ACTIVITY BASED PERSPECTIVE ON ORGANIZATIONAL INNOVATION ADOPTION

A contextual approach to five adoption processes within the food industry

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Juokaa kanssani, seuranne on kunniaksi. Kanssanne olen kaatumaton.
Maljanne nostakaa, Teräsbetoni

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1 INTRODUCTION

1.1 Background

It is nearly impossible to find an industry that is not engaged in continuous or periodic innovation and reorientation due to the dynamic nature of most markets (Hurley & Hult 1998). New technologies and products are launched more frequently and their ability to alter competition structures and disturb markets' equilibrium has long been recognized (see e.g. Levitt 1983). In an ever changing, complex and turbulent business environment the effective adoption of continuously developing new technologies is one critical determinant of organizational competitiveness and survival (Tang & Zannetos 1992, 135; Stoneman & Kwon 1996).

Given the key position of new technologies and their effective adoption in business, one could expect this to be a solid and well established field of research. On the contrary, the current body of academic knowledge concerning how organizations adopt innovations is considerably less than the sum of its parts.

A literature review still after 30 years produced strong evidence in support of Downs and Mohr's (1976) claim that "the most alarming characteristic of the body of empirical study of innovation is the extreme variance among its findings." The review illustrated the wide range of definitions and divergent conceptualizations and models of innovation adoption. Some authors liken adoption to a decision making process, some to decision choice, and still others to decision making plus implementation processes. The breadth of an empirical phenomenon related to the adoption concept seems to vary between studies (see Makkonen 2008). There are in addition other theoretical concepts applied in the literature that are closely linked to similar empirical phenomena. For example, Swan and Clark (1992), as well as Hislop (2002; 2003), use the term *appropriation* to refer to the organizational decision making process when adopting an innovation. This introduction of new concepts is perhaps due to authors who are interested in this empirical domain preferring to conceptualize it without getting involved with the fuzzy innovation adoption and diffusion approach and its controversial terminology.

Part of the reason for the disharmony and fuzziness related to innovation adoption and diffusion research is the variety of directions from which the research field has been approached. Innovation adoption and diffusion have

been the focus of research for example within *economics* (e.g. Mansfield 1961, Stoneman and Ireland 1983), *sociology* (e.g. Rogers 1962), *geography* (e.g. Brown 1981), *medical sociology* (e.g. Coleman, Katz, and Menzel 1957), and *cultural anthropology* (e.g. Barnett 1953) (for a review see Gatignon & Robertson 1985, 849; Rogers 2003, 43–91; Greenhalgh, Robert, MacFarlane, Bate, Kyriakidou 2004; Lissoni & Metcalfe 1994). According to Everdingen and Wierenga (2002, 649), innovation adoption and diffusion theory was brought to the marketing discipline in the sixties (see e.g. Robertson 1967, Bass 1969).

Grønhaug and Kauffmann (1988) state that "researchers preoccupied with innovation are partly unaware of the research done and conceptualizations used by colleagues from other disciplines". Rogers (2003, 39) sees the situation as completely the opposite, "every contemporary diffusion scholar is fully aware of the parallel methodologies and findings of other traditions. All of the diffusion research traditions have now merged intellectually to form a single, large invisible college, although scholars in many different disciplines conduct diffusion research." After the review it is easier to adopt the former view.

Within the whole body of adoption and diffusion research, *organizational* innovation adoption has been a neglected field. Deep attention has been paid to individuals rather than organizations in the adoption research. Differing from the individual adopter context, organizational innovation adoption relates closely to complex social interactions between groups and individuals, and also to the development pattern of structures, roles and systems (Reunis, Raaij & Santema 2004, 202). In this sense, the results are not directly applicable from individual context to organizational context.

The research on organizational adoption has mostly considered adoption as *choice* rather than *process*. In these studies, the focus has been trained on adoption as a decision making outcome and factors affecting this outcome (see e.g. Choffray & Lilien 1980; Everdingen & Bamossy 2000, 125; 164; Gatignon & Robertson 1989, 36; Waarts, van Everdingen & Hillegersberg 2002). The process of adoption is widely considered only as a "black box" yielding innovation adoption. Studies of the dynamics of the innovation adoption process, and the identified factors' influence on each step of the process are rare (Frambach & Schillewaert 2002, 164).

The emphasis in the previous literature on the operationalization of adoption as a choice reflects the position of adoption in a wider conceptual setting (see Makkonen 2008). In the context of *diffusion research*, in which the focus lies on macro level innovation diffusion, adoption is seen as a choice, a part of the diffusion phenomenon. As a process, adoption is viewed when considered in itself as a focal organizational level phenomenon studied

within *adoption research*. This duality related to adoption also explains the controversial terminology and research findings described.

Research attempts have focused on scrutinizing and integrating the independent variables that affect adoption, but adoption itself has not attracted particular attention. The lack of a common definition implies conceptual and methodological problems as far as the research is concerned. There is no point in attempting to integrate factors that influence adoption, if the definition of adoption varies from study to study. Integrative research attempts have been made (e.g., Rogers 1962, 2003, Wejnert 2002) to unify the diverse concepts, variables and processes but, surprisingly, no concrete attempt has yet been made to find a solution to the core problem of what we mean by organizational innovation adoption. This study aims to shed light on the clear and crucial scarcity of conceptualizing and understanding the organizational innovation adoption process.

1.2 Purpose and approach

Instead of an instant choice, adoption is seen as a process in this study. Process phenomena tend to spread over time and space and are *context-bound* in nature. Due to this embeddedness, processes can be understood only with reference to their contexts and not as separate entities. With regard to any process, a distinction can be drawn between *process*, its *content* and the *context* (see Pettigrew 1990a, 268; 1992, 8–9; 1997; Van de Ven & Huber 1990). The three elements are interlinked, as a process takes place in a certain context being affected by it as well as impacting on it. A similar reciprocal relationship exists between a process and its content as well as between the content and context. The idea of duality, influencing the other elements while being influenced by them, follows loosely the general idea of structuration and duality between structures and processes (see Giddens 1984).

The purpose of the study is to examine how companies adopt technology innovations. According to the classification of process, content, and context, the purpose is divided further to four subquestions:

1. What is the nature of the organizational adoption process?
2. What activities underlie the organizational adoption process?
3. What structures are linked to these activities?
4. How do the structures affect activities in the generation of organizational innovation adoption?

The first subquestion refers to the content and process of adoption. The nature of adoption refers to the phases of the adoption process and to the meaning of the whole process. This is termed *descriptive content* as it

describes the adoption process by answering the question *what does the adoption process comprise*, and hence refers to the definition of the process. In addition to these *descriptive phases*, there are activities that produce these phases and thus the whole adoption process. These activities (the second subquestion) are attached also as a dimension to the content of the adoption process and comprise the functional content of the process. *Functional content* answers the question *what is the adoption process a result of* and refers to activities generating the adoption process.

The third subquestion refers to the context of the adoption process. The content-context interplay is assumed to characterize the adoption process, as different structures embedded into different levels of contexts affect the activities generating the adoption process (the fourth subquestion). Due to the inseparability of the contexts and structures, they are considered synonymous in this study. The definition of adoption process, and the understanding of the activities producing adoption in interplay with the structures, develop as a result of the study and culminate at the end of the study in an activity based perspective. Figure 1 presents the links between the subquestions and the content, context and process.

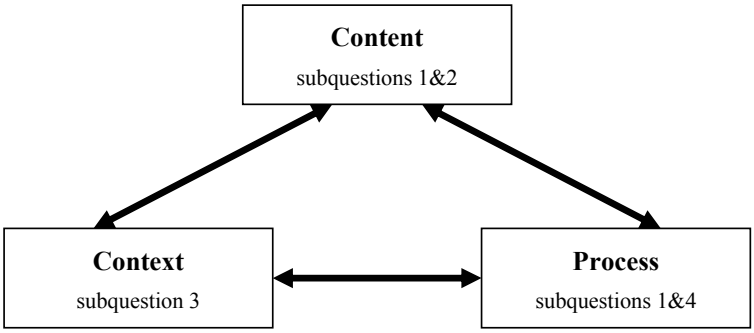

Figure 1 A metaframe of the study

The fourth subquestion refers to the main aim of the study. *The final aim is not to identify and describe activities and structures but to generate adoption theory based on these elements.* At a more abstract level, this aim of theory building refers to generating a deep and structured *understanding* of the phenomenon. Due to the nature of the research purpose and the earlier literature on the phenomenon, the study adopts *qualitative approach* and *multiple case research strategy* in theory building (see Eisenhardt & Graebner 2007, 26).

Due to the emphasis on the relationship between the adoption process and its context, the approach of the study is *contextual* by its nature. According to Pettigrew (1990b, 10), contextual process research is an approach "capable of

drawing on concepts from a variety of disciplines and several levels of analysis" (see also Featherman and Lerner 1985, 659). Featherman and Lerner (1985, 672) state that "different modes of analysis and causal explanation do not need reduction or integration into one overarching theoretical paradigm; evidence from distinct paradigmatic approaches can accrue or coexist to account for a complex phenomenon" (like organizational innovation adoption) (see also Lewis & Grimes 1999, 672; Gioia & Pitre 1990, 584).

Following the presented suggestions two large fields of research can be linked to the adoption and diffusion literature: *organizational buying behavior approach* and *network and interaction approach (IMP).* These two approaches are essential in answering the second, third and fourth subquestions. This approach falls into the category of *multiparadigmatic research* that goes hand in hand with the case research strategy in this study (see Lewis & Grimes 1999).

The innovation adoption and diffusion approach is the *leading approach* of the study. The role of the adoption and diffusion approach is *descriptive.* It is applied to define and set boundaries for the adoption phenomenon, to describe it. The organizational buying behavior approach and network and interaction approach are *complementary approaches* and used only to provide tools to further understanding on the adoption phenomenon. Thus the role of these approaches is *explorative.*

The emphasis on context and interplay between context and process leads to difficulties in setting clear boundaries for the process phenomenon. This necessitates gathering data, which deals with multiple levels and units of analysis whose boundaries can be ambiguous (Langley 1999, 692–694). The chosen theoretical approaches operate both at the micro and macro levels and hence answer this call for multiple levels and units of analysis. The research is *multilevel research* by character.

All three approaches are first reviewed and then applied separately into empirical reality through the *interview method*. In this regard, the three approaches produce three separate empirical accounts of three different phenomena; *adoption process of technology innovation* (innovation adoption and diffusion approach), *buying process of new technology* (organizational buying behavior approach), and *interaction episode* (network and interaction approach). The empirical accounts will then be used to acquire knowledge of the adoption process phenomenon. This step in which conceptualizations and knowledge generated through the complementary approaches are transferred to further understanding of the adoption phenomenon is known as metatheorizing. Metatheorizing produces the activity based perspective on organizational innovation adoption. Thus the study is *metatheoretic* by its

nature. The following section discusses the relationships between the theoretical approaches.

1.3 The relationships between the theoretical approaches

Innovation adoption is a micro level phenomenon in which the potential adopter goes through the adoption process and finally adopts the innovation. Cumulative adoptions lead to innovation diffusion in which an innovation becomes more common in the social system it diffuses. Due to the previously occurred diffusion, there were potential communication sources and opinion leaders. These formed a context for a single adoption process. The emphasis of research on innovation adoption and diffusion thus varies as economists are interested in the aggregate level economic growth aspect of adoption and diffusion, while other social sciences focus on explaining individual/organizational adoption behavior in terms of the adoption process (Frambach 1993, 24).

This study focuses on single organizations' adoption processes with reference to social system diffusion and applies the innovation adoption and diffusion approach in that respect. Mostly, the literature does not draw a clear distinction between adoption and diffusion, but here the idea is to consider adoption as a focal phenomenon and diffusion as a context of it. Hence, splitting the adoption and diffusion approach into *adoption approach* and *diffusion approach* makes this choice more explicit (Link A in Figure 2). In this study, the innovation adoption approach is used to refer to the adoption process and the literature thereon. The innovation diffusion approach refers to the perspective and literature dealing with macro level innovation diffusion. The innovation adoption and diffusion approach is used to refer broadly to the whole body of literature comprising both these micro and macro level approaches.

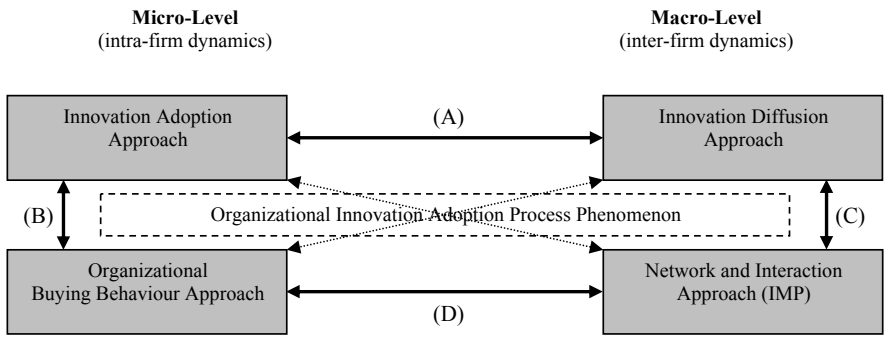

Figure 2 The relationships between the theoretical approaches

In the marketing literature, the innovation adoption approach and *organizational buying behavior approach* have a long and interestingly evolved relationship (Link B). In early marketing textbooks, innovation adoption and diffusion was incorporated into nontask buying models (Webster & Wind 1972, 19–20). Sheth (1977, 21–25) positioned the innovation adoption paradigm under the behavioral approach to buying. Since those times, it would appear that the only explicit and rigorous scientific attempt to initiate discussion on the relationship between these fields, albeit in a very limited form, was made by David Wilson (1987). Wilson (1987, 323) states that "scholars have long studied the industrial adoption process without considering it as a part of the normal buying process of the organization. When a product or service is new to the organization its acquisition can be viewed as a new task buying process or as an adoption process." However, this initiation left no noticeable impact (see also Ward and Webster 1991 who review different organizational buying behavior related approaches).

In the current research on organizational innovation adoption, organizational buying behavior is reflected very scarcely and mostly implicitly. The weak echoes of buying behavior research are embodied for example in the buying center concept employed by some authors in the context of adoption research, or in the interchangeable use of the adoption and buying concepts (see e.g. Woodside & Biemans, 2005; Woodside, 1994; Sharma 1994; Woodside, Liukko & Vuori 1999, 30). Hence, it seems that the innovation adoption approach has grown apart from organizational buying behavior in the context of marketing literature. There is no explicit state of the art review of these fields together. Considering the evolvement of the fields and their interconnections, the inclusion and application of the organizational buying behavior approach in this study feels a natural choice.

Similarly to the innovation adoption and organizational buying behavior approaches operating at a micro level, congruencies can be found at a macro

level between the innovation *diffusion approach* and the *network and interaction approach* by IMP. IMP is an informal research group aiming to conceptualize and understand industrial marketing from the perspective of interorganizational interaction, relationships and networks (see e.g. Ford 1997, Håkansson & Snehota 1995, Axelsson & Easton 1992). The link between the innovation diffusion and network and interaction approaches (link C in Figure 2) is weakly established in the previous literature. The work by Robertson, Swan and Newell (1996) is an exception, in its discussing a network approach very similar to IMP with the diffusion approach explicitly in parallel. The importance of the understanding of networks to diffusion research is reflected in the statement by Rogers (2003, 331) that "we must understand the nature of networks in order to understand the diffusion process". Despite the potential benefits, the shortage of joint consideration of the fields is an obvious gap in the current literature, so it feels reasonable to adopt the network and interaction approach in this study.

Link D in the model is the most evolutionary. The IMP approach can be seen as a reaction against focal firm oriented classical organizational buying behavior research (see Tanner 1999). This development deserves a little closer scrutiny here in order to understand the joint background of the two.

The focus of early organizational buying behavior studies has been on analyzing and understanding specific buying decisions from the buyer's perspective (see e.g. Webster & Wind 1972, 2). The work by Webster and Wind (1972) was conducted in order to facilitate the marketing activities of the selling firm as furthering understanding of the buyer organization's behavior in the buying situation. These seller activities are only meaningful and interesting in these traditional models in terms of how they influence buyers' behavior (Ward & Webster 1991, 422). The original buying models combined multilevel rational decision making models with buying processes (Gadde & Persson 2004).

The study of buying as a purely intra-organizational process is difficult, partly because of the many interactions of this process with the firm environment, particularly the interactions with the supplier's selling activities (Nicosia and Wind 1977, 114). Nicosia and Wind (1977) made an attempt to integrate the two levels of analysis in organizational buying, intra-organizational and inter-organizational. Due to the scarce research efforts at that time on the inter-organizational aspects of buying, their otherwise rigorous analysis was mostly speculative in this area. They wrote (1977, 114) that "there are practically no textbooks on the transaction per se nor studies of the complex interactions between the selling and buying processes that precede and follow the conclusion of a transaction". They assume there to be

several implications for future research attempts due to this “one sidedness” in the literature at that time.

There has been a lot of development in the area of interaction between companies since that time, providing us with empirically based conceptual tools to continue the early work by Nicosia and Wind (1977). The work done within the IMP Group for example has shed light on the inter-organizational issues concerning organizational buying.

Given the lucrative opportunities for contribution, explicit research efforts aiming to integrate the intra-organizational and inter-organizational levels of analysis in buying have surprisingly been little taken up. An exception is the work by Ward and Webster (1991) which considers organizational buying behavior, the IMP approach and the innovation adoption and diffusion approach all under the title of organizational buying behavior. Also Barclay 1992 uses the term “organizational buying” to cover both traditional buying behavior and the IMP approach. In this thesis, organizational buying behavior refers to the traditional focal firm approach (e.g. Robinson, Faris & Wind 1967, Webster & Wind 1972, Sheth 1973).

The traditional focal firm oriented buying behavior discussion has almost ended and the current research on inter-organizational issues almost denies the linkages to that phenomenon and has in some part concentrated on criticizing that field of theory. According to Ward and Webster (1991, 446–448), the buying related research on the inter-organizational level is more defined by “common criticism of earlier “unit” conceptualizations than by a unified, coherent definition of just what the “interaction perspective” means”.

Despite the criticism of the organizational buying behavior approach (see e.g. Sheth 1996; Campbell 1985), I believe similarly to Tanner (1999) that organizational buying models could be of much help in developing the IMP approach further. The IMP approach has been criticized for having produced loose and general rather than specific theory, having attached the produced conceptualizations relatively weakly to the available work done within the sociology and social psychology of organizations (organizational learning), and because of largely ignoring individual intentions in the analyses (See Möller 1994, 361, 363). Especially organizational buying models are applied in this study to bring in the conceptualization of individual level actions that are not considered in the interfirm level framework of IMP.

Webster and Wind (1972, 9) wrote that “the study of organizational buying behavior must have an interdisciplinary focus and must be eclectic in borrowing from whatever fields of behavioral and policy sciences are likely to help us understand the relationship between particular inputs and specific responses or buying actions” (see also Möller 1985, 3). In this sense, this study contributes and “brings to life” organizational buying behavior in terms of

attaching it, to the IMP approach. This aim is coherent with Ward and Webster (1991, 420), who propose further research to reorganize, test and extend existing work in order to attain the goal of a "coherent set of middle-range theories of organizational buying behavior".

The consideration of the link between organizational buying behavior and the network and interaction approach mostly served the purpose of showing the reader that organizational buying behavior research could still be worth applying here, despite the fact that the modern research in the field tends to focus on inter-organizational dynamics. Despite the lucrative cross-fertilization opportunities between these fields, this study focuses primarily on contributing understanding of the organizational innovation adoption process. As a by-product, some insights will be provided on the relationship between organizational buying behavior and the network and interaction approach; however, this is not a key focus.

1.4 Technological innovations in the food processing industry

1.4.1 Food processing industry

The food market has attracted a great deal of public attention as the arena for a number of dramatic food related problems including dioxin, mad cow disease (BSE), the listeria bacterium, poultry diseases and infected pork to mention just a few. These issues have attracted publicity largely because the food market is significantly different to other consumer markets. The role of food in consumers' everyday life is huge. As consumers we not only eat food but also attach feelings, fears, emotions and expectations to it. "Few sectors of industry are so inextricable from people's perception of their quality of life as the food industry. Food engages, affects and provokes – it is both a source of pleasure and of fear." (Lagnevik, Sjöholm, Lareke & Östberg 2003, viii.)

Technological development and efficient public information provision have made consumers more aware of the opportunities and also the possible threats presented by food. Consumers demand food that adds value and quality to life. Food consumption has become an increasingly important physiological aspect of consumers' self-identity. Nutrition decisions are influenced by a variety of ethical and moral issues, too. These changes in the role of food have seen it shift from a commodity to a high value added product. (Lagnevik, Sjöholm, Lareke & Östberg 2003, 3–9.)

The food processing industry is currently facing its greatest upheaval in modern times, promoted by increased international competition, structural change, technological change, global warming, and shifting consumer habits.

World Trade Organization (WTO) negotiation outcomes have led to lower barriers to entry for food products in the European market and thus intensified *international competition* which forces food producers to reduce production costs or add customer perceived value to products. *Structural change* is reflected in the globalization of retailing, the rapid growth of the convenience market, and co-operation between different actors in the value chain. The increased penetration of high volume heavy discounter retail chains into domestic markets has depressed the prices of commodity products in many countries, but also affected the convenience market in terms of efforts to industrialize the kitchen and the meal by combining different food products and food services offering the consumer more prepacked and ready-to-serve meal options. (Lagnevik, Sjöholm, Lareke & Östberg 2003, 3–9.)

These dynamic circumstances offer an interesting and fruitful context in which to study organizational innovation adoption processes. The empirical part of the study investigates five adoption processes in five food processing firms. All five adopter companies operate within the food processing sector in Finland. Out of respect for their wishes, the companies remain anonymous here. They were chosen according to *size* (number of employees: Foodconcern1 ca. 4,500, and ca. 100 at the production plant in question; Foodconcern2 ca. 5000; Foodmedium ca. 150; and both Foodsmall1 and Foodsmall2 ca. 15) in order to exemplify different types of processes in terms of company policies and practices.

The chosen innovation adoption processes were as similar as possible in terms of adopter perceived radical newness, and the perceived commitment needed to conduct the adoption process. Also, in all the cases except Foodsmall2, high risk was associated with these processes. Risk is generally understood here as “the probability of loss” (see Mitchell 1995).

1.4.2 Technological innovations adopted in manufacturing

Schumpeter was first to bring out the concept of innovation in 1934 (Hurmerinta-Peltomäki 2001, 43). According to Schumpeter (1934, 65), production is combining different raw materials. In order to produce new products or current products exploiting different production methods, raw materials and production have to be combined differently. Based on this idea, Schumpeter (1934, 66) defines innovation as the “new combination” of existing materials.

Due to their key role in modern society, innovations have been extensively studied, despite or perhaps due to which the increasing interest and growing number of studies in the field has yet to yield a generally accepted definition

of the concept of innovation (Damanpour and Schneider 2006; 216; Damanpour & Evan 1984, 392–393; Cobbenhagen 2000, 25). According to Zaltman et al. (1973), innovation may refer to three main concepts: a process of developing a new item, a process of adopting a new item, and a new item itself. This lack of consistency hinders knowledge accumulation in the field (Johannessen, Olsen, and Lumpkin 2001, 20). Despite their variety, however, the definitions share certain similarities regarding the characteristics of innovation. On a more abstract level, newness and utility are common to most of them (Hurmerinta-Peltomäki 2001, 48). Newness is mostly considered from the viewpoints of firm, world, adopter, industry, market or customer (Garcia & Calantone 2002, 112). This study considers innovation, as Cumming (1998) put it, "the first successful application of a product or process" for a potential adopter. The perception of newness (and utility) matters, but absolute newness does not (Damanpour and Evans 1984, Lyytinen and Rose 2003, 559). With respect to this, all the production machines or other production solutions examined in this study were clearly innovations from the adopter companies' point of view as they were perceived to be radically new and brought evident benefits.

The dual-core model of innovation (Daft 1978; see also Grover, Fiedler & Teng 1997, 274; Knight 1967) divides organizational innovations into technical innovations and administrative innovations. *Technical innovations* relate to the technical nature of an organization or a primary work activity in which an organization converts raw materials into finished products. Technical innovations need to be distinguished from *technological innovations*. Technical innovations are not merely innovations resulting from advanced technology; they are linked to the primary activities and the value adding process of the organization, and adopted as a means of changing and improving those activities, which in themselves may or may not exploit technology (See also Damanpour & Evan 1984, 394). *Administrative innovations* refer to the behavioral or managerial side of the organization, the social system of rules, roles, procedures and structures (e.g. a new way to make decisions). Sometimes administrative innovations are used synonymously for organizational innovations (e.g. Mouzas & Araujo 2000, 294), but here the term organizational refers only to an organizational adopter.

Swanson (1994, 1076) took the dual-core model further and presented his tri-core model of innovation (Figure 3).

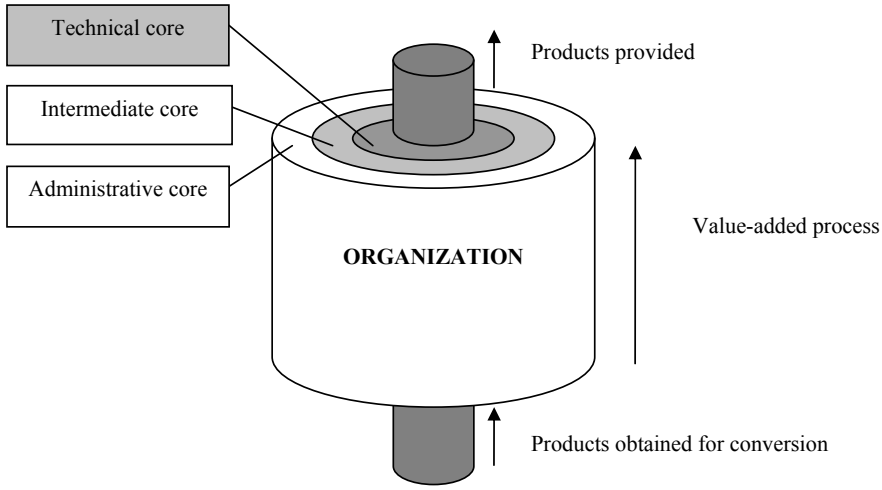

Figure 3 The tri-core model (based on Swanson 1994, 1076)

Swanson (1994, 1076) argues that the dual-core model is inadequate for the study of innovations, which contain elements of both technical and administrative innovations and do not therefore fit into just one of these categories. To solve this lack of fit, he brings in a third category he calls the information systems core, resulting from his study on information systems, but here labeled more generally as the *intermediate core* (Figure 3). The intermediate core is positioned between the technical and administrative cores and serves as an information link between them.

The three layer classification presented emphasizes the view of a firm as a production organization (see Ansoff 1971, 17–21). This view still commands relevance in contemporary thinking although the nature of firms has changed and many are not production systems at all if the term is interpreted very narrowly (see Scott 1995, 46). Instead of a narrow interpretation, the view of a firm as a production system is used here to refer to the process through which a firm produces additional value for customers.

In this study, the scrutinized innovations fall into the category of technical innovations, since they are adopted as part of the primary activities in which the case organizations convert raw materials into final products. All the studied innovations are also technological innovations. For the sake of clarity, instead of the term technical, the terms technology and technological innovations are used in this study. Technology is seen simply as a "man-made creation that embodies the application of scientific knowledge and understanding" whose value is determined "by the extent that it meets the user's need, objective and requirement" (Gee 1981, 5). The terms innovation

and technology are quite often considered synonymous in the literature (see e.g. Küppers 2002, 30) and also in the focal study.

In the organizational buying behavior section, the term product is used in addition to innovation as it is a more general term and inherent to this field of theory. In the empirical context, the informants refer to the adopted innovations as machines, solutions, methods and investments, and hence the empirical part also recruits these concepts to refer to technological innovation.

1.5 The process and structure of the study

1.5.1 The research process

The research project started in spring 2004 with a review of earlier research. At the beginning, only the innovation adoption and diffusion approach was under consideration, but the theoretical perspective was then widened to cover organizational buying behavior and network and interaction approaches as well. Prior to data collection, the theoretical framework was supplemented with generic decision making theories but they quite soon fell away as the combination of the theoretical approaches felt too heavy.

In developing the theoretical framework and the logic of the study, international conferences [particularly IMP conferences (2005, 2006, and 2007)] have proved very fruitful forums. The following Figure 4 depicts the key phases of the research project.

