The price setting of a technical system in a network-based purchasing/development project

A conceptual framework

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Abstract

This paper introduces a conceptual framework for explaining the price setting process of a technical system in a purchasing/development project in which several other actors are involved besides the customer and the supplier. The conceptual framework is a preliminary result of a case study in progress. It frames the economically related price setting concept into a wider and more varied picture comprising purchasing, technological development and a network of many organizational actors. The industrial network perspective according to the Uppsala school is chosen as the basis for description of the interorganizational processes. Basic elements in this approach are relationships and interaction between clearly identifiable actors with a specific purpose. The price setting in a network case is thus pictured as an interaction process between actors connected through a network of relationships. The interaction is structured according to five enacted and parallel roles, namely prioritizing, supplier base organization, technological development, financing, and price rationalization. The suggested framework can be used to create interesting research questions. For example, the framework may explain why a buying company can achieve a very low price for a production system which is purchased from a company acting as a systems supplier. Such a message should be pertinent to small firms or companies having difficulties in making big and expensive investments in new production systems. Furthermore, can an extraordinary low price be achieved while the close relationships in the network are kept and even improved. A positive answer to this question has theoretical implications.

INTRODUCTION

Purpose

The price for a technical system and consequently the setting of it is of major importance in any business deals. Traditionally, the price setting may be thought of as a bargaining process involving a buyer and a seller haggling over price issues such as which mark-up to add to the unit cost. But what if this traditional approach is left in favour of an interaction process in which price setting is framed into a wider and more varied picture comprising purchasing, technological development and a network of many organizational actors. How can such a price setting process be described?

Relatively little scholarly attention has been devoted to answer this question. Instead, most of the research to date has focused on pricing strategies and the buyer-seller relationship. For example, Marsh (1987) and Heinritz et al. (1991) give an overview of pricing techniques with respect to purchasing transactions. They limit themselves to buyer and seller relationships. Ford et al. (1998) take on a network perspective when they discuss different business issues. With respect to pricing of a technical system to be purchased, their emphasis seems to be more on pricing techniques and their prerequisites and less on the process itself. In addition, they seem to limit themselves to customer and supplier relationships only. Gadde and Håkansson (1998) also take on a network perspective when they among other things discuss efficiency with regards to purchasing and touch upon the price issue. However, they do not seem to have any deeper interest in the subtilties of the process of price setting in a network. Nagle (1987) and Zbaracki et al. (1998) devise several strategies that can be used to improve pricing of products from the seller´s point of view, i.e. they seem to be more interested in the seller´s competitive position on a market.

Even though the price setting process in a network of organizational actors seems to have received little attention, I still believe the theme is worth studying. Smith Ring and Van de Ven (1993) state that business deal processes among several actors, in which I contend that price setting is an integral part, have implications for the performance of the parties and the motivations to continue, or terminate, an interorganizational relationship. An example might be a small company having trouble in making a big and expensive investment in a new production system. The company would be interested in a low and affordable price for the production system to be developed in a structure of supplier companies, whereas the suppliers are interested in achieving full coverage of their expenses plus profits. In the price setting process leading to an agreement, all actors would be interested in retaining cooperative relationships as well.

The focus of this paper is the price setting process in a network of organizational actors. The paper introduces a conceptual framework for explaining the price setting of a technical system in a combined purchasing and development project in which several other actors are involved and have an influence besides the buyer and the seller.

I will start by presenting the conceptual background. These bound the scope of the argument. Next, I will introduce a network model based on business relationships. It will be used to describe the web of actors, activities and resources involved in the interaction processes. Thereafter, the framework for the price setting process is spelled out. It is built on the concept of interaction between actors along different dimensions. Finally, I will use the proposed framework to develop some empirical and theoretical implications.

Conceptual background

Technical system

A technical system is a set of interrelated physical objects or artifacts integrated into a materialized and functioning whole (Bijker, Hughes and Pinch, 1987; Petroski, 1996).

This definition excludes the individual and collective routines that are pertaining to the technical system in order to operate the system and make it useful, and it also excludes the knowledge that goes into designing the system and its routines (Bijker, Hughes and Pinch, 1987, p. 4). The often referred term technology includes these two aspects plus the physical artifacts.

A company can make use of technical systems in several areas (Solberg and Danielsen, 1992). One area is production where technical systems in general are called production or manufacturing systems. Production systems take as input raw materials bought from suppliers and transform them into products that can be sold to customers.

Price

By the term price I will mean the amount of money paid for a technical system, which is purchased by a buying company from a selling company or delivered by a supplier to a customer. Given only one invoice for the entire technical system, Gadde and Håkansson (1998, p. 73) describe the price as the figure that is found at the bottom line of the invoice. The price can also be expressed as s firm lump sum enclosed in the price clause in the contract for the delivery of the technical system. Any discounts have been taken into account for the price figure.

Minimizing the price has been the traditional preoccupation of the purchasing functions in many companies and the main focus of their purchasing strategy, even if this has meant that the analysis of other relationship costs and benefits have been neglected (Ford et al., 1998, p. 113). The concern for a low price for the buyer is valid for this text as well. However, the lower limit for the price, at which a supplier can afford to make and sell a product, is based on cost coverage (Heinritz et al., 1991, p. 219).

Purchasing/development

Gadde and Håkansson (1998) contend that the purchasing function of industrial companies has gone through significant changes during the last decades. Purchasing has traditionally been considered almost a clerical function, with the quite restricted short-term goal of buying specified products as cheaply as possible. One much used way to achieve a low price for products has been to apply competitive pressure towards a number of suppliers.

