PURCHASING IN SUPPLY CHAINS

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ABSTRACT

From a purchasing point of view, it can be argued that in order for a supply chain to be efficient the cost of purchasing must be balanced with risk pertaining to the supply market and the purchased product.
To decide on the appropriate forms of supplier relationships today, we argue that there are three main dimensions to be considered:

- A more complex environment. There are different solutions for different kinds of goods and markets depending on supply network, product complexity and legal issues pertaining to immaterial software rights.
- Supply chain efficiency. Three dimensions define supply chain efficiency: Agility, the ability to handle short term change, Adaptability, the ability to handle long term change and Alignment, the ability to ensuring that the interest of the members also is in the interest of the supply network as a whole. All three aspects must be considered when choosing the appropriate form of supplier relationship.
- Product life cycle. Depending on where in the life cycle a product is, the number of potential suppliers and customers vary; hence a different type of relationship is needed.

The new more complex supply networks where the actors assume many different roles, an increased number of tiers and the more complex legal situation will make the choice of relationship form dependent on the situation and need to be re-evaluated frequently.

Key Words: Supply Chain Management, Purchasing strategy, Supply Chain Efficiency, Complex Supply Networks, Product Life Cycle, Supplier Relationship, Legal Considerations.

1. Introduction

It is important to identify and select a supply chain network structure that is effective both for the customer and the supplier (Holmström et al 2000, Hoover et al 2001, Bucklin 1966). Hence the customers buying decision process should be coordinated with the suppliers supply process in an efficient supply chain. From a purchasing point of view, it can be argued that in order for a supply chain to be efficient the cost of purchasing must be balanced with risk pertaining to the supply market and the purchased product. The greater the uncertainties in supply and demand and the increased use of manufacturing, distribution and logistics partners the higher exposure to risks in the supply chains (Christopher et al, 2002).
In the following we will discuss three aspects of the increased complexity in choosing an appropriate form and level of relationship with a supplier in a given situation.

- A more complex environment. Kraljic (1983) showed that purchasing should not be standardised and that there are different solutions for different kinds of goods and markets.
- Supply chain efficiency. Lee (2004) argues there are three dimensions defining supply chain efficiency: Agility, the ability to handle short term change, Adaptability, the ability to handle long term change and Alignment, the ability to ensuring that the interest of the members also is in the interest of the supply network as a whole. All three aspects must be considered when choosing the appropriate form of supplier relationship.
- Product life cycle. Depending on where in the life cycle a product is, the number of potential suppliers and customers vary, hence a different type of relationship is needed.

To decide on the appropriate forms of supplier relationships today, we argue that these three main dimensions should be considered simultaneously as an aid in choosing the appropriate form of supplier relationship and level of commitment.

2. A More Complex Environment

A widely used model is Kraljic(1983) who developed the matrix in figure 1 to illustrate the different purchasing strategies. Kraljic differentiated according to “importance of purchasing” and “complexity of supply market”. Fundamentally he argued for a differentiation according to complexity of supply market. Behind the term “complexity” we may also have more soft factors like supply chain confidence in terms of attitudes and perceptions of the users and members of the supply chain (Christopher and Lee, 2004). If, for instance, the buyers are worried about receiving their deliveries in time they will either order earlier or increase the order quantity, adding cost. Because of such uncertainty of supply the telecom company Cisco in 2001 had accumulated large component stocks, when the market suddenly collapsed. Later this Cisco had to write off a loss of $2 billion.

High importance of purchasing	**Materials mgmt.** "Leverage items" (e.g. electric motors) Abundant supply	**Supply mgmt.** Strategic items (e.g. scarce mtr, high value components) Natural scarcity
Modest importance Low importance of purchasing	**Purchasing mgmt.** Abundant supply No critical items	**Sourcing mgmt.** Bottleneck items (e.g. electronics Production-based scarcity
	Low complexity of supply market	Modest complexity High complexity of supply market

Figure 1 Kraljic's purchasing strategies

Some 15 years after Kraljic, Spekman et al (1999) discussed purchase differentiation. Instead of "importance" and "complexity of supply market" Spekman et al used "technical complexity" and "commercial complexity" as the differentiating factors. Different levels of sourcing and levels of cooperation are described reflecting different supply relations. Spekman et al (1999) emphasized the differentiation dimensions as "length of planning horizon, level of corporate involvement, criticality of the purchased product/service and the level of shared norm development. It can be seen that most companies should plan to engage in relatively few highly collaborative relationships: the kinds where the mutual risks and rewards are significant enough to define corporate success or failure." The reasons are that they require heavy resources and that they are hard to execute because strategic objectives frequently conflict and cooperation can be maintained only as long as mutual competitive advantage can be derived. The consequence is that the majority of relations will be based on traditional open-market interactions (Spekman et al 1999).