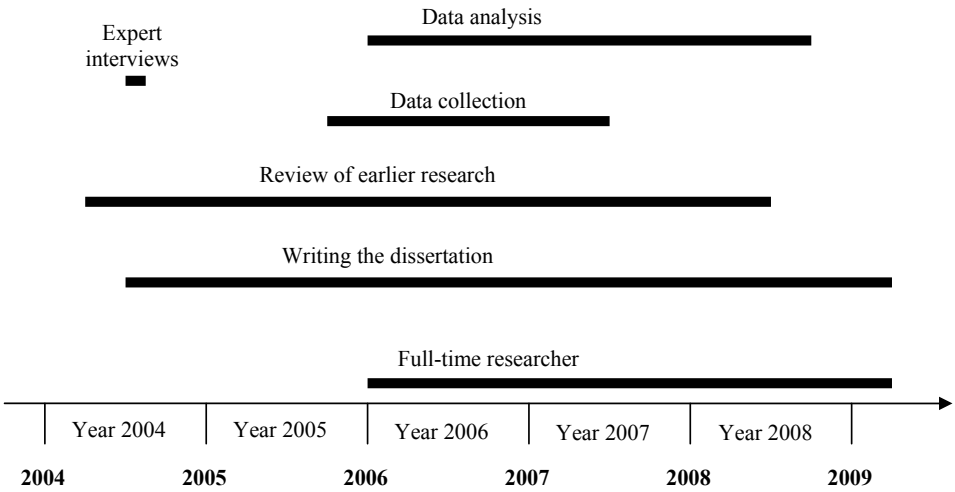

Figure 4 The research process

The empirical part of the study commenced with the expert interviews at the end of 2004 (see Appendix 1). The idea was to gain an understanding of the industry and possibly to gather empirical information within the context. Data collection began at the end of 2005. I wanted to have sufficient knowledge of the theoretical approaches before entering the field, which meant there was a gap between the expert and case interviews. Data collection was concluded in summer 2007. The data collection process was much about learning across the cases and that took time. Also gaining access, finding suitable informants and scheduling the interviews took some considerable time. Analysis was undertaken in parallel to the data collection and continued thereafter. From autumn 2007 to spring 2009, much of the research activity focused on writing the dissertation. From the beginning of 2006 until the end of the project I had the opportunity to work as a full-time researcher.

1.5.2 The structure

After the introduction, the study begins in Chapter 2 with a discussion of organizational innovation adoption. This review of the current literature furnished a definition of adoption and partly answered the first subquestion. At the end of the chapter, the assumptions regarding adoption in this study are made explicit.

In the methodology chapter (Chapter 3), the focus lies on the philosophical underpinnings of the study, its contextual approach, and more operational level issues such as case selection, data collection and data analysis methods. Chapter 4 offers case descriptions, which are rather more general than detailed, in order to avoid unnecessary duplication in the analysis phase.

Chapter 5 presents the three theoretical approaches and their application to the empirical reality. First, the innovation adoption and diffusion approach is conceptually modeled with reference to the definition realized in Chapter 2. The cases are then investigated through the conceptual model. The innovation adoption and diffusion approach is summarized at the end of the section. Next the organizational buying behavior literature is brought onto the stage. The discussion starts with a consideration of the organizational buying behavior research paradigm and then focuses specifically on the concepts of buying center, buying situation and buying process. These constructs were chosen due to their central position in organizational buying literature as well as on the basis of their applicability in this study. At the end of the section a conceptual synthesis model is presented. The synthesis model is then applied to the empirical reality of the cases. The analysis is summarized at the end of the buying behavior section. Lastly, the network and interaction approach is

discussed. The consideration begins with a general positioning of the approach. Then the focus is trained on relationships in the form of cumulative interactions, the building blocks of networks, and accumulations of actor bonds, resource ties and activity links. The consideration is based on the centrality of these constructs within the IMP approach and their applicability in this study. The conceptual model of the network and interaction approach is then applied to the cases and finally the analysis is summarized at the end of the section.

The section summaries in Chapter 5 create the basis for comparing and combining the approaches in Chapter 6. The metaframe (Figure 1) is applied in summarizing the theoretical perspectives. As an end result, Chapter 6 provides the activity based perspective conceptualizing the organizational innovation adoption process. Finally, in Chapter 7, an overview of the study is presented along with a discussion of the theoretical contribution, managerial implications, quality and limitations, and future research avenues.

2 ORGANIZATIONAL INNOVATION ADOPTION PROCESS

This chapter delineates the field and concepts of innovation adoption and diffusion. The guiding idea in reviewing the adoption and diffusion literature for a *synthesis definition of adoption* is to find as suitable a common denominator as possible that binds together the various definitions and models presented, as well as a more abstract spirit beyond the individual pieces of work. This is to avoid throwing out the baby with the bathwater by introducing a new conceptualization that loses sight of the backbone of the research field (cf. Butler 1990) and hence would be no better than launched fuzzy new concepts in the literature. The idea is that the existing body of research on the organizational innovation adoption process defines that process, and restricts the viewpoint and empirical area of appliance.

Because of the variety of disciplinary roots of the research there is no clearly established conceptual difference between organizational and individual (e.g. consumer) adoption and diffusion. An organization or an individual are simply considered as different units of adoption within the same theory. Therefore the definitions generated and studies conducted in the individual adopter context are equally important in defining the meaning of adoption and diffusion despite the results across the fields not being directly transferable.

First, a conceptual difference is drawn between choice and process research. Secondly, the concepts related to process are scrutinized in more detail. At the end of this consideration, a definition of and perspective on adoption in this study is concluded.

2.1 Innovation adoption as choice and process

According to Ozanne and Churchill (1971), “The industrial adoption process is nothing more than a decision process leading to the purchase of an industrial innovation.” Gatignon and Robertson (1991, 319) define the adoption process as “the decision sequence that consumers use to determine whether or not to adopt the innovation”. Similarly, Woodside and Biemans (2005) define the adoption process as “the decision-making process of an individual unit of adoption…”. In the first edition of his seminal book Diffusion of Innovations

(1962), Rogers conceptualizes the adoption process as awareness, interest, evaluation, trial and adoption. It could thus be said that the innovation adoption process is the decision making process of acquiring an innovation. However, adoption is also the last phase, or culmination of the adoption process in various adoption models. Rogers (1962) defines this last step as "a decision to continue full-scale use of an innovation". In an industrial context, Klein, Conn and Sorra (2001) see adoption as "an organization's decision to install an innovation within the organization... adoption is a decision point, a plan, or a purchase". In this respect, the definition of adoption is at least twofold: adoption could be seen as both the decision making *process* from the outset until the decision has been made, and as the final decision *choice* as an outcome of the process (for a classification of levels of decisions see Kriger and Barnes 1992). Both conceptualizations, choice and process, are described in the literature.

Innovation adoption has traditionally come under the umbrella of *diffusion research*, and in this context it is understood as choice. This perspective has dominated also the field of organizational innovation adoption and diffusion, as the research has typically involved large samples of organizations and has focused on correlations between groups of factors and a specific outcome of the adoption process. This research approach has yielded environmental, organizational and managerial factors that distinguish adopters from non-adopters, different variables such as sources of information used (see e.g. Rogers 2003), and the role of the CEO (Meyer and Goes 1988), as predictors of adoption. However, these diffusion models cannot explain how these factors evolve and interact with other factors during the adoption process, finally producing adoption or rejection (see Langley & Truax 1994).

This shortcoming in terms of tackling the process nature of innovation adoption, both in the consumer and industrial contexts, is a consequence of a focus on the phenomenon of macro level diffusion. This means that a single adoption process and adoption choice as an outcome thereof play only a marginal role among the other adoption-producing processes. Together, these adoption decisions form a pattern of diffusion, of which for example shape, rate and potential are in the focus of this research, rather than any single adoption decision (see e.g. Puumalainen 2002).

As a process, innovation adoption is not only a means for bringing about the adoption, which is of interest only as part of an aggregate level cumulative pattern. On the contrary, the process is a meaningful organizational activity in itself. Figure 5 illustrates the distinction between choice and process type research on innovation adoption, and links them to underlying philosophical orientations and foci of these fields of research.

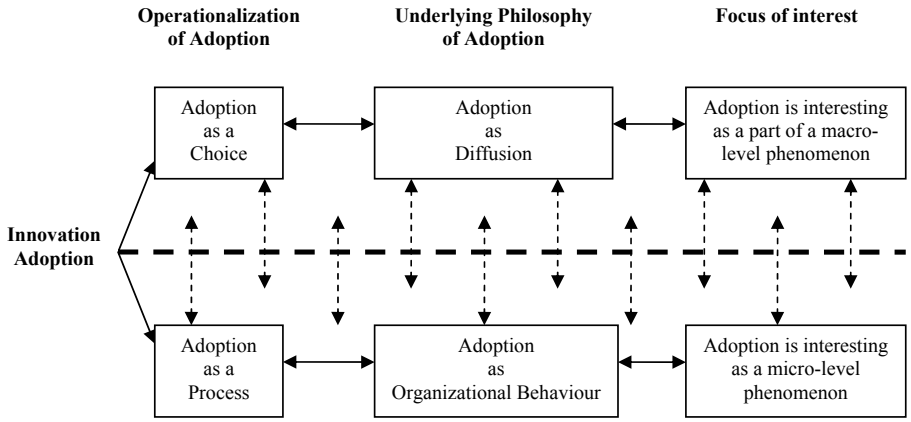

Figure 5 Innovation adoption as a choice or a process (Makkonen 2008)

Mohr (1982) saw innovation adoption and diffusion as an example of a field of research that confused process theory and variance theory (choice, here). It appears that the situation has not improved since 1982 in that most researchers do not recognize that innovation adoption as choice and as a process are different fields of research leaning on different underlying philosophies and foci of interest. The dashed line between the two research streams and the arrows crossing it in Figure 5 illustrate the confusion in terminology and results in these separate fields. What is most alarming is that there is perhaps a tendency to believe that this confusion is mostly unconscious, as the clear distinction between the choice and the process approach is not widely recognized in the literature.

Even though the concept of innovation adoption is shared, the underlying ideas are substantially different according to whether adoption is considered behavior or diffusion. According to Mohr (1982), attempts to mix process and variance theory will lead to "significant impediment", and "lending back and forth between variance theory and process theory leads to a situation in which neither is as well served as it truly deserves, although further work along either track by itself, more purely conceived, might well pay handsome dividends." The research results from these two different fields are like "intermingled pieces of two different jigsaw puzzles. When one realizes that one is dealing with a mixed collection, the two types of bits must first be sorted out; then assembly can go forward in earnest." This means that the application of the results of studies in which choice is a unit of analysis to process studies and vice versa is difficult and risky. In other words, the influence of different factors identified in studies on innovation adoption as choice, focusing on

market level diffusion and generating results through quantitative surveys, may be only weak reflections of some other factors or elements that are more critical during the process: hence we believe that these identified factors are meaningful or important in themselves. Without the recognition of a clear boundary between these separate fields of research, the research labeled "innovation adoption" will clearly continue to lack harmony and cohesion.

This blurred boundary between process and choice is embodied in the widely recognized meta-analysis of the relation between the characteristics of innovation and its adoption-implementation conducted by Tornatzky and Klein (1982). They included studies that consider adoption a yes/no decision (70 studies) and those that also take into account the decision and the post-adoption phases (five studies). However, the results of the meta-analysis were not given in this form, but were mixed together.

2.2 Concepts related to the innovation adoption process

Becker and Whisler (1967) reviewed the literature on organizational processes of innovative behavior (as they call them, but comparable to adoption process in this case) and reported "a substantial degree of agreement" in the visualization of a four stage process: stimulus, conception, proposal and adoption (or rejection). However, some adoption models seem to stretch adoption to cover also activities after the adoption decision. A variety of terms has been used in this respect: Hage and Aiken (1970) refer to evaluation, initiation, implementation and routinization; Zaltman, Duncan and Holbek (1973, 62) to knowledge awareness, attitude formation, (adoption) decision, initial implementation and sustained implementation; and Rogers (2003) and Zmud (1982) to initiation, adoption and post-adoption. Also, Rogers revised the original model (1962) in the later editions (1983, 1995, 2003), and identified the phases of knowledge, persuasion, decision (adoption), implementation and confirmation. In these latter versions, the adoption process also includes phases that follow the adoption decision. Most of the definitions of the adoption process in the literature use the *pre-adoption* and *adoption* classification, but some extend the concept to cover *post-adoption* activities as well (see Damanpour and Schneider 2006).

Divergence characterizes the process of adoption partly due to this post-adoption phase. Post-adoption seems to confuse the meaning of adoption as a decision making process or a choice outcome of the process. Post-adoption has been attached to adoption in order to reflect *continuity of use of the innovation* related to the term adoption, and hence to draw the distinction between adoption and a single purchase (e.g. Robertson 1971, 57). The former

represents a *change in the pattern of behavior* of the adopter and the latter amounts to a *trial* (Gatignon and Robertson 1991, 325).

Despite the distinction between adoption and trial, most of the studies consider adoption in terms of purchase, occasionally repurchase (see e.g. Mittelstaedt, Grossbart, Devere 1976, 85), purchasing behavior, product ownership, or product possession, rather than "extensive and prolonged use of the innovation" (Nabih, Bloem and Poiesz 1997, 191). In this sense, adoption as continued "full-scale use of an innovation", as Rogers (1962, 17) defines it, has basically been interpreted as an *intention* rather than an *action* of use (see Nabih, Bloem & Poiesz 1997, 190).

Despite being essential, the demand for "continuity" or "prolonged use" as part of the definition is problematic, since there is no absolute measure to determine when "use" satisfies that requirement. It is easy to assume the demand being context dependent on different adopters, innovations and situations. In line with the previous literature, it is suggested here that continued use could be interpreted as commitment to the innovation. Thus, the adoption process is about the *development of commitment to the innovation.* Adoption is achieved once sufficient commitment to the innovation has been developed. The commitment can be interpreted as *orientation to use an innovation now and in future*. As commitment is an end result of more or less intensive cognitive processing and actions, it can be assumed to be reflected as a change in the pattern of behavior with reference to innovation. This change was emphasized in the previous definitions.

It seems that most of the research on organizational adoption has focused on innovations that follow a two stage adoption process; management makes a decision to adopt an innovation after which the individual employees are able to adopt. Hence, the first adoption decision refers to "a decision, typically made by senior organizational managers, that employees within the organization will use the innovation in their work" (Klein & Sorra 1996). Rogers (2003, 403) terms this first adoption decision *authority adoption* and the individual adoption that follows *contingent adoption decision.* Similarly, Zaltman et al. (1973) use the terms *primary adoption* to refer to the organizational level decision and *secondary adoption* to describe employee level adoption. Also Leonard-Barton and Deschamps (1988) distinguish between *authority decision* and *end-users' adoption decision.* The process of achieving targeted employees commitment to full use of an innovation can be termed *implementation* (Klein & Sorra 1996) or *intra-firm diffusion* (cf. Kim and Srivastava 1998). The *individual acceptance decision* ends the individual's adoption process.

The two stage process of adoption (organizational-employee), in terms of pre-adoption, adoption and post-adoption, is comparable to assimilation.

Meyer and Goes (1988) define *assimilation* as "an organizational process that (1) is set in motion when individual organization members first hear of an innovation's development, (2) can lead to the acquisition of the innovation, and (3) sometimes comes to fruition in the innovation's full acceptance, utilization, and institutionalization." This process is divided further into three subprocesses (a knowledge-awareness stage, an evaluation-choice stage and an adoption-implementation stage), each comprising three episodes. Woodside and Biemans (2005) use the terms *breadth of use* (cumulative number of users) and *depth of use* (extent of use and its impact on the firm) to describe assimilation comprehensiveness.

Individual level diffusion within the organization, even though it is more active than passive, is the consequence of organizational adoption. Individual level diffusion results from single adoption decisions and is separate from, even though closely related to, the phenomenon of organizational adoption.

Not all innovations adopted in organizations follow the two stage process logic. For example, some raw material or capital investment innovations can easily be thought of as independent of individual employee adoption. The adoption models that ignore the post-adoption phase concern the organizational level adoption process, and those that include post-adoption go further and take into account the employee level adoptions within the adopter organization. In both cases, however, the adoption refers to the development of commitment to innovation.

Becker and Whisler (1967) found that most innovation theorists terminated the analysis at the adoption stage, even though the later activities were those realizing the change in the organization. It is possible to study organizational adoption and employee level adoption separately, but if the focus is on both, then it is a question of innovation assimilation. From an intuitive perspective, in a case of one-step adoption, assimilation and adoption can take place in parallel, or adoption may precede or follow assimilation depending on the point of commitment to the innovation. The terminology used throughout this study with regard to the innovation-adoption process is shown in Figure 6.

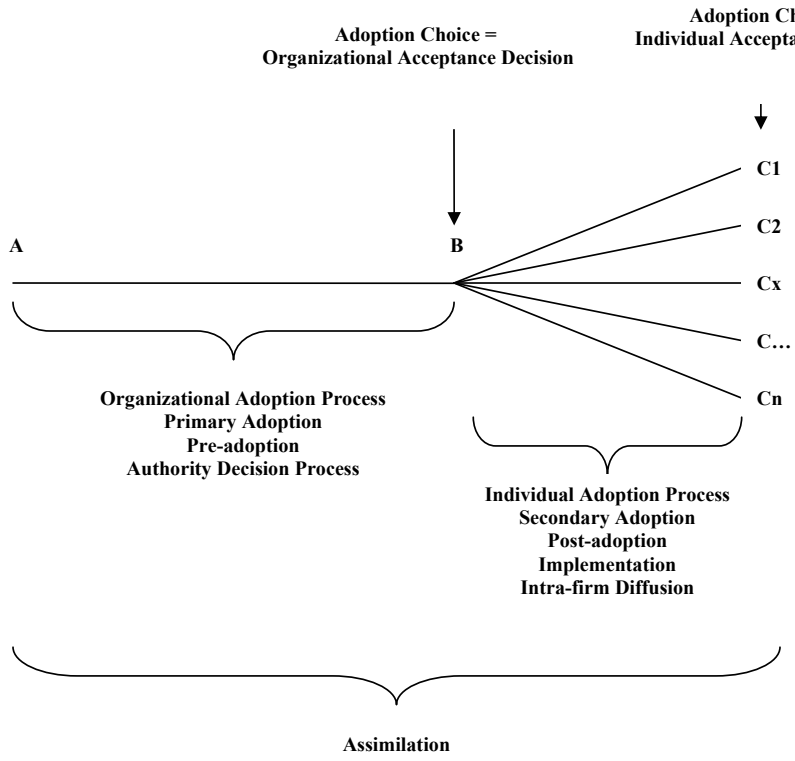

Figure 6 Concepts related to organizational innovation adoption process

It is posited here that the organizational innovation adoption (line AB in Figure 6) is synonymous with primary adoption, pre-adoption, and the authority decision process. Similarly, individual adoption (line BC) is equivalent to secondary adoption, post-adoption, implementation and intra-firm diffusion. Organizational adoption choice or the organizational acceptance decision (B) concludes the organizational adoption process and potentially initiates the individual level. Similarly, individual adoption choice or the individual acceptance decision (C) closes off the individual adoption period. The term assimilation covers these activities as a whole, incorporating both organizational and individual adoption processes.

For the sake of clarity, *organizational innovation adoption in this study refers to the process of primary adoption*. The process of adoption is about *commitment development to innovation*. Some of the definitions reviewed saw the process as decision making and comprise active reflection phases (e.g. a phase of evaluation), while some depict the whole process and its phases more as outcomes (e.g. persuasion). In this respect, the very meaning of adoption, commitment, could also be seen either as the organization committing to innovation (active meaning) or organizational commitment development

(outcome meaning). The researcher strongly suggests that viewing the process as an outcome is coherent with and more faithful to the idea beyond adoption and diffusion tradition. As the process outcome is always adoption, due to the theoretical focus of the approach, and hence known, the process phases are also more descriptive and elegant at an *outcome level* rather than at the *level of activeness*. This is because these underlying actions will inevitably lead to knowledge, persuasion and adoption, otherwise the process in question would not be an adoption process.

The terminology in this study puts forward the view of adoption process phases as outcomes of organizational behavior. The adoption process is thus a sequence of the knowledge, persuasion and adoption phases. The adoption process perspective on the empirical reality is fixed on these behavioral outcomes. The actions or activities that lead to these outcomes (possibly evaluation, information gathering etc.) are of interest only in terms of producing these outcomes. Figure 7 illustrates this categorization.

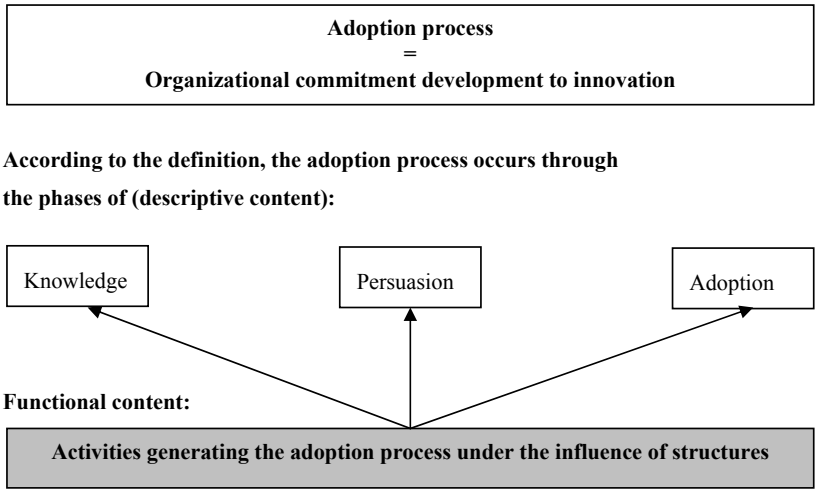

Figure 7 The descriptive and functional contents of adoption process

This classification establishes a conceptual relationship between *activities* (functional content) and *outcomes* (descriptive content: knowledge, persuasion, and adoption) leading to adoption. To be precise, the sequence of activities (functional content) that generates the adoption process (descriptive content) under the influence of different structures could be viewed as a different process *external* to adoption. This is because it is not included in the sequence of outcomes; rather, it generates these outcomes and thus the whole

adoption process. However, due to the fact that these activities are actually the *content* of the adoption phases, and the interconnections between the adoption process and these activities generate the adoption process through the adoption phases, it is reasonable to consider these activities a functional content of the adoption process.

The distinction between the descriptive and functional content is presented in order to delineate and sharpen the discussion throughout this study. Also it facilitates knowledge transfer from the complementary approaches (the organizational buying behavior and the network and interaction approaches) to further understanding of the mechanism (functional content) beyond the descriptive content producing adoption and the whole adoption process. This mechanism producing the adoption process refers to activities that took place under the influence of various structures from different levels of contexts. Chapter 6 presents this mechanism in the form of the *activity based perspective*.

Because decision making as reflected in the definitions of adoption and adoption process is a major component and underlying activity leading to these outcomes, it cannot be totally isolated from the discussion of the adoption process in the descriptive meaning. Some authors consider adoption as decision making, and therefore when citing these authors there is no intent to violate their use of terminology. For this reason, the adoption related decision making process (functional content) and adoption process (descriptive content) are considered synonyms in some parts of the study, when the author is obliged to do so despite the fact that the very meaning of adoption process phases refers to outcomes of organizational activities (descriptive content).

2.3 Assumptions on the nature of the adoption phenomenon

A basic distinction can be drawn between open and closed systems (e.g. Thompson 1967). The *closed system* represents an organization with no interaction with its environment. In the modern business environment, this type of organization never exists. The more realistic *open system* represents an organization that is in a state of continuous interaction with its environment. An organization is seen as an entity enacting processes of input, throughput and output. The value adding process, in which an organization converts raw materials into finished products that are sold on the market, which in turn makes the purchase of new raw materials possible, demonstrates the fundamental cycle typical to an organization (Grønhaug & Venkatesh 1991, 19).

Damanpour and Schneider (2006, 217; see also Damanpour and Gopalakrishnan 2001, 47; 1998, 4 and Damanpour and Evan 1984, 406–407) state that "innovation adoption is a means of creating change in the organization to ensure adaptive behavior and is intended to change the organization so that it maintains or improves its level of performance or effectiveness." More widely, the discussion and different views on performance is a fundamental issue in organizational science (see e.g. Lin & Carley 1997, 125), and hence the adoption phenomenon can be attached to this debate as well through the idea of performance improvement.

Contingency theorists (Lawrence & Lorsch 1967; Burton & Obel 1984; also Robertson & Gatignon 1986 in the context of organizational adoption) underline that it is not the environment as such, but the *fit* or *match* between the organization and its environment that determines organizational performance (see also Damanpour & Gopalakrishnan 1998, 11). Again, two extremes can be identified, the deterministic and voluntaristic views of the organization-environment relationship. The *voluntaristic view* states that organizations do not passively drift at the mercy of environmental changes but actively take strategic actions, like adopting innovations, in order to influence the environment (see Child 1972; Dougherty & Heller 1994; Cyert & March 1963; March & Simon 1958; Ackoff 1981). In this view, innovation adoption is considered as a concrete measure to enhance the fit between an organization and its environment (Subramanian 1996, 224; Subramanian & Nilakanta 1996, 632).

The view of fit and its importance is shared for example by population ecologists (Hannan & Freeman 1977), who argue that the match between an organization and its environment is necessary for organizational survival. However, the population ecologists consider the environment more *deterministic* and a single organization's ability to survive is dependent on the more fixed and given characteristics of the organization that cannot be adapted to changes in its environment. Rather it is a mechanism similar to "natural selection" that separates the organizations with a better or worse match to their environment (See Lin & Carley 1997, 125–126; Subramanian 1996, 224; Subramanian & Nilakanta 1996, 632).

Also views or motives on adoption that are not directly linked to the organization-environment relationship can be found (See Lin & Carley 1997, 125–126; Subramanian 1996, 224; Subramanian & Nilakanta 1996, 632). The adoption of innovation can be seen to revamp and energize the organization and in this way enhance performance (See Dos Santos & Peffers 1995), or constitute natural behavior for some kinds of organization without there being any deeper reasons for adoption (See e.g. Dewar & Dutton 1986).

This study assumes an open system view of the organization (Thompson 1967) and considers the organization an active actor that can adapt and change within the limits related to its resources. The degree to which adoption is oriented to change the environment or be a product of the environment's control over the firm is thought to vary between the cases.

Adoption as an outcome is thought to be linked to a process somewhere between the rational intended and purposeful behavior of an organization (that has been emphasized in most definitions of the term organization Grønhaug & Venkatesh 1991, 20) and a more serendipitous or individualistic ego-boosting journey of the individuals in the organization. What is important here is that the adoption process is thought to be linked to active organizational functioning despite the motives for the process. This idea of activeness is related to a view of organizational innovation adoption being mostly a *collective human action* that happens through the *cognitive efforts of the individuals participating in the process* in an organizational context. Similar to a view of organizational buying behavior (Johnston & Spekman 1987, 103), adoption is thought to be a function that is dependent on a series of interactions and communications flows that take place in the environment between adopters and suppliers and within each firm. Thus a network surrounding the adopter organization, and of which it is a part, forms a context for the adoption process. In this study, actors refers to both organizational actors and individuals in these organizations. Individuals in the organizations participating in the adoption process may refer both to a formal structural subunit or to individuals from different organizational units that are interlinked through interpersonal communication flows related to the adoption process (see Spekman & Stern 1979, 56).

In this study, adoption refers to the adoption of innovations that are brought into the adopter company from *outside the company boundaries* (cf. Gopalakrishnan & Damanpour 1997, 16–17). Hence, innovativeness relates here to the timing of an adoption (e.g. Rogers 2003), not to the generation of new products through research and development activities.

3 METHODOLOGICAL CONSIDERATIONS

3.1 Philosophical underpinnings

According to Burrell and Morgan (1979), social scientists are faced with four sets of assumptions, namely ontological, epistemological, human nature and methodological, which are present more or less explicitly or implicitly in research. *Ontological assumptions* concern the very essence of the phenomenon and deal with issues of whether the "reality" under investigation is external and manifested to the individual, or is a product of an individual's mind. The former view is linked to *realism* and the latter to *nominalism*, two opposite ends of a continuum. Closely related to ontological issues are the assumptions of the epistemological nature of the phenomenon and its investigation. *Epistemological assumptions* refer to knowledge acquisition and assessment; whether the nature of knowledge can be identified and communicated as hard, real and tangible, or softer, more subjective, spiritual or even transcendental, based on insight of a unique and essentially personal nature. The two extremes of epistemological positioning thus view knowledge as something that can be acquired, *positivism*, or something that needs to be personally experienced, *anti-positivism*. The third set of assumptions considers *human nature*, the relationship between human beings and their environment. The two extremes in this debate are *voluntarism* and *determinism*. The former views man as a creator of his environment, emphasizing a creative role and free will, the controller rather than the controlled. The latter sees human beings and their experiences as products of the environment under which they are controlled.

Ontological, epistemological and human nature assumptions all have direct implications of a *methodological nature* that may differ in the context of social science from (at one end) the more natural science oriented *nomothetic approach* of the world as hard, real and external to the individual, and at the other end the softer and more personal *ideographic approach* (see Figure 8).

