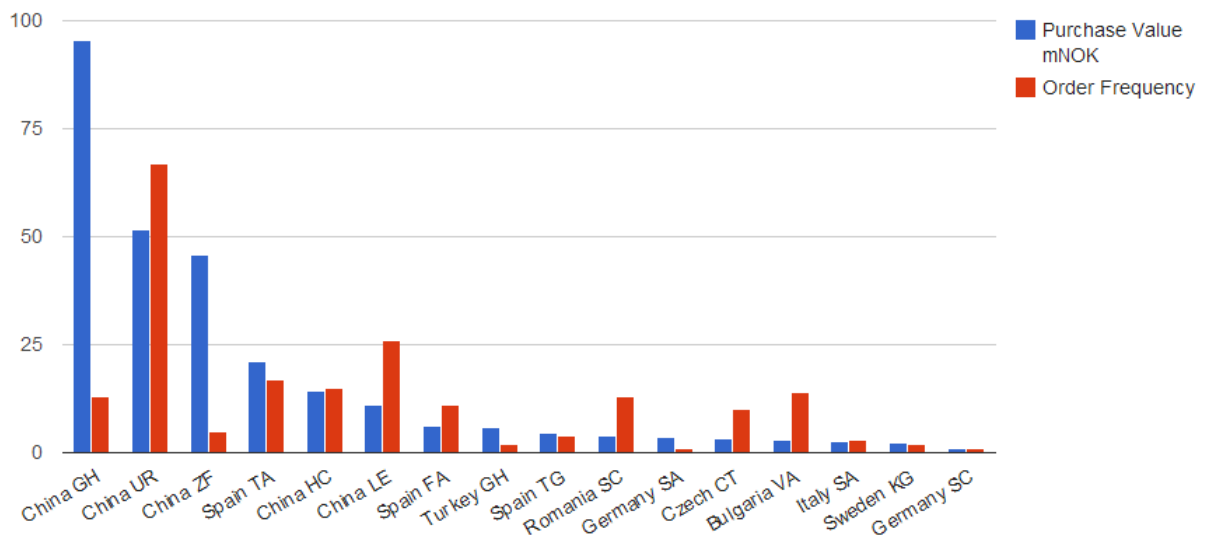


Figure 15. Purchase value and order frequency to strategic and leverage supplier in five years

All the strategic suppliers listed in the table 8 have a long-term relationship with RPN, but none of them has any formal agreement. The suppliers are randomly selected when there is a purchase order and the main criterion of choice is price. Often, more purchases occur in China than in Europe for the reason of price. Some suppliers have frequent contract with RPN, while some not. The original purpose is to manufacture most of the components in China, unless customers specify European supply. Hence, RPN initiates different goals in Chinese and

European market. In China, RPN's goal is to improve the partner supply performance and increase network, in which the partner development and bonding are sources of dependence. Although the supplier China UR has the highest transactions from RPN in terms of order volume and frequency, the relationship between the two is still one-way partner relationship, which means that only the buyer tells the supplier what to do. By contrast, a two-way relationship requires both buyer and supplier to jointly figure out what to do and how to do, which is more efficient than one-way relationship and has the high interdependence. In Europe, RPN tried to increase its network as well, but RPN is not able to commit to any supplier and build a long-term relationship with frequent contracts, in which only bonding dependence exists for RPN. During the last five years, the purchasing management is also varying due to the change of circumstance. Both China GH and China ZF have large workshops and took most of large projects from RPN in the last four years. It is the reason that both of them have extreme high order value with very small order frequency in the column chart of figure 15. However, the orders to these two suppliers are less and less since 2012 as the supplier prices have been going up and the buyer dependence have been increasing.

The last five are leverage suppliers supplied raw material and simple turbine fabrication. Often the raw material is purchased by fabrication and machining suppliers to reduce supply risk. So there is not much purchase volume for raw material supply, the suppliers are often chosen according to price they offer. The purchase goal is to receive required material with required quality. In this situation, RPN has transactional sources of dependence to the four foundries mentioned before. RPN starts to use the suppliers of Romania SC and Czech CT in 2012. Romania SC is a small workshop for supply of simple fabrication and Czech CT is also a small workshop with qualified skills and advance equipment for runner machining. The intention of RPN is to build long-term relationship with these two suppliers and leverage the purchased commodities. Thus partner development would be the dependence source in the future.