2.1. The evolution to more complex environments

Two of the sources of increased complexity are more complex products and more complex relationships among members of the supply network. In regard to the more complex supply network we note that the traditional hourglass model of a manufacturer buying components and raw materials from a number of suppliers, manufacture something out of it and selling it to customers is increasingly replaced a model where the customers are served by a network of resources owned by the company or its business partners such as contract manufacturers and third party logistics providers. Even the word "supply chain" is less relevant in the telecom industry as from the system producer's point of view it is better described as a network with 6-8 levels, if we include the phone user, the network operator, the systems producer, systems supplier, first tier supplier (part systems), second tier supplier (complex component parts, cable-trunks, racks and magazines) and third tier supplier (simple components, cables and metal parts), serving a particular market as seen in figure 2. Moreover, the supply network with many parallel flows is a better description as many companies in the telecom industry have outsourced large portions of their production to one or more contract manufacturers and are keeping marketing and product design, hence increasing the need for network coordination and increased focus on collaboration and relationships.

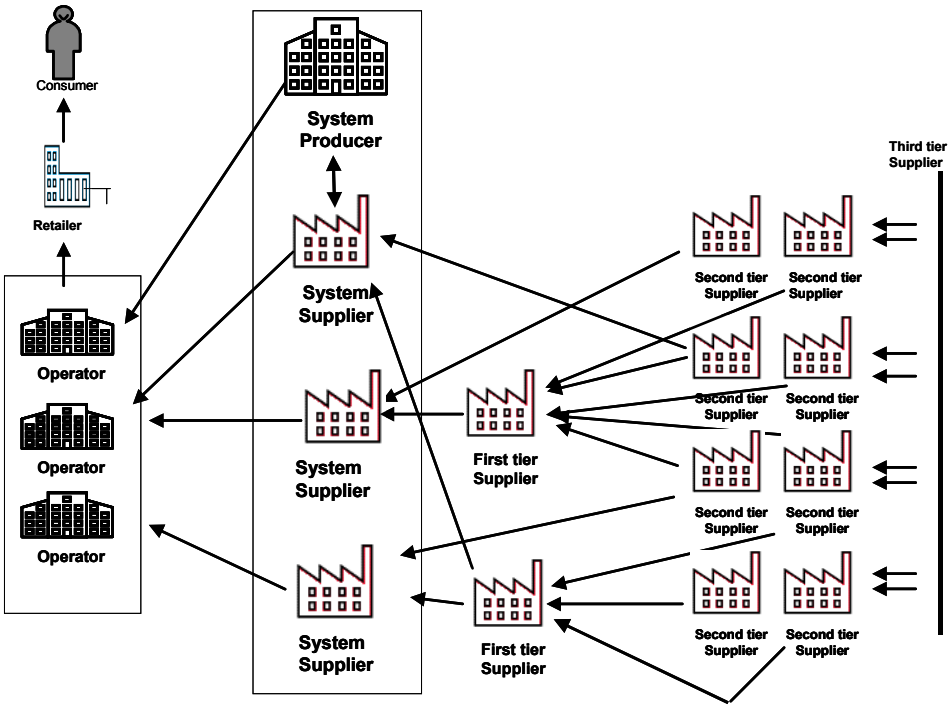

Figure 2 Telecom supply network from a systems producer's point of view.

2.1.1. Complex Network

In the telecom sector the systems supplier are contract manufacturers such as Solectron or Flextronics and in the 1st tier level you find companies like IBM and Microsoft. In the 2nd level you find complex component producers as Texas Instrument, Intel as well as software companies such as Microsoft. The 3rd level consists mainly of smaller part producers. One reason for the complex network is the extensive outsourcing from large companies such as ABB, Ericsson and Volvo. One other reason is that the main actors in the network want to decrease the number of supplier in direct contact. The chosen systems suppliers have taken over the direct contact with smaller suppliers producing less complex products like modules as part of systems and components, both high tech and standard components. The restructuring gives a hierarchy, figure 2. The network hierarchy means that the relation between suppliers and buyer in one level is more similar than before.