According to Torvatn (1996, p. 8), the traditional purchasing process, as seen from the purchasing firm, consists of defining the needs and requirements for the wanted product, asking for bids from a set of potential suppliers, and then to evaluate the bids according to product criteria. Most often the criteria are price and discounts, but in most recent literature some quality and logistics considerations have been brought in. The supplier who can match the product criteria better than the other suppliers, become the chosen supplier. In short, each purchase is treated as a separate transaction handled through market mechanisms, and it is implicitly understood that the market will ensure that the cheapest product satisfying the requirements is acquired. No further contact or arrangements are required between the buyer and the supplier.

Today, however, a new view has emerged which focuses on achieving low total costs, which include price agreement as well as internal costs of the buying company (Gadde and Håkansson, 1998). Also in this new view, quite a number of companies regard purchasing as a function of major strategic importance through the adoption of several roles. The first role concerns the possibilities of educating or training the suppliers, thus making them develop in a wanted direction. For instance, the supplier´s quality assurance system with respect to technological development may need improvements, and the buyer can make requirements about this plus contribute with formal or informal training resources. The second role comprises technological development in cooperation with suppliers. Attention is directed to encourage, direct and assist technological development in cooperation with suppliers and to assist in other development programs inside supplier relationships. Especially, the focus is on adapting supplier technology to the buying company. One might say that suppliers are mobilized in relation to technological development, or more specifically, development of a technical system to be used at the buying company. The third role is about attempts to structure and change the network of suppliers. One of the ways is to regulate the number of suppliers, both the total number of suppliers and the number of suppliers with whom the buying company works closely. Encouraging suppliers to become systems suppliers is one way of changing the structure of the supplier network. The objective is to mobilize the suppliers for development which is more efficient.

Consequently, the new view is mainly concerned with cooperation between purchaser and suppliers where the parties can gain from acting in concert, leading to a win-win situation. The cooperation may however be thought of as a limited involvement in an area where the parties can see that there are benefits. I will in this text build upon this new purchasing/development view.

Project

Not very often purchases involving technological development, or vice versa, is in general organized as a project by the buying company (Lock, 1987; Elvenes, 1992).

The project may very well involve several companies (Powell, 1990, p. 306; Briner, Hastings and Geddes, 1996, p. 22). It means that the team members of a project can come from both the parent organization of the project and other organizations such as suppliers and consulting firms (Briner, Hastings and Geddes, 1996, p. 25). Jessen (2001, p. 439) even suggests that the project concept is a very fruitful way of organizing industrial endeavours when several companies are involved.

There exists no clear and unambiguous definition of the project concept (Nicholas, 1990). Instead, one may say that a project has several characteristics which makes it different from the routine operations in an organization. For instance, Lockyer and Gordon (1996) hold that a project is a process-oriented, unique, temporary and multi-disciplinary undertaking which consists of a set of coordinated and controlled activities. In addition, a project can be both complicated and risky. The objective of the project is a result or product conforming to specific requirements including constraints of time, cost and resources.

Projects pass through several distinct phases, called the project life cycle. The tasks, people, organizations and other resources change as the project moves from one phase to the next. Pinto and Slevin (1988) define four project phases, namely conceptualization, planning, execution, and termination. It is during the execution phase that any systems or products are actually purchased. Given that the price format is a firm lump sum expressed as the contract price, Marsh (1987) suggests that it should be set before the purchase is executed, i.e. during the initiating project phases. This establishes the amount of the purchaser´s commitment in advance, it provides the maximum incentive to the contractor to complete the work on time, and it reduces to a minimum the amount of administrative work involved after the contract has been let.

The network case

A traditional picture of the price setting process is that it involves two companies, namely the buyer and the seller (Ford et al., 1998). The two focal actors basically haggles over the price (Fisher, Ury and Patton, 1991; Torvatn, 1996, p. 8). The buyer wants the lowest price possible, whereas the seller would like to achieve coverage of all his costs plus a high profit for his delivery. This picture can be somewhat moderated. For instance, Lewicki, Saunders and Minton (1997) bring into the price negotiations third-parties such as arbitrators, mediators and process consultants. The negotiations may also involve other benefits than the price only (Fisher, Ury and Patton, 1991).

In contrast to this traditional picture, a wider and more varied picture can be drawn. Price setting is part of a purchasing process (Marsh, 1987; Torvatn, 1996, p. 96), and

purchasing may imply supplier training, development of all or parts of the technical system to be delivered and supplier base restructuring (Gadde and Håkansson, 1998). It means that the price setting for a technical system can be seen as an integral part of a process comprising both purchasing and technological development. Such a view is also in line with Granovetter (1985) who says that economic action like price setting is embedded in on-going relations or interactions that at some time facilitate and at other times derail exchange. When taking this embeddedness of price setting into consideration, it also means that other organizational actors than the buyer and seller come into sight. The focus shifts from two actors to a network of actors.

If the supplier does not have all the required development resources within his own company to complete the delivery, he has to engage other companies or subcontractors who have specialized in making specific parts or subsystems to technical systems (Cleland, 1986; Youker, 1992). The supplier takes the responsibility for assembling, integrating and delivering of a complete and ready-to-operate system to the buyer. This makes him a so-called systems supplier (Ford et al., 1998, p. 145). If a new and complicated technological solution has to be developed, some of the subcontractors may be research organizations (Powell and Brantley, 1992). It is also a possibility that some of the subcontractors are located in other countries than the systems supplier and the buying company (Schneider, 1995). The use of subcontractors usually has to be in agreement with both the buyer and the seller (Marsh, 1987).