The most diversified components needed by RPN are in non-critical and bottleneck category and mostly are purchased in Norway considering the easy to manage and short in delivery. More than 15 Norwegian suppliers have been used by the buying company in these two categories. For non-critical items, the goal of the buyer is to meet quantity target and the actions of its suppliers is to transact and fulfill the desire of the buyer. Therefore, the source of dependence is resources dependence. In accordance with the findings from Caniëls and

Gelderman (2007), the interdependence between the buyer and its suppliers is very low in the non-critical category. As there is no difficulty to purchase the non-critical items, the buyer has no dependence to any single supplier and these non-critical suppliers do not rely on one single customer. The dependence between buyer and supplier is balanced. For bottleneck items, RPN needs customized components with high quality requirements. Therefore, a few small workshops are able to meet the desire of the buyer. To the buyer, the source of dependence is not only transactional resources but also operational effort. However, it is not a supplier dominance case for RPN since the need is not frequent and Chinese supply can be backup plan.

6.4 *Relationships and actions*

There is no single approach of managing buyer-supplier relationships for a small buyer that has no explicit business strategy. The purchasing strategies should rely on the knowledge and understanding of both the buyer and supplier and circumstances that they are in (Cox 2004). The choice of buyer-supplier relationships within each category of purchasing portfolio has impact to the dependence position and purchasing competence of a small buyer. The main principle of reducing dependence is to move along the two directions that is reducing either the profit impact or the supply risk. In the following context, the options of buyer-supplier relationships and corresponding actions in each category are suggested to small buyers with reference of strategic directions suggested by Gelderman and Van Weele (2003). Table 10 provides an overall summary of various buyer-supplier relationships and corresponding dependence in each category.

- Strategic items

In previous researches, strategic items required the buyer to have a strong attractiveness and a strong relationship with the suppliers. However, the suppliers in the strategic quadrant are treated differently by a small buyer. For the core commodities in RPN, such as turbine runner, partner relationships with a few key suppliers always contribute to the competitiveness of the company. Such relationships require joint development, mutual trust, mutual commitment and open information exchange, accordingly generates total interdependence between the buyer and suppliers. In addition, the dependence in such relationships should be symmetric in order to yield value creation (Heide 1994). For the sake of the symmetric dependence, it is important to build relationships with an appropriate size of suppliers which have incentive to cooperate and improve performance. As the interdependence is moving up further, the relationship

could become a strategic alliance or a vertical integration. Vertical integration means that the buying company operates its own workshop and insource the complete core commodities, but this approach will increase the company investment, which may not be suitable for a small company.

Other core commodities, such as Pelton turbine injector, can follow the similar way described above, either partnership or vertical integrated workshop. The injector is relatively small, but complicated and important assembled part on a Pelton turbine. The assembly of an injector is the most critical process. There are not many workshops that have the capability to make the complete injectors according to RPN requirements, but each component in one injector can be made by small machining workshops. In order to reduce dependence to few suppliers, insourcing assembly and outsourcing components can be an efficient approach. The disadvantage of this approach is that RPN takes complete responsibilities of quality risk and the operation cost will be increased due to the purchasing activities for more than 50 small elements in one injector design.

For complex fabrication commodities, the purchasing activities can work separately between China and Europe according to the current purchasing situation in RPN. In China, RPN should maintain the stable relationship with supplier China UR. Partner relationship with value creation dependence may be necessary for a long-term development. In Europe, RPN purchases randomly from different fabrication workshops. Without a stable purchase volume in Europe, terminating partnership and looking for competitive alternatives might be a desirable approach for a small buyer like RPN to reduce supply risk. According to the resource dependence theory, RPN will be highly dependent on the supply from China UR, but less dependent on European suppliers. When it is not possible to reduce the dependence of one party to the other party, then one should increase the dependence of the other party instead. It could occur through increasing the demand to the supplier or adding specific investment. If a partnership develops in an undesirable way, the buying company may have to search other approaches to reduce the dependence on the certain suppliers. The buying company could either search new alternative suppliers or develop easy manufacturing design to reduce supply risk. In this way, the fabrication commodities will move from strategic quadrant towards leverage quadrant as the supply risk is reduced. Looking for alternatives might be easy to carry out, while decomplexing design may be a challenge to a small buyer. The drawback of frequently using alternatives is that it generates additional switching costs.