To complicate the picture even further, a member of the supply network can be a supplier, a contract manufacturer and a competitor at the same time. An example is the Korean company LG Electronics who is manufacturing parts for several competing manufacturers as well as marketing their own products under its own brand.

As we have seen, the trend in today's industry goes towards a more complex business environment, where the customers in each level try to reduce the number of suppliers but still outsource more of its production facilities. This means that each company increasingly concentrates more on their core business and purchases other parts from their suppliers or subcontractors. It also means that a greater part of the total added value is purchased. These products/systems purchased become a more essential part of the company's total business. Therefore purchasing has to be managed in a more strategic way.

Generally speaking the complexity of the delivered product decreases further down the network hierarchy. This affects the relation between supplier and buyer, and means that the purchasing strategy, tactics and operations will change depending of where in the network the

supplier or buyer is situated. Still every level has to deal with different suppliers and a differentiation of strategies is therefore helpful.

Kraljic suggests that the purchasing strategy is differentiated after evaluating the complexity of the supply market and the importance of the purchased product. This is less relevant in the telecom industry today as the network has evolved into many parallel flows and members assuming multiple roles. Furthermore, we distinguish between levels in the supplier hierarchy as we have seen a clear difference in behaviour depending of where in the hierarchy the buyer is situated. We use separate models for each network level in order to capture suitable strategies, when the buyer may be the systems producer, the systems supplier, first tier supplier, second and third tier supplier. After selecting a purchase strategy we also need to select a proper purchasing method depending on the complexity of both the existing supplier market as well as the complexity of the product/service you intend to purchase, which differ depending of where you are situated in the supply network chain.

In the telecom industry innovation increasingly means introduction of new services for mobile phone consumers rather than more efficient hardware. This requires a much closer cooperation between the systems producer and the operators. Ericsson has made the decision to focus on these services and have outsourced a large part of their equipment manufacturing to be able to meet the new business environment. In the future we might see a lot more of companies in the second level of the supplier sector finding opportunities either for completely new companies, or as component suppliers wanting to expand their business by adding value in the value chain. The telecom and the car industry are good examples of this new trend and it will spread over to other types of industries.

We will now describe the challenge to adjust the supply strategy for customer and supplier in selected situations referring to the following dimensions: “number of suppliers” (dominance) and “product complexity”. Compared to Kraljic and Spekman we distinguish between “a few dominating suppliers” and “a restricted number of suppliers”.

Situation: a few dominating suppliers – high product complexity.

A few dominating global suppliers mean a risk that the customer cannot get required parts or services that he wants, as well as the continuous risk of rising prices, where there is no competition. Examples of such systems suppliers are Cisco and IBM. One software supplier is Microsoft, which is dominating the software for a lot of industries[1]. The main risk within an industry like telecom is capacity shortage, which means that you cannot get enough “critical” subparts or systems. The strategy then is to be agile regarding the required technical solution so they can use an alternative system/ different subpart delivered from the same, or some other supplier. By aligning the goals of the supplier with those of your own he is as dependent on you as a customer as you are of him as a supplier and will go an extra mile to secure your need. Of course it is necessary that the quality requirements will be secured. Furthermore, you need to anticipate any long-term changes in product demand and be ready to re-evaluate your relationship with the supplier.

Situation: a few dominating suppliers – low product complexity/ standard products

With few dominating suppliers and standardised products the best purchasing strategy is utilize the aligned interest with your peers and cooperate on the telecom industry level in order to get high volumes enough to get your requirements heard in relation to other industries

[1] An example from the automotive industry is Bosch, serving the truck manufacturers globally with electronic fuel injection systems. Individual truck companies are too small to influence Bosch and discuss individual solutions.

like the data or the game industry with much higher volumes than the telecom industry. Examples of suppliers with standard product of low complexity are Knurr and Segerstöm&Svensson producing electronic cabinets and magazines in different sizes.