The customer and the systems supplier are engaged in a close relationship (Ford et al., 1998, p. 134). During many years, the buyer and the seller have made adaptations to each other, and the integration between the two companies can be substantial. For instance, the buying company knows that they from the selling company can get a technical system which satisfies their needs and expectations and which costs less than those of the competitors. The selling company know that they can combine their own knowledge with the knowledge of the buying company to develop a system better suited for operational requirements, thus making the system easier to sell to other customers. For the two companies it implies dependence on each other. Especially, it implies dependence on a specific supplier for the buying company.

According to Håkansson (1990), the buyer´s customers may also be involved in the development of a technical system. If the technical system is a production system, it surely will have an effect on them when the system is operational. In order to better embed the future operational system into the systems of the buyer´s customers, it is usually a good idea to involve them in the system specifications phase (Ford et al., 1998, p. 238).

All or parts of the developed technical system may become a product for the selling company (Von Hippel, 1998). Hence, the seller´s customers should be considered. It can for instance be done by involving them in the system specifications phase.

Technical development has to be financed some way or the other (Rosenbrøijer, 1998, p. 38). If the development work cannot be financed by the buyer and seller themselves,

banks or venturing firms may be used for giving loans or some other financial support (Maidique, 1988). Another possibility exists however. As part of an industrial development of regions or upcoming and promising business areas, product development can be financed in terms of grants or subsidies (Sabel et al., 1988). This brings into the picture governmentally based funding organizations. Usually the financial actors will set conditions to the development project to become involved, for instance that the resulting products have an additional sales potential.

The picture I have drawn so far, is completed when I along with Max Wideman (1998) take into account the buyer´s competitors, other potential suppliers than the chosen systems supplier and government agencies and commissions working with for instance judicial, legislative and executive matters.

Of course not all of these actors will turn up on every price setting occasion during a purchase, but many of them will. Max Wideman (1998) contends that the involved actors have an interest in what the final price will become because they have invested in the project and expect some kind of profits from the engagement. This should imply that the price setting is influenced by several actors besides the buyer and the seller only. It further implies that we can speak of a network of organizational actors constituting a network, in which the price setting is carried out as an integral part of a purchasing and development effort. This picture is wider, more varied and quite different from the above described traditional picture of two actors haggling over the price. It should also be in line with Smith Ring and Van de Ven (1993) who contend that “an unprecedented number of business firms in many industries have been entering into a variety of interorganizational relationships to conduct their business deals.”.

In the pictured network, interdependency between the companies can be identified, i.e. the buyer needs a system that only the seller can supply. In addition, there is a certain level of complexity and uncertainty in conjunction with the purchasing project. This means that features like complementarity and high transaction costs can be identified in relation to the purchase, implying that there might be sound reasons for choosing a network perspective for analysis of interorganizational processes such as the above described price setting case (Powell, 1990; Piore, 1992).

Problem statement

As said in the introductory section, the purpose of this text is to make an initial attempt to develop a conceptual framework for explaining the price setting of a technical system in a combined purchasing and development project in which several other actors are involved and have an influence besides the buyer and the seller.

In achieving this purpose and based on the conceptualizations I have made above, I find it suitable to try to answer the following questions:

1. Which network approach should be used, and how can the network be modelled?

2. How can price setting be described as an interactive process between different organizations?
3. How can the price setting process as part of strategic purchasing be conceptualized using a role categorization?
4. Which specific price setting mechanisms are available within each role?
5. Can the roles and specific price setting mechanisms be used separately or in combination with each other to give a wanted outcome?
6. What are the prerequisites for the use of the roles and specific price setting mechanisms, separately or in combination?

METHODOLOGY

The conceptual framework is a tentative result of a case study which is in progress and is conducted in accordance with Yin (1994). The aim of the case study is to generate a theoretical model which can explain the empirical findings from several cases in which unexpected low purchasing prices for production systems were achieved by the customer. The main reason for selecting the case study research design is its flexibility when constructing new analytical frameworks and testing established theoretical propositions (Andersen, 1997). It should also be noted that cases related to the aim of the study may not be easy to identify.

The empirical data has been collected through participant observation, interviews and documents in the same industrial network. The interacting companies belong to the space industry, i.e. they are part of a Norwegian and European industrial network focused around utilization of data from earth observation satellites. Participant observation means that unique and in-depth data should be available for analysis, thus giving the researcher the possibility to capture and explore the complexity of the interaction processes along the different dimensions and in the involved relationships (Jorgensen, 1989). A possible drawback with participant observation is that the data could be contaminated by "subjectivity" or personal feelings, and that my scientific identity could be spoiled. But by being able to switch back and forth between the insider´s perspective and an analytic framework, which I do in this case study, I contend together with Jorgensen (1989) that I have an "objective" approach to my data and my research.

THE NETWORK PERSPECTIVE

Theoretical approach

The industrial network perspective according to the Uppsala tradition denotes a theoretical position within the discipline of business administration which builds on a large number of empirical observations from which it has been concluded, among other things, that companies interact intensively when technological development projects are carried out. Crucial in this theoretical approach is the understanding of the importance of

long-lasting and relatively stable relationships or cooperation between different companies and organizations for the undertaking of activities with an economic purpose. Relationships, in this sense, contain technological adaptations with respect to products and production facilities. Relationships also contain social elements like trust, commitment and talk. One might say that an industrial network perspective focuses on the dependence between industrial actors.