Overall, RPN should find the most competitive supplier according to customer preference among the qualified suppliers and have long-term cooperation with a few of them. Table 9 illustrates the general different strategies for Francis turbine / main inlet valve (MIV) and Pelton turbine in two different supply markets with respect to strategic items.

Regardless of any long-term relationship, it is vital to maintain some alternative qualified suppliers in case of shortfalls. Some other factors should also be considered if the purchases are randomly happening in Europe. For instance, the availability of suppliers may effects the delivery time and quality.

	China	Europe
Francis / MIV	Partnership	Long-term relationship
Pelton	/	Partnership

Table 9. The relationships of RPN and its suppliers in Chinese and European markets

- Leverage items

The leverage quadrant in the Kraljic matrix is characterized by buyer dominance(Caniëls and Gelderman 2007). Gelderman and Van Weele (2003) proposed two strategic directions that are exploiting buying power and developing a strategic partnership. To gain leverage in a relationship, Buchanan (1992) proposed to the buyer either increase the benefits provided or decrease the costs of the suppliers. A small buyer has difficulty to achieve any of them with the factor of financial magnitude. Thus, the feature of buyer dominance in leverage quadrant is not applicable to small buyers. The buyer dependence can be managed through long-term relationship or strategic partnership. The long-term relationships have no commitment on contracts and that means the buyer has relatively low dependence on its suppliers. Strategic partnership is also available for leveraging suppliers in order to ensure the stable supply and supplier performance.

RPN could leverage the purchasing of simple fabrication and raw material, but as a small buyer, the order volume is still not attractive to the large suppliers. RPN often exploits buying power through pooling all the leverage and strategic items to one long-term supplier. That means to move leverage items towards strategic quadrant. For refurbishment projects, competitive bidding and short-term contracts are feasible options to keep leverage. RPN is trying to pool the purchase items and use the supplier that provides the best offer.

- Bottleneck items

In the bottleneck quadrant, the buyer normally has a high dependence to its suppliers. Thus the buyer's choice is either take it or leave it. Take it means accepting the dependence on a specific supplier to ensure the supply. Leave it means introducing substitutes to reduce the dependence to few suppliers. Introducing substitutes could be either decomplexing the requirements and developing simple product substitutes or searching new suppliers from different supply market. In this case, short-term relationship becomes appropriate after the new products or new suppliers are introduced. When the replacement is not possible, in order to gain a better deal or to ensure the supply, the buyer may have to make an agreement with the particular supplier from a long-term point of view. This is also consistent with the strategic directions suggested by Gelderman and Van Weele (2003).

The small machining parts purchased by RPN are often for refurbishment projects and are positioned in bottleneck quadrant. The volume and demand is absolutely unpredictable. Due to this reason, the bottleneck suppliers used by RPN are often from other industries or are supplying to diversified industries. The incentive of these suppliers to work for a small buyer is moderate or low. In practice, RPN maintains relationships with a few small workshops in Norway, but the buyer dependence is not very high, since RPN has an expensive alternative solution.

- Non-critical items

Gelderman and Van Weele (2003) indicated two strategies for non-critical category: pooling requirements and individual ordering. Accordingly, long-term and transaction are the two relationship options in this category. The approach for long-term relationships aims at pooling the non-critical requirements and reducing the operation costs. A frame agreement with preferred suppliers or frequently used suppliers can be efficient to maintain long-term relationships. For other items, when the pooling is not an option, the purchasing has to be carried out individually. The transaction relationship is sufficient to meet the buyer's quantity target.

Irrespective of hydro turbine and main inlet valve, RPN supplies a large number of standard accessories to customers, for example, instruments, piping, standard valves and pumps. RPN has a long-term relationship and frequent contracts with some suppliers offering instruments, standard valves and pumps in Norway. As there is more than one supplier available for each non-critical item, RPN has very low dependence to these suppliers. For some non-critical

items that are too scattered to conduct pooling, RPN only proceeds with individual orders and has one-time or repeated transaction relationship with these suppliers.