Situation: a restricted number of suppliers – high product complexity

The situation is less risky than with a few dominating suppliers, but still needs caution since a drop of supplier capacity will affect the market over time with increasing prices. The normal purchase solution is to use traditional tenders getting offers from a number of suppliers based on detailed specifications. Examples of systems suppliers are Flextronics and Solectron. Other hardware examples for complex components are Texas Instrument and Philips, which operate single global plants serving all telecom customers globally and the computer games industry as well. Buying companies like Ericsson and Motorola are too small to influence suppliers like Texas Instruments and Philips, but the number of suppliers are enough to decrease the supply risk.

Situation: a restricted number of suppliers – low product complexity/ standard products

Ericsson, Motorola, Nokia, etc buy standard components from for instance Siemens and Motorola. We suggest a mix of the traditional sourcing strategy (more costly) and a standard invitation for offering a "Volume contract" (if volume is large enough) or an e-RA, a reversed auction on the Internet. The selected solution depends on standardisation and volume as well as the size of the buyer companies.

Situation: large numbers of suppliers – high product complexity

The situation is seldom relevant since there is normally no high complexity of an average supplier of standard products.

Situation: large numbers of suppliers – low product complexity/standard products

The situation is seldom relevant since Ericsson, Motorola, Nokia, etc buys component indirectly by letting the systems suppliers be responsible.

More complexity is expected in other industries when they become more complex in the same way as the data & telecom industry is today. When the business environment is more complex you need to have closer contacts with the remaining few suppliers, which means that you will become more dependent on your supplier base.

Not to jeopardize your own future business it's important that you select the "right" suppliers that will fit into your decided purchase strategy and supply chain solution. Please note that a "right" supplier today might not be suitable a few years later. Therefore you need to monitor your supplier base regularly and evaluate their performance periodically to determine when the supplier will deviate from the expected performance. After increased resources are used to set things right over a longer time you consider the expensive alternative to replace the supplier

2.1.2. Complex Products

Adding to complexity in the telecom industry is the complexity of the products themselves. The products are often assembled from a large number of components adding to the need for planning and coordination of the network. The components may also be complex as they are based on a particular technology or manufacturing process limiting the number of potential suppliers or possible contract manufacturers.

The product complexity is likely to increase as the innovative R&D is increasingly introducing new services for consumers. This requires a much closer cooperation between the

systems producers (Ericsson, Nokia, Siemens, Alcatel etc.) and the operators (Vodaphone, Telefonica, China Mobile etc.). Ericsson has made the strategic decision to focus on services and has outsourced a large part of their equipment manufacturing. The fewer the suppliers the more sensitive the relation to the suppliers is from the outsourcing company point of view. With few suppliers you have to collaborate much more carefully.

2.1.3. Legal complexity

The legal risks compared to the commercial risks are a new increasing risk exposure today and even more in the future, when the software contents in the products will increase. This new risk factor is not mentioned or discussed either in the existing literature or elsewhere.

Software products will increase the legal risk of being sued in court, if the software product is used in a way that will come in conflict with applicable agreement or law. The reason to this situation is that you normally don't buy software products as you only rent them. In all software agreements you can find the conditions under which are you allowed to use the actual software product. In most cases the software owner wants to know, who is the end-user of his product. The reason to this is, that he wants to have control over the user and that the license conditions are followed. Therefore the software owners are very strict with all OEM-users and the sub-license conditions and ever more if there is a sub-sub-license situation. All these software conditions will complicate your Supply Chain in one way or the other, due to a need from the software owners to control the physical flow of their products. Please note that, if you not are aware or not willing to set up your Supply Chain to meet with these new software conditions, you dramatically increase your legal risks.

One problem is purchasing/renting innovative software. The experience in systems producers is that innovative software often is found in smaller software companies. To buy such software however, may be risky. As the same innovations often are developed in several competing companies, or almost the same innovation is developed in more than one company at the same time. The question of intellectual property rights may be difficult. Small software companies have often no resources to make global checks on property rights. Later, if it is detected that the property rights are violated, the cost may be high enough for the company to go bankrupt. They are not capable of covering eventual infringement costs after a court verdict Therefore these software companies in most cases refuse to take responsibility for the ownership of the software. Consequently a large systems producer is reluctant to buy from such small companies.

One solution however is that the buyer contacts a large systems supplier dealing with similar software products and asks them to use the small software company as sub supplier and take responsibility for the whole software package. In this case a close cooperation is established with the innovative small software company but the legal problems are taken care of by the large systems software supplier.