A relationship can be understood as a contact between to firms that is acknowledged by both firms. The mere existence of a single transaction is not enough for them to accept that a relationship is established. Rather, there have to be several contacts over time, or as Håkansson and Snehota (1995, p. 4) have said it: "… we will concentrate on relationships between companies over time, rather than single exchange episodes and transactions". But it is not a requirement that a transaction of physical goods shall take place in a relationship. Exchange of information or knowledge may be sufficient, as long as the exchange is recognized as important by the involved organizations.

For this text, I will adopt the industrial network perspective according to the Uppsala school. This means that we in the network-based purchasing project can identify mostly long-lasting and relatively stable relationships. The close relationship between the buyer and the systems supplier is an example of such a relationship.

The network model

A relationship between two companies can according to Håkansson and Snehota (1995) be characterized in terms of activity links, resource ties and actor bonds. I will also use these concepts to describe the network of actors, activities and resources and their corresponding links, ties and bonds.

Activities are those actions that take place within firms and within relationships. Transformation activities are usually performed within the companies to manufacture products from raw materials. Several activities can be linked together and constitute an activity chain that ends up with the finished product. The activity chain is usually performed within one company. However, a company needs to purchase the raw material from another company, meaning that an activity chain can stretch over several companies. The activity concerned with transfer of a product between companies is called a transferral activity. A third type of activities performed within and between companies is called coordination activities. The purpose of these activities is to coordinate production activities, and they go alongside the production activities.

An activity chain can be followed through several firms with the introduction of transferral activities. The concept of activity links indicates that activities are performed in a logical sequence between companies. It also suggests that there is an interdependency between companies when activities are performed. In order to perform any activity, an actor needs resources to draw on. Resources are combined, developed, exchanged or created, and for this other resources are needed. To perform transformation

activities, transformation resources are required, and to perform transfer activities, transfer resources are required. A mutual dependency exists between transfer and transformation resources. Resources consist of both physical and tacit resources. Examples of resources are raw materials, semi-manufactured products, products, capital, production equipment and individuals with their knowledge and experience. Relationships are also resources since they can be used to gain access to the resources of other actors.

Resources can be controlled through hierarchical access, through market access or by establishing relationships to actors in the network. The use and value of a specific resource is dependent on how it is combined with other resources, and a resource tie is created when different resource elements of two actors are combined.

Actors are the enactors of relationships. Actors can be individuals, departments, firms and even group of firms. It is individuals who represent companies in their actions. The actors´ function is to initiate activities by drawing on the resources they control or can mange to get access to through other actors. Actors are also responsible for the coordination of activities. To do this, actors use information and knowledge which can be obtained through resource utilization, performance of activities or contact with other actors. Thus, information that originally was stored in an activity or a resource can be taken over by actors through learning and afterwards become a part of the actors.

Actor bonds represent contact with other actors. To establish such contact, actors need to know about other actors and their capabilities. An actor has an identity or meaning which is created and held in the eyes of another actor. The actor need to be perceived by other actors as a distinct and intelligible entity in order to attract the interest of other actors and the resources required. If not, an actor will elicit no action from other actors, and will fall apart and cease to exist. Companies are actors because they are attributed an identity by those who interact with the company. Actor bonds arise in business relationships when two related actors mutually acquire meaning in their reciprocal acts and interpretations. Actor bonds are important elements in shaping the identity of an actor.

INTERACTION RELATED TO PRICE SETTING

Because price setting is pictured in a network perspective, it means that business relationships and thus interaction between different actors is a basic feature of the price setting process (Håkansson and Snehota, 1995). However, what have been said about interaction so far is related to the long-lasting aspect of a business relationship. How can interaction be understood in a project or temporary perspective?

Viewing the price setting as an integral part of a process comprising both purchasing and technological development, means that it is also part of an innovation process (Lundvall, 1992). By innovation, I will as Lundwall (1992) mean new use or combination of pre-existing possibilities and components. The new combination in terms of products, systems or ways of organizing activities may be easy to identify and realize, or may take

an enormous intellectual effort or extremely creative minds to develop and complete. The innovation process can from a network perspective be understood as an interaction and learning process enacted by and occuring between different organizational actors (Lundwall, 1992). Or, as Tidd et al. (1997, p. 29) express it: “Innovation is a coupling and matching process, where interaction is a critical element.”.

When discussing technological innovation, Waluszewski and Håkansson (2000, p. 17) define the concept of interaction to mean mutual and reciprocal actions directed towards identifiable counterparts. They go on to say that acting is not based on a given amount of information, but on information that is permanently changing. Hence, it is impossible to have full information of all alternatives and consequences in advance. It is also impossible to know exactly the content of one´s own acting until the counterpart has interpreted it and reacted. This implies that nothing brought about through interaction is given, but created and re-created again and again.

The kind of interaction we see in our network-based purchasing project is directed toward clearly identified counterparts. The results of the series of acts and counteracts affects social, economic and technical aspects pertaining to actors and relationships in the network, and are particularly observed in the development of relatively stable and long-lasting relationships (Waluszewski and Håkansson, 2000, p. 19).

The aforementioned implies that business relationships and thus interaction have a significant effect on price setting of a technical system. By focusing on these relationships we get a different perspective on the issue of price setting. The focus shifts from the single actor to the network of relationships and its power to combine the activities and resources of more than two companies. It also shifts from a clearly defined and rational task of price setting to an uncertain and partly uncontrollable developing situation in which the complex process of interaction is a key element.