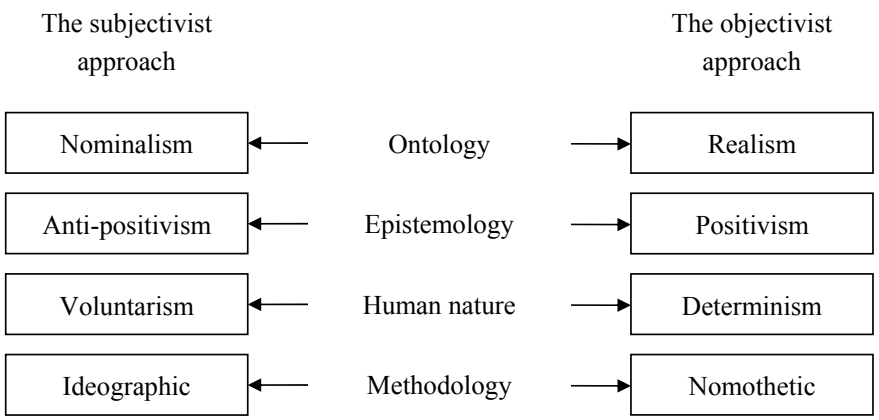

Figure 8 The subjective-objective dimension (Burrell & Morgan 1979, 3)

The features related to the four dimensions and depicted on the left hand side compose the subjectivist approach and those depicted on the right hand side compose the objectivist approach (Burrell & Morgan 1979, 2–3, See also Pihlanto 1994, 373–377; Morgan & Smircich 1980, 497 for discussion). The *objectivist approach* is likely to target the analysis of relationships and regularities between the different elements it comprises. The concepts, their measurement, and identification of underlying themes are central methodological issues in a search for universal laws and patterns governing the observed reality. The *subjectivist approach* questions the existence of a general external reality and instead adopts a relativistic view of social nature focusing on individuals creating, modifying and interpreting the world in which they find themselves.

Due to the nature of the research question and the studied phenomenon, this study mainly adopts the subjectivist approach but also recognizes some aspects of the objectivist worldview (see Olkkonen 2002, 95–97 for middle-range thinking). In part, the phenomenon, the organizational innovation adoption process, and knowledge thereof are socially constructed. This idea is very natural since organizational innovation adoption is mostly a collective human action that occurs through the mental processes of the participating individuals. The individual participants partly define their focus of interests within the context of the adoption process and the problems and solutions related to these interests. Hence the social world and a view of adoption are greatly socially constructed by the individual participants. Similarly, I focus specifically on certain aspects of these socially constructed worldviews according to my interests and aims in the research, and extend this construction aiming to form a subjective view of the process through a (theoretical) understanding of the phenomenon. Although the subjectivity of

the individual stories and their composition is framed by the researcher, this does not infer random storytelling or deceit. Rather the informants and the researcher aim to render as objective and realistic a description of the process as they can. However, the process is strongly affected by the meanings attached to it by the informants and the researcher. (See Morgan & Smircich 1980; Berger & Luckmann 1966).

I believe that it is possible to acquire knowledge of the phenomenon without direct self-experience of it, and this acquired knowledge can be used to understand other similar types of case, too. In this sense, the view adopted here is more relaxed compared to a pure anti-positivistic view, but comparable in the sense that the direct experiences of the process participants are highly valued and emphasized, since these participants occupy a key role in the data collection and are given the freedom to express their personal view on the process (see Pihlanto 1994, 376).

However, the results of the study cannot be generalized in the way that we understand generalization within positivistic epistemology. The idea of voluntarism and the active role of the interviewed individuals and their companies as creators of their environment is coherent with the notion of the more nominalistic ontology of the study. These individuals are in a key position, creating and conducting the adoption processes that are changing their organizational environment, but are also controlled and restricted by that very environment. In this sense, there is believed to be a reciprocal relationship between the individuals and the organizational environment in which they operate. A similar relationship is thought to exist between the adopter organization and its business context; the organization affects these relationships but is also being controlled by them.

These philosophical stances greatly determine the choices of research design and data collection methods (see Pihlanto 1994) in tandem with the nature of the research question (Yin 2003). As one relaxes the idea of the world as permanent and concrete structures, the mainstream quantitative data collection and analysis methods become less fitting. Adopting a more subjective worldview, this study applies qualitative case research in order to acquire knowledge on the research phenomenon and develop theory (See Morgan & Smircich 1980, 498; Yin 2003; Pihlanto 1994, 377).

The research approach is presented in Figure 9 in terms of *descriptive* versus *normative* aims and *theoretical* versus *empirical* argumentation (Neilimo & Näsi 1980; Lukka 1991; Kasanen, Lukka & Siitonen 1993).

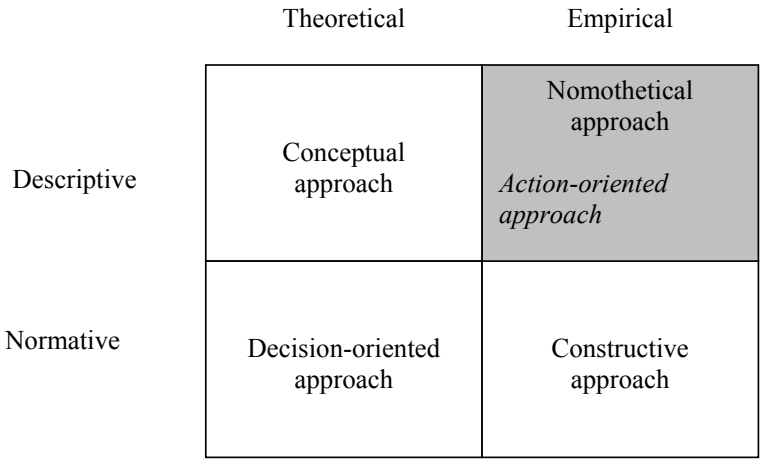

Figure 9 Positioning the research approach (Kasanen, Lukka & Siitonen 1993)

This research is based on the *action-oriented approach* that builds on the subjectivist approach (Pihlanto 1994, 375). The argumentation relies on empirical evidence in a descriptive manner. Due to the subjective orientation and the aim of gaining a deep understanding of the phenomenon under investigation, the study separates itself from the nomothetical approach which builds on causality and quantitative measures (see Kasanen, Lukka & Siitonen 1993; Neilimo & Näsi 1980).

The methodological choices are however never clear or indisputable. Due to different assumptions, the research community has positioned itself in different camps, arguing strictly for the supremacy of their own philosophical and methodological standpoints and against the others (For this discussion see e.g. Töttö 2000; Raunio 1999). The following focuses first on the contextual approach of the study and then moves on to present and discuss the more operational level decisions and techniques adopted and conducted here.

3.2 Contextual approach

Contextual understanding (sometimes described synonymously as holistic) is gaining currency as a research approach. Abbott (1995, 93) draws attention to the change in social science from "units to context, from attributes to connections, from causes to events." Initially, contextualism can be attached to the philosopher Stephen Pepper (1942) (see Pettigrew 1990a, 268) and was then applied widely as a guiding principle for example by Andrew Pettigrew in his studies of change processes (see e.g. Pettigrew 1985; 1990a).

The contextual approach refers in this study to an emphasis on the relationship between the adoption process as a focal phenomenon and its context. Pettigrew (1997, 341) describes the relationship between context and action (focal process): "Context is not just a stimulus environment but a nested arrangement of structures and processes where the subjective interpretations of actors perceiving, learning and remembering help shape process." Thus actions drive processes but are embedded into contexts. Actors are both producers and products, contexts are shaping and shaped (See also Giddens 1984). The interchange between the two occurs over time and is cumulative in character.

Suggestions related to conducting contextual process research (see Pettigrew 1990b, 10; Featherman & Lerner 1985, 659) led to the adoption of two theoretical approaches in addition to the adoption and diffusion approach; organizational buying behavior and network and interaction approaches. On this basis, the research falls into the category of *multiparadigm research*. The theoretical approaches applied in the study operate both at the *micro* (innovation adoption, organizational buying behavior) and *macro* (innovation diffusion, network and interaction) level. This brings *issues of level* to the study.

It should be noted that the aim of contextual understanding is explicitly shared between contextual process research by Pettigrew, multiparadigm research (Lewis & Grimes 1999) and levels research (see e.g. Rousseau 1985; Klein, Dansereau & Hall 1994; Hitt, Beamish, Jackson & Mathieu 2007), but that there are no cross-references between the fields despite their forming a coherent and highly interlinked combination suitable for approaching complex phenomena such as organizational innovation adoption.

Figure 10 depicts the contextual approach of the study that is a sum of contextual process research, multiparadigm research, levels research, and theory building case strategy. Contextual process research structures the subquestions of the study and provides a metaframe for the study (Figure 1). The multiparadigm and multilevel approaches derive from the contextual process research and suggestions on how to conduct it. As a loose framework, the metaframe (Figure 1) allows for the application of the more precise theoretical approaches and guides their use.

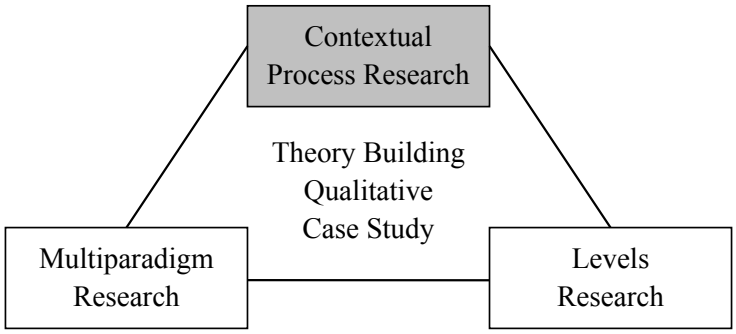

Figure 10 Building blocks of the contextual approach of the study

Theory building qualitative case study is placed at the heart of the contextual approach in Figure 10. The main aim of the study lies in revealing the elements of the process, content and context, and understanding their interplay. This understanding will be presented in a form of activity based perspective on organizational innovation adoption. The following discusses theory building case research strategy, after which the multiparadigm research and levels research will be considered with reference to the aim of theory building in the study.

3.2.1 Theory building case research

Case research is one *research strategy* among experiments, surveys, archival analyses, and histories (e.g. Yin 2003, 5). From this standpoint, the case study can be either a qualitative or quantitative approach (e.g. Yin 2003). Since the goal is *understanding* rather than causal explanation, this study adopts a *qualitative approach* (Stake 1995, 37). Qualitative data provide depth and detail (Patton 1980, 22). A qualitative case study method is in line with an attempt to achieve a *contextual view* of the organizational innovation adoption process that is not a well established research area from the process perspective. The aim is to understand the whole that is more than the sum of its parts. Instead of isolated variables, scales, or dimensions, a more comprehensive understanding of organizational innovation adoption is in focus here (See Patton 1980, 40). Each case is considered as a particular and unique opportunity to identify new features of the research phenomenon.

Case strategy has been proposed as applicable to meeting the aims of understanding the dynamics of a complex unbounded research phenomenon in a certain chosen real life setting (See Eisenhardt 1989, 534; Yin 2003, 5–9, 13 see also Pihlanto 1994, 373). The choice of a case study may facilitate the

researcher in covering *contextual conditions* that are believed to be pertinent to the phenomenon. Hence, this approach especially fits the "how" and "why" type of research question, scrutinizing contemporary events over which the researcher has little or no control. Due to the complexity related to the multiperson and multilevel interactions assumed to be inherent to the organizational innovation adoption phenomenon, the case study approach seems an appropriate choice through which to tackle the organizational adoption process and understand it in its dynamic context. In particular, the case study approach facilitates the use of different data collection measures (Yin 2003, 83–106), which is essential in order to understand complex organizational phenomena (Scwenk 1985, 501).

Eisenhardt (1989, 534) proposes three classifications of case research, namely description producing, theory testing, and theory generating case studies. Due to the scarcity and inconsistency of earlier research on organizational innovation adoption from the process perspective, this study applies *theory generating case research strategy* (e.g. Eisenhardt & Graebner 2007, 26). Case methodology fits perfectly with the aim of theory generation and hence understanding. Eisenhardt and Graebner (2007, 25–26) argue that "a major reason for the popularity and relevance of theory building from case studies is that it is one of the best (if not best) of the bridges from rich qualitative evidence to mainstream deductive research. …building theory from cases is likely to produce theory that is accurate, interesting, and testable. Thus it is a natural complement to mainstream deductive research."

The focal study does not aim to act as a review of the presented definitions of theory, but rather views theory simply as "the connections among phenomena, a story about why acts, events, structure, and thoughts occur" (Sutton & Staw 1995, 378). A good theory is "a limited and fairly precise picture" that tries not to cover everything but targets parsimony (Poole & Van de Ven 1989, 562). Theory building here refers to the process of sensemaking of the empirical reality by conceptualizing and categorizing observed structures and processes and their relationships into a system of more abstract non-observable constructs and their relationships (Weick 1989; Astley 1985; Handfield & Melnyk 1998, 328). In this sense, the abstract aim of "understanding" in this study can be converted to theory generation.

Stake (1995, 3–4) distinguishes between intrinsic, instrumental, and collective case studies. *Intrinsic case studies* are conducted to reach a deep understanding of the case in question rather than achieve a general understanding that can encompass other cases, too. The *instrumental case study* takes the opposite approach in that the particular case is of interest to facilitate understanding of other cases as well. The *collective case study* is

similar to the instrumental type, but multiple rather than single cases are selected for investigation.

This study falls into the collective category; the aim of studying the five empirical cases here is to acquire knowledge that can be carefully generalized to cover other similar cases. Multiple case design was chosen for its ability to provide a more fruitful basis for theory development compared to a single case study (Yin 2003). This study focuses on organizational innovation adoption processes that occur over time and hence the research approach is *longitudinal* and *retrospective* (see Kimberly 1976, 329; Miller & Friesen 1982, 1013–1014; Halinen & Törnroos 1995).

Despite all the favorable issues supporting the choice of the case study approach, it also has its weaknesses. Halinen and Törnroos (2005) have presented the challenges inherent in applying the case method in network studies. This consideration is relevant also in this study, as the network surrounding the adopter organization, and of which it is a part, forms a context for the research phenomenon. The network approach is also one theoretical approach applied in the study.

According to Halinen and Törnroos (2005), the problem of network boundaries as well as that of complexity related to networks, forces the researcher to choose his or her perspective of the network. In this study, the network is viewed from the perspective of the focal adoption process. All actors that took part in the temporal adoption process are considered as potential informants. Actors here refers to organizational actors and individuals in the organizations. The problems of time and of case comparisons are not particularly prominent in this study. The adoption process defines the time as it is bound to the occurrence of the process, as well as to the prior and future aspects of the process. Case comparisons are of interest here only in terms of enriching data collection and the possibility to compare and potentially to corroborate revealed new aspects of the phenomenon in one case in the context of other cases. For this reason, the cases are chosen to be rich in *size* of the adopter companies, in order to gain size-related variance for the adoption processes studied. Size of company has been chosen in particular due to its process separating role in previous studies (e.g. Frambach & Schillewaert 2002, 165). This supports the goal of revealing new features and structures for theoretically conceptualizing adoption processes, not particularly aiming to find certain general factors and their influence on the process (Eisenhardt & Graebner 2007, 27).

3.2.2 Multiparadigm research in theory building

Multiparadigm inquiry can be categorized further into cumulative classification of multiparadigm review, multiparadigm research, and metaparadigm theory building (Lewis & Grimes 1999). *Multiparadigm reviews* refer to the characterization of certain dominant paradigms and the recognition of divides and bridges between them. Möller (1994, 366) writes that "it is argued that researchers need metatheoretical descriptions for road maps; a multiparadigm perspective can enhance both the understanding of theories and theory building." Möller (1994, 366) adds that "the basic function of any metatheoretical description of research traditions is to reveal the key assumptions on which those traditions are based. Identifying these assumptions and the primary goals of the tradition provides an abstract summary of the tradition and helps to position it among other traditions that focus on the same empirical domain."

Multiparadigm research goes a step further and involves applying different paradigms in collecting and analyzing data and cultivating their diverse representations of the studied phenomenon (Lewis & Grimes 1990). The empirical application of different theoretical views may occur in a parallel or sequential manner (See Gioia & Pitre 1990). Parallel studies reveal and preserve theoretical conflicts by depicting the different aspects of the phenomenon magnified by opposing theoretical views. The sequential studies build on an idea that the one paradigm-specific study provides inputs for a subsequent study.

This study employs the *metaparadigm theory building approach* that is also known as metatriangulation. In *metatriangulation* the aim is to juxtapose and link different paradigmatic insights providing a novel understanding of the phenomenon. Lewis and Grimes (1999) target the process of theory building from multiple paradigms and present a detailed road map for the metatriangulation research approach. The major steps in the process are depicted in Figure 11.

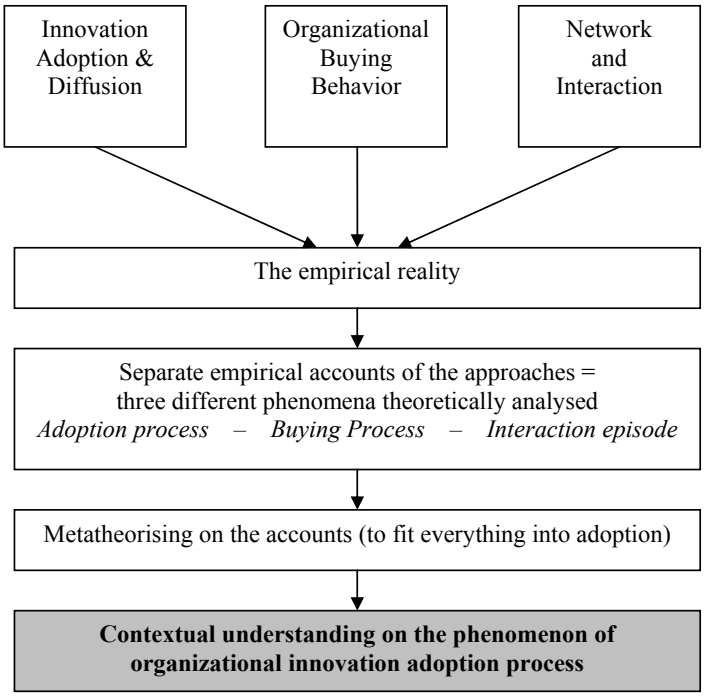

Figure 11 The logic of metatriangulation

All the three approaches were first reviewed and then applied separately in data collection through the interview method. In this regard, the three approaches produced three separate empirical accounts of three different phenomena; *adoption process of technology innovation* (innovation adoption and diffusion approach), *buying process of new technology* (organizational buying behavior approach), and *interaction episode* (network and interaction approach). The empirical accounts were then used to acquire knowledge about the adoption phenomenon. In the *metatheorizing* phase, the conceptualizations and knowledge generated through the complementary approaches were transferred to further understanding of the adoption phenomenon.

The previous literature did not provide a good covering solution, rather some loose ideas of how to deal with conceptual issues in the metatheorizing phase that arose from the different approaches and their different concepts to capture the empirical phenomenon. Lewis and Grimes (1999) propose using each paradigm to "paradigm-compatible issue" (e.g. Hassard 1991), or broadly define the common abstract phenomenon across the approaches. The first solution would have led to partial views of the wider phenomenon linking the approaches, and the second to ambiguous struggling attempts to express the phenomenon unbiasedly. In the context of this study, the latter would have

resulted in expressions of the process under scrutiny as something like "the process in which new technology pops up in a company". This characterization is not value free. It would also dilute the contribution because it is not attached to any theoretical field.

In general, this discussion refers to the question of "where does a theorist stand when viewing paradigm representations simultaneously?", and in this study how to convert the knowledge of the approaches into an understanding of the adoption phenomenon (Lewis & Grimes 1999, 687; see Parker & McHugh 1991; Scherer 1998 for this discussion). It is evident that whatever the solution for the "standpoint", it does not free the phenomenon totally from the old conceptualization but leads to a new conceptualization that is also not a purely overarching view of the reality (see Popper 1970; cf. Easton 1994, 375). It is easy to believe, similarly to Pettigrew (1990a, 269), that "the search for a simple and singular grand theory …is unlikely to bear fruit."

Bearing this discussion in mind, the focal study preferred to direct its contribution to a specific area of the literature (organizational innovation adoption), but still attempt to take into account the richness of the empirical phenomena surrounding the phenomenon under scrutiny. As a result of the focal research, a classification of the descriptive and functional contents of the focal phenomenon was offered in order to solve the conceptual dilemma related to the metatheorizing phase.

In this case, *descriptive content* answers the question *what does the adoption process comprise* and refers to the definition of the process (organizational commitment development). *Functional content* answers the question *what is the adoption process a result of* and refers to activities generating the adoption process. To be precise, the activities (functional content) that generate the adoption process could be viewed as a different process *external* to adoption. This is because the adoption process was defined as an outcome (commitment development) not as active organizational operations in order to reach commitment. However, due to the fact that these activities are actually the *content* of the adoption phases, and the interconnections between the adoption process and these activities generate the adoption process through the adoption phases, it was reasonable to consider these activities a functional content of the adoption process. In this respect, other processes and activities that in empirical reality are intertwined with the focal process under scrutiny can be included in the functional content category. Here, the organizational buying process and interaction episode could be included in the adoption process without conceptual controversy when considering them as parts of the functional content.

Unlike theoretical triangulation (Denzin 1989), metatriangulation does not aim to find the best of the approaches, the truth, but to enlarge and enlighten

understanding of the studied phenomenon as well as the paradigms employed (Lewis & Grimes 1990). The accommodation of different views within metatriangulation neither implies unification nor overall synthesis of the paradigms. As the approaches applied here derive from different contexts and possess different worldviews, a pure, everlasting and non-contradictory union between them is not possible. Rather the goal is a richer, holistic and contextualized purview that can be conducted from a perspective of one of the applied approaches at a time. Juxtaposing paradigmatic explanations may facilitate the translation of the constructs to a metaparadigmatic level and the generation of a theory that links contrasting representations (see Gioia & Pitre 1990).

The innovation adoption and diffusion approach was the *leading approach* of the study. The role of the adoption and diffusion approach was *descriptive*. It was applied to define and set boundaries for the adoption phenomenon, to describe it. The organizational buying behavior approach and the network and interaction approach were *complementary approaches* and used only to provide tools to further understanding on the adoption phenomenon. Thus the role of these approaches was *explorative*.

The reviews of the approaches in the theoretical framework are extensive and viable as separate entities. They are not brief glimpses garnered for an adoption process perspective in order to break away from the prevailing assumptions and restrictions related to adoption. This expansion or proliferation is the underlying idea of the whole metatheorizing approach, as opposed to subjugating or homogenizing the differences between the approaches (see Lewis & Grimes 1999, Gioia & Pitre 1990; Popper 1970).

The theoretical framework in this study refers to preunderstanding. The aim was not to test or verify the linkages between the theoretical concepts in the models presented at the end of the each review of the approaches. Rather, these models as defined at the end of each theoretical approach were presented in order to summarize the approach, raise the interview themes, and use the model in structuring the empirical analysis in order to make the presentation of the results more effective and coherent between the cases.

The result of metatriangulation in this study is the activity based perspective on adoption. As this perspective builds on the three different theoretical approaches, it can be considered *hybrid theory* in which a meaning of a certain concept may differ from its meaning in the original context (See Easton 1994, 376). The complementary approaches operate in the industrial marketing context. Therefore it is evident that activity based perspective considers organizational innovation adoption differently than for example some another study within different discipline, sociology for example.

3.2.3 Levels research in theory building

Most of the management research deals with a single level of analysis (e.g. individual, group, organization) and can be classified into micro or macro categories. In relation to this, Knorr-Cetina (1988, 21), wrote that "there is venerable tradition in sociology which argues that social analysis is divided between individualism and collectivism, or between action perspectives and structuralist views, and that one or the other (depending on the writer's preference) arbitrarily reduces social phenomena to one level of reality."

Multi-level investigations are rare despite the fact that some organizational issues would definitely need to be targeted using a combination of the macro and micro perspectives. The benefit of multi-level investigation is its ability to capture the richness of social behavior and emphasize the *context* in which the behavior occurs (Hitt, Beamish, Jackson, Mathieu 2007). According to Poole and Van de Ven (1989, 562), "social science loses an important resource for theory development if the incompatible or inconsistent theses which inevitably arise in the study of organizations are ignored or are eliminated." They (1989, 563) warn that researchers tend to develop a "trained incapacity" to exclude aspects of the theory under development that would create inconsistency. Hence, as this development towards consistency continues, the theory becomes more and more "perfect" despite the fact that its ability to tackle the multifaceted reality is decreasing.

Instead of avoidance, the tensions between the levels could be taken as a starting point and a source of inspiration in theory development (Poole and Van de Ven 1989, 563). First, the researcher may conclude that both approaches are fundamentally sound and describe their influence on each other. This leaves the both sides intact. Secondly, if the tensions derive from conceptual limitations or flaws in theory or assumptions, new concepts or totally new perspectives may be introduced. This study follows the latter example and aims to build the activity based perspective on adoption that take into account both the intra- and inter-firm levels of analysis by drawing conceptualizations from approaches at the different levels.

Despite the fact that multilevel research is not dependent only on quantitative or qualitative methodology, the articles that provide guidance in multilevel research tend to refer to quantitative modeling and construct measurements at different aggregation levels (see e.g. Klein & Kozlowski 2000; Wieseke, Lee, Broderick, Dawson, Van Dick 2008, 321). There are some issues that need particular attention in conducting multi-level research. Rousseau (1985) argues that the levels of theory, measurement, and analysis are the central issues of concern in multilevel research efforts. *Level of theory* refers to the entity in which a researcher makes generalizations (e.g.

individual, group, organization). Every construct is tied to one or more organizational levels; no construct is level free (Klein, Dansereau & Hall 1994, 198). *Level of measurement* refers to a level of data collection. For example, self-report qualifies as individual level data and a number of group members as group level data. *Level of analysis* is the unit to which the data is assigned. The level of theory is in practice not dependent on the levels of measurement and analysis. The individual level datasets and their analysis may lead to organizational level generalizations for example. Also the levels of measurement and analysis may differ: individual level data is analyzed at group level, for example. This data aggregation demands careful argumentation and the validity of the aggregation is not self-evident (see Morgeson & Hofmann 1999).

Whatever the flavor of quantitative approach, a consideration of the presented level issues makes the choices of the focal study more explicit. The individuals that had a role in the adoption process are the informants of the study. These individuals may be employees of the adopter, supplier, or third party companies. The informants are interviewed regarding different events and issues of which they were a part of or had knowledge on (individual, group, organizational and inter-firm). In this regard, data collection takes place at multiple levels. For example, some parts of the interviews consider the characteristics of the individual and others the individual as a representative of the group or organization. Similarly, the level of analysis varies accordingly.

The different levels of data and their analysis are converted to the theory of an activity based perspective on the organizational innovation adoption process. The adoption process comprises the level of analysis. The activity based perspective views organizational innovation adoption as a collective end result of individual acts. Individual acts can be seen as the most elementary units of analysis of organizational functioning (see Parsons 1951). The individual acts form activities with reference to structures at various levels leading to *organizational* commitment development to innovation. Thus *the level of the theory is organizational*.

I believe similarly to Klein, Dansereau and Hall (1994, 195) that paying greater attention to levels issues will strengthen the theory development and provide holistic understanding. Despite the opportunities presented by the multilevel approach, it also has its weaknesses. The integration of two levels has been considered to some extent impossible (see Huber 1991), and the research usually favors one over the other. Thus far the social theorists have actually been struggling with the issue of linking micro level actions to macro level structures (see e.g. Coleman 1986). Attempts to overcome this paradox in individual theory have often gone “awry” (Poole & Van de Ven 1989, 568).

Wilke and Ritter (2006) discuss the levels of analysis in B2B marketing research and state that "Introducing the causal arrows in two directions, for example, from micro to macro and from macro to micro, would result in circular causality, virtually impossible to verify. Models that focus on the reciprocal interaction between two levels of analysis, for instance, between the organization and the network, therefore can be considered as conceptual maps of reality rather than precise theories." The activity based perspective manifests contextual understanding. That is somewhat similar to a conceptual map. The idea is not to produce strict causality between the constructs.

3.3 Case selection and description

The selected cases are organizational innovation adoption processes from different companies. The adoption process is both the case and the unit of analysis in this study. Three expert interviews were conducted prior to the selection of cases from the food processing industry, in order to gain knowledge of the industry and an idea of the fit between the theoretical approach and this empirical context. The interviews revealed that the Finnish food processing industry would seem be a fruitful empirical context for the research, a view further supported by newspaper articles and a variety of reports on the issue (e.g. Wiklund, Orava, Brännback, de Heer 2002; Wiklund, Orava, de Heer, Brännback 2001; Blankenfeld-Enkvist & Brännback 2002). Furthermore, informal discussions with Laura Sinisalo, the former head of the Turku School of Economics Innomarket research unit, provided me with crucial information on current practices in and detailed knowledge concerning the food processing industry.

Three options were considered in case selection. First, to choose one innovation offered by some supplier and scrutinize its adoption in different companies. In this case, the innovation and supplier would have been the constant in every case and only the adopter firm would have varied. Secondly, to choose a single adopter firm and study its adoptions of different innovations. In this case, the adopter firm would have been the constant and innovations and suppliers would have varied. Thirdly, the innovation, supplier and adopter could vary, and hence different adopter and supplier firms could be scrutinized in every case. In order to gain variance revealing different aspects of the adoption processes, and make the study more explorative in nature, this third option was chosen.

Basically there are two effectively opposite options for case selection, namely random and purposeful sampling (Eisenhardt & Graebner 2007, 27). *Random sampling* aims to facilitate the generalization of results to encompass

a larger population, as randomness increases the likelihood that the data collected are representative of the population under study. *Purposeful sampling* derives from the idea of learning or understanding something on the basis of studied cases. The focus is not so much on the cases themselves as on the opportunity to exploit the cases to serve more abstract theorizing purposes (See Patton 1980, 100). Given that the aim in this study is to understand the research phenomenon per se, the focus here lies on scrutinizing cases that best serve this aim and hence the procedure of purposeful or theoretical sampling was adopted.