Figure 3 describes the dilemma for the customer. Unique software products from small companies create both a legal and a commercial risk. The legal risk is to be sued from third party and the commercial risk is that the small software company goes bankrupt and the buyer no more can or is allowed to use the actual software.

Some of the small software companies quite often sell their products with none or a very limited protection towards any violation of any third parties IPR or patent rights and you as their customer have then to take the full responsibility and risk. Even if some of these small companies will accept to take the full IPR responsibility it will not help, as they just will go bankrupt if you claim they will take full economical responsibility, as experience tell with these smaller companies.

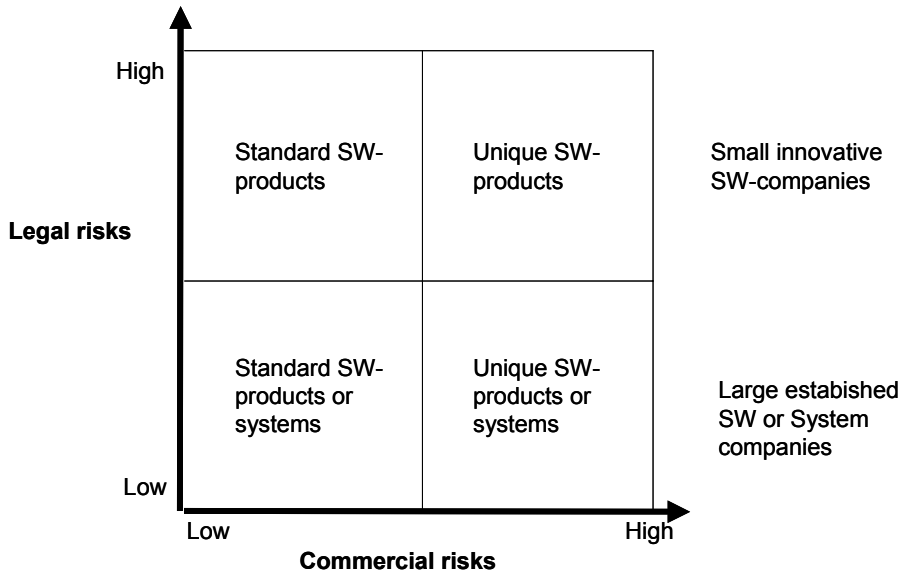

Figure 3 Software influence on the risk exposure

This is an important reason why you have to analyse your risk exposure in the Supply Chain and when your risk is determined to be too high you should avoid those small suppliers and try to minimize the number of qualified suppliers. In many cases the Systems Producers do not dare to use these small innovative software companies as their suppliers, because of the high risks exposure. The solution is to use a larger well-known software supplier to include the actual smaller software company's software products in his system or software package, which becomes more and more common today. All these considerations will have effects on the whole Supply Chain. If you don't work actively to solve these new risk situations, your total risks might increase compared with a traditional Supply Chain setup. The consequence is that all System Producers are getting more dependent of each selected supplier, when you reduce the number of suppliers, and the importance of choosing the "right" supplier increases.

3. Supply Chain Efficiency

It is reasonable to assume that for a network to be effective not only must the nodes themselves be effective but more importantly, the linkage between them must be effective. Hau Lee (2004) presents a framework for assessing the efficiency of a Supply Chain. It consists of three components each concerned with a specific time frame. Agility is the capability to deal with short-term change such as unexpected demand and component shortage. Adaptability is the capability to deal with long-term change such as shifts in customer demand and new technology. Alignment entails ensuring that the interest of the members also is in the interest of the supply network as a whole. If a member in an aligned network for example reduces its inventory, the entire Supply Network will benefit by total reduced inventory, and shorter throughput time. An agile Supply Network should be able to absorb and handle minor demand variations over time. The adaptive supply network might handle larger changes in demand through a type of early warning system that involves all levels of the actual Supply Network to be able to take proper actions and correct the delivered volume to avoid both shortage and over stocking of products. To achieve agility and adaptability the organisation needs a reliable forecast system able to adapt to larger demand variations in an early stage. The forecast tool needs skilled and experienced personnel, with ability to sense major increases or decreases in volume from the customers as soon as the change excesses a predetermined level.

It is also important that the forecasting function at the System Producer has the authority to take corrective action towards the whole supplier network. In order to mitigate the bullwhip effect, one of the most important keys to success is to inform the whole network at the same time of any dramatic change in the forecasted volumes (Lee, Padmanabhan, and Seungjin, 1997), as illustrated in Figure 4.