STRATEGIC PURCHASING ROLES APPLIED TO PRICE SETTING

Gadde and Håkansson (1998) mention and Torvatn (1996) use a model of purchasing which structures the purchasing task into three roles, namely rationalization, technological development and supplier base restructuring. The three roles are presented as different aspects of the purchasing work conducted among several companies, and they are thought of as complementary rather than alternative choices. According to Torvatn (1996, p. 95), the rationalization role is related to the activities needed to make the total costs in the buying company low. Since cost reduction is not my focus, I will use the notion of price rationalization instead. In the strategic purchasing concept of Gadde and Håkansson (1998), the roles of education, technological development and supplier base organization are appearant. The education role is new compared to Torvatn (1996), but it is not incorporated in price setting. In addition to the mentioned roles, I will suggest a prioritizing role and a financing role. The idea of prioritizing comes from Cooper (1993). Regarding the role of financing, Gadde and Håkansson (1998) mention it but do not create a separate role.

Together the five roles, namely prioritizing, supplier base organization, technological development, financing and price rationalization, should describe a price setting process which takes into account that it goes on in a context of network actors conducting purchasing and technological development. I believe that the roles devised can be used to analyze the interaction pattern when a buying company wants to influence the suppliers and other counterparts in different ways to support own interests. The network actors control valuable resources, and if these can be directed to the buyer, it means great advantages for him, especially with regards to price setting. It can be done by initiating actions and reacting to counteracts. The attempts should not be limited to the suppliers only, but also to other actors who can have any effect on the purchasing activities and results.

Network, identity and trust

The requirement for these attempts is knowledge about the existing network because such knowledge serves as a resource that can be used during purchasing when a buying company wants to affect a certain supplier (Gadde and Håkansson, 1998, p. 162). In order to create such knowledge, an overview of the network has to be generated. In this lies the identification of important actors and the definition of the network border. In addition to the supplier side, there are actors such as raw product suppliers, distribution firms, the buyer´s customers, buyers of the system supplier´s products, other potential buyers or customers of the system in question, owners of the focal companies, authorities, developing agencies, private and public funding organizations.

To be able to affect a supplier directly, the buying company must have a certain influencing basis (Gadde and Håkansson, 1998, p. 163). Simply told, a influencing basis implies that the counterpart has or feels he ought to take the buyer into consideration when he plans his actions. In other words, the buyer has to be known and looked upon positively by the counterpart and vice versa. A positive interpretation of each other is dependent of an understanding of fellowship. This understanding or spirit of community can be created in two ways. First, the companies can interpreted that their identities are directly connected to each other, i.e. what is good for me is also good for you. Second, the counterpart trusts the influencing actor with respect to actions in different settings, i.e. the supplier believes the buying company wants him less harm than good. This means that a company´s influencing basis can be described in terms of identity and trust.

Identity reflects two aspects of a company (Gadde and Håkansson, 1998, p. 163). First, unique features are attributed to a company by the counterpart. The features can be related to technological resources, organization, finances, reputation and so on. This makes a company different from other companies. Thus, identity is necessary for a company to be perceived by other companies. Second, identity refers to membership. This means for instance that a company together with its customers and suppliers can be part of a business or industrial area. Thus, identity is a way to describe how a certain company belongs to other companies. This means that identity reflects both individuality

and membership of a collective. When counterparts are asked to interact, they will always base their actions on the identity of actors who take the initiative. A central actor within an area will be perceived differently from a an outsider company.

Shortly told, trust means that a buyer believes that a supplier will fulfill its obligations, even if problems should arise (Gadde and Håkansson, 1998, p. 165). But trust also goes the other way, i.e. a supplier must have trust in the buyer. In order to embark on a more extensive cooperation effort, there will always be uncertainties and risks related to whether a solution is invented and implemented. Trust helps in reducing such uncertainties and risks. An important feature of trust is that it takes time to build it. It means that trust is a result of a long and stepwise process in which the parties learn to know and trust each other.

Identity and trust are critical aspects when companies systematically attempt to affect or mobilize suppliers in different ways (Gadde and Håkansson, 1998, p. 166). Both identity and trust can be created and developed. With respect to identity, it is about developing both uniqueness and membership in relation to its suppliers. Regarding trust, it involves a continuous and committed cooperation effort where all the cooperating parties can gain.

Having said so much about identity and trust in a network, it is time to move to the role description.

Prioritizing role

New products or services will usually result in a need for new manufacturing systems (Utterback, 1994). Products may have several features (Cooper, 1993, p.82), and the more features the more complicated and expensive the manufacturing systems will become. Consequently, fewer product features will give cheaper production systems, here also understood as technical systems.

Cooper (1993, p. 97) contends that a sharper focus and better prioritization should be a goal when new products and their features are developed. In order to prioritize, he suggests questions related to the economic and business soundness of the project or the project parts, i.e. does each part continue to meet or exceed the business and return-on-investment criteria. It means that a commercialization and risk analysis has to be carried out, and it requires information about customers and their needs plus suppliers and their offers regarding production systems. Such information is usually an outcome of an interaction process (Lundvall, 1992).

The situation may also be that some of the customers have a significant influence on the choice of products and their features (Ford et al., 1998, p. 87). Here the outcome will be formed through combined actions and intentions of all the parties having an interest in the project. It can be a rather complex process involving handling of different relationships (Ford et al., 1998, p. 152).