Category	Buyer-supplier relationships	Level of buyer dependence	Source of dependence
Strategic	Strategic alliance	High mutual	Exploitative Explorative Joint development
	Strategic partnership	High mutual	Partner development
	Locked-in relationship	High	Bonding
	Long-term relationship	Low	Bonding
Leverage	Long-term relationship	Moderate	Bonding
	Strategic partnership	High mutual	Partner development
Bottleneck	Long-term relationship	Moderate	Bonding
	Short-term relationship	Low	Operational effort
Non-critical	Transaction relationship	Low	Transactional resources
	Long-term relationship	Low	Bonding

Table 10. Buyer-supplier relationship and dependence for small buyers within each category of purchasing portfolio

6.5 Discussion

Generally, short-term competition or long-term collaboration is not the only option of relationship available to a buyer, especially to a small buyer that is completely flexible in purchasing. There is a paradox about the relationships and dependences. Pfeffer and Salancik (2003, P46) stated the buyer which requires one primary input for its operations will be more dependent on the one supplier offering that input than the buyer that use multiple inputs from different suppliers in small proportion. Gelderman and Van Weele (2000) indicated that both buyer and supplier have an incentive to reduce the dependence to the other organization due to the natural conflict of interests in buyer-supplier relationships. Following the above logic, short-term relationships and multiple sourcing should be the preference approach for small buyers to lower the buyer dependence. However, value creation also occurs in long-term and partner relationships which require high dependence. That means high dependence cannot be skipped in some circumstances. When the level of dependence ranges from low to high, the relationships should be symmetric(Buchanan 1992). The symmetric high dependence relationships depend on the importance of resources and the willingness of suppliers to work with the buyer. Cox (2004) has indicated that the decision of relationships cannot be made in isolation because the suppliers have their own goals and motives. When the uncertainty increases, the suppliers who have an incentive to work with the buyer become important to

the success of the buyer in purchasing(Buchanan 1992). As small buyers, it is essential to build balanced relationship with appropriate suppliers which have an incentive to cooperate for items in the strategic and leverage category.

Kralijc's purchasing portfolio is a useful tool in practice to identify effective differentiated purchasing strategies. The case study in this thesis provides valuable insights in the practical employment and strategic discussions. The purchasing portfolio can be seen as an entry approach for a small buying company in identifying strategic purchasing directions. The positions in the matrix are viewed as the key in determining the buyer-supplier relationships and purchasing strategy. The basic principle of purchasing portfolio is to minimize supply risk and make the most of purchasing power(Emerson 1962), and thus the positions in the matrix are not fixed. On one hand, when the market environment and condition change, the commodities positions in the matrix and the relevant buyer dependence will be different and consequently change the strategy to buyer-supplier relationships. On the other hand, the small buyer can always search for possibilities to move to the positions with less risk and less dependence.

Gelderman and Van Weele (2003) found three additional parameters that should be included in the purchasing portfolio analysis, including the overall business strategy, the situations on the supply markets, and the performance capacities and intentions of suppliers. The purchasing approach selected by the buyer should comply with the overall business strategy. If the overall strategy focuses on customers and their requirements, the products are more customized and more items are in strategic and bottleneck quadrants. If the company is looking for cost reductions and efficiency, more standard products will be designed and more items will move to leverage and non-critical quadrants. For a small buyer, a company business strategy is important to guide the purchasing in practice. However, working without a fixed strategy may allow a small buyer to react with more flexibility in the buyer-supplier relationships.

In some cases, the small buyer can bring the customer in the buyer-supplier relationships to reduce the buyer dependence. Emerson (1962) stated that when C-A relation is connected through A with the A-B relation, a simple linear network C-A-B is formed and at the mean time the properties of A-B are altered. The involvement of C in A-B relation breaks the previous balance between A and B and gives A power advantage(Emerson 1962). For the major commodities purchased by RPN, there are often three or four suppliers capable of the