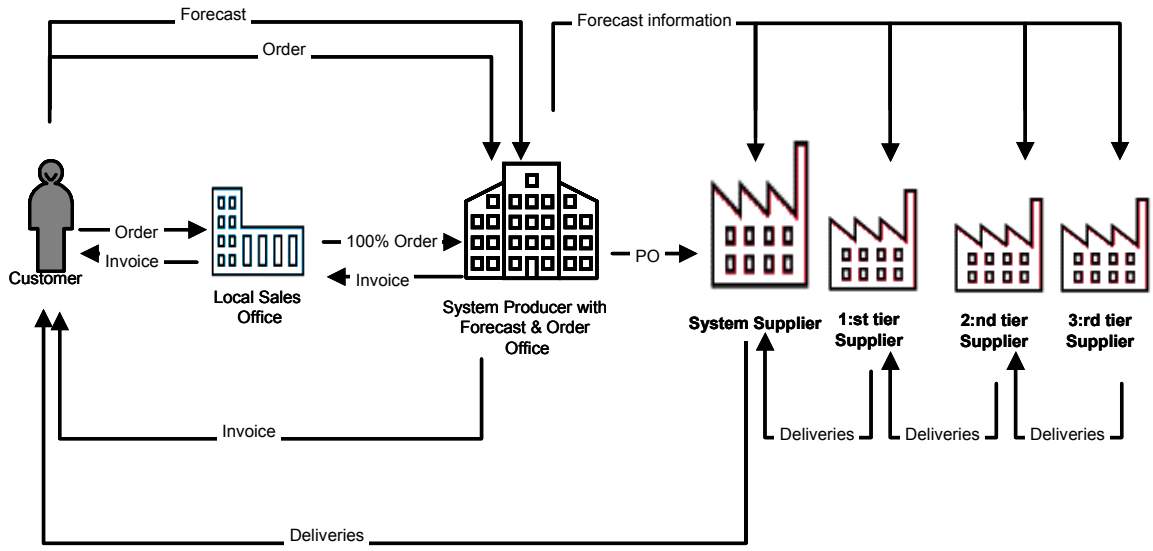

Figure 4 Supply Chain forecasting

The organisation must also have a predetermined action plan agreed with each supplier how to involve all suppliers concerned in case of a drastic change of the required delivery volume in the Supply Network.

In sum, key factors is to establish an accurate forecast tool, are taking the following steps.

- The organisation organizes the data collection from the customer in such a way that relevant information is received regularly in a proper timeframe.
- The organisation develops a forecast tool (Internal information system) that is accessible by any authorized person anywhere in the organisation independent of the geographical place.
- A good forecast tool includes an efficient information system, which gives fast and relevant information of all demand changes to all suppliers concerned down to the lowest level of suppliers.
- The accessible information system must be good enough to ensure that subparts and components can be stored as far back in the Supply Chain as in the 3rd or 4th tier supplier storage and still be able to meet required delivery lead times of the finished product to the end customers.

The improvement of the forecasting and information system in the network is a critical factor to improve the Supply Chain and speed up the flow of products from the lowest supplier level through the network to the Systems Producer. The key factor in speeding up the deliveries in the Supply Chain is to do the work in parallel and not in sequence. To this end software

companies like I2, Manugistics, SAP and Oracle have developed Advanced Planning and Scheduling (APS) applications, as extensions to existing Enterprise Resource Planning systems (ERP), to help manage and optimize the material flow between partners within the supply network.

An empirical study of Supply Resource Management (van Weele, 2003) showed that large Dutch industrial companies improve their information technology system to be able to speed up and shorten the delivery lead-time and use suppliers as their own company external production resources.

4. Product Life Cycle Dynamics

Recently we have seen the influence of the technology and product life cycle on the need for collaboration and degree of cooperation (Collin 2003; Wang 2004). Collin argues that as the technology matures and customers (telecom operator) are gaining experience, some customers insource value added activities from the systems provider (for instance shifts from buying turnkey equipment to buying radio base stations only). Wang argues that as the GSM technology becomes more mature and standardised, the need for close collaboration with suppliers' decreases. One consequence is decreased profit margins for the supplier. At the same time we see some operators outsourcing management already from start of a 3G-telecom network (for instance Hutchison sharing operator responsibilities with Ericsson). As technology (like GSM) and products mature, the power balance among suppliers and customers will change. We will first discuss the dynamics from a supplier's point of view and later from a customer's point of view.