Purposeful sampling may be based on extreme cases, typical cases, maximum variation, critical cases, political importance or sensitivity, or convenience (see Patton 1980, 105). Here, sampling was based on maximum variation with reference to firm size, due to the revealing elements and features of the process (Eisenhardt & Graebner 2007, 27) that go hand in hand with size, an aspect that has in itself been found in a variety of quantitative surveys to be a critical factor affecting adoption (Frambach & Schillewaert 2002, 165; more widely on the link between innovation and size see Camisón-Zornoza, Lapiedra-Alcamí, Segarra-Ciprés & Boronat-Navarro 2004, Damanpour 1992). In this sense, the cases are polarized with respect to the two extreme ends of the size continuum, small and large (Yin 2003).

The size of the adopter organization was assumed to affect the adoption process in different ways. The larger firms were assumed to consider adoption in a more systematic and formal fashion. This refers to explicit processing and documentation that follows company policy, and potential certified quality systems to deal with these kinds of issue. In smaller firms, the adoption related evaluation is perhaps more about individual acts and processing on the part of the firm's owners. The larger firms might be more capable in gathering and processing adoption related information and have partners of the kind that possess such information. The smaller firms might not be as professional in these activities that lie outside of the firm's core operations. It was assumed that in smaller firms the adoption's target of solving current problems, and the orientation, is more short term in nature. In larger firms, the adoptions are likely to be an end result of broader development in which the single adoption is a small ingredient. Perhaps the larger companies are more aware of the available options but due to limited resources the adoptions are pending in the pipeline. On this basis, the adoption processes and the factors affecting the adoption are perhaps different in larger firms than in smaller firms.Sampling according to size produced five cases, ranging from two small companies via a medium-sized one to two large companies (number of employees: Foodconcern1 ca. 4,500, including ca. 100 at the production plant in question;

Foodconcern2 ca. 5,000; Foodmedium ca. 150; and both Foodsmall1 and Foodsmall2 ca. 15). Table 1 illustrates the key features of the chosen cases.

Table 1 Study cases

Company	Number of employees	Process type	Risks	Price of Innovation
Foodsmall1	ca. 15	Production development	Financial	MEUR 0.4
Foodsmall2	ca. 15	Production development	Not notable	ca. EUR 20,000
Foodmedium	ca. 150	Production development	Financial	MEUR 0.4
Foodconcern1	over 4,500	Production development	Microbiological quality hazard	EUR 80,000
Foodconcern2	over 5,000	Production development	Variety of production challenges	MEUR 8

Secondly, the innovation to be adopted was used to rank the suitable cases. The basic condition was that the candidate innovation must meet the criteria for innovation, namely it being perceived as new and beneficial from the adopter company's point of view (see e.g. Cummings 1998). Also, that all the innovations were technological in nature.

When approaching the companies, I was seeking processes in which adopter perceived newness of innovation and the commitment required to implement the innovation were high. All the cases were similar in these characteristics. Thus, all the adoptions were allocated resources and considered in such a way that they became processes involving several people. It was notable that due to this sampling, in all the cases except Foodsmall2, there was a high risk associated with the processes. It was also important that all the adoption processes be completed at the time of data collection, in order that there was a known end result, namely adoption/rejection; a rejection would have been of no value to this study.

In the Foodsmall1 case, organization commitment was high due to size of the investment and potential risk involved in making the wrong decision. The

adopted innovation was an aseptic packing machine, at a cost of 400 000 euro i.e. 20% of the company's annual turnover. The risk was financial predicated on the machine not working, or its being acquirable at a lower price from elsewhere. Because the machine was tailored specifically for the company it was not possible to run a trial prior to adoption, or return it afterwards if it proved unsuitable.

Similarly, in the Foodmedium case the adopted innovation was a packing machine that was to some degree comparable to that adopted by Foodsmall1. It was the largest single production machine investment in Foodmedium's history, again at a cost of 400 000 euro. From a financial perspective, the investment was relatively minor compared to that of Foodsmall1, since Foodmedium's annual turnover is much higher. There was, however, a clear financial risk involved, and also as the effective performance of the machine was essential, a high degree of commitment and level of resources were dedicated to the process.

Foodconcern1's adopted innovation was a quality assurance method. While not in itself an expensive investment, at around 100 000 euro, the consequences would have been disastrous if the method had not have worked properly. Due to the high microbiological risk, the opportunity for trial use was exploited and the company was highly motivated to test and implement the method.

In the Foodconcern2 case, the investment, a new production line, came with an 8 million euro price tag. In addition to the high financial risk, were the method not to function appropriately, there were a number of production related risks, too. The most significant were the potential problems in the whole raw material chain, as the company uses live raw material. During possible delays, the animals in question would perhaps have grown too large for processing. The production line comprised three machines that the company had no prior experience of, and other equipment such as conveyors enabling production flow and processing. Despite the fact that the machines could be evaluated by observation on reference visits, the whole combination of the new line could not be trialed. Thus, it was evident that the adopter was highly motivated to dedicate resources to the adoption process.

The Foodsmall2 case also had dedicated resources and commitment but was differentiated from the others in terms of risk, of which there was little associated with the adopted innovation. The process was a matter of the joint development of an innovative solution with the supplier. This case was chosen partly because of this joint development scenario. The other cases were more about picking up a solution provided by the supplier with little joint development focus. And to emphasize the special nature of this case, a part of the innovation was rejected after a period of use. This rejection makes the case

an interesting ingredient on our journey to build theory regarding organizational innovation adoption.

As processes that fall into the characterized category tend to be strategic processes or at least deeply reflect organization strategy, the *access* perspective was also considered. I asked for hints to help identify potential case companies from Innomarket, a research unit of Turku School of Economics at that time. Innomarket's staff had contacts with the food processing industry. As a result, I approached a quality assurance manager of a big Finnish food processing company. Because of her company position, as well as her position as chairwoman of an association of food sciences, she was considered a good starting point for access to potential cases. On the basis of her advice, I contacted the technology supplier of Foodconcern1. At the first interview with the supplier's CEO, I asked for a case that would meet the criteria of perceived radical newness, and perceived commitment needed to conduct the adoption process. The CEO arranged access to Foodconcern1.

Based on the hints from Innomarket I also contacted Foodsmall1. The company's CEO-owner accepted the proposal for research cooperation. I found the Foodmedium contact while attending a miniseminar where I heard a presentation given by the company's production manager in which an up-and-coming adoption was mentioned. After the presentation, the production manager promised that her company would participate in the study. She also hinted at another big food processing company, which later became Foodconcern2 in this study. Due to her work history in different food processing companies, she also strongly encouraged me to include different sizes of company in the research, which supported the theoretical findings on size. Finally, the Foodsmall2 contact also came from Innomarket.

In Foodmedium and Foodconcern2 there were various potential adoption processes that met the criteria. Recent processes were preferred here since the informants would find the details easier to recall.

In addition to these five companies, I approached two others in Finland that both refused. When I was looking for another big company, before Foodconcern2, I first contacted one without any prior recommendation. I had a picture of the company as an innovative and technology development oriented organization, and met their production manager and logistics manager. At the meeting, both were interested in collaboration and proposed an interesting adoption process that had just taken place. However, they needed to seek acceptance at a higher organizational level. After two weeks, I was told that the company could not participate due to its being part of a foreign concern and unwilling to ask permission from headquarters in this minor case. I also approached another medium-sized company that politely refused due to

significant organizational changes and their busy circumstances at that time. This was before I contacted Foodmedium.

The original idea was to have two companies from each category. However, no other medium-sized company was brought in because of saturation in the cases collected to date (see Pihlanto 1994, 375). The same themes started to crop up in every case, and I felt that there was sufficient empirical material from the five. From these data, I clearly recognized that the adoptions are temporal processes initiated by prior development, influenced by various simultaneous activities at individual, group, organizational and network levels, and shaped by future visions. This finding was distinctive in every collected case and futher data from this perspective felt unnecessary. These findings seemed a promising starting point for the theory generation. Because the aim of the research was to generate new theory manifesting a wider abstract level understanding of the adoption process, these data were highly satisfactory for this purpose. I had no reason to believe that futher data would have questioned the basic findings related to adoption as a temporary process in a wider context. This was unlikely as the collected cases were different in size and the variance criterion was already met, and secondly the findings feel intuitively highly rational. Of course further data would have provided details and concepts for this general level view, and sharpened the links between the concepts. However, there was a tradeoff between detail and abstractedness. As creating a precise model of variables and their linkages was not the aim of the study, there was no reason to continue data gathering.

3.4 Data collection

According to Yin (2003, 83–106), empirical evidence in qualitative case studies may derive from documentation, archival records, interviews, direct observation, participant observation, and physical artifacts. The difference between documents and archival records is that documents may be for example letters, memoranda, other communiqués, agendas, announcements, and minutes of meetings or other written reports of events, whereas archival records refer to more statistical data or specific personal records such as diaries or calendars. Interviews are one of the most important methods generating empirical evidence in the case study context, and will appear as guided conversation rather than structured queries. Observation in this classification is divided into direct observation and participant observation. Direct observation refers to the outsider role of the researcher observing the research phenomenon, and in participant observation the researcher is a part of the system he or she observes, having some role in it. Physical artifacts refer to

technological tools or a work of art, for example. The idea is that in observing or gathering these artifacts the researcher produces information on the research phenomenon.

In this study, the *interview method* was chosen as the primary data collection technique. The method fits especially well with highly episodic and infrequent phenomena (Eisenhardt & Graebner 2007, 28). The documents were used as secondary data where available to support the interview material (see e.g. Glueck & Willis 1979). In all the cases, the companies' webpages and general information from the Internet were used for financial information, staff, and company characterization. In Foodsmall1 and Foodsmall2, there were no focal process related documents available. In Foodmedium, there were a couple of meeting memos and e-mail conversations between Foodmedium and the technology supplier. These documents did not provide any value for analysis. In Foodconcern1, there were also some documents on the evaluation of the adopted method, and one informant looked at old e-mails on her computer, on the basis of which some of the exact dates were confirmed.

In Foodconcern2, there was an astonishing amount of documentation available regarding the process. It included various specific project plans, budgets and costs, documents of meetings between the different interest groups, project administration, technical drawings, all the e-mails related to the process, contracts, intra-firm communication and training, and project conclusion information. Access was granted to all these documents. They were used to confirm the specific dates and episodes in the process. Also, some of the issues discussed in interviews were considered in the documents and hence confirmed. As the process was so fresh, there were no notable inconsistencies in the interviews, although relying on interviews alone has been criticized for example by Golden (1992, 852), who reported that in his study nearly 60 percent of the retrospective accounts were contradictory to the validated reports gathered only two years earlier. The documents also sewed up the missing technology supplier interview, as it was not possible to reach the supplier for an interview in the Foodconcern2 case.

As the studied processes had already taken place, observation was not possible. Also, the physical artifacts technique cannot possibly provide knowledge of an immaterial organizational innovation adoption process that refers to abstract organizational behavior through individuals.

Different distinctions between research interviews have been presented. Patton (1980, 197–206) discusses three optional interview approaches: the informal conversation interview, the general interview guide approach (also known as semi-structured interview, see Hirsjärvi & Hurme 2002, 47), and the

standardized open-ended interview. The predetermined structure of interviews is the loosest in the first of the three, and strictest in the last.

The interviews for this study utilized the *general interview guide* approach (see Appendix 2). Interview themes were derived from the theoretical approaches. Each theoretical approach was applied in the data collection, as if there had been no other approaches. In this sense, there were three different studies going on in parallel here, *adoption process of technology innovation* (adoption and diffusion approach), *buying process of new technology* (organizational buying behavior approach), and *interaction episode* (network and interaction approach). Despite the parallel studies in this phase, the research phenomenon throughout the study is the organizational innovation adoption process. These parallel studies exist only to serve the purpose of contextual understanding of the research phenomenon.

As organizational innovation adoption was thought to share similar features with organizational buying behavior, the guidance is drawn from the organizational buying behavior research field. The use of a single individual as a data source has been criticized by Nicosia and Wind (1977) due to purchasing activities diffusion throughout the organization and over time which makes the single individual approach inadequate to garner sufficient knowledge of the phenomenon. Ward and Webster (1991, 448) note that since many of the organizational buying behavior studies are based on data collected from a single participant, even though it has been widely acknowledged that organizational buying behavior is a group process, this poses some questions about the validity of these empirical studies. Instead of the single individual approach, Calder (1977) mapped activities by interviewing various participants in the buying process to trace back the different activities that took place during the process. Wilson and Lilien (1992) found that data collected from multiple informants significantly outperform data collected only from single informants. Also, in their methodology article, Eisenhardt and Graebner (2007, 28) suggest choosing numerous and highly knowledgeable informants who view the studied phenomenon from different perspectives in order to raise the reliability and reduce the bias of the interview data.

In this study, the data collection builds on an idea to interview all the individuals who had a certain role in the process, in order to describe the studied processes comprehensively. In addition to guidance from the field of buying behavior, the network and interaction approach takes the idea of multiple informants further beyond company boundaries. In order to acquire information from the inter-firm context of the adoption process and apply the network and interaction approach, which is a necessity to achieve the research purpose of the contextual approach, external actors are interviewed, too. This is in line with and even exceeds the suggestion by Huber and Power (1985,

174–178; see also Wilson 1996, 17). All the informants are interviewed according to the themes of the interview framework. This data collection tactic was thought to lead to a rich pool of data which can then be analyzed through the theoretical approaches (see e.g. Martin 1992). The informants are listed in Appendix 1.

In the context of organizational buying, the use of the *snowballing technique* has been supported in identifying the key informants, by Moriarty and Bateson (1982), Johnston and Bonoma (1981), Spekman and Stern (1979) and Vyas and Woodside (1984). This technique was also applied in this study. All the informants were asked who else took part in the process or would be otherwise worth interviewing in the case.

Both telephone and face-to-face interview techniques were used. The face-to-face interviews were conducted on the informant's company premises, except for one interview that was conducted in the informant's garden at their home, and two that were conducted at a restaurant. Every interview took place in peaceful and quiet facilities in which I and the informant could talk without interruption or disturbance.

All the interviews were transcribed in order to facilitate analysis in a comprehensive fashion. I did not notice any difference between the telephone and face-to-face interviews in terms of data quality or atmosphere. In fact, the most sensitive issues in Foodconcern1 regarding cooperation with the competitor were discussed over the phone with an informant who I had never met before, nor met after, the interviews. Neither in other cases was the telephone interview method recognized to reduce quality or affect suspiciousness. The following Table 2 presents the interviews per case.

Table 2 Interviews in the cases

Case	Interviews				Missing
Foodsmall1	Adopter: 2	Seller: 1		Total: 3	None
Foodsmall2	Adopter: 5	Seller: 2	3rd parties: 2	Total: 9	None
Foodmedium	Adopter: 8	Seller: 1	3rd parties: 1	Total: 10	1 person at adopter
Foodconcern1	Adopter: 8	Seller: 2		Total: 10	None
Foodconcern2	Adopter: 7		3rd parties: 1	Total: 8	Seller
				In total: 40	

The data in Foodsmall1 comprise three interviews. The two owners of the company were interviewed together twice, and the CEO-owner of the technology agent company who supplied the method was interviewed once by telephone. In addition to these three interviews, some brief questions were posed by telephone in order to specify some issues more deeply during the analysis phase. No other individuals were involved in the process, other than the aforementioned informants.

The data in Foodsmall2 comprise nine interviews. Five of the informants worked at the adopter organization (CEO, former and current production managers, maintenance manager (electricity), and former production assistant), two at the supplier organization (CEO, and a professor who was developing the method), and the final two represented two different third party companies (CEO-owner of the cleaning company for Foodsmall2's production facilities, and a consultant who conducted microbiological testing in order to measure the performance and results of the method's use). Of these individuals, the former production manager (the company's other owner) and the maintenance manager (electricity) were interviewed face-to-face, and the others were interviewed by telephone. Foodsmall2 is special compared to the other cases in the sense that some of the informants were interviewed in order to acquire knowledge of the current status of the method's utilization. For example, the current production manager was not even working at Foodsmall2 when the adoption process took place. This approach was taken because a part of the method had already been rejected and there was dissonance on the current status of use.

The data in Foodmedium comprise 10 interviews. The investigating expert team at the adopter company comprised the production manager, the maintenance manager, and the sales and marketing manager. The first two were both interviewed twice but the third declined an interview. The CEO, one of the two owners, was interviewed once, as were the CEO-owner of the technology agent company that was a supplier in this case, a member of Foodmedium's board, and an outsider technology consultant who took part in the process. In addition, the product development & quality assurance manager of Foodmedium was interviewed twice. The CEO-owner of the technology agent, a member of Foodmedium's board, and the consultant were interviewed by telephone and the others face-to-face.

The data in Foodconcern1 are derived from 10 interviews. All the project group members (laboratory assistant, production manager, and quality & development manager) at Foodconcern1 worked at the production plant in question. The laboratory assistant and the production manager were interviewed together onsite. The quality & development manager was interviewed by telephone as he had left the organization. Both of the microbiologists were interviewed twice by telephone. The supplier's CEO was interviewed twice face-to-face, and the head of production and the factory manager were both interviewed by telephone. The role of these two additional interviews was mostly confirmatory in terms of supporting and strengthening the existing perceptions, since the persons were not directly engaged in the project at a concrete level.

The Foodconcern2 case involved 8 interviews. Seven of these informants worked at Foodconcern2 and one was a representative of a third party company. The key informants were the head of the project and development organization, the project manager and the production manager. The adoption process was largely culminated on the input of these individuals. Due to the fact that during the data collection sequence I could not set the boundaries for the adoption process before having seen the whole picture, the rest of the interviews focused on post adoption activities that were outside of scope of the adoption process. These informants were the heads of the subprojects. However, all these interviews were transcribed and analyzed in order to set boundaries for the adoption process and hence were beneficial and needed. The supplier could not be reached for an interview. Due to the highly extensive documentation this did not, however, hinder the case to any notable extent. There was significant cross-learning between the cases which guided the data gathering process. Thus the following focuses on the order of the interviews (see Appendix 3).

First, the technology supplier for Foodconcern1 was interviewed. However, this was partly comparable to an expert interview as conducted in order to

acquire knowledge in the field, and was partly a case interview. The CEO of the technology supplier provided me with general knowledge about the industry, and also about his company, products and typical adoptions of the products. At that time, the interview was not specifically targeted in terms of the Foodconcern1 case. Foodmedium was the first case to start (8th December 2005). After three interviews regarding Foodmedium, interviews for Foodconcern1 commenced (14th February 2006), and the first interview for Foodsmall1 soon followed (3rd March 2006). This first phase of interviewing comprised 15 interviews in the three cases. I then moved to Paris for data collection (from 22nd March to 1st July 2006). Due to insufficient data from France, neither the data nor its collection were used or reported.

Due to the clear role of a theoretical framework in data collection, the study possesses deductive characteristics. The interview framework comprised themes from every chosen theoretical field. The conceptual models of each theoretical approach were formed to facilitate building a theory led interview framework, in which the different theories were related to questions comprising different sections; but in the interviews, usually, themes from different interrelated theoretical approaches were covered in parallel. On the other hand, the role of the theory derived questions was not compulsive or restrictive; rather, the discussions were guided by the themes derived from the theory and the preformed questions were only there to help generate and initiate discussions on the topic. In some interviews, the discussion was so rich that the preformed questions were used only to a marginal extent, and vice versa some interviews were more or less driven by these questions.

The interviews started with general topics and open questions. The informant was first asked to relate freely a narrative on how the process had proceeded and what had happened during it. These free descriptions often revealed some new issues, as every informant viewed the process from their own standpoint providing an opportunity to continue with the newly raised topic. Additional questions were always posed when a new and lucrative research aspect on the adoption process was revealed, in order to acquire as much detail as possible. In order to produce empirical raw material for theorizing, data collection aimed to elicit richness and depth. In addition to data related strictly to the temporal phase of the adoption process, data related to prior, parallel and future events and actions were gathered to the extent that they were linked to the adoption process under scrutiny. Newly raised topics of significance were also added to the questionnaire and put to the other informants in the interviews that came thereafter. These were, for example, the preceding and parallel activities related to the adoption process at both the individual and organizational level, future visions and ideas of firm development affecting adoption, and informal relationships between the

individuals. Sometimes, with regard to the new themes, I contacted the informants that had already been interviewed to hear their opinion on the matter. This flexibility in data collection is in line with Eisenhardt (1989, 539). Also, clarification was later sought from the various informants to check some minor inconsistencies, until consistency or reasonable interpretation of inconsistency was achieved. Prior to the second interviewing phase, all the interview material was transcribed and a preliminary analysis conducted in order to target data collection at newly raised important topics.

The second interviewing phase was based on the same interview framework, together with the inclusion of the newly raised topics from the earlier interviews (for the order of interviews see Appendix 3). Also, I had time to compare the interviews from the first interviewing period with the theoretical approaches and then strengthen the original interview framework from the theoretical perspectives as well. The second interviewing period comprised 25 interviews and started with a new case, Foodsmall2 (8th December), soon followed by another new case, Foodconcern2. Also additional interviews were conducted in this period in all the three cases where interviewing had already commenced. The order of the interviews enabled effective cross-learning between the cases targeting the data collection. Also, the break between the two phases was highly beneficial in order to compare the first interviews with the theory. In total, 40 case interviews and three expert interviews were conducted.

Due to the research phenomenon being significantly focused on adopter companies' actions, the interviews with the adopters' representatives were in general the most fruitful in this study. The interviews with the suppliers were more confirmatory in nature, mostly providing support for the adopters' interviews. The quality of the data gathered from the technology suppliers varied between cases. In some, the technology suppliers were not particularly eager to speak in detail about their customers' matters. The problem was not that they would not have believed that I had asked the adopter company for permission, rather that they felt there was a degree of conflict of interest with regard to discussing their views on the process or negotiations, and their feelings about the fact that the adopter companies would be in receipt of the results of the study might also be considered counterproductive. In general, all the supplier interviews were useful, and suppliers recalled some things better than the adopters, and raised other interesting issues just as the adopters had done. The interviews with the technology suppliers in the Foodconcern1 and Foodsmall2 cases were especially fruitful. In Foodconcern1, this was largely because the supplier was the entrance point in the case, was willing to help me, and was a charismatic person holding plenty of views and opinions. In Foodsmall2, the adoption process dealt with a joint development project

between the supplier and the adopter, and naturally both parties had a lot of views and insights on the process. The interviews with the third parties in the Foodsmall2 and Foodconcern2 cases were also mostly confirmatory.

To reduce the biases related to data collection and interpretation Huber and Power (1985, 174–178) suggest to motivate the informants to co-operate, minimize the time gap between the occurrence of the phenomenon studied and data collection, consider the framing of questions, use preset, structured and easily understood questions, use of probe questions in order to ensure that the question was understood correctly and the answer is complete and finally to use two interviewers.

In this study, the informants were motivated a variety of ways. I tried to behave as respectfully, politely but at the same time as friendly as I felt was considered appropriate by the informant. In this sense, I succeeded in facilitating a warm and open atmosphere during the interviews and also in encouraging the informants to take a positive view of the study before the interview, too (see Kincaid & Bright 1957). I described very carefully why this kind of research is conducted, and how it is beneficial and useful for the informant and his/her company, and for the industry, the academic community and myself. The time gap was minimized in the sense that I sought primarily adoption processes that had taken place recently, which made the processes easier to recall. Also, the importance of these adoption processes was considered a fact that facilitated recall. I tried to pose questions in a way that they did not purposefully lead the informant.

I improved the questions during the process as I learnt how to conduct interviews in a better way and in which order the themes were best considered. During the interviews, I constantly made sure that I had understood correctly and that the informant had nothing else to add on the topic at hand. If I realized afterwards that something had been left undiscussed, then I made an appointment for a reinterview or asked for the missing details by telephone or e-mail. As there were multiple informants giving information about the same process, there were sometimes inconsistencies in the stories or something critical came out in the later interviews, within the case or in another case, which needed to be discussed also with the informants who had already been interviewed. For this purpose, I also recontacted the informants who had been interviewed earlier.

3.5 Data analysis

Miles (1983, 118) notes that “the most serious and central difficulty in the use of qualitative data is that methods of analysis are not well formulated” and

continues (p. 122) that "It is fair to say that by the best of current standards, analysis of qualitative data is a mysterious, half-formulated art." Also Yin (2003, 110) supports this view: "unlike statistical analysis, there are few fixed formulas or cookbook recipes to guide the novice." Also complexity related to data analysis derives from the fact that analysis is not a separate function. Rather it runs in parallel with data collection and guides it in new directions, as was the case in this study and reported in the data collection section (Dubois & Gadde 2002; Stake 1995, 71–72). Also, I as a researcher was a key instrument in data collection and analysis, as well as in the conclusion phases of the study (see Bonoma 1985, 204). The clear sequence of a researcher's individual mental processes can be difficult or even impossible to indentify and report correctly. Therefore, this section concentrates on the main phases and actions in the data analysis mainly after the data had been collected. But in addition to these phases described here, the analysis comprised ongoing implicit mental activities that occurred constantly at each step of the study.

The central challenge in data analysis is how to move from "shapeless data spaghetti toward some kind of theoretical understanding that does not betray the richness, dynamism, and complexity of the data but that is understandable and potentially useful to others" (Langley 1999, 694). A widely recognized guide to qualitative data analysis by Miles and Huberman (1994) contributed significantly to the data analysis structure. The general aim was to make sense of the different views of the informants on the research phenomenon according to the theoretical approaches of the study. The analysis of the data started with the conversion of the gathered material into literal form. I *transcribed the interviews* word by word in order to facilitate comprehensive analysis. This transcription was carried out in parallel with the data collection. Refining the transcribed data began from *within case analysis* (Miles & Huberman 1994, 143–171). The written material was already largely organized under the research themes, as the interviews were guided by the interview framework that was in turn based on the conceptual models of each theoretical approach. Also, every interview started on the whole with the informant's free chronological description of the case. The first task was to combine the interviews in order to form coherent chronological *case descriptions*. The Foodconcern1 case was the first to be processed.

Drawing again on the organizational buying behavior context, Anderson and Chambers (1985, 16–17) propose two different options to cope with the difficulties in modeling organizational buying. First, a detailed listing can be used to recognize the steps leading to the purchase choice. This technique is however laborious and the generalizability of the described process is poor. The other option is to identify only the crucial antecedents of the purchase choice. With this second option there is again a tradeoff, as descriptive

richness is sacrificed for parsimony, but the generalizability to other buying processes strengthens (see also Kauffman 1996). Similarly, also Stake (1995, 74) notes that the case data can be converted into new meanings and knowledge by directly interpreting the individual instance or *aggregating* multiple instances into a class. Here the case descriptions were starting points for applying the chosen theoretical approaches to the cases. Hence individual actions and properties were gathered together to build notions with a more complete coverage. These descriptions, with greater width than depth, were more insightful loose frames to be stuffed and analyzed with concepts from the different theoretical fields. Also in order to avoid duplication with the analyses sections, the case descriptions were kept short.

As a subphase of metatriangulation, a triangulation phase was implemented in the study (see Denzin 1989, 236–247). Data were analyzed in different sections through the innovation adoption and diffusion approach, organizational buying behavior approach, and network and interaction approach. These separate empirical accounts were used as building blocks of the activity based perspective. The comparisons of the approaches confirmed the idea of a widely shared empirical domain of the approaches that enabled the transfer of conceptualizations from the complementary approaches to further understanding of the innovation adoption phenomenon. This phase is termed metatheorizing.

The relationship between theory and empirical evidence can be both top-down and bottom-up type relationships (See e.g. Ma & Norwich 2007, 212). A top-down relationship refers to the application of abstract theoretical concepts to interpret a dataset. A bottom-up relationship means the generation of the concepts from a dataset and interlinking them to form an emergent theory. This study is *theory driven* in the sense that there are three chosen theoretical approaches through which data were collected and analyzed in separate sections. The analysis was conducted in the spirit of the conceptual models presented at the end of every section (see Yin 2003 for pattern matching), but also the empirically based order of activities in the cases and newly raised themes were taken carefully into account. Citations were included in the analyses in order to strengthen the chain of evidence. Citations were translated from Finnish into English by an outsider professional.

Every section of analysis resulted in summaries in which the key findings of the empirical application of the theories were highlighted. *Cross-case analysis* (Miles & Huberman 1994, 172–238) was important in the data collection phase in cross-learning and directing the data collection, but also during summarizing the analyses. The summaries were raw material for theorizing for the activity based perspective in Chapter 6. This partial development of the activity based perspective as a result of the separate

applications of the chosen theoretical perspectives and their combination agrees widely with the characterization of theory building as “disciplined imagination” (Weick 1989), and is in line with the suggestion by Eisenhardt and Graebner (2007, 29).

4 CASE DESCRIPTIONS

The empirical part of the study investigates five adoption processes in five food processing companies in Finland. Respecting their wishes, the companies remain anonymous here and are referred to as Foodsmall1, Foodsmall2, Foodmedium, Foodconcern1, and Foodconcern2.