Supplier base organization role

According to Gadde and Håkansson (1998, p. 175), the supplier base organization role concerns mobilizing of suppliers by connecting the different suppliers in a systematic way. The objective is to mobilize or organize the suppliers for development which is more effective and efficient.

The supplier network is a combination of different kinds of relationships (Gadde and Håkansson, 1998, p. 176). Some relationships are long-term, some are only for a year or so, some are very deep whereas some are at arm length´s distance. Long-term and deep relationships require actions from the customer, for instance are technicians placed at the supplier, there is cooperation on development projects and stabilization of the demand occurs. This contributes to development of competence. There are also different responsibilities within the network. This gives rise to a supplier structure such as a systems supplier with several subcontractors.

Other partners can also become development partners (Gadde and Håkansson, 1998, p. 177). It is future and upcoming interests that make this happen. This result in development and production to be moved between the network actors. Also, knowledge is transferred, resulting in higher competence within the network and access to better resources.

The structure of suppliers creates pressure on all the suppliers, in so far as they must keep the costs down (Gadde and Håkansson, 1998, p. 177). This because they otherwise could be competing with expanding and competent partners inside or outside the network. From the outside, new actors may enter with new solutions that use standardized modules with lower prices, or new actors may bring to surface new technology with better performance or cheaper price.

The strategy for the buying company acting in the network is to organize the development work so that most of the development is done by other companies. in this way suppliers become vital (Gadde and Håkansson, 1998, p. 177). The buying company´s productivity becomes more dependent on the combination of different resource items, thus complementarity between such resource items is important. Since it is actors who hold the resources, the number and choice of actors in the network becomes critical.

The market position of the buyer company is important, because a critical element is the knowledge about products and production technology (Gadde and Håkansson, 1998, p. 178). A second element is knowledge about new actors and new resources. Especially it is important to look for new technological developments. Another option might be to look for specific partners that need priority for development, education and so on. Also, can other cooperation modes be identified w.r.t. suppliers and supplier categories, can cooperation with other buyers be obtained, or can systems suppliers be developed.

Torvatn (1996, p. 97) mentions that one of the tools belonging to the supplier base organization role is to regulate the number of suppliers, both the total number of suppliers

and the number of suppliers with whom the buying company works closely. Encouraging suppliers to become system suppliers is another way of changing the structure of the supplier network. In this thinking, the company reduces the number of suppliers by relegating some of it´s old suppliers to sub-suppliers. Systems suppliers has become a common way to organize things in heavy assembly industries. In addition, companies can work with the degree of standardization in the supplier´s production.

Technological development role

According to Gadde and Håkansson (1998, p. 170), the development role consists of mobilizing the suppliers with respect to technological development. In our case we are talking about development of a technical system, i.e. the buyer wants the certain suppliers to contribute with resources to a production system which has to be developed.

The suppliers can either be identified in the existing network or they are at the moment staying outside the network (Gadde and Håkansson, 1998, p. 170). In any case it is a need for an actor analysis to identify suppliers that are both willing and capable of being development partners. When involving actors, it is important that the suppliers get their profits as well. However, the profits can be both short-term and long-term.

When capable and willing actors have been identified, a development project has to be organized at the buying company with the aim of developing a new production system (Gadde and Håkansson, 1998, p. 170). The first step in the developing process is to work out the concept and specifications for the system. Thereafter the specifications for the different subsystems are drawn up. The specification work is usually done as a cooperation effort between the buyer and several of the suppliers, and requires thorough analysis of the different parts of the system and the system as a whole. Following the specifications development phase, suppliers are requested to develop subsystems according to the specifications. This might imply testing and building of prototypes, which takes time and requires skilled competence from several actors, also from the buyer. Most of the existing suppliers will prefer to continue the cooperation. However, some of the suppliers may drop out, mostly due to unwillingness to or incapability in participating in the development project. Not all cooperation efforts lead to something. A few of the suppliers, existing or potential, may find the requirements so tough that it makes the buying company an interesting partner for the suppliers. This due to the opportunity to develop competitive products.

When the feasibility of the system is proven through prototyping and testing and the detailed specifications have been written down, the different suppliers are asked to prepare a quotation (Gadde and Håkansson, 1998, p. 171). Following submittal of the quotations to the buyer, he negotiates with the different suppliers and organizes a development project. Herein adjustments and adaptations of development activities and resources between buyers and suppliers may occur. One of the suppliers are given the role as a systems supplier.

By acting according to the development role, the relationships within the network are further developed (Gadde and Håkansson, 1998, p. 174). A satisfactory solution has been brought forward through the interaction between the involved actors, i.e. the result is a system that satisfies the expectations w.r.t. quality and design a system. The identity and the trust have been strengthened between the actors. Knowledge has been transferred, and tough requirements have led to new products that have a selling potential. Other results are that the relationships have been deepened and strengthened, e.g. the social ties have been strengthened due to many persons in contact. The dependency w.r.t. technology has increased which gives both opportunities and barriers. The creation of new mental models and new knowledge can give possibilities in other networks. We see a development from shallow relationships to deep relationships and from less dependency to more dependency.

Financing role

The financing role is not described as a separate role by Håkansson and Gadde (1998), however they mention that development costs can be financed in several ways.

If the costs required for the development exceed the short-term and long-term income from the focal relationship and other complementary relationships, the supplier will lose money. This will sooner or later lead to a withdrawal from the cooperation effort (Håkansson and Gadde, 1998, p.174). It means that work and the costs related to the purchasing project must be covered in one way or the other. Below here several ways to finance the purchasing project will be described.