A supplier's goal is to introduce a new innovative product in square 7, 8 or 9 in Figure 5, depending on the market size.

When a supplier introduces a new product it will target an existing market, hence start in square 7 or 8 giving the supplier a temporary monopoly. Consumer products will always start in square 7. When a new product is introduced as a response to a particular customer's need, it will start in square 9. A supplier improves his position by moving from square 9 to 8 and to 7. Dominating suppliers exist when suppliers have a monopoly, or are part of an oligopoly. An example is Intel in the semiconductor business and Bosch in case of fuel injection for diesel engines in the automotive industry. An extreme case is the Swedish company Micronic Laser Systems, which has 99 % of the world market for extreme laser pattern machines[2] producing flat screen TV panels.
After the product launch the goal is to grow the market without increased competition and move westward towards square 7. This is possible by having a sustainable competitive advantage such as superior or proprietary technology.
But in many cases as the market grows, competitors will appear and the movement is southwest rather than west. Depending on the particulars in speed of market growth and emerging competing suppliers we may briefly pass square 8 with stronger supplier power.

[2] The machine is making photo masks used in microlithography. This is for instance used when making flat TV-screens (consisting of about 70 000 transistors, where each defect transistor is seen on the screen – meaning that there is not allowed to be any defects). One large customer is Intel. Others are a number of Japanese companies like Hoya, which delivers to the leading flat screen producer Sharp. Monopoly, vulnerability and close cooperation with customers means for instance that a new machine is tested in one of the customer's factories before the market dares to buy. The fact that the machine may run for 15 years means some safety (with the condition of proper maintenance).

For products in industries with short product life span, the process will end in square 4, as they will become obsolete as new product generations are introduced.
In some industries the supplier cannot stop the evolution from ending in square 1 as products end up as commodities.

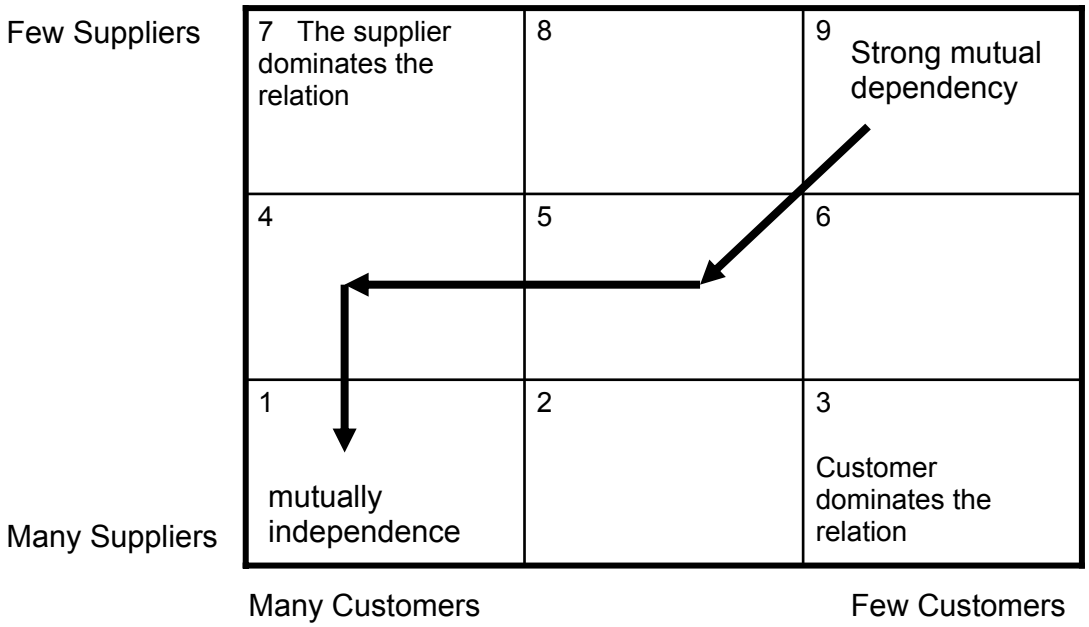

Figure 5. Power distribution among suppliers and customers `in B2B relations.`

A customer benefits from having many potential suppliers and therefore wants to move south towards square 1, 2, or 3 depending on the starting situation. For some unique components his position is in square 9, but for many components there are already many potential suppliers. To move to square 3 will be a rare case when the customer owns the property rights, i.e. patents etc, to the products and lets competing suppliers bid on manufacturing contracts.