All the studied adoption processes were similar in terms of adopter-perceived radical newness, and the commitment needed to conduct the adoption process. Also, in all the cases except Foodsmall2, there was a high risk associated with these processes. They all concerned production machinery or other production solutions that were clearly innovations from the adopter company's perspective, since they were perceived as radically new and brought evident benefits (e.g., Cumming 1998).

This chapter presents brief case descriptions to provide the reader with an overview of the studied adoption processes and their organizational contexts. These descriptions are not interpreted with reference to the theoretical approaches discussed elsewhere.

Neither are the adoption processes sharply depicted or defined in this chapter, but the processes that are believed to comprise the adoption process in full are presented. These processes are wider sequences of events during which the adoption processes (defined as commitment development to innovation) are believed to occur. The adoption process may be equal to this process or be a smaller component thereof. This is because the theoretical discussion on adoption leading to the conceptual model of adoption process and its application to the cases will only provide us with the understanding to set boundaries for the adoption process phenomenon in the cases.

The visual illustrations of the cases depict to varying degrees the critical events in the company's history, important events prior to the adoption process, and the process which comprises the adoption process. These are shown in the figures as lines whose length is not drawn to scale in terms of time. The processes during which adoption is believed to occur are illustrated by thicker lines. In the Foodsmall1, Foodsmall2 and Foodmedium cases, the more general background information on company establishment and important events linked to the focal adoption process are given. This is in order to provide a basis for the reader to evaluate and form a picture of the companies. In the Foodconcern1 and Foodconcern2 cases, the illustrations focus more narrowly on the processes that comprise adoption processes and

prior critical events related to this process. The reason behind the sparser presentations is that in both cases the studied processes deal mostly with a single production plant. The concern level histories as well as the plant level histories are so complex and rich that it is not practical to report them in a similar fashion to the smaller company cases. Also both concerns have attained such a significant and established position that in this situation the detailed background information (e.g. the year of establishment) is not relevant.

4.1 Foodsmall1 and a new packing machine

Foodsmall1 is a small family business established in 1977. A married couple runs the company, and their daughter and son also participate in its operations. All the important decisions are taken by the married couple. In addition to the owner family, the company employs around ten people. The business idea is to develop, produce and market healthy and health supporting high quality vegetarian and organic food supplies for consumers who value wellness and well-being. At present, a major part of the company's business is built around one product range that was introduced in 1995. The adoption process in question concerns the packing function for this product.

In the Foodsmall1 case *the innovation was a disinfection function in a packing machine*. Foodsmall1 previously had a similar kind of packing machine but without this disinfection function. Two packing machines were used to pack the product prior to the adoption. In the first three years after the products were launched only one machine was used, and then in 1998 another was acquired. The third machine, the adoption of which is scrutinized in this study, replaced the original machine and has now been run in parallel with the second since 2003 (see Figure 12).

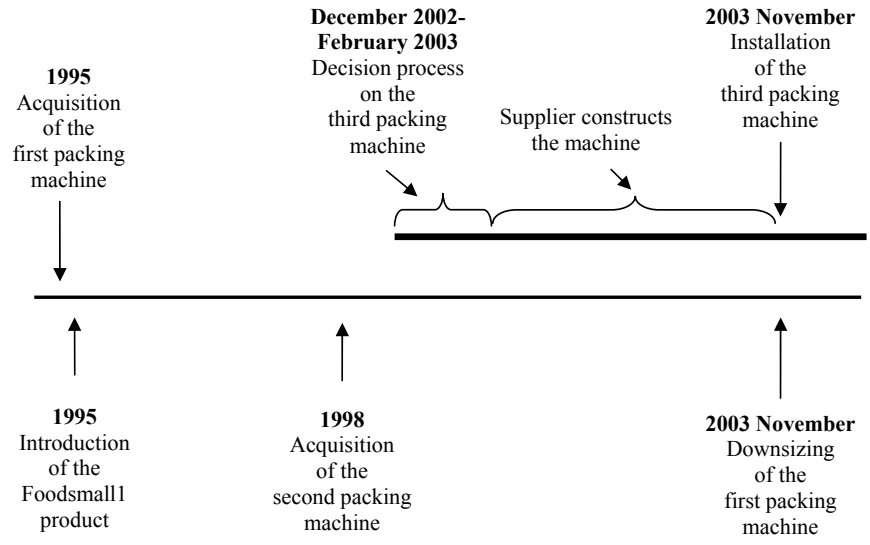

Figure 12 Key events in Foodsmall1 case

The decision process on acquiring a new packing machine started at the end of 2002 as the owners started to consider the potential need for more packing capacity. Sales were expected to rise in the near future and Foodsmall1 had to ensure that it could supply retailers with sufficient volume. The packing function was an evident bottleneck and therefore a new packing machine and improvements to the packing line were essential. At the end of 2002, Foodsmall1 contacted a technology agent business that represented a well known international technology manufacturer.

The basic need was for greater packing volume, but the owners were shown packing machines with a disinfection function when they were considering what type of machine to acquire. The old machines were not equipped with any such function. The owners had three choices: to acquire a machine without a disinfection function, acquire one with a semi-disinfection capability, or take the one with full disinfection. The machine with a semi-disinfection function was finally chosen. This feature was perceived as new to the adopter and also brought benefits that constituted an innovation for Foodsmall1. The acquisition was furthermore significant in financial terms for a small company as the machine was priced at around 400 000 euro. Although Foodsmall1 could have adopted a cheaper packing machine without the disinfection function, they felt that the rising trend towards purity and the avoidance of preservatives in food may lead to a situation in the future where aseptic packing is more important, and as a small company they could not

afford to make a replacement investment in the near future. The idea of purity and organic production is also a key theme in Foodsmall1's business vision.

The investment decision was taken in February 2003 as the owners signed a contract with the technology agent. The technology manufacturer started to construct the machine and finally installed it in November 2003. The machine has been in routine use ever since and has enabled the company to pursue its vision of ideal production; hence the benefits are such that the machine constitutes an innovation for Foodsmall1. The agent company is considered the supplier in this case, handling all interactions with Foodsmall1 while the manufacturer played no role other than installing the machine.

4.2 Foodsmall2 and a new dry disinfection method

Foodsmall2 is a small family business comparable in size to Foodsmall1 in financial terms as well as in employing around 10 people in addition to the two owners, who are brothers. One was the CEO and the other the production manager during the adoption process. Foodsmall2 was established in 1941 and is a well recognized, traditional player. The company has been owned by the same family from the outset and is currently run by the third generation. The business idea is to produce traditional products applying tomorrow's technology. This means additive and preservative free production enabled by high technology in which the company has invested extensively. This type of production is very rare in the highly traditional industry in which Foodsmall2 operates and hence the company differs substantially from the other players.

Foodsmall2's production occurs in part in sterile facilities which as has been suggested is very uncommon within the industry in question. The company built up its first sterile production facilities in 1995 but certain problems and shortages became manifest over time. In 2002, the company constructed new production facilities based on experience gained the first time around, and from visits to aseptic facilities in a variety of companies. Figure 13 depicts the key events related to the adoption process.

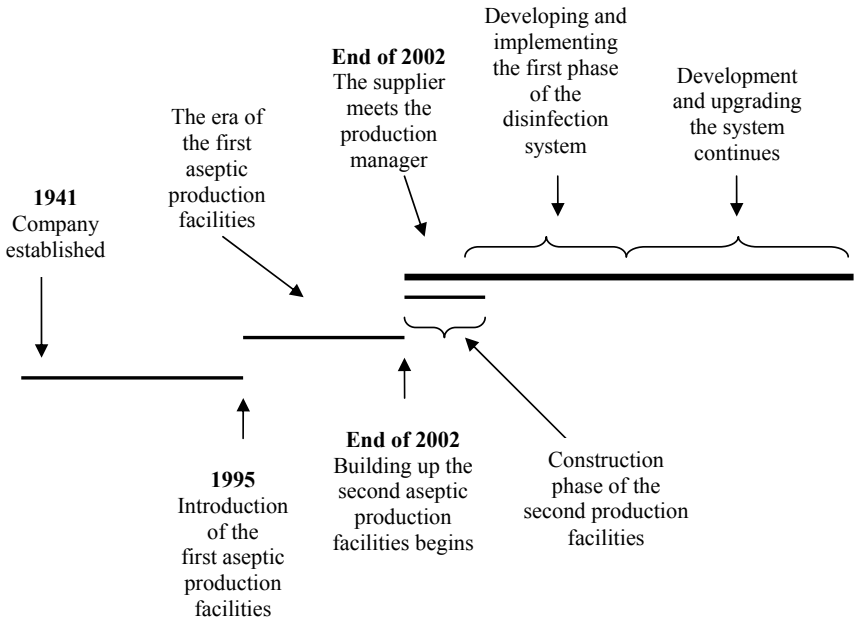

Figure 13 Key events in Foodsmall2 case

During the production facilities construction phase, the CEO-owner of the technology supplier visited Foodsmall2 in order to demonstrate a cover for UVC lights. *The cover and a disinfection solution based thereon comprise the innovation in this case.* The cover makes the use of UVC lighting feasible in washable production facilities. However, the idea of the applicable solution was virtually nascent at that stage. Foodsmall2's production manager knew the supplier's CEO-owner from an earlier visit to Foodsmall2 when he represented another technology supplier. However, the production manager was not aware that the CEO-owner had started a new business of his own. The supplier did not know at that time about the ongoing upgrade of the aseptic production facilities but thought that Foodsmall2 could be a potential partner in developing the dry disinfection solutions further towards a ready commercial product.

The idea of the joint development of a new disinfection system was a perfect fit with the ongoing production facilities' revamp and Foodsmall2's business philosophy of pure, additive and preservative free production. The commitment needed to this development was mostly a matter of sacrificing time rather than employing financial resources. Also, as the solution did not replace any other system, there was no risk related to its functionality. The idea was that if it worked it would offer something extra in terms of a disinfection function. In this sense the project was not high risk. The

development of the first phase of the disinfection system started and took place partly in parallel with the production facilities' reconstruction.

In the first phase, the UVC lights were located in the ceiling in the packing facilities. The packing function was the most critical part of the process as the hot product coming from the oven is sterile and can be contaminated only up until packing. The first phase disinfection was applied when the production process per se was not running. UVC light is harmful to humans and hence could not be in use when employees were in the facilities. However, online disinfection was required as sterility is much more critical when production is online as opposed to offline.

In the second phase, the UVC lights were installed in different phases of the cell in which the product is cut and packed by a robot. Placing the lights in that cell was possible because it is covered and production workers are not exposed to uncovered light. In order to prevent contaminants finding their way into the packing facilities via the production workers, a so-called "human lock" was constructed. UVC lights were placed in a cabin through which the employees entered the production facilities to disinfect their hands and feet.

The third phase involved assuring online disinfection by bringing in active oxygen generators to be added to the UVC disinfection process. The active oxygen generators were in use for a while but are not used anymore. The development of the system continued until the production manager left the company in autumn 2006. He sold his share of the company to his brother and no longer works for Foodsmall2.

The system is still in use but there are dissonant views on its performance. The production manager was sure that the method worked. The staff of Foodsmall2 is not fully familiar with the method, as the project was led and implemented by the production manager. The current feelings with regard to the system are dissonant but in general it is believed that the system is beneficial. The UVC lights are still in use and bring benefits such that they constitute an innovation for Foodsmall2.

4.3 Foodmedium and a new packing machine

Foodmedium is again a family business, established in 1959. The company is categorized as medium-sized by Finnish food processing industry standards as it employs around 150 people. Foodmedium manufactures products under its own and private label brands, and had launched a new consumer product in March 2003. The company initiated production from scratch in terms of machinery and technical support. *The innovation in this case was a new packing machine.*

Foodmedium was forced to make the decision to introduce a new product when a large proportion of its private label production was withdrawn in May 2003. In autumn 2002, when the production transfer decision was made public, a popular movement against the transfer was instigated by ordinary citizens in Finland. This was because the product in question strongly reflected certain aspects of Finnish culture and hence had a deep cultural resonance. Despite the resistance, production was transferred abroad. This was considered a brutal act by many Finns and hence Foodmedium's new product was seen as the offspring of the transferred product and attracted a lot of attention and support, also in media. The following Figure 14 depicts the key events in the Foodmedium case.

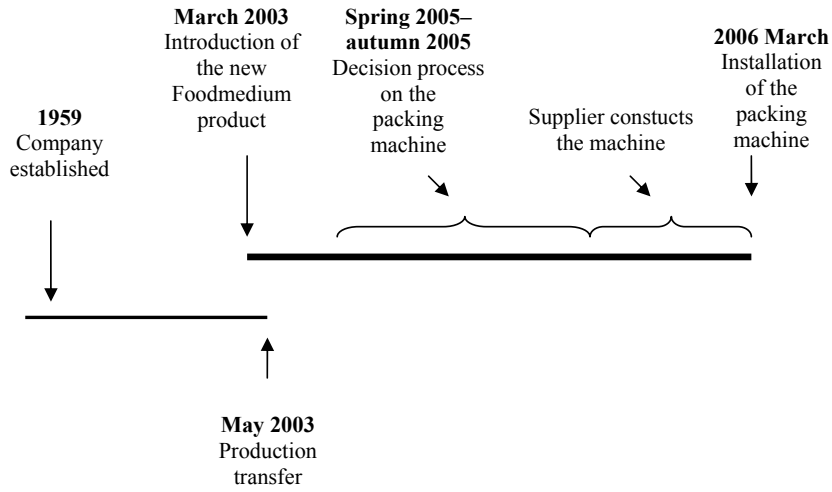

Figure 14 Key events in Foodmedium case

The company designed and built a simple production line for the new product in just three months. Although Foodmedium had poor technical facilities at the outset, it had extensive experience in this type of production due to the contract manufacturing of a similar product. From March to May 2003, Foodmedium produced the new product and contract manufactured product in parallel. After the market launch of the new product, the company saw the clear need to improve the production line, but before taking on major financial commitments it needed to be sure that the new product would survive and be accepted by consumers.

Discussions at Foodmedium concerning potential improvements started in autumn 2004 as it seemed that the new product's market share was growing. After having taken a 20 percent share, the company felt sufficiently encouraged to commence the improvement of the production line. The first

target was the packing function, which was very labor intensive and thus was the most obvious candidate at that time. The company's management decided to ask an expert team to investigate what kind of solutions were available to make improvements. The expert team examined different options and very soon proposed investing in a new automatic packing machine to replace six workers on the production line and thereby improve cost efficiency.

The expert team found four suitable suppliers and obtained approval from the management to open negotiations. Finally, the company's management accepted the proposed packing machine and the chosen supplier's conditions. The machine cost around 400 000 euro and constituted the largest investment in a single machine in the company's history. The decision process to find suitable candidates and to choose between the suppliers was enacted from spring to autumn 2005. Once the contract had been agreed, the international supplier started to construct the machine, which was finally installed in March 2006, and has been in use ever since. The planned cost reductions were achieved and hence the packing machine was highly beneficial and constituted an innovation for Foodmedium.

A technology agent business was involved as in the Foodsmall1 case, but there were interactions between the adopter and both the technology manufacturer and the agent company. The CEO-owner of the technology agent company was usually a member of the team meeting the technology manufacturer's representatives, and did not play a significantly individual role as had the agent company in Foodsmall1. For this reason, the supplier in this case constitutes the technology manufacturer in tandem with the technology agent. The CEO-owner of the agent company was so intertwined with the technology manufacturer that there is no point at which to separate them in this context.

4.4 Foodconcern1 and a new quality assurance method

Foodconcern1 is one of the biggest food processing companies in Finland employing over 4000 people and has a long tradition in the Finnish food processing industry. The studied adoption process took place in the context of a larger project that aimed to develop microbiological analytic procedures at a single production plant. The project element under scrutiny here included a concrete investment in a *new quality assurance system that is the innovation in this case*. The element was targeted at a solution to reduce storage time in microbiological quality assurance, in order not to have to construct new storage and also because of problems in quality assurance performance. The volume of production at the plant was set to rise due to a company level

decision to close one of Foodconcern1's plants and concentrate all this type of production to the plant under examination. The plant needed to find a solution to adapt to increased production. The microbiological analytics necessary to assure the quality of end products was a particular bottleneck in the new context.

The plant had been aware of the existence of faster microbiological quality analysis methods since 2000, mainly because of active suppliers who had approached the plant. Prior to the shutdown decision, these methods were not seriously considered even though it might have been beneficial to invest in them. Due to the projected increase in production volumes, the plant was more eager to respond when the CEO of a technology agent company contacted the production manager (who was at the project's outset the quality & development manager, but was shortly thereafter appointed production manager), who agreed to meet him in autumn 2001. The key events are depicted in Figure 15. As Foodconcern1 was never in contact with the technology manufacturer, the agent company is considered the supplier in this case.

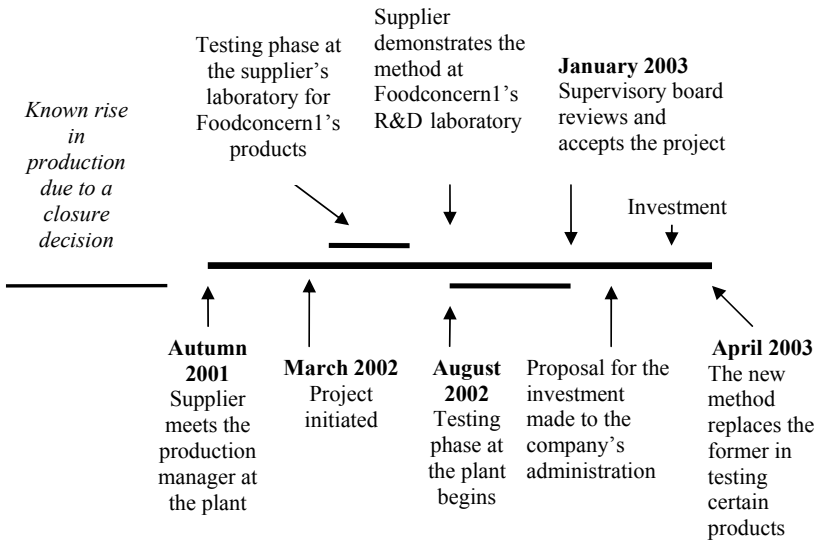

Figure 15 Key events in Foodconcern1 case

The new quality assurance method comprised a testing machine and the necessary chemical reagents. The method seemed promising from the outset, and the potential benefits sounded lucrative. After some weeks of preliminary investigation, the production manager was sufficiently interested to look at the product in more detail, and decided to take the idea further within the

company. He needed to convince the plant manager, who was a gateway to the central administration. The plant manager considered the product worthy of further investigation and decided to put it forward as a proposal to the central administration. The production manager drew up a project plan which named him as project manager, defined project goals, other project personnel, and the schedule. Central administration was in favor, authorized setting up a formal project, and chose two official unbiased evaluators from within the company.

The project outline was derived in part from the requirements to satisfy an internal technology development process, linking this project to the company's ISO 9001 quality system. The formal protocol was not followed due to the large financial commitment to the new system, but because of the microbiological risk related to the project. The machine would cost less than 100 000 euro, but the company needed to be certain that the new system worked and would not incur any quality hazards.

Following the initiation of the project in March 2002, the supplier performed a series of tests in order to adapt and fine tune the method to suit the products to be tested at the plant. During this test period, Foodconcern1 sent its products to the supplier for analysis. The method was adjusted accordingly, and the test period started at the plant in August 2002. First, the supplier had to assure the company level microbiologists at the central laboratory that it was worthwhile engaging in a more intensive testing phase. As coordinators and experts in microbiological testing methods within the company, the microbiologists had the power to kill the project if they found it unpromising. The supplier visited the central laboratory in September 2002 and performed a set of tests to demonstrate the method. At first, the microbiologists were suspicious of the technology because they had previously had some negative experiences with the technology platform in the late 1970s and early 1980s. However, the supplier managed to convince them and to prove that the technology was now accurate enough for the intended purpose, and hence received permission to continue.

The new method was run in parallel with the old one until January 2003 in order to allow for comparisons. The number of tests conducted, which was as high as 10,000, was sufficient for statistical analysis. After the testing period, it seemed that the method was specific and sensitive enough for the purpose. Once convinced, the project group decided to present the results to the evaluators. It was their job to make sure that the project complied with the formal internal guidelines, and that the results served the intended purpose, before they accepted it. The plant was then in a position to make an investment proposal to Foodconcern1's management, which authorized the investment. Once approval had been granted, the machine that had thus far

been leased was purchased. It has been used to analyze some product groups, without employing the older method as a backup, since April 2003.

After implementing the method, the plant was able to reduce the microbiological quality assurance storage period from 5–6 days to 3 days for the products thus analyzed. This tremendous time saving meant the plant had no need to construct new storage or recruit new personnel, and was thus able to lower storage costs. Hence due to the method's newness and clear benefits it constituted an innovation for Foodconcern1.

4.5 Foodconcern2 and a new cutting and deboning method

Foodconcern2 is also one of the largest food processing concerns in Finland and a little bigger than Foodconcern1. *The innovation in this case was a new cutting and deboning production line at a single production plant of Foodconcern2.* The idea behind this innovation derives from a development path started more than ten years ago. In the mid 1990s, the company planned and envisioned together with an expert organization the plant's future production process and product flow. The technology has evolved since the 1990s, and some of the expected future opportunities have now been realized. In 2000, the company reconstructed the production element whose automation project is studied here. The technology was not mature in terms of larger scale automation at that time. However, the key persons involved already had quite a clear idea of what kind and size of machines would be required, and so space and locations were set aside for their installation. In autumn 2005, the decision process to improve the production line and acquire new technology was initiated. Figure 16 depicts the key events in the process.

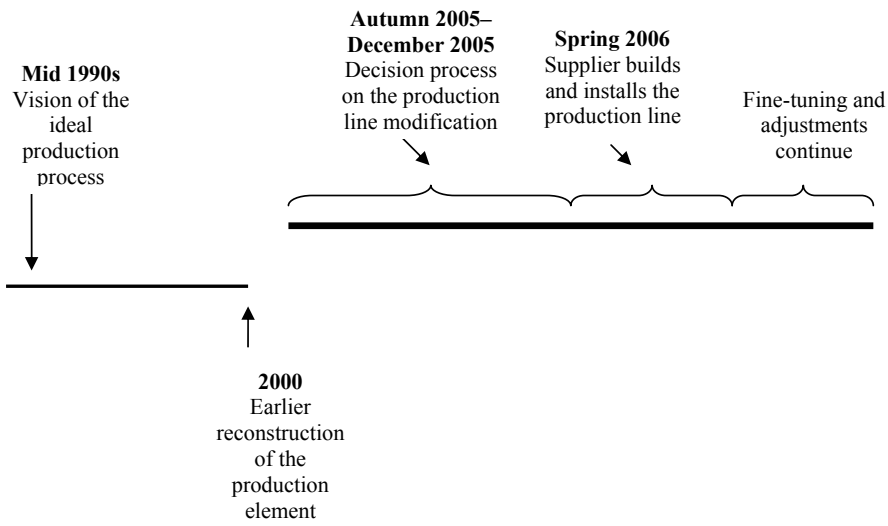

Figure 16 Key events in Foodconcern2 case

The decision process ran until the end of December 2005, at which point the company agreed a contract with the chosen supplier which then started to construct the machines and equipment. The new production line comprises three new interlinked machines and other equipment such as conveyors enabling product flow and processing. The majority of the former machines and equipment was replaced, and the new line was installed in phases during spring 2006. The most difficult aspect of the installation was that normal production continued during the week, so the installation had to be carried out in parallel.

In the improvement process decision phase, only a few employees were engaged in the project; a production manager and some production process leaders, a project manager, and the head of the project organization. The project organization was a joint resource at the concern, but both the head of the project organization and the project manager had their permanent offices at the plant facilities. The production manager held a key position in the project. He has a clear vision of the ideal production process and has been working over the years to develop the production line towards that vision. As he was responsible for production in the element under development, he was an internal customer of the project organization in question.

The head of the project organization designated the project manager for the task and acted as his supervisor. In addition, as a former production manager for the element concerned, he had specific knowledge and contacts in the field, and had also been active over the years in creating the concept and guidelines with regard to the ideal production solution. The project manager led the

project and acted as a central communications link mediating between the concern and the supplier, as well as between the concern and other external organizations, including another competing technology supplier and a number of companies who participated in the installation phase. This was the first larger project he had had management responsibility for, and due to that lack of experience in that respect his role was relatively small during the early phases but grew as the project entered the realization phase where the coordination and scheduling tasks were more significant.

The element process leaders helped refine and clarify the preliminary ideas concerning and needs for the production line under development. During the completion phase, the project recruited several individual and organizational actors within eight functions, each of which had its own subproject manager. These functions were IT, production processes, quality, testing, installation, construction, project management, and automation. This division of the project into subprojects was executed early on, and further defined during the project when new issues arose.

Automation was implemented first in order to improve cost efficiency, as it involved the replacement of nearly sixty production staff in that element. Due to the newness and evident cost savings, the new production line clearly constituted an innovation at Foodconcern2. The total cost of the production line was around 8 million euro. In addition to the financial risk, a further risk was incurred in terms of the radical change the new line brought. This could have led, for example, to interruptions in production or deviations in quality. After the installation, quite a lot of fine-tuning and adjustments were required in order to reach a satisfactory performance level. However, the production line is currently in use and works as planned.

5 INNOVATION ADOPTION IN INDUSTRIAL MARKETS

This chapter presents both the theoretical framework of the study as well as its application to the empirical data. The chapter starts with a theoretical consideration of the innovation adoption and diffusion approach that is followed by its empirical application to the five cases. Similarly the organizational buying behavior approach and finally the network and interaction approach are theoretically reviewed and then applied to the empirical cases.

A danger in this type of metatriangulation study can be that the main focus is laid on the "home" approach (the adoption and diffusion approach) and giving it a more favorable position compared to the others, which will lead to inadequate knowledge of the other approaches (see Lewis & Grimes 1999, 687). The roles of the study approaches are explicit from the outset; the adoption and diffusion approach being supreme and the organizational buying behavior and network and interaction approaches being complementary. The research phenomenon is described and defined by applying the adoption and diffusion approach and the complementary approaches are used to explore this phenomenon.

The reviews of the approaches in this chapter are viable as separate entities. They are not brief glimpses garnered for an adoption process perspective in order to break away from the prevailing assumptions and restrictions related to adoption. This expansion or proliferation is the underlying idea of the whole metatheorizing approach, as opposed to subjugating or homogenizing the differences between the approaches (see Lewis & Grimes 1999, Gioia & Pitre 1990; Popper 1970). For this reason, the reviews of the complementary approaches are extensive rather than focused on certain concepts or parts of the approaches considered. This serves the aim of, in a broad sense, discovering suitable conceptualizations applicable to building the activity based perspective in Chapter 6.

All the approaches conclude with a conceptual model that forms the basis for the empirical investigation. These models are tools used to bring the empirical reality to the theoretical consideration. The theoretical framework in this study refers to preunderstanding. The aim is not to test or verify the linkages between the theoretical concepts in the models. Rather, these models concluding each theoretical approach are presented in order to summarize the

approach, raise the interview themes, and use the model in structuring the empirical analysis in order to make the presentation of the results more effective and coherent between the cases.

The consideration of each approach ends with a summary. In the summary sections the most relevant aspects of the theoretical and empirical considerations are emphasized. The summary sections partly follow the presented process, content and context categorization. The summary sections form the basis for building the activity based perspective in Chapter 6.

5.1 The innovation adoption and diffusion approach

5.1.1 Diffusion as a context for the adoption process

Robertson (1971, 20) defines diffusion as a "process by which something spreads". Swanson (1994, 1071) sees innovation diffusion in the industrial context as referring to "the pattern of its adoption by an organizational population over time." The innovation diffusion approach is a kind of memory that ex post draws on all the individual adoption choices available and presents them in the form of a certain historical curve that is specific for the innovation examined. On the other hand an innovation diffusion phenomenon is an ongoing macro level social process that forms the context of a single adoption. As a result, an individual adopter, who is experiencing risk and uncertainty, is willing to turn to others to gain more information and reassurance (Valente 1995, 5). This continuous flow of information spreads on a macro level and its processing on a micro level is reflected in the definition of innovation diffusion by Rogers (2003, 5), "The process in which an innovation is communicated through certain channels over time among the members of a social system."

Choffray, Lilien and Yoon (1988, 52) differentiate between *innovative adoption,* which is a process in which the potential adopter tries the new product independently, and *imitative adoption* behavior, in which the process is copied by other firms (see also Mahajan, Muller & Bass 1990, 3–6). Innovative adoption as defined by them is inapplicable to real life situations. This is because most or even all adoption processes would fall into the category of imitative adoption, due to the fact that they take place in a certain social context in which adopters are always affected by social influences (see e.g. Montgomery, Lipshitz and Brehmer 2005, 5). It is often the case that a firm's information gathering activities attach a focal intra-firm adoption process to a market level diffusion.

A *social system* sets the boundaries for a diffusion phenomenon. Gatignon and Robertson (1991, 319) define a social system as "a set of people with a shared sense of commonality who tend to interact over time". Coleman, Katz and Menzel (1957) examined a local community of doctors and Ryan and Gross (1943) two communities of farmers for the social systems of their studies. In an industrial context Mansfield (1961) applied the concept to iron and steel, railroad, bituminous coal, and brewing industries.