The purchasing situation can be analyzed and structured in a way that creates business opportunities in terms of new products for the participating actors (Gadde and Håkansson, 1998, p. 170). This means that a combined development and financing role is assumed. Von Hippel (1998) describes a way to separate a system development into two parts. The first part is on the supplier and concerns the general part of the system which can be sold to other customers. The second part is left to the buyer due to “sticky” information, i.e. information that is specific for each customer and hard to get for the supplier. Instead, the supplier develops a set of tools that are part of the delivered system and which can be used to adapt the system to the local conditions. This implies three financing possibilities.

First, some of the development work, the “sticky” part, is done by the buying company, and he can finance the most of the work by using his own personnel. Especially, this is an interesting option if the personnel can develop knowledge that can be of use in the future. The price to pay to the supplier is thus reduced. Second, the general part can from the supplier side be looked upon as product development. The new product can be sold with good profits to several customers in the future. By distributing the development costs of the general part on the focal customer and the future customers, the price to pay for the buyer of the system can be reduced. The prerequisite for this option is that the supplier is willing to take the risk for future sales. Third, Von Hippel (1988) in introducing the

concept of lead user, he points to the importance of identifying such users. This means that they have economic value for the developer. So, why not let the buying company become the lead user for the systems supplying company. The prerequisite for using this option is that the requirements of general part of the system are thought if being future requirements of such products and are hard to come up with elsewise.

Some funding organizations, at least in Norway, can finance product development as part of industrial development of regions or business areas. The financing is done in terms of grants or subsidies. It is a prerequisite for such financing that the products proposed, have the potential to be sold to many customers. It means that separation of the system development into a general part and special part as Von Hippel (1998) devises, is necessary to achieve this kind of financing. It is also a prerequisite that the supplying companies meeting the funding organizations are interpreted as interesting, i.e. they have a clear identity w.r.t. growth potential.

A possibility that is not much mentioned is to integrate some of the development work with the supplier´s development work that is already financed. A prerequisite for this option is for the buyer to have good knowledge of the actors and their activities.

Re-use of existing subsystems and modules, which have been paid for previously, is always possible. A prerequisite for this option is that the new system can be integrated and function together with the existing equipment.

A situation not much seen is a sudden occurrence of cheap modules to be used in the system. A prerequisite for such a possibility is that the module has been paid already by someone else, and for some reason this someone else has walked away from the already placed order. In such a way the module may have been paid already by the company that placed the order initially or by an insurance company who has to cover the costs for the already placed order. It is also a prerequisite for such an option that industrial orders can be insured against several kinds of unforeseen accidents.

A differentiated supplier structure with companies located to several countries can protect against exchange rates, interest rates and customs (Gadde and Håkansson, 1998, p. 174. If the exchange rate moves in a favourable direction for the buyer, a considerable amount of money can be saved for the buying company. This kind of financing is hard to plan in advance since exchange and interest rates are hard to foresee. Customs can be taken into account since they are known and are seldom changed.

Concerning financing, there exist several creative ways to finance the purchase, i.e. so-called financing instruments. Examples are payments as exchange of work force, later payments, percents of other sales, payment when a production roof has been achieved, mutual benefits, etc. Other examples are ownership, shares, bonds, options and futures in the buying company for the seller. The most of these possibilities are available via third parties, but can also be provided directly between the buyer and the seller. I will consider these instruments a very creative way of financing an investment, and I think it is outside the scope of this text to treat these instruments.

Price rationalization role

According to Ford et al. (1998, p. 175), the price for a technical system is set by a number of ways in an arm´s length type relationship between two companies. These range from simply adding a markup to the seller´s costs related to the delivery of the technical system, following the prices of competitors, estimating what the customer may be willing to pay, calculation of the value-in-use, or some combination of these ways.

If the technical system is a new product from the supplying company, the seller is usually in a better position than the buyer to assert a price (Ford et al., 1998, p. 175). A too high price may however lead to no deal or transaction, at least for the moment. If the price is too low, the supplier runs the risk of selling too many systems without being able to amortize own development costs. Later attempts to raise the price is often difficult to achieve, especially in the context of an existing relationship.

If the technical system is a more mature product, the price is likely to be driven by the buying company (Ford et al., 1998, p. 175). The buyer usually manages to set or drive the price by playing one potential supplier against another in order to extract price or other concessions from them. If several competing suppliers are available, a competitive tender can be arranged by the buyer to set the price (Lockyer and Gordon, 1996, p. 46). Torvatn (1996, p. 95) mentions power games of putting pressure on the suppliers or negotiations and comparisons between suppliers. In this lies also the possibility to modify the product requirements to suit the product, to use standardized solutions that already exist or to bring in new suppliers with new and better solutions. In this situation, it is a possibility for the supplier for being treated unfairly, i.e. used and abused. If future does not matter, the unfair treatment may do no harm. In a relationship which has developed into collaboration, unfair treatment may destroy a relationship.

A relationship between two companies can evolve into collaboration with respect to development and adaptation of the resources and activities of the two organizational actors to suit each other´s requirements (Ford et al., 1998, p. 167). According to Ford et al. (1998, p. 177), the price for a technical system in a collaboration type relationship is a mechanism by which the respective benefits, costs, adaptations and investments of the two parties can be accounted for. It means that the price setting process becomes different from an arm´s length type relationship, even though such price setting elements can be identified.