job in the project country. The suppliers do not care much whether large or small hydro equipment company wins the project, because they have the same probability to receive the order from the hydro equipment company. From the supplier's perspective, good performance will make good reference for supplier itself and also make good reputation to the end customers. This is the situation that the customer, RPN and its suppliers form a power network(Emerson 1962). Here, the customers are playing an important role in the relationships between buyer and supplier. The customer is connected with the buyer-supplier relationships through the small buyer, and at the mean time the small buyer gains power advantage from the customer. The usage of customers' power can be considered when there are only a limited number of suppliers available in the market designated by customers and the customer is well-known. However, when supplier selection for major parts is driven by customers, the small buyer will lose flexibility and may suffer from unbalanced dependence. In addition, the buyer-supplier relationship can also be strengthened by enhancing the communication, providing the supplier with more order volume, or involving the supplier in product development or value analysis(Olsen and Ellram 1997).

7. Managerial implication

Small companies are more flexible in purchasing due to their special characteristics. Small companies that have low purchase volume and unstable demand should have different supplier relationships from large companies in order to be competence in the market. From managerial perspective, it is essential to understand the small buyer's dependence towards its suppliers in buyer-supplier relationships. Sufficient understanding of dependence can lead to appropriate buyer-supplier relationships and take competitive position in purchasing. This study provides important guidelines for small buying companies in terms of buyer-supplier relationships and dependence. Small buying company should focus on the type of dependence and the factors determining the dependence in buyer-supplier relationships. The purchasing portfolio can be used to separate different suppliers and identify the corresponding dependence for a small buying company, in particularly a small company supplying high diversified products to customers.

Continuing on the ideas expresses in the previous paragraph, for commodities in strategic and leverage quadrants, strategic partnerships are necessary to small buyers in some situations. The small buyer should assess the risks in these relationships and explore possibilities to reduce dependence. The small buyer should become aware of own dependence basis and should also investigate to what extent the dependence is acceptable. When there are sufficient alternatives, long-term relationship is suitable to all categories in purchasing portfolio. The buyer dependence to suppliers is relatively low for long-term relationships. In other words, the buyer has no commitment to its suppliers in long-term relationships. A short-term relationship can be considered for bottleneck suppliers. Most of the time, transaction relationship is taken by small buyers in the relationship with non-critical suppliers. In this situation, the suppliers are selling standard parts to a large number of customers. The small buyer is only one of the customers to the suppliers. Therefore no one depend on the other. The basic idea of purchasing strategy is to reduce either profit impact or supply risk, so that to reduce the buyer dependence. There is no single option of relationships to each supplier and no fixed decision to the purchasing department of a small buying company. The purchasing decisions in a small buying company are flexible to be adjusted in anyway at any time with the purpose of improving the total business profit.

8. Conclusion and Future Research

There has been relatively little research on buyer-supplier relationship and dependence with respect to small buying companies. The prior literatures inclined to concentrate on small companies as suppliers to large companies as buyers. The objective of this paper is to look into the dependence in buyer-supplier relationship from the small buyer's perspective. A case is used to explore the buyer-supplier relationship in practice. The existing theories are applied in the purchasing practices of one small company.

To answer the first research question, this study has examined the small buyer dependence towards large suppliers due to the characteristics of small company from four aspects: financial magnitude, need for technological expertise, availability of alternatives and switching costs. The second research question is answered by the explanation of four dependence factors and seven sources of dependence. Before introducing the purchasing strategies, the two dimensions - profit impact and supply risk in purchasing portfolio are used to differentiate the suppliers. A variety of buyer-supplier relationships are then suggested to small buyers and the management of these relationships shall be according to the usage of purchasing portfolio and buyer dependence. Based on the theory research and the case study, a guideline is made to the small buyers, shown in table 10. The table summarizes the relationship options in each category of purchasing portfolio and the corresponding dependence level and sources of dependence. The results are empirically tested by the case. Different purchasing strategies are suggested for each type of buyer-supplier relationships.

Besides the factor of dependence, many other factors, such as environmental uncertainty, country culture, the capacity change of individual supplier and the purchasing behavior of buyer may also influence the decisions of buyer-supplier relationships. Future studies with respect to small companies should seek additional drivers of buyer-supplier relationships and examine the impact to small buyers. In addition, this case study is specific in hydropower industry. The buyer-supplier relationships and the purchasing practices may be different to a small buyer in other industries, due to the different characteristics and supply circumstances.

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