Mahajan, Muller and Bass (1990, 1) propose that because it is a theory of communication, the main focus of diffusion theory lies in communication channels and the way they are used to transmit information about innovation within and into a certain social system. Two concepts, heterophily and homophily, are central to characterizing this communication (Rogers 2003, 305–308). Communication within social systems is characterized by *homophily*, which refers to high degree of similarity between a pair of individuals in communication. Homophily speeds up a diffusion process as it facilitates effective communication and understanding between communicating parties. However, some heterophily is needed in order to facilitate communication between different homophilous cliques (see e.g. Granovetter 1973). *Heterophily* is the opposite of homophily and refers to a high level of difference between a pair of individuals who are communicating. See Martilla (1971) for more on word of mouth communication with regard to adoption in an industrial context.

The concepts of change agent and opinion leader are central in understanding communication in diffusion theory. *A change agent* refers to "an individual who influences clients' innovation decisions in a direction deemed desirable by a change agency", whereas *opinion leadership* refers to "the degree to which an individual is able informally to influence other individuals' attitudes or overt behavior in a desired way with relative frequency". A significant distinction between the constructs is that an opinion leader is a part of the social system examined, whereas a change agent is an outsider to that social system (Rogers 2003, 300, 365; see also Lancaster & White 2001, 288; Kautz & Larsen 2000, 14; Katz & Lazarsfeld 1955). An ideal change agent is a balanced mixture of competence (heterophily) and credibility (homophily) (Rogers 2003, 385). Opinion leadership may be based for example on the early adoption of the innovation (see e.g. Turnbull & Meenaghan 1980).

Van de Ven (1986, 594) points out that "One of the key questions in the management of innovation then becomes how to trigger the action thresholds of individuals to appreciate and pay attention to new ideas, needs and opportunities." The diffusion approach in a marketing context builds on the idea of how a supplier can convert potential adopters to actual adopters. This

is done by affecting communication flows in order to make potential adopters aware of an innovation and then to communicate the benefits of that innovation to convince the adopter of the innovation's supremacy. In this sense the concept of *threshold* is important in diffusion theory (see e.g. Rogers 2003, 355). A threshold refers to the number of other actors that must be brought into a certain activity before another individual actor will join that activity (see Granovetter 1978). This threshold concept is closely linked to the concept of *critical mass,* which refers to the number of people required to adopt a product or service that is then sufficient to convert further adopters at a rate of adoption that is self-sustaining (Rogers 2003, 343).

Traditional diffusion theory builds around the idea of monopolistic competition and passive adopters. Robertson and Gatignon (1986) incorporated the idea of competition into diffusion research in the form of multiple competing change agents acting on different suppliers. The competition between different technology types has been studied for example by Menanteau and Lefebvre (2000). The opposite of the passive adopter assumption is provided by Swan and Newell (1995). They found that those who are actively involved in professional associations perceived an association as an inter-organizational network that is a useful platform, which facilitates learning about new technological developments in their area.

Institutionalization theory (see e.g. Pfeffer 1982, 239) has a point of contact with innovation diffusion theory. Pfeffer (1982, 246) presents a straightforward argument that "once an innovation is institutionalized, it is adopted and accepted not because it has rational or technical properties but because social expectations are that good, well managed organizations will do so." The imitation effect, social norms and expected pattern of behavior may replace the rationality of an adopter (see Dimaggio & Powell 1983). The studies have addressed factors that stimulate innovation and foster this sort of *bandwagon effect*. Bandwagon pressures are caused by the fear that non-adopting may lead to performance that is below average in a business arena, if adopters substantially benefit from innovation (Lee & Chan 2003, 98). Lee and Chan's (2003) study revealed that innovations are adopted by publicly held companies, even if the action will not bring in any real tangible benefit. This is because it is sufficient that they believe that the adoption will enhance the market perception of the value of their organization.

5.1.2 Phases of the adoption process

Despite various process stages classifications and innovation process models in depth discussions about the actions taken during the process stages are rare.

This is very much due to the focus on the choice type of adoption research. The technology adoption model (TAM) developed by Davis (1989) has been widely applied in technology and innovation acceptance decisions (e.g. Plouffe, Hulland, Vandenbosch 2001, 210). TAM builds on the Theory of Reasoned Action (Fisbein & Ajzen 1975; Ajzen & Fisbein 1980) and focuses on individual users' acceptance decisions within an organizational context. Due to this individual employer orientation, the technology adoption model is not applicable to the further understanding of organizational innovation adoption (authority decision).

Both Rogers (2003) and Frambach and Schillewaert (2002) present organizational innovation adoption models that consider the stages of adoption to be activities of the adopter organization. Thus, these models depict decision making related to adoption rather than the adoption process itself (adoption process stages were defined as outcomes rather than active actions).

The general innovation adoption model by Rogers (2003, 169) is chosen as a starting point for the empirical consideration in this study. This model is very likely the most well known adoption model. It depicts the stages as outcomes of more or less thorough organizational decision making action and is consistent with the diffusion adoption ideology. The model consists of five stages: knowledge, persuasion, decision, implementation, and confirmation.

Knowledge refers to an individual's exposure to an innovation's existence and an individual's understanding of an innovation's functions. The adopter recognizes the underlying need for the innovation as it becomes aware of innovation. On the other hand the adoption process may be triggered by an awareness of a problem. The former are called *innovation oriented decisions* and the latter *problem oriented decisions* (Campbell 1966, 460). Diffusion literature considers innovation to be mostly a stimulus that results in the adoption of new technology. Thus, innovation oriented decisions are closer to the main idea of diffusion research and consequently, some authors use the term diffusion to refer only to the "spontaneous unplanned spread of new ideas" and the term dissemination to refer to "diffusion that is directed and managed" (Rogers 2003, 6). Despite the initiation of the process due to awareness or because of organizational need the knowledge of an innovation, as a result of these early actions in the organizational adoption process, is important only in this model. *Whatever the sequence of actions has been, they are interesting only in terms of them resulting in knowledge about an innovation.* Knowledge has been split into *awareness knowledge* (knowledge about an innovation's existence), *how-to knowledge* (how to use an innovation), and *principles knowledge* (the principles of how an innovation functions) (Rogers 2003, 171–174).

Persuasion may or may not be the result of the evaluation of an innovation. Similarly to knowledge formation, *our interest here lies not in the evaluative decision making actions themselves but in the result of the persuasion to adopt an innovation.* In the persuasion stage an adopter develops a favorable attitude towards innovation. An unfavorable attitude is impossible as it would not lead to adoption, which is the main point and a prerequisite of the adoption process (cf. Rogers 2003, 169). A favorable attitude does not necessarily lead to adoption. According to Klonglan and Coward (1970) evaluation may result in *symbolic adoption* or *symbolic rejection*. Symbolic adoption is necessary for *use adoption* but there can be a time lag between symbolic adoption and use adoption. For Klonglan and Coward, *anticipatory adoption* refers to a behavior pattern that postpones use adoption after the symbolic adoption. Weiss (1994, 353) reported that the greater the expectation of future improvements in the technology available, the more likely it is that firms will suspend their adoption of the current technology. A *cue to action* refers to an event that accelerates or forwards the process from persuasion to moving to adoption. *An adoption decision* closes the adoption process.

Implementation refers to putting an adopted innovation into use. *Confirmation* refers to a pattern of behavior in which an adopter seeks reinforcement for the adoption decision. In the confirmation stage an adopter may continue or stop using an already adopted innovation. This post adoption rejection is called *discontinuance*. (Rogers 2003, 174–192.)

5.1.3 Factors affecting the adoption process

Many research threads have attempted to find factors affecting innovation adoption or rejection. The focus of these studies lies on the building and testing different adoption models. The emergence of this research field is greatly affected by the work done by Rogers (1962). Differences between influences presented in the literature can be found to be related to the point of time in the adoption process on which they focus. Some of the models emphasize very early adoptions related to the diffusion process and others concentrate on late adoptions (Waarts, van Everdingen & Hillegersberg 2002, 412).

Research findings suggest that factors affecting an adoption choice (Tornatzky & Klein 1982; Damanpour & Evan 1984, 393) and an adoption process (Daft 1978; Daft & Becker 1978, 121; Kimberly & Evanisko 1981; Swanson 1994, 1071; Drury & Farhoomand 1999, 135; Downs & Mohr 1976) may vary between *different innovation types*. Thus, factors that have been pointed out to have a certain influence on a consumer context, or other types

of organizational innovations, cannot be directly applied to technological innovations in organizations. Technology related attributes are perhaps not rigid and fixed but are socially constructed (Newell, Swan, & Galliers 2000, 245). The application of the results of choice oriented adoption research to process adoption research is also challenging.

This section of the study focuses on briefly reviewing the most frequently discussed factors and their influence on the adoption process. Due to the variance of the contexts of the studies presented the factors and their influences are mostly speculative in the context of the process approach to an innovative technology's adoption. However, these factors and their influence will form the basis for the empirical investigation in the focal study. This is because there are currently no better tools to work with.

Innovation characteristics are perhaps the most studied factor group affecting innovation adoption. The most common of the variables are relative advantage, compatibility, complexity, trialability and observability (Rogers 2003, 219–266). *Relative advantage* refers to the benefits of an innovation over the former solutions the innovation is superseding (Kautz & Larsen 2000, 15). The benefits can be improved profitability, decreased costs and risks, enhanced comfort, and savings in time and resources (Rogers & Shoemaker 1971, 138–139). The customer *perceived* relative advantage is the key focus, not the objective advantage (Rogers 2002, 990). Relative advantage has been found to be an especially critical factor in the early stages of diffusion (Carter Jr, Jambulingam, Gupta & Melone 2001, 286) and, in the context of technology innovations, the most critical factor facilitating adoption (Aubert & Hamel 2001, 891; Premkumar & Roberts 1999, 480). A special type of innovation, called *preventive innovations*, is presented by Rogers (2003, 176). These are adopted in order to avoid an occurrence of some unwanted event in the future. The occurrence may or may not take place if an innovation is not adopted. For this type of innovation the relative advantage is attached to the likelihood of the event occurrence.

Compatibility refers to the degree to which the use of an innovation is considered to be consistent with values, sociocultural beliefs, needs and past and present experiences (Hernández Ortega, Jímenez Martínez & Martín De Hoyos 2007, 8; Waarts et al. 2002, 415). In the technology innovation context the concept of "technology clustering" (Rogers 2003, 249 see also Eastin 2002) reflects an idea that some technologies are closely interlinked and hence affect adoption decisions about each other. The prior expectations of some technology innovations can also affect the decision to adopt.

Complexity refers to the perceived difficulty of understanding and using an innovation (Rogers 2003, 257; Rogers 2002, 990; Kautz & Larsen 2000, 15). *Trialability* refers to the possibility of using innovation on a limited basis

(Rogers 2003, 258; Rogers 2002, 990; Kautz & Larsen 2000, 15). Trialability is especially important in the early stages of a diffusion process as information on the benefits of adoption cannot be gained by observing others' use of an innovation (Rogers 2003, 258; Evaristo & Kaharanna 1998, 65; Coleman et al. 1957). *Observability* refers to the degree to which the benefits of adoption can be gained by observing others' use of an innovation (Roger 2003, 258).

The more important and lucrative the *perceived positive innovation characteristics*; relative advantage, compatibility, trialability, observability and the less important and pernicious the *perceived negative innovation characteristics*; complexity and uncertainty (Venkatraman, 1991) the more likely an innovation will be adopted. *Uncertainty* refers to a situation in which a decision maker cannot define the probabilities of the potential consequences related to an option. Hence, uncertainty is a more ambiguous situation than *risk,* as in a risk situation the probabilities of different alternatives can be defined (March & Simon 1958, 137).

According to Cestre and Darmon (1998, 124) early adopters emphasize positive innovation characteristics and late adopters emphasize negative innovation characteristics. In a meta-analysis by Tornatzky and Klein (1982) only relative advantage, compatibility, and complexity were found to significantly affect an adoption decision.

Different *adopter characteristics* have been presented that affect adoption but those influences have varied from study to study. According to Frambach and Schillewaert (2002, 165) *size* has usually been found to affect adoption positively, as larger companies feel a greater need to improve and support their performance by adopting an innovation. On the other hand, smaller organizations have been said to be more receptive towards new innovations. Frambach and Schillewaert (2002, 165) believe that part of the explanation is *organization structure,* which is related to size to some extent. More formalized and centralized organizations (usually large firms) are less likely to initiate adoption but are more capable of implementing innovations properly (Zaltman et al. 1973; see also Damanpour, 1991; for further discussion on firm size see McDade, Oliva, Pirsch 2002, 442, 452). What is more or less self-evident is that organizational *innovativeness* positively affects the adoption of technological innovations (e.g. Hurley & Hult, 1998). The availability and direction of a technological strategy (see Rosenbloom & Cusumano 1987) and its integration with a business strategy (Pappas 1984) has also been found to be important for adoption (*strategic posture*).

5.1.4 Conceptual model of the organizational innovation adoption process

Figure 17, below, represents a synthesis of the discussion presented in this chapter. In addition to adopter and innovation related factors (adoption factors), the following model includes a discussion of the social context of adoption under the categories of *social system* and *environment* (diffusion factors). The categorization of *adoption factors* and *diffusion factors* refers to a view of adoption as a temporary process that takes place within a context that is influenced by a social system and an environment. In addition to change agents, competitive pressures (Gatignon & Robertson 1989; Katz & Shapiro 1994) have been included in the environment category.

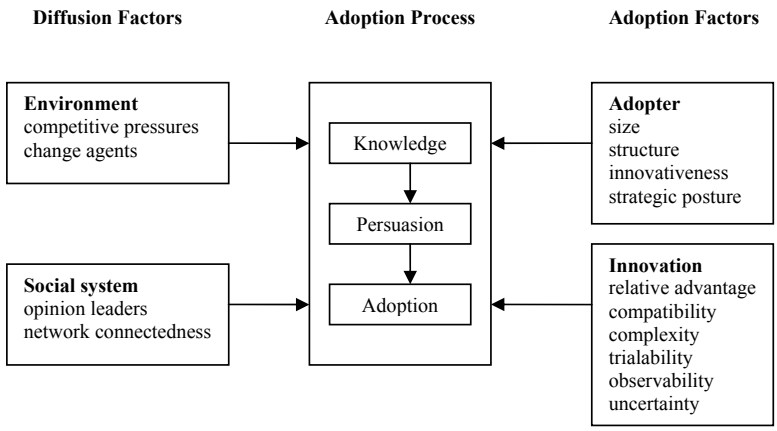

Figure 17 A conceptual model of the innovation adoption process

The synthesis model (Figure 17) accentuates the development of knowledge, persuasion, and adoption, which have been put at the very center of the model. Adoption has been conceptualized as an outcome of the process because the model only depicts processes that end in adoption. Due to this theoretical focus it makes little sense to consider rejection in the context of adoption theory, although Rogers (2003) considers rejection as an alternative option during all the stages of adoption.

The process builds on the idea of interpreting adoption as the *development of commitment to an innovation.* Accordingly, all post adoption activities have been excluded in the model. According to this idea, an implementation phase may be included in adoption process, but only if it takes place during the commitment development process. Implementation after commitment to innovation (change) refers to the conduction of change and is excluded from

the model (cf. Rogers 2003). The relationships of the variables and their relationships with the adoption stages have not been hypothesized because current literature, which mostly considers an adoption process to be a "black box" producing choice, does not shed any particular light on these interactions during the adoption process.

5.2 The innovation adoption and diffusion approach as applied to the cases

The following adopts the synthesis model of adoption (Figure 17) as a starting point for the analysis. The analysis will be faithful to the process steps of knowledge, persuasion and adoption. This is because of the theoretical focus of the approach, which sees adoption process phases not as reflections of the active working of an organization but as outcomes. The approach is only indirectly interested in how an organization performs activities that lead to outcomes. The main focus is laid on adoption, which is generated from knowledge and passes through persuasion on its way to adoption. These steps define the process. If the phases were questioned, the phenomenon being examined would no longer be an adoption process instead it would be something else e.g. a decision process.

The analysis recognizes and seals off the adoption processes from the wider processes, which they are linked to. In practice this means that, most, of the real world occurrences described are included in the phases of adoption. However, the phases after an adoption are briefly discussed in order to provide the reader with an understanding of the context of an adoption process and help them to evaluate the author‘s decision to set boundaries for the adoption process.

The position of the affecting factors is not fixed. As these factors derive from a mixture of studies that focus on an adoption choice or an adoption process and different types of innovations their effects on the processes studied here may vary. A further difference from variance research is the idea of introducing these variables and using them as a starting point for recognizing critical process elements. In no sense was an attempt made to strictly attach them to the process steps and then demonstrate a clear affect.

In each case, the factors that affect the processes are presented, but only if they were identified as elements of the processes. New factors have been added by following the same logic. The timing of the presence of these factors is illustrated by arrows that attach them to the process phases. Furthermore, adoption has been defined as the point at which commitment to an innovation has been developed. The processes have been depicted solely from the

viewpoint of adoption. As a result, certain aspects of the processes differ from the general description of the cases presented in Chapter 4.

5.2.1 Foodsmall1 and a new packing machine

In Foodsmall1's case the innovation was a disinfection function in a packing machine. Foodsmall1 gained *awareness knowledge* about an aseptic packing machine when it contacted a supplier to hear about the potential solutions they had to offer for fixing the problem of insufficient packing volume. During that time c*ompetitive pressures* were driving Foodsmall1 to improve its packing volume by acquiring a new packing machine. Sales had risen strongly and there were clear pressures to make sure that production capacity was sufficient to meet retailers' needs.

> *It started with the company wanting to ensure sufficient capacity. If there are problems, you can't have a backlog of orders that go back weeks. The retailers will soon say we don't need that kind of firm. Volume is what they wanted, and aseptic packing into the bargain. (The owners)*

Hence the company faced a problem that forced it to look for solutions. Figure 18 depicts the phases and factors influencing the adoption process.

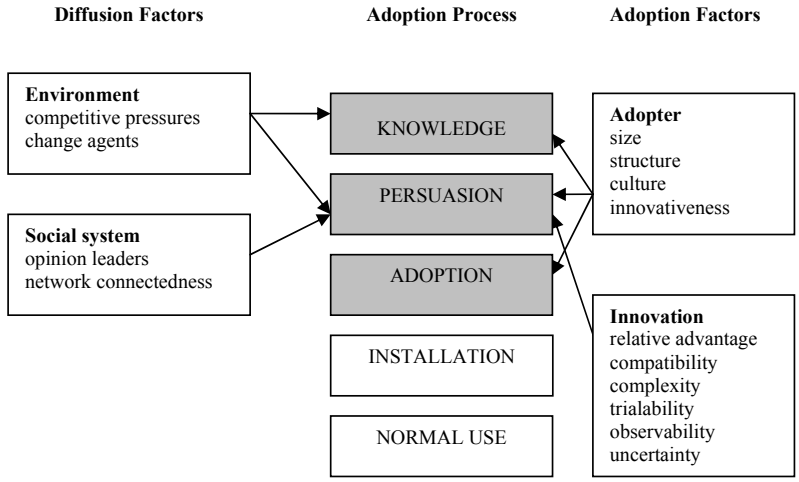

Figure 18 Foodsmall1's adoption process

Foodsmall1 knew the supplier as it had earlier bought production machinery from them. In the beginning Foodsmall1 was only looking for a

machine to improve the volume of packing but the supplier spoke about machines that have disinfection features as well. Foodsmall1 had adopted and already had in use a basic machine without a disinfection feature, so this feature was completely new for the company. Awareness knowledge developed via *how-to knowledge* and became *principles knowledge* with regard to the chosen innovation as the supplier introduced and explained the functioning principles of the different types of disinfection features available. Basically, there were three potential options to adopt; a full disinfection method based on hydrogen peroxide, a semi disinfection method based on UVC and alcohol, or a basic machine without a disinfection function. Compared to the other options of the supplier the semi disinfection feature had a *relative advantage* over the others and was *compatible* with Foodsmall1's values. The compatibility of the innovation, compared to the other machines of this supplier refers, to safe disinfection without any fear of potential residuals in the packed product and compatibility with the price of the machine. The *persuasion* brought about by the disinfection function developed because the purity and safety of its products is crucially important for Foodsmall1's business ideology.

> *Better to buy one decent machine because product quality is extremely important. The key words are organic and purity and they are becoming ever more important. (The owners)*

The adopted machine was the first of its type in Finland. Hence, during the process, there were no earlier adopters or opinion leaders with relevant information able to discuss experiences of functionality and practical issues within Foodsmall1's social system, which is quite small. However, the adoption decision was facilitated by the fact that these machines had already been sold in other European countries, even if only in small amounts. In other European countries this machine had been adopted by food processing companies and (according to Foodsmall1 this was 36th machine sold up to that point). Hence the diffusion that had already occurred did make an impact on Foodsmall1. Information about the diffusion and innovation was gained via a reference list and from the reputation of the supplier company. The owners said that the most important factor for them was to know how many of these machines had been sold in Europe:

> *Machines that have sold in only very limited quantities are not really wanted here because there is too much uncertainty associated with them. (The owners)*

This could be understood as an indirect *observation* of other companies' use of the machine. In addition to that observation, the *uncertainty* related to the complex technology was further reduced by their trust in the supplier.

We were not able to assess the technical performance and details but we do trust the supplier. (The owners)

With reference to technological functioning uncertainty was also an issue with regard to the benefits of the disinfection function. Questions were asked about the difference, if any, it might make, and financial uncertainty was raised with reference to the machine's worth and if the same benefits could be achieved at a cheaper price via another supplier. A comparison with the other options available and the machine's other, positively perceived, innovation attributes reduced the uncertainty linked to it. Such indirect observation of the machine was the best way to gain information about it as a *trial run* was not possible. In fact, all the packing machines are individually adjusted and adapted to their production line after purchase and work differently in different production lines.

Foodsmall1 had some informal discussions about the machine's adoption with a couple of food processing companies they have good relationships and frequent informal discussions with. This led to the increased likelihood of adopting the innovation they did as their brief search for alternative options did not reveal anything better. The machine suggested by another company did not include any disinfection feature, and Foodsmall1 received no advice or information on other available machines with a disinfection function. Hence, this packing machine had a relative advantage over the alternatives that Foodsmall1 had heard about. However, as the aim of the adoption of a disinfection function was to reduce the likelihood of quality hazard occurrences (preventive innovation), the function was not likely to bring in any measurable benefits. This is because it is unlikely that there will be any actual problems with regard to disinfection in the future. In other words, when the machine's relative advantage over a machine without a disinfection function is in use it is preventing a problem that the company will not be aware of ever having been a threat. However, in this case, the future invisibility of the benefits did not prevent the adoption of this function. Furthermore, the perceived relative advantage of the machine over other options presented by other suppliers was partially derived from its compatibility with machinery Foodsmall1 already possessed. This older packing machine had also been bought from the same supplier. Thus, familiarity with the spare parts and maintenance procedures and the supplier were all factors that worked in favor of adopting the option finally adopted.

Compatibility also refers to mental compatibility here as the earlier machine and the supplier already had a certain privileged position in the Foodsmall1 owners' minds and, consequently they were less likely to place any other option on an equal setting. There could have been other more sophisticated solutions available but in this context they may not have been as attractive due

to their incompatibility with the previously acquired packing machine and with Foodsmall1's working relationship with the supplier. This novel type of knowledge, the *how-to knowledge of a supplier* (how the supplier performs), facilitated the choice of the already known supplier. In addition, the *ease of use* (low complexity) of the machinery was due to familiarity with the earlier machine. The consequence of this ease of use and their relationship with the supplier meant that Foodsmall1 did not really seek out other options on the market.

> *However, it was not an emotional decision, as the benefits of choosing the same supplier were so evident. And the first one has functioned well and the maintenance engineer who comes once a year is perfect. (The owners)*

All these positive innovation characteristics and the established relationship with the supplier made a favorable case that led to the adoption of the innovation. The *adoption choice* is equivalent to the purchase of the machine. The adoption was followed by the construction, installation and everyday use of the packing machine. The machine is still in use and performs as planned.

Due to the fact that Foodsmall1 is a small firm its small *size* and less hierarchical *structure* affect the form of the adoption process. Due to its small size the *personal characteristics* of the owners were strongly reflected in the process because no official standards or routines existed for accomplishing the task. The owners were also able to make decisions quite freely. This shortened the process as the adoption process from awareness knowledge to adoption choice lasted only four months. The four month period was mostly about need specification with the supplier (what kind of packing was to be used, what would the volume be, etc.) and self convincing. By self convincing I mean a process and time that was needed in order for them to have the courage to enact their convictions and make the final decision. This aspect of behavior was mostly related to informal discussions with firms in the industry, the owners' emotions, intuition and business hunches rather than any hard economic facts. This tendency had been present during earlier investments at Foodsmall1 and it can be said that they have a certain *culture* that indirectly affects the process. This culture derives from recent and riskier investments that Foodsmall1 had successfully made. The owners had a very positive attitude towards risk taking and risks in their business:

> *Risks are a necessity for any business, without risks it is quite difficult to proceed, but we are well aware of our limits. (The owners)*

This culture can also be called *innovativeness* in this context. Even though they mostly received negative feedback instead of support from other firms they trusted in their own vision and pioneering strengths. Thus, the innovative culture of Foodsmall1 was highly contributory to the adoption of the

machinery. Despite being a small firm, Foodsmall1 was the first in Finland to adopt such a packing machine. During interviews the owners said that they were, and usually are, interested in discussing issues with partner companies in order to confirm their own ideas and to perhaps to seek practical advice. On the other hand, they also explained that they do not pay much attention to the opinions of others but prefer to act in a way that is true to their ideals. Other companies were critical of the potential decision to adopt an aseptic packing machine. However the entrepreneurs ignored this criticism because they thought it displayed a lack of knowledge of the solution and envy.

> *Encouragement we did not receive, mostly partner firms didn't understand this choice… We think that these people do not understand our vision of purity and therefore cannot understand the investment. They think that it is too little a market, but it's growing… In general we have become used to discovering our own paths when it comes to this product and its production. (The owners)*

One reason for ignoring the opinion of others is that they think that no one else has as good a vision of their business as they themselves have. Thus, they make decisions with respect to their vision not according to others' ideas or advice.

> *The backbone of our business is a strong vision of purity and all our decisions are subordinate to this. Hence, we are not so worried about the opinions of others. (The owners)*

In this sense the information acquisition related to the social system in this case was very incoherent. The decision making process in the firm was not a separate and clearly recognized function but it was conducted more or less intuitively. In brief, some information was gathered and analyzed but not systematically.

5.2.2 Foodsmall2 and a new dry disinfection method

Foodsmall2 gained *awareness knowledge* of a cover, which allows UVC lights to be installed in its washable production facilities, when the CEO and owner of a technology supplier came to meet Foodsmall2's production manager. The production manager was then the joint owner of Foodsmall2. However, the idea of the applicability of the solution was very indistinct at that stage. Nevertheless, the supplier (a change agent) believed that the owners would be potential partners for further developing the dry disinfection solution he proposed. He saw two main reasons for this. Firstly, Foodsmall2 had been profiled as developing its production process towards becoming additive and

preservative free. This is a core statement of Foodsmall2's business and differentiates it from bulk manufacturers when competing for consumers. Foodsmall2 had already invested in sterile production and the *culture* supporting this idea had evolved. Secondly, Foodsmall2 is a small family business and hence was thought to be more approachable and likely to engage in this kind of project, even though the supplier did not have a proven track record. This supplier's belief in Foodsmall2's innovativeness proved to be correct.

Foodsmall2's production philosophy calls for sophisticated methods in disinfecting their production facilities. UVC technology is well known but the production facilities of a food production plant are very demanding for any electronic device, and especially for the application of fragile UVC lights. For this reason there were no previous solutions that the production manager was aware of (his knowledge is a key point here, not the absolute fact of whether or not these solutions existed). This cover for the fragile UVC lights seemed to partially solve this problem and hence the *how-to knowledge* and the *principles knowledge* about the cover were easily obtained because this building block of the innovation was not very *complex*. However, the *persuasion* required to start developing a disinfection system based on these covered UVC lights was high.

The innovation, that was possible to construct, was *compatible* with Foodsmall2's ideas and values and provided a *relative advantage* over all other solutions on the market that the company was aware of. Despite that fact the innovation was *preventive* (and was adopted in order to reduce the occurrence of problems related to product quality), belief in the importance of this area of development was so high that the type of innovation did not inhibit the adoption process.

> *It was about assuring and improving hygiene. Well, improving is actually what we were doing, but then I began to get interested in the assurance aspect of it. And these methods offered the opportunity for that: dry disinfection and disinfection when production was running. These methods hadn't been implemented anywhere …well actually UVC lights have been sold and they're used in various places, but let's say that we consciously began to build dry disinfection during production. (Production manager)*

The process of persuasion greatly involved the thought processes of the production manager because in the *structure* of this small family business decision making is very centralized. However, knowledge about how to apply the UVC lights in the most effective manner was not clear at the beginning. This knowledge, which is here termed *context specific knowledge,* was essential for adoption and was only gained by purchasing and installing the lights. The cost of the lights and covers was quite minor, which meant

building the system was trialable and no significant *uncertainty* was related to it. For the purchase and building up of the system the other owner of the company needed to be persuaded by the production manager of the value of the innovation in order to approve its purchase. A s*ocial system* played no role in the adoption process as Foodsmall2 was the first adopter and co-developer of the innovation. Figure 19 illustrates the adoption process.