The two companies may redefine their activities related to delivery of technical systems in order to improve the relationship between them (Ford et al., 1998, p. 176). It means that the negotiations between them are as much about which company will do what tasks as it is about the price for each episode in the relationship. The supplier´s contribution to a customer can be complex and is likely to extend beyond the delivered technical system. Some of this contribution may only be received in the future after both parties have incurred short-term costs. Similarly, the contribution of a relationship to the supplier may extend beyond the receipt of immediate revenue and is likely to include some of the benefits of the adaptations and investments incurred by the customer. Price is only one

part of how the benefits of a relationship are shared between the parties involved. For example, if both parties can reduce the monitoring work related to the delivery of the technical system by approximately the same amount, then both companies are likely to keep their savings and not adjust the price.

Separate use or combination of roles

The discussion above suggests that the price setting of a technical system in a network-based purchasing/development project can be structured according to several roles. Here, roles are not understood as a predetermined set of rules of conduct, but more as a dynamic process in which the different roles are enacted in parallel, more or less, by the involved actors (Korsnes et al., 1997). The interaction processes following the role categorization bring actors together to work out solutions on different aspects of a project. The solutions have important effects on the price of the technical system.

The prioritizing role concerns putting efforts in the more profitable options, thus reducing the complexity and the price of the system. The supplier base organization role concerns mobilizing of suppliers in order get a more cost-efficient development project. In the development role, the intention is to come up with a concept for a development project of a technical system which also has potential outside the focal relationship. Bringing in other actors than the supplier side gives some new possibilities with regards to mobilization of resources. The financing role comprise different options for bringing funding into the supplier side of the project. In the price rationalization role, the intention is to achieve a fair price, i.e. a price which the buyer finds reasonable and is able to pay and which still can cover the costs of the seller.

All the roles are closely related, and they are all directed towards achieving a final and agreed upon price. Every role is multi-faceted in terms of several mechanisms available for the actors, and new mechanisms can always be added. The identified roles have one common feature. All are highly dependent on each other. For example, in order to finance a system, a funding actor outside the supplier base has to find the general part of the technological development interesting. Furthermore, it is assumed that it is important to include all the roles in an analysis where the purpose is to try to understand the price setting process in a network case.

CONCLUSION

The purpose of this paper has been to develop a conceptual framework for explaining the price setting of a technical system in a combined purchasing and development project in which several other actors are involved besides the buyer and the seller.

The industrial network perspective according to the Uppsala tradition forms the first foundation for the conceptual framework. Basic elements in this approach are relationships and interaction between clearly identifiable actors with a specific purpose,

for instance with respect to price setting. The second foundation is that price setting is understood as an integral part of purchasing, and purchasing is furthermore pictured according to Gadde and Håkansson (1998). It means that purchasing may involve supplier education, technological development and supplier base restructuring.

Cooper (1993) mentions prioritizing as part of technological development with respect to products. Gadde and Håkansson (1998) devise three roles. The education role is left out in this text. The other two roles, technological development and supplier base organization, are included. Torvatn (1996) devise a rationalization role to be used in purchasing. I allow myself to rename it to a price rationalization role. In addition to these four roles, I introduce one new role. The financing role comprise different options for bringing funding into the project. Hence, price setting of a technical system in a network case is understood as an interaction process between actors connected through a network of relationships. The interaction is structured according to the roles devised, however, the interaction may not fit neatly into the role categorization. The roles are enacted in a parallel way, i.e. they are dependent of each other. However, it does not mean that all the roles can be clearly identified in a given case, but many of them will, more or less.

Given a complicated project such as our purchasing case, it usually is a need for many options to resolve the different issues. The term requisite variety of options may be used for this situation (Nonaka and Takeuchi, 1995), and it can be created by seeing price setting of a technical system as an integral part of purchasing and purchasing again in conjunction with development, thus making up an innovation project. An innovation project contains many more elements to play with, and can be a sophisticated approach to harness the project to the complicated issues to resolve, for example the price setting of a technical system in a situation where many contradicting interests are present (Quinn, 1988).

A problem with the proposed conceptual framework is that it may blur the line between the phenomenon and its context, i.e. the price setting concept may be contaminated by the concepts of purchasing, technological development and network of relationships. If so, it probably arises from my attempt to focus on the setting of price using a network related technological development approach, which I by the way think is important in this case. It is also worth mentioning that the price setting concept in this text should be distinguished from the rather limited pricing term found in the economic literature. The suggested framework indicates that network structure and technological development may play a significant role in economic behaviour such as pricing. Hence, I believe I am in line with Uzzi (1997) who contends that economic action is embedded in social structure.

The proposed framework can be used to generate interesting research questions. An empirical one might be framed around the phenomenon in which an extraordinary low purchasing price is achieved by the customer. Can the suggested framework be used to explain why a buying company can achieve a very low price for a production system which is purchased from a company acting as a systems supplier. The selling company acting as a systems supplier is pre-determined, i.e. we are talking about a close

relationship. This message should be pertinent to small firms or companies having difficulties in making big and expensive investments in new production systems. One might ask whether such an interaction process directed towards an extraordinary low purchasing price can go on in a climate of cooperation instead of conflict. According to the proposed framework, there is no reason why a buyer could not aim for an extremely low price as there should be few chances for conflicts to arise that could jeopardize the close relationship. This stands in contrast to Uzzi (1997), who contends that actors in close relationships satisfice rather than maximize on price in order not to risk destroying close relationships.

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