5. Conclusions

To decide on the appropriate forms of supplier relationships today, we argue that there are three main dimensions to be considered: Complexity of network, supply chain efficiency and product life cycle.

The new more complex supply networks where the actors assume many different roles, an increased number of tiers and the more complex legal situation will make the choice of relationship form dependent on the situation and need to be re-evaluated frequently.

To ensure an efficient supply chain the forms of relationships must be chosen with agility, adaptability and alignment in mind. We have shown that the relative importance of these factors varies with the product and should also be reviewed frequently. The appropriate form of relationship varies from arms-length interactions to formal partnerships.

To certify the appropriate form of relationship is in synch with the product life cycle a mechanism must be put in place already at the early stages of supplier negotiations to ensure the necessary freedom of action at later stages. As we have shown above, the need for cooperation and coordination very much depends on the complexity of the situation, the impact on supply chain efficiency and the product life cycle. Today it is not enough to evaluate strategy by going through the different purchases a company does and pick an appropriate strategy according to Kraljic or Spekman et al. It is also important to consider the

relationship with the business partners in the network. With whom should we be partners, form an alliance with or outsource production to? Furthermore, it is important to consider the efficiency of the supply network. What systems and structures must be in place to ensure an appropriate level of agility, adaptability and alignment for each type of purchase?

As the purchasing environment today is much more complex with the actors assuming many different roles and new legal issues, such as ownership of software, the type of relationship with the supplier must be adapted to the situation and re-evaluated often.

Kraljic's supply management model is still relevant in many cases. Close, hence expensive, collaboration should be restricted to cases of high complex supply markets in combination with high importance of purchasing. As also advocated by Spekman et al (1999) and the authors, complexity of product (technology) and supplier structure (commercial complexity of supply market) is two of the important explanatory factors when deciding about supply chain strategy.

With only a few dominating global suppliers the buyer is very vulnerable, both to price fluctuations and to shortage in capacity in an over heated business climate. Already when the few have grown to a restricted number it is easier to handle (traditional tenders may be used) both in case of low and high product complexity. When there are many suppliers at least large customers have substantial negotiate power. In the telecom industry though, even the number one systems producer, Ericsson, has limited buying power because other buyers in the computer and game industries are buying much larger volumes.

However in the telecom industry complexity in supply network structure gives reason for further differentiating supply strategy. As shown above it is motivated to adjust the strategy according to the network level ($1^{st,}$ 2^{nd}, 3^{rd}, etc. level in a network comprising up to nine levels). Furthermore we have to differentiate between hardware and software part of a product as software often is not sold but only rented for specific applications. As we study the supply hierarchy we understand that the product character differs. The systems producer buys whole systems, or sub systems and software. Further down the hierarchy the material is less complex, which changes the supply management strategy. The suppliers may be large or small companies, but increasingly the large companies take over direct contacts with large buyers and the smaller are moved one step down.

The complexity of sourcing as well as the need of a cost effective and efficient supply chain is increasing and to be able to decrease the total purchasing cost successfully, all successful organisations must invest in strategic sourcing, improved Supply Chain Management (SCM) and introduce a new unit that can handle the Supply Resource Management (SRM) in an efficient way. This means that you need to create a very efficient supply chain, have a reliable method to select the "right" suppliers and also a number of methods to supervise the performance of your existing suppliers over time. Please be aware that the supplier with the lowest product price do not need to be the "right" supplier, but it might be another that in a better way fits into your existing Supply Chain and therefore dramatically decreases your logistic cost and in the same way also the total purchasing cost. In your search for the "right" supplier be aware to investigate all aspects of the potential suppliers with reference to your needs, before you make your final decision of using a new supplier.

What will happen within the coming few years? The supply chain dynamics will probably continue to develop. We will see a lot more increased standardisation both concerning hardware and software products and systems. We probably will see larger – and fewer suppliers in all levels of the supply network and the importance of selecting the "right" suppliers will most probably increase based on more strict supply and purchasing requirements.

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