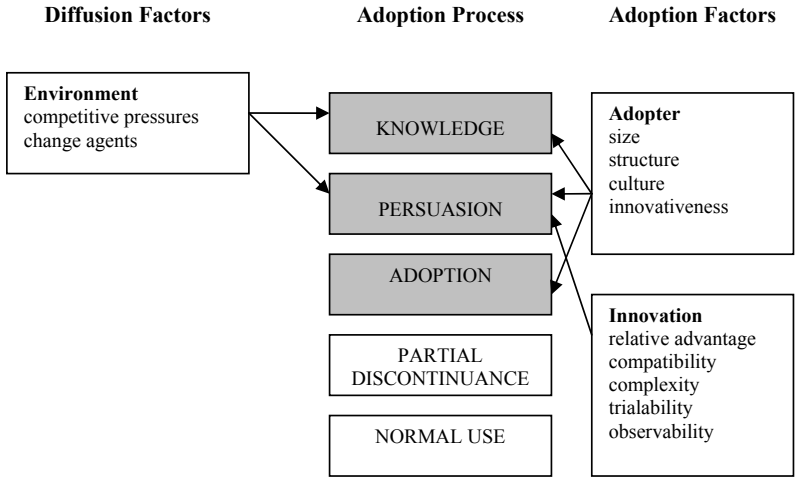

Figure 19 Foodsmall2's adoption process

The project resulted in co-operation between the supplier and Foodsmall2 in developing, installing and modifying a disinfection solution based on UVC lights. If the project had failed the technology would not have been adopted. In the first phase the UVC lights were placed in the ceiling of the packing facilities. The packing function was the most critical part of the process as the hot product coming from the oven is sterile and can be contaminated only before packing. After it is packed product contamination is no longer possible. The first phase of disinfection was used when production was not running. During this period the usefulness of the method was perceived and *adoption* can be seen as happening in this phase. UVC lights are harmful to people and cannot be used when employees are in the facility. However, online disinfection was desired as sterility is vastly more critical when production is online than offline. This led to an upgrading of the system.

In the second phase the UVC lights were installed in different phases of the cell in which the product is cut and packed by a robot. The placing of the lights in this cell was possible as the cell is covered and production workers are not exposed to uncovered light. In order to avoid contaminants finding their way into the packing facilities a so called "human lock" was also

constructed. UVC lights were placed in a cabin in order to disinfect hands and feet before workers entered the packing facilities.

The third phase was about assuring the online disinfection results by bringing in active oxygen generators to aid the UVC disinfection. The active oxygen generators were in use for a while but were discontinued. The company was committed to using the oxygen generators and they can be regarded as another adoption. Concrete evidence that they were to be adopted comes from the observation that new and more powerful generators, which the production manager ordered, were delivered but never installed. Rejection after adoption is called discontinuance in the model. The UVC lights are still in use, and bring in benefits such that they constitute an innovation for Foodsmall2.

5.2.3 Foodmedium and a new packing machine

The discussion on potential adoption began in autumn 2004 at Foodmedium. The concrete adoption process for finally adopting a machine began in spring 2005 and the final adoption decision was taken in autumn 2005. Before the adoption Foodmedium had been aware of different automatic packing machines for a relatively long time. The idea of using automated machinery instead of people, however, was not very new or innovative. The company had well established relationships with various technology suppliers due to its long history in the field. It had already had an unsophisticated packing machine in the production line. However, that machine was transferred to a new production facility. That packing machine had been designed and built by a small machine shop and was the only one of its type manufactured. Modern automatic packing machines differ tremendously from the one Foodmedium used to have before. These new generation machines were perceived as modern and were expected to be beneficial for Foodmedium, as the one finally adopted clearly was. Hence, they can be considered innovations. At the end of the 1990s representatives of Foodmedium had been in contact with the company that finally supplied the machine as, at that time, Foodmedium had considered and proposed that it should purchase a more efficient packing machine to replace the old one. However, this did not happen due to the company's decision makers' reluctance to invest in Foodmedium's production line.

Due to the generality of automatic packing in modern food processing, and the well established position of the company in the field, Foodmedium was also aware of other suppliers of packing machines. In this sense Foodmedium had extensive general knowledge about different types of packing machines

that exist and that could be used for packing. The following model (Figure 20) illustrates the adoption process.

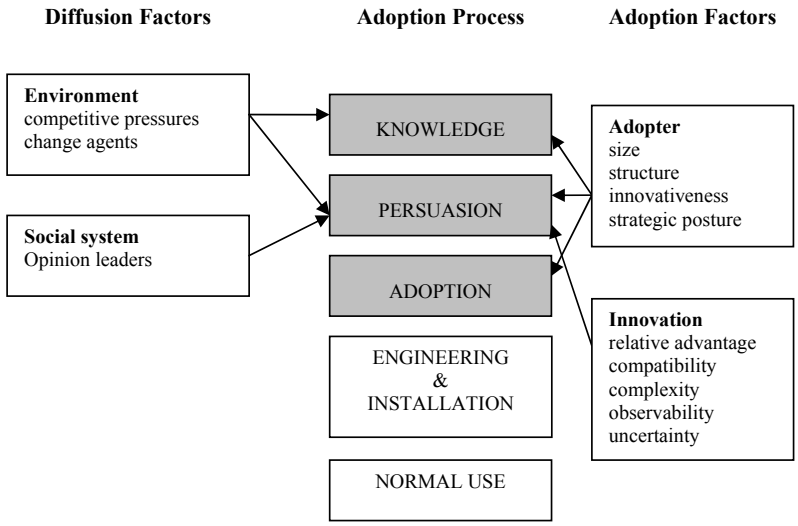

Figure 20 Foodmedium's adoption process

At Foodmedium *competitive pressures* can be said to have fostered the evolvement of general knowledge about different technologies. Due to competition there is a constant need to improve manufacturing in terms of cost effectiveness and quality enhancement. Consequently, Foodmedium carefully monitors technological development in the field. Personal contacts with the technology suppliers (change agents) were emphasized by most of the informants as facilitating awareness knowledge too. On the basis of their general knowledge about packing, Foodmedium had a positive attitude towards the technology because it was clear even before adoption that it would bring in cost savings.

After starting production, with its own brand after the previous product's production had been transferred to another contractor, Foodmedium accepted the idea of adopting new packing technology in the near future (*symbolic and anticipatory adoption*). Being a quite *small* company Foodmedium felt it was too risky to adopt until there was sufficient evidence that the new product would succeed, even though the company has a positive *strategic posture* towards new technologies as regards the benefits they can bring.

> *We knew that two women sitting opposite each other and packing wasn't the very latest technology. Of course, it's not worth buying expensive equipment when you don't know how the product is going to do in the market. You*

> *have to have a certain market share before it's worth automating. (Maintenance manager)*

A concrete starting point for moving towards adoption was a market share in the *consumer markets,* which encouraged the company to make a greater financial commitment. Actually, it had already been decided that if the product was accepted by consumers and retailers such an investment would be a top priority. Hence this activity derived from the technology strategy of the company.

> *Then, when it began to become clear what a useful investment it would be, it was prioritized and made the number one project. (Board member)*

Thus, after taking a 20 percent market share the company felt encouraged enough to improve the production line. This indicates that Foodmedium had not been a very innovative adopter, but belonged to a later adopter group. Being a family business the company was rather small. Despite the slow start the less bureaucratic *structure* of the relatively small company facilitated the quick consideration of adoption once an assurance of the basis of adoption was gained. Foodmedium's concentrated ownership and its two owners' active participation in the management of the company enabled a fast and flexible adoption process.

> *In our firm, of course, decision making is really easy, as we're directly under the owners. You don't have to ask around anywhere, the owners decide directly. (Production manager)*

As stated before, when Foodmedium entered into a contact with the supplier it already possessed general knowledge about the different packing machines but then it became aware of the possible specific solution for its purpose (*awareness knowledge*). According to Foodmedium's requirements the supplier presented a plan for realizing the packing machine, as the machine was not a standard product but needed to be purpose built. After the planning and conceptualization the supplier presented the idea to Foodmedium. During this step Foodmedium developed an idea of how the machine works (*how-to knowledge*). Foodmedium were *persuaded* to purchase the packing machine when they made a comparison of it with other suppliers' realization plans. The chosen solution and its supplier were perceived to be the most convincing. In this case, the *how-to knowledge of the supplier* facilitated the adoption.

> *They're very professional and they've manufactured a lot of tray packaging machines for the food industry and they've specialized... in the automatic packing of aluminum tubes. (Maintenance manager)*

The chosen solution was finally the cheapest although at the beginning of the process, according to the price estimates of the four competing suppliers, it

was the most expensive. During the process the prices of the other three solutions went up while the price of the one eventually chosen remained fixed. This capability to adjust price correctly in the early phases was seen as reflecting the experience and expertise of the supplier.

The innovation was thought to have a *relative advantage* over the other solutions and of course over any manual way to handle the packing function. The *uncertainty* related to the newness and the relatively high price of the innovation was reduced by trust in the supplier, due to earlier transactions with them and their reputation. Hence, the chosen innovation of this supplier was emotionally *compatible* with the values and ideas of Foodmedium. More widely this refers to the *how-to knowledge of the supplier,* in addition to the *how-to knowledge* about a specific innovation. As the packing machine was purpose built Foodmedium had the opportunity to choose some of the parts used so that the machine would be compatible with other machines in use. This was important in terms of technological compatibility as it allowed them to more effectively maintain their spare parts storage.

The already evolved *how-to knowledge then* deepened towards *principles knowledge* as the technology supplier organized a reference visit for the representatives of Foodmedium. A visit was organized to a plant that produced a similar product to Foodmedium and used a similar type of packing machine to that under consideration. The reference site was significantly bigger than Foodmedium and the capacity of the packing machine was much higher than that adopted by Foodmedium. The representatives of Foodmedium had an opportunity to discuss with and pose questions to the employees of that company. Thus, the reference company can be considered an *opinion leader* in this case. This visit made the innovation *observable* to Foodmedium and eased the *complexity* and *uncertainty* related to it. A *trial run* of the innovation was not possible in this case as the packing machine was purpose built after the agreement was made. During the reference visit Foodmedium made a contract with the supplier to purchase the packing machine. With this decision Foodmedium accepted and committed to the innovation and closed the adoption process. This fast decision was achievable because the CEO-owner of the company was present and able to approve the purchase decision there and then. After the adoption decision co-operation with the supplier began in order to put the machine into use and conduct the accepted change. The implementation phase involved close co-operation with the chosen supplier as the machine needed to be customized according to jointly created specifications. The ready machine was then installed by the supplier. It is now in use and functions as planned.

5.2.4 Foodconcern1 and a new quality assurance method

Foodconcern1 had general knowledge about new quality assurance techniques before the beginning of the adoption process of the innovation scrutinized here. This knowledge was mostly due to active suppliers seeking business. As Foodconcern1 is a *large firm* it is bombarded by various suppliers (change agents). Foodconcern1 was aware of the supplier, who had actively taken part in different kinds of exhibitions, and built knowledge about its products through different channels. Also, the *social system* facilitated information about the existence of new technologies. Foodconcern1 is well represented in informal communities through employees who have social networks through which much *homophilious* information passes. Due to *competitive pressures* Foodconcern1 is constantly willing to improve its performance, is open to new ideas and is aware of technological opportunities.

The general knowledge, and very brief informal pre-consideration related to this, did not lead to any further consideration of the innovation until the supplier of the adopted innovation contacted Foodconcern1 in order to demonstrate the method. Thus, it is clear that Foodconcern1's *innovativeness* was not a powerful driving force in this case. Instead, the active supplier was the *cue to action* that was needed to push the company over the *threshold* to enter the adoption process after earlier *symbolic and anticipatory adoption decisions* (decision to postpone adoption).

The development of Foodconcern1 at that time was forcing it to shorten the storage time of the quality assurance function or, alternatively, construct more storage space to enable it to conduct its quality assurance. The method proposed by the supplier aimed to cut storage time from five or six days to three days. In addition, the new quality and development manager at the plant studied was interested in faster methods and speeding up the quality assurance laboratory's activities. Figure 21 illustrates the adoption process.

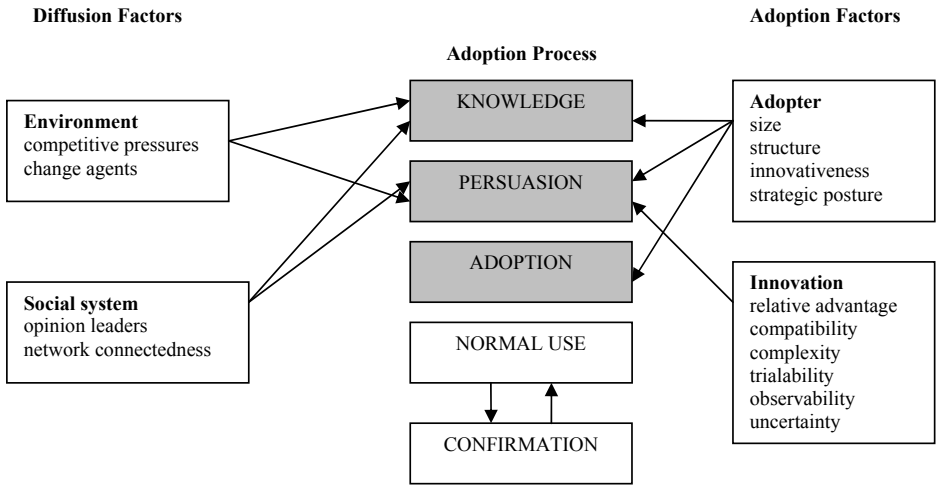

Figure 21 Foodconcern1's adoption process

The technology supplier represented a *change agent* promoting the change from the old method to the one it supplies. On the other hand the supplier was also an *opinion leader* in the sense that it was a user of the method because the method was in use in the supplier's laboratory to produce commercial analytical services. The other competing technology supplier was a change agent for the innovation it supplied. Thus, the chosen supplier had a great role in advancing the formed *awareness knowledge* on the innovation towards *how-to knowledge* and even to *principles knowledge*. This knowledge evolvement was also facilitated by the staff of Foodconcern1 possessing a good basic knowledge of the technology platform.

Despite understanding the functioning of the method little was known about its functioning in the quality assurance context at Foodconcern1. This *context specific knowledge* was essential in persuading Foodconcern1. Hence, the supplier focused on developing that by testing the method on Foodconcern1's products in its own laboratory. After that the testing continued at Foodconcern1's laboratory. The testing period was very much about the evaluation of *innovation characteristics*. On the basis of *principles knowledge* it was clear that the method had a *relative advantage* over the former one if it worked properly. This advantage was derived from the time saved in analysis which would result in quality assurance cost savings.

As the method was not part of any certain system but operated individually *compatibility* here refers to mental compatibility rather than technical compatibility. The perceived relative advantage in the beginning was sufficiently high to overcome skepticism and in this sense the mental incompatibility of the method with the values of Foodconcern1, and thus more specific investigation of the method was promoted. This was facilitated by the *observability* of the method as the supplier could demonstrate the benefits of the method by using it and by showing a reference list. Additionally, the method was *trialable* and a testing period was possible without the need for much commitment. This was because the method was a ready to buy product that could easily be converted for Foodconcern1's purposes by the supplier.

In the testing phase the ease of use (*low complexity*) worked in favor of promoting *persuasion*. *Uncertainty* was, and still is, attached to the method but the other perceived innovation attributes reduced this uncertainty. The results that were obtained during the six months of testing were in line with the older method. In this case the method was not very expensive but the role it played was very important.

During the testing Foodconcern1 was in contact with another food processing company that had earlier adopted the same method for a similar purpose. This company was an *opinion leader* in this case. It provided detailed knowledge of the innovation's use and functionality that suggested it was favorable for adoption. The existence of an earlier user in Finland also facilitated adoption, due to the fact that the authorities had accepted the method. Additionally, it was considered safer for the company to put resources into this process as they believed that there was a guarantee that it was not a waste of resources. In this sense Foodconcern1 was not very innovative in its adoption.

> *If it had been the case that no one used the method anywhere yet we would have been taking a big risk. We would have had to rethink things very seriously, or think about how much they would have to pay us to try it out. (Production manager)*

After some time testing the method Foodconcern1 became more persuaded of its merits and began to favor the decision to adopt it. The method felt reliable and skepticism related to it was reduced and the theoretical benefits received empirical support through use of the method.

As the benefits were evident and concrete the persuasion to adopt was clearly strong. The machine that had been leased during the testing period was bought, after its purchase was given the go ahead by Foodconcern1's central administration. Subsequently, quality assurance for certain products was carried out with this new method. Being a large and centrally led company the adoption decision was not as fast as it could have been, so the process evolved

through the official routes in the concern's hierarchy. The method is in use and Foodconcern1 is committed to it. The saving of time is evident but the method is however still being monitored as Foodconcern1 is not yet fully convinced of the tradeoff between saved time and the quality of microbiological analysis. Also, not all products are tested with this method and the old method is still in use for subcontract manufacturing and children products. Hence, its use could be expanded. The concern's openness to new technological opportunities may mean that the adopted method could be replaced by a novel solution in the near future and competitive pressures may affect the confirmation stage as well. Some employees have a very ambivalent attitude towards the method despite its clear benefits and good performance.

> *It may be that it's only after we have used it for two or three years that the problems begin to appear. There's always the possibility that it will let us down, that suddenly after five years someone will ask: What have you been fooling about with this for? That's quite possible, too. (Production manager)*

However even if the method was to (and most likely will) be replaced by a new method it can be said to have been adopted as the commitment to use has taken place.

5.2.5 Foodconcern2 and a new cutting and deboning method

The company had closely followed technology evolution in this field. The key people in the company had already developed a vision of an automated process, and had an idea for an ideal production, process since the mid 1990s. The chosen production line was adopted in 2006. Their general knowledge about these technologies was gained by visiting different production plants and being in close contact with the key technology suppliers in the field. Contacts within a *social system* and also to *technology suppliers* (change agents) can be said to have been well established and revealed knowledge about new innovations. Also, global *competitive pressures* were forcing the company to seek new ways of improving quality and cost efficiency. For Foodconcern2 it is natural that when new innovations are found they are seriously considered for adoption. One of the informants described this continual change as follows:

> *It somehow seems safer to stick with what you know and are accustomed to as the sector is changing all the time. In fact the opposite is true; the biggest insecurity factor is to get left behind. (Head of implementation subproject)*

As a big company Foodconcern2 has the resources to support and encourage the search for and assessment of new technological opportunities, which is emphasized in the company strategy as well. It can also be said that Foodconcern2 is, in general, an *innovative* company.

At the beginning of the year 2000 the company began to seriously consider the adoption of new production technologies similar to the production line eventually bought. However, the time was not right then for its adoption. The company realized that the machines did not work effectively and companies who had adopted early versions had struggled with them. Nevertheless, the company still had a positive attitude towards this technology and its development. This earlier decision not to adopt can be said to be an adoption postponing decision (*symbolic and anticipatory adoption*). There was clear *persuasion* about the technology, although it was not yet reliable. Figure 22 illustrates the adoption process.

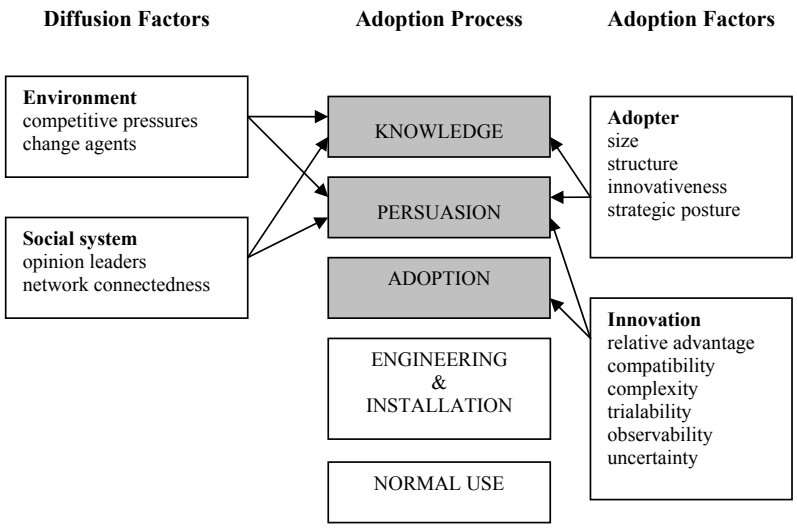

Figure 22 Foodconcern2's adoption process

Due to a long term interest in and positive persuasion about these technologies the company was willing to begin a project to consider the options in more detail as they gained *awareness knowledge* that the new generation of these technologies was now available. The awareness knowledge deepened into *how-to knowledge* and *principles knowledge* as key people visited the supplier, another potential supplier and the reference plants organized by these two suppliers. On the basis of those *observations,* it was clear that the technology had developed enough to be applicable for the Foodconcern2's purpose. Seeing the machines perform was essential for the

company due to their *complexity.* Without viewing them the *how-to knowledge* and the *principles knowledge* would have been very difficult to attain otherwise. A *trial* of these machines was not possible as they are purpose built for each customer. Even though the principles knowledge was attained, it was not sure if these machines would perform at Foodconcern2 as planned. Knowledge about the fit between the innovation and its functional context, *context specific knowledge,* was quite low. After comparing the innovation finally adopted to those supplied by the suppliers' competitors, final *persuasion* towards innovation was generated. The innovation also had a *relative advantage* over the other option considered. The persuasion was also facilitated by the *compatibility* of the innovation with the company's production facilities. During 2000 a section of the production facilities had been renovated and space had been left for machines to be installed at a later date.

> *We had places for the automatic machines already there. We had a pretty good picture of what size they would be and what they would be like – and it was a damn good picture. I mean, we just had to drop them in there. (Head of project and development organization)*

The central administration approved the adoption decision after the reference sites of the two potential suppliers were visited. Since installation there have been some adjustments and enhancements, but the line is in use and has replaced the former line and its production machinery. Despite the recent adoption the interviews indicated that development will continue and the company has not stopped considering further improvements.

> *If we allow the factory to get into quite a bad state while we wait for the new technology, if we say that we'll manage with these old machines until things develop further. Well, this would at first sight seem quite an attractive option. But, if we do that in the future we won't have the financial or mental resources to develop anymore. So, to me it seems that this is a place where we have to go step by step but not take a huge leap all at once. Because, if we did take a huge leap the whole factory would be bogged down by a new process. Production, maintenance and even product design would have a huge amount of work to do with different parts of the process… Of course what we've done so far is not perfect. We are quite far ahead already, but there still has to be readiness to change, so that we can keep up with our rivals. These machines may actually have quite a short life span and if better knowledge comes along, we'll go with it. (Head of implementation subproject)*

Hence there is no confirmation step but adoption was followed by normal use. Despite the fact that the adopted innovation could be rejected in the near future it has been adopted and committed to.

5.3 Summarizing the innovation adoption and diffusion approach

The diffusion process was defined as the context of a single organization's adoption process on which the most emphasis was placed. The earlier definition of adoption as organizational commitment development to innovation guided the modeling of adoption. On this basis all the post adoption activities were excluded from the model (Figure 17). The phases of knowledge, persuasion and adoption comprise this commitment development process. The adoption as a final phase is equivalent to the *point of commitment* to the innovation and consequently ends the innovation adoption process.

The adoption process is influenced by the *diffusion factors* (environment and social system) as well as *adoption factors* (innovation and adopter organization). The phase of the diffusion of an innovation in a social system is affected by the existence of opinion leaders and the visibility of the innovation to the potential adopter. An adopter can communicate with previous adopters of a technology and with the other potential adopters in their social system and gain knowledge about the innovation. Also the marketing attempts by the change agent (supplier), who is usually not a part of the social system but belongs to the environment category, may affect the adoption process.

All the five cases can be illustrated with reference to the phases that chronologically follow on from each other, from knowledge through persuasion to adoption. However, the duration and content of these phases and their share of the total adoption process varied case by case. In the smaller firms, Foodsmall1 and Foodsmall2's cases, the adoption processes examined were quicker than in the other cases. This can be simply due to the type of adoption and the adoption situation being different in those cases to the others. Though, it cannot be directly stated that in general these processes are different in smaller and bigger firms. Although it seems that larger firms have a certain development chain, their adoptions had already been acknowledged within the companies for some time, and were therefore, more the result of long-term development. Thus, these processes in the larger firms (Foodmedium, Foodconcern1 and Foodconcern2) were not immediate responses to exposure to the innovations. Instead an *evolutionary aspect* was present in all of them. In comparison the small firm technology adoptions (Foodsmall1 and Foodsmall2) were more serendipitous.

The larger firms had better general knowledge about the product category or technology platform related to the innovation than the smaller ones. Hence, the bigger firms knew about the future adoption long before it happened. For example in Foodconcern2's case the actual adoption process of knowledge, persuasion and adoption of an innovation was the result of an evolutionary process that had begun ten years previously. In Foodconcern1's case the

company had general knowledge about faster methods but the adoption was influenced by the concern's decision to shut down another production plant and to transfer its production to the examined production plant. This production transfer decision influenced the initiation of the adoption process. Foodmedium also had some general knowledge about automatic packing machines and their benefits but the adoption process was affected by the new product acceptance process, which was dependent on retailers and consumers. Before this acceptance process had reached a certain level, a 20 percent market share, the company was not eager to make a large financial commitment. With regard to Foodsmall1, it needed more packing volume, but during the search and evaluation process it was serendipitously introduced to machines with a dry disinfection function. Foodsmall2 was also introduced to the innovation it adopted in a quite random way.

Differences were also shown by the information channels used and emphasized by the adopters. The information provided by the supplier (change agent) was more important to the smaller companies, while bigger companies tended to use other sources of information that were consulted for a specific purpose (Foodconcern1 even consulted the main competitor), or already had direct or indirect knowledge, or experience of the adopted innovations.

All the adoption processes were *commitment development processes*. Compared to the raw distinction between the adoption decision making process and the implementation presented in the literature (although the implementation was included in some definitions of the adoption process as well) the commitment approach includes the different activities and phases of the adoption process, which refer to commitment development. In Foodconcern1's case the innovation was implemented before adoption. This implementation was necessary as it led to persuasion and adoption. This example shows that the inclusion or exclusion of implementation from an adoption process does not need to be made problematic. The important fact is that, as long as an implementation is a building block of a commitment development it is a part of the adoption process. Commitment can be further defined as *orientation to use an innovation now and in the future*. Hence, this relieves the difficulty related to a permanent change in a pattern of behavior that had been used in the previous literature and been expressed, for example, as *confirmation* of the adoption decision.

In the empirical cases the idea of confirmation was criticized. For example, even though Foodconcern1 had adopted the innovation three years prior to the interview, they said it was still being tested and that perhaps a better option would supersede it in the future (for management sticking to old routines vs. active scanning see e.g. O'Neill, Pouder & Buchholtz 1998, 102; Oliver 1991; Mintzberg & Waters 1985). This was also similar in Foodconcern2's case. The

idea there is not to stick to a new production line forever. In this sense the application of the adoption approach becomes very difficult if confirmation is included in the adoption process phases. Confirmation does not fit well with the idea of change and its approval that lies beyond the adoption and diffusion approach. Originally, the approach did not explicitly suggest any notion of confirmation, even though some studies have applied this concept. Therefore, a confirmation phase is unlikely to be included in the adoption process (commitment development process).

The commitment development notion is indirectly supported in other fields. In the organizational buying behavior context it is related to the "creeping commitment" concept. Robinson, Faris and Wind (1967, 19) describe the late stages of the buying process and decision from among the final alternatives: "The basic concern then is really an independent choice between alternatives X, Y, and Z; the question usually can be expressed, As of now, to what extent are we committed to alternatives X, Y, and Z?" In the context of strategic decision making Mintzberg, Raisinghani and Théorét (1976, 246) view the decision as commitment. They define decision as "a specific commitment to action" where the action has strategic consequences for the organization making the decision and a decision process is "set of actions and dynamic factors that begins with the identification of a stimulus for action and ends with the specific commitment to action. The challenge in this commitment-oriented definition of adoption is that it is difficult to define empirically the point of commitment (see Mintzberg & Waters 1990, 2). In this study this problem was reduced as all the processes were important for the companies and were formally considered in the organizations. Therefore, there was clear evidence that allowed the researcher to identify the moment of commitment.

The following model (Figure 23) describes the adoption process in terms of content and context.

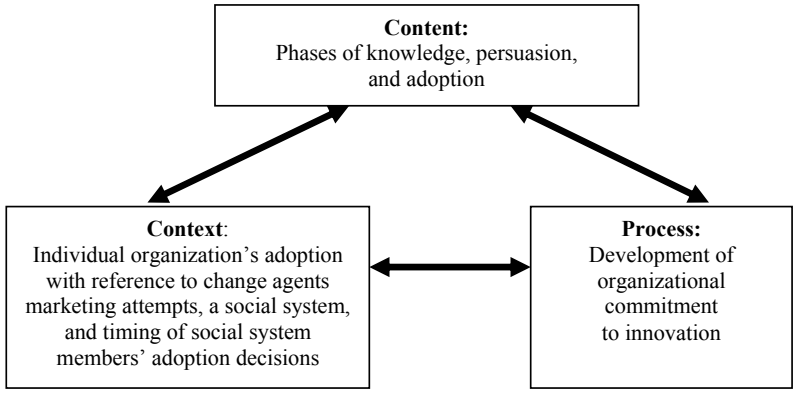

Figure 23 Content and context of an organizational innovation adoption process

The adoption and diffusion approach focuses on the process through which knowledge of an innovation develops to an adoption decision via persuasion. A distinction was made between *awareness knowledge* (the adopter becomes aware of an innovation's existence), *how-to knowledge* (how the innovation works), and *principles knowledge* (the principles of the innovation functioning). In addition to these three, two novel types of knowledge; *context specific knowledge* and the *how-to knowledge of a supplier*, were found. The former was most strongly evolved in the adoption processes of Foodsmall2, Foodconcern1, and Foodconcern2. This type of knowledge refers to knowledge about an innovation's functioning in the context into which it will be placed. In this sense, it only broadens the *how-to knowledge* that is related to an innovation (how to use the innovation, and how it performs). Another novel knowledge construct, the *how-to knowledge of a supplier* (how the supplier performs), was found to be especially important in the Foodsmall1 and Foodmedium cases.

As there is a strong bias towards innovation, which has been called a "pro-innovation bias" in the previous literature (see e.g. Rogers 2003, 106–118), knowledge about an innovation leads to persuasion and finally to adoption. This is termed bias because the process is interpreted as an adopter falling in love with an innovation (persuasion) and then wanting to adopt it, thus rejection processes are not considered within this theory. Arguing for a focus on adoption processes only and viewing the process as persuasion development that leads to adoption is not bias at all. Instead, adoption should be understood, from all theoretical approaches, as a perspective that isolates a narrow part of a wider empirical reality. The persuasion in the cases was the end result of consideration; a phase in which the fit of an innovation with an organization's purposes was more or less carefully thought out. Through

comparison, the persuasion to adopt one of the potential solutions developed and eventually led to adoption in the cases of Foodsmall1, Foodmedium, Foodconcern1 and Foodconcern2. However, afterwards, the processes comprising knowledge, persuasion and the adoption were recognized within the innovation adoption and diffusion approach. Hence, instant and irrational falling in love with an innovation was not a mechanism (functional content) in the cases that resulted in persuasion (See the discussion of the descriptive and functional contents of the adoption process in section 2.2.). Therefore, this "bias" is a deliberately selected theoretical focus of the approach.

Organizational actions and other factors are relevant only from the perspective of the process steps of knowledge, persuasion and adoption. This means that the evaluation and comparison of alternatives are relevant only if they give something to the adoption process. Partly for that reason the approach originally lacked concepts that refer to active decision making or decision makers within the adopter organizations. To consider the adopter as an active decision maker the concept of a buying center has sometimes been applied in adoption studies (e.g. Woodside & Biemans 2005) reported in marketing journals. However, this does not belong to the inherent concepts of the approach but is borrowed from the organizational buying behavior approach. In general, in marketing literature the adoption and diffusion of innovations are closely linked to organizational buying behavior (see e.g. Wilson 1987, Webster & Wind 1972, 19–20). Therefore, the following sections focus on examining the organizational buying behavior approach in order to gain a deeper understanding of the mechanisms beyond adoption, and aim to produce useful knowledge for the building of a wider understanding of the organizational innovation adoption process.

5.4 The organizational buying behavior approach

5.4.1 The main research approaches to organizational buying behavior

According Ward and Webster (1991, 419) "organizational buying behavior refers to decision making processes in formal organizations". Webster and Wind (1972, 2) see organizational buying behavior as referring to "the decision making process by which formal organizations establish the need for purchased products and services, and identify, evaluate, and choose among alternative brands and suppliers". According to these definitions organizational buying behavior is not a static event but a process (Ward & Webster 1991, 421). The process nature is also underlined by Möller (1985, 4) who wrote that "the key conceptualizations of organizational buying behavior

comprise the phases or subprocesses of the buying process, the elements of that process, and the contextual factors affecting it". With respect to this any buying situation can be defined as a set of attributes and the evaluation of those attributes (Möller 1985; see also Wilson 1977; Möller 1981).

The existence of the organizational buying behavior field of research builds around an idea, which has been supported in behavioral research, that sees the choices of individuals in an organizational setting, of which they are part of, differing from choices made in settings in which the context is less dominant (see e.g. Draper 1994; Ward & Webster 1991, 421). Organizational buying behavior has been affected by various fields like marketing, organizational behavior, purchasing, economics (see Webster & Wind 1972, 12), sociology and psychology (Johnston & Spekman 1987, 92). The term purchasing has been used sometimes interchangeably in buying and marketing literature but purchasing can be also considered to be an independent field of research according to the analysis by Das and Handfield (1997). In this study buying is considered a synonym for purchasing and articles focusing on purchasing have been included in the discussion of buying behavior in the theoretical framework.

Möller (1985) reviews different organizational buying research paradigms and ends up suggesting a categorization of decision system analysis, structural role analysis, information processing analysis, multi-attribute choice analysis, and social influence analysis. The *decision system analysis approach* concentrates on revealing the structure of the buying process, its subprocesses, the buying center, its tasks and the persons who carry them out. *Structural role analysis* refers to a research setting in which a detailed knowledge of tasks, positions and persons and the interplay between them is under investigation. It is similar to decision system analysis but more focus is placed on individual positions, tasks and interrelationships. *Information processing analysis* goes beyond the individual decision making criteria and the choice processes carried out. *Multiattribute choice analysis* offers large data collection and statistical analysis to complement the decision analysis. *Social influence analysis* facilitates the understanding of inter-departmental and inter-organizational interactions related to buying. As can be noted, all the presented approaches are related to a notion of organizational *buying as a decision making process* and emphasize different aspects of it.

In addition to this, a more abstract presentation of research paradigms by Möller (1985), Sheth (1977, 18) introduces a classification of buying behavior research focus areas that works on a more operational level (See also Wind & Thomas 1980; Sheth 1996 for classifications on the literature). He classifies the research focus areas into *buying decision types* (behavioral acts: make, buy, or lease, supplier choice, product choice, reciprocity, sole source; process

decision: new task, modified rebuy, straight rebuy, precipitating product supplier commitment), *the buying task evaluation* (e.g. value analysis, cost reduction, economic order quantity), the *decision making process* (economic, organizational, and behavioral approaches), *communication and its influence on the decision making process* (e.g. seller and buyer interaction, communication sources), *individual decision maker's characteristics' impact on the decision making process* (e.g. perceptions, choice criteria, perceived risk), *organizational characteristics' impact on the decision making process* (e.g. lateral and vertical involvement in buying, demographics, organizational style), *purchase situation characteristics' impact on the decision making process* (e.g. product type, business climate, legal and political considerations). This categorization also builds around *the process view of buying*, or at least scrutinizes the final choice as a culmination of the process that is linked with different factor groups that influence and shape it.

The remainder of this chapter on organizational buying behavior focuses on the constructs of the *buying task* and the *buying center* and then moves on to discuss and model the *buying process.* The two constructs, *buying center* and *buying task*, have been chosen from among the other constructs affecting the process of buying because of their highly important position in the literature (see e.g. Sheth 1996). The organizational buying process is mostly a group process. Single individuals do not typically make organizational buying decisions; rather a varying number of people are involved in some way. It can therefore be stated that to understand organizational buying behavior one must understand group behavior (Morris, Berthon and Pitt 1999, 264). Group behavior is captured under the notion of a buying center in the literature. The importance of a buying task or buying situation is linked to variance in buying processes. Möller (1985, 4) states that attempts to generate generalizable conclusions on the structure and elements of the buying process face an essential problem caused by "the complex idiosyncratic nature of organizational purchases". This is due to variance in buying situations, people, departments and organizations involved and a context or an environment. In fact, early studies within the field on situational variance led to the famous buy-class classification of buying situations by Robinson, Faris and Wind 1967.

5.4.2 Buying task

The idea that organizational buyers use alternative decision processes to cope with different situations stresses the importance of categorization for buying tasks or situations. *The buygrid model* developed by Robinson, Faris and Wind

(1967) is perhaps the most widely known classification of buying situations. In the buygrid model the buying process is seen to be composed of eight stages that follow each other and are being strongly influenced by the buying task. *A straight rebuy* takes place when a buyer rebuys from the latest supplier without the consideration of alternative sources of supply. *A modified rebuy* describes a task in which the need to replace an existing solution leads to the consideration of new information and alternatives. *A new task* refers to a buying situation in which the buying organization has no prior experience about the purchasing of a product and therefore needs a large amount of information on various alternatives (Robinson, Faris & Wind 1967; Lichtenthal 1988, 125; Johnston & Spekman 1987, 95–97; Woodside 1989, 44–48).

Straight rebuy is generally the most simple of these three and tends to be decided by a single person instead of a complex decision making process by a group of people (Woodside 1989, 9). At the opposite end lies the new task that is usually attached to a high demand for information and is carried out by a group of people. Between these extreme ends is modified rebuy. The buy-class framework has been researched extensively and received much support (e.g. Lewin & Donthu 2001; Anderson, Chu & Weitz 1987) as well as criticism (e.g. Möller 1985). The buy-class framework is included as part of Sheth's (1973) model of organizational buying behavior.

The buygrid classification is closely linked to the information level of the buyers, the perceived risk and the search behavior, but is insufficient to provide a definition for product complexity or significance in a specific situation as the classification concentrates only on the *perceived newness* of the buying situation. Möller (1985, 5) suggests replacing this paradigm with extensive problem solving, limited problem solving and routinized response behavior categorization, which was originally generated in the consumer decision process context (see e.g. Howard & Sheth 1969) but later applied to conceptualize other decision making processes (Howard, Hulbert and Farley 1975).

The problem solving framework, compared to the buy-class framework, is more substantive as it covers information inputs, processing rules, and supplier alternatives (Möller 1985, 5). In *routinized response behavior* information inputs are prespecified in detail in terms of supplier and product attributes, processing rules are specified in detail, and supplier alternatives are completely known and specified. *Limited problem solving* describes a situation in which information inputs are partially structured, processing heuristics are prespecified in a general form and supplier alternatives are partially specified. *Extensive problem solving* characterizes situations in which the specification of information inputs is developed when processing rules are developed during

the process and supplier alternatives are not specified. This problem solving categorization, however, does not explicitly take into account the relative importance of the buying situation and neither does it take into account the product to be bought. To offer a more comprehensive conceptual framework Möller (1985, 5) suggests attaching an organizational *commitment* dimension to the presented categorization. Here organizational commitment refers to the degree of the organization's *perceived commitment* to the product (cf. Wilson et al. 2001).

Contingency theory (Lawrence & Lorsch 1967) has been applied, by some authors, when explaining organizational buying behavior (see e.g. Spekman & Stern 1979; Woodside 1989; Wilson, Lilien, Wilson 1991). Wilson, Lilien and Wilson (1991) included two situational dimensions in their contingency paradigm, the buying task and the perceived risk. The buying task refers to the buygrid framework (Robinson, Faris & Wind 1967) and the perceived risk is composed of *technical uncertainty* and *financial commitment* dimensions. The categorization was already introduced in a thesis written by Woodside (1989). As in the categorization by Möller (1985), *commitment* is also a central construction of the contingency paradigm developed by Woodside (1989, 100), who builds on the five product related dimensions that describe a purchasing situation; importance, complexity, innovativeness, familiarity and purchasing frequency, which were suggested by Möller and Laaksonen (1986, 179). Woodside (1989, 10–11) uses the *financial commitment* construct in her contingency paradigm model in order to more specifically and measurably present the consequences, in terms of money, of the magnitude of the adverse consequences of making the wrong decision. Financial commitment composed of financial importance, end product importance and production process importance was proposed by Möller and Laaksonen (1986, 179). Similarly technical and performance complexity and usage complexity (Möller & Laaksonen 1986, 179) are interpreted as *technological complexity* (technical uncertainty in Wilson, Lilien & Wilson 1991) and *innovativeness*, and familiarity and purchasing frequency in the *buying task*.

The risk and the consequences of a bad decision vary in a decision making process in terms of the presented factors. At one end consequences are high for new task decisions involving a high financial commitment and technically complex products. At the opposite end, the consequences are low for straight rebuy decisions involving low financial commitment and technically simple products. Somewhere between these two opposite ends modified rebuy decisions can be placed. (Woodside 1989, 101).

Henthorne, LaTour and Williams (1993, 42) divide risk in organizational buying into three components: performance risk, social risk and economic risk. *Performance risk* refers to the risk that there is a failure in the product or

it does not perform as it was supposed to. This risk is especially high when buying technically sophisticated products which buyers are incapable of professionally evaluating. *Social risk* relates to others' attitudes towards and acceptance of the product to be purchased. *Economic risk* is the risk of money loss if a bad decision is made.

Bunn (1993) argues that each buying decision is composed of four buying activities: The search for information, use of analysis techniques, a focus on proactive issues, and reliance on control mechanisms. The appearance of these activities is related to the four dimensions: *purchase importance*, *purchase task uncertainty*, *extensiveness of choice*, and *perceived buyer power* related to the buying situation. *Search for information* refers to "the buyer's effort to scan the internal and external business environment in order to identify and monitor information sources relevant to the focal buying decision". *Use of analysis techniques* relates to "the extent to which the buyer makes use of formal and/or quantitative tools to objectively evaluate aspects of the buying decision". *Proactive focusing* is defined as "the extent to which decision making related to the focal purchase is prospective and thus considers the strategic objectives and long range needs of the firm". *Procedural control* means "the extent to which the evaluation of a buying decision is guided by established policies, procedures, or transaction precedents".

Six different buying situations were identified on the basis of the appearance of the activities (Bunn 1993): *casual purchase, routine low priority, simple modified rebuy, judgmental new task, complex modified rebuy,* and *strategic new task*. Purchase importance and buyer power increase when moving from a casual purchase towards a strategic new task. There is little task uncertainty in the situations of casual purchase, simple modified rebuy, and complex modified rebuy, moderate task uncertainty in routine low priority and strategic new task situations and great uncertainty in judgmental new task situations. There is an extensive choice set in casual purchase, routine low priority, and complex modified rebuy situations, and a narrow choice set in simple modified rebuy, judgmental new task and strategic new task situations. The search for information and the use of techniques of analysis increase when moving from casual purchase towards a strategic new task. A proactive focus is the dominant aspect of buying in a strategic new task. It is placed on a high level in simple modified rebuy and complex modified rebuy situations, and placed on a moderate level for a judgmental new task and a superficial level for routine low priority, and no attention is given to a proactive focus in a casual purchase. Routine low priority, simple modified rebuy and complex modified rebuy situations follow standard procedures. In a judgmental new task and a strategic new task there is little reliance on established procedures. A casual purchase situation simply transmits the order.

Bunn (1993) does not present any specific order for activities as she believes that there is a wide variation in the order of activities. This classification is linked to the buygrid framework. Bunn (1993) suggests that casual purchase and routine low priority situations correspond somewhat to the straight rebuy, while simple modified rebuy and complex modified rebuy are attached to a modified rebuy situation, and a judgmental new task and a strategic new task are similar to a new task situation.

To briefly summarize it seems that the buying task is the result of the perceived newness of the situation (Robinson, Faris & Wind 1967), information inputs, supplier alternatives, and commitment (Möller 1985), financial commitment and technological complexity (Woodside 1989), purchase importance, purchase task uncertainty, extensiveness of choice, and perceived buyer power (Bunn 1993). All these dimensions have an effect on the buying process.

5.4.3 Buying center

Organizational buying behavior can be either a group process or an individual process. Nevertheless, non routine and high commitment buying situations requiring extensive information acquisition, due to lack of organizational experience and potential risk, are more commonly decided jointly than individually (e.g. Grønhaug 1975; Tidd, Bessant & Pavitt 1997, 181; Weigand 1968; Patton, Puto and King 1986; Wilson, Lilien & Wilson 1991). The notion of a *buying center* has been one of the most important conceptual contributions within the research on organizational buying behavior (Johnston & Bonoma 1981, 143; King, Patton & Puto 1988, 95–96). The concept was introduced by Robinson, Faris and Wind (1967) but the notion of multiple individuals engaging in buying was originally made by Cyert, Simon and Trow (1956).

The buying center concept refers to all those members of an organization involved in the buying decision process with responsibility for buying (Robinson, Faris & Wind 1967; Webster & Wind 1972, 6; Dadzie, Johnston, Dadzie & Yoo 1999, 434; Pae, Kim, Han & Yip 2002, 720). In addition to employees of the buying organization, the concept may also refer to individuals outside of the buying organization that have a role or responsibility when buying (see e.g. Dawes, Patterson & Lee 1996). In addition to the buying center, the parallel concepts of *decision making unit* (Corey 1983), and *buying task group* (Spekman & Stern 1979) have been used to refer to a multi-person feature of organizational buying.

The social influence and interaction theory and organizational psychology have been placed in a key position for offering a theoretical frame for buying center studies (Möller 1985, 6). Different emphases can be found in attempts to present an integrative framework. Bonoma, Bagozzi and Zaltman (1978) have commented on the systems view of small groups by presenting organizational buying as a system constructed by various dyadic interactions within an organization. Johnston and Bonoma (1981) apply the communications system approach by providing insights into the dynamics of the buying center. They suggest five factors that describe the buying center: vertical involvement in the communication of hierarchical levels, the horizontal involvement of different departments, the number of individuals involved in the buying communications network, the connectedness of buying communications, and the centrality of the purchasing manager in the communication network.

5.4.3.1 Buying roles

Licthtenthal (1988, 119) suggests a buying center's roles are the most permanent concepts in organizational buying behavior research. Roles allow members of a buying center to be studied as individuals as well as part of the group. The roles play a key role when attempting to find a solution to the question "Who does the buying?" Similarly, Nicosia and Wind (1977) underline the applicability of the role concept. As an evident shortcoming of the literature of that time, Nicosia and Wind (1977, 111) saw researchers' concentrating only on either subjects making decisions or the activities of the decision process. To shed light on this problem they (1977, 112) proposed that the concept of role was applicable when studying people and activities within the same framework. This is because the concept of a role consists of subject and activity dimensions or "a pair of observed subject-activity values". In this sense all buying activities can be depicted by subjects. In order to define roles the subjects and activities must be traced and combined.

Webster and Wind (1972, 17) have proposed five roles for the buying center participants: users, buyers, influencers, deciders and gatekeepers. *Users* are those who use the product to be bought. *Buyers* and *influencers* are those who influence the process directly or indirectly by providing information and evaluative criteria. *Deciders* are capable of making their choice from among the alternatives. *Gatekeepers* filter incoming information to the buying center. This classification is very intra-firm oriented. The role of active outward orientation is captured in the *boundary spanning role* (Spekman 1979; Tushman and Scanlan 1981; Jemison 1984) and defined as an individual who

actively participates in various types of inter-organizational networks. Krapfel (1982) built on the boundary spanning role in his advocacy model, which develops the idea that some persons within a buying organization may become *advocates* of a seller.

Calder (1977, 193) calls the buying center role approach developed by Webster and Wind (1972) *functional role analysis*. Instead of focusing on subjects functional role analysis concentrates on certain common patterns of behavior that are supposed to be crucial to group functioning. As a descriptive approach functional role analysis is useful, but without empirical testing nothing can be said about the importance of the different roles. Calder (1977, 194–195; See also Katz & Kahn 1966) argues for the advantages of the *structural role theory* over the functional role approach such as that proposed by Webster and Wind (1972). Structural role theory adopts a view of organization as a social structure in which different people occupy different positions that are interlinked. A single individual's role is constituted through other people's demands and expectations. In this sense, this analysis enables both the analysis of the structure and the functions. The functional role category lacks this complexity, which can be captured by the structural role analysis. Positions and buying activities compose the structure in structural role theory.

Similarly to Calder (1977) Lichtenthal (1988) approaches organizational buying behavior from a structural view (drawing heavily on the work of Bates and Harvey 1975). Lichtenthal (1988, 120) builds around the idea of viewing an organization as "a collection of nested role relationships". The core concepts in this approach are *acts, roles* and *positions* that are defined according to Bates and Harvey (1975). For Bates and Harvey (1975, 46) an act, the smallest ingredient of human behavior, is the base component of structure. A role is seen in turn as a set of acts. Position refers to "the total set of norms that are associated with the behavior of a single group member" and *status* refers to "all of the norms that specify the behavior expectations toward a given alter actor or class of similar alter actors in a particular group" (Bates & Harvey 1975, 91). A role can then be defined as "clusters of norms organized around functions" (p. 91). Roles are situation specific and represent distinct substructures within positions and statuses. (Bates and Harvey 1975, 91). In this sense it can be stated that the concept of role is more dynamic than position, which is more static and fixed on a person.

The distribution of complementary role behaviors, which members execute, forms a structure for a buying center. The idea here is to see a buying center as a view of communication pattern and social networks rather than as a static group (Lichtenthal 1988; Bristor and Ryan 1988). General findings on the composition of buying centers provide support for this dynamic view as it has

been pointed out that the structure of the buying center varies between organizations, and even within a particular organization with reference to a buying situation and idiosyncratic personal, interpersonal, organizational, and environmental characteristics (Wind & Thomas 1980, 242–245). Figure 24 illustrates the positions and roles during a buying decision process.

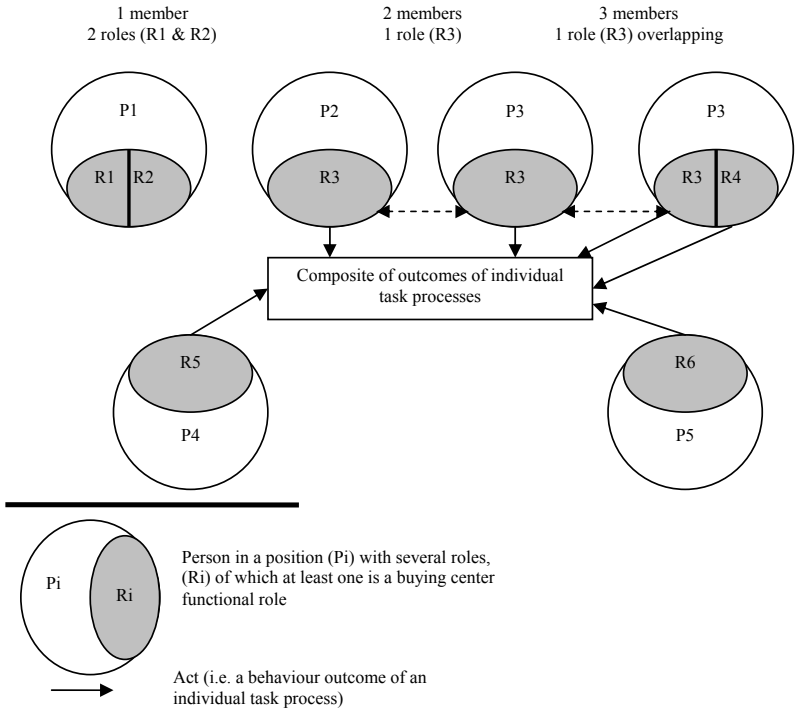

Figure 24 Buying decision as a composite of the outcomes of individual task processes (based on Lichtenthal 1988, 122)

Lichthenthal (1988, 121) proposes that neither an individual nor an organization resolves a buying situation but rather that a decision arises as a result of a small group task process, which consists of outcomes from individual task processes. The different people in the model may hold the same role or one person can perform various roles. (See Lichtenthal 1988, 123). Lichtenthal (1988, 138) criticizes the previous research, which assumes without empirical support that the number of roles in a buying center is fixed (see Webster & Wind 1972), that the organizational position exactly determines the role in the buying center, and that the roles are mutually exclusive and cannot overlap.

When concentrating on behavior results the identification of different stages of the decision making process and the organizational positions of the

members become less important in understanding the buying process. In other words, rather than positions the *distribution of complementary role behaviors, which members execute, form a structure for a buying center*. On the other hand adopting a group behavioral view on buying, i.e. the documented variance of the number of stages during a process is easy to understand. The stages identified in different studies reflect relatively few acts in a buying process or the major behavioral events during it, which may consist of hundreds of behavioral acts (Lichtenthal 1988, 138). Hence, an organizational buying process can be characterized as a "complex network of interactions motivated by personal, group or functional and organizational goals" (Dadzie, Johnston, Dadzie & Yoo 1999, 435).

5.4.3.2 Buying center communication

Rogers and Kincaid (1981) present an *information network approach* that provides a deeper understanding of the small group task process depicted in Figure 24, through which the buying decision is generated. The information network approach can be applied to describe communication processes among certain systems using interpersonal relationships as the unit of analysis. In this case a buying center forms the system. The network approach adopts communication links rather than isolated individuals as units of analysis and aims to make visible, understandable and manageable the communication structure that people live within. Instead of restricting a unit of analysis to individuals, communication network analysis conceptualizes human communication as a process of mutual information and exchange.

Rogers and Kincaid (1981, 63) define communication as "a process in which the participants create and share information with one another in order to reach a mutual understanding." This means that communication is always a joint activity, a mutual process of information sharing between two or more parties and always involves a relationship. These interrelated relationships form communication networks of interconnected individuals "who are linked by patterned flows of information" (Rogers & Kincaid 1981, 63). As a result of information sharing, individuals converge or diverge from each other in terms of their mutual understanding of reality (see Figure 25).

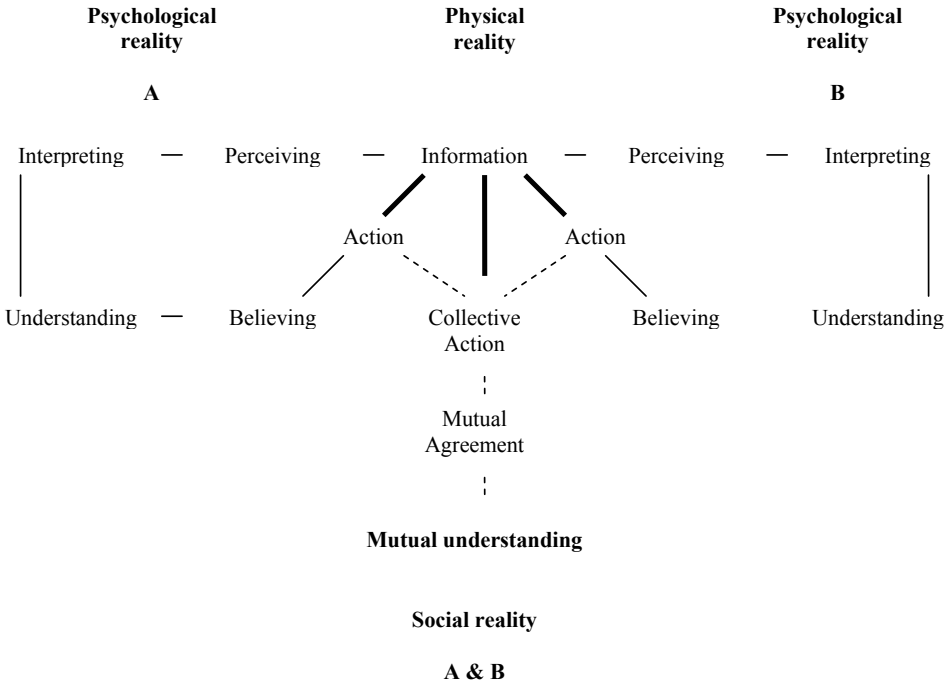

Figure 25 Basic components of the convergence model of communication (Adapted from Kincaid 1979[1] see Rogers & Kincaid 1981)

The relationships between the basic components of the communication process can be seen in Figure 25. Mutual understanding and information are the dominant components of this model and in this sense it differs in its nature from the previous linear models (consisting of variations of source, media, message, decoder, receiver, encoder, feedback) or relational models of communication (relationships among participants are also considered) (Rogers & Kincaid 1981, 35–57).

The unity between information and action is accentuated in the model by the three bold lines. Rogers and Kincaid (1981, 55) state that "all information is a consequence (or physical trace) of action, and through the various stages of human information processing, action may become the consequence of information." Similarly, unity can be found between the other components of the model, which highlight the fact that the communication process has no beginning and no end; "only the mutually defining relationships among the parts which give meaning to the whole." (Rogers & Kincaid 1981, 56).

[1] Kincaid (1979) The convergence model of communication, Honolulu, East-West Communication Institute, Paper 18.

At the individual level information processing involves *perceiving*, *interpreting*, *understanding*, *believing* and *action*, which result in new information for further processing. Collective action, mutual agreement and finally mutual understanding may be achieved through a combination of the individual level actions. The other possible results, in addition to mutual understanding with mutual agreement are: mutual understanding with disagreement, mutual misunderstanding with agreement and mutual misunderstanding with disagreement. The prerequisite for these collective results is that individual information processing becomes human communication among two or more persons who hold the common purpose of understanding one another (Rogers & Kincaid 1981, 56–57 cf. conflict negotiation characteristics in Sheth model).

The interaction patterns that generate the organizational buying decision within a small group can be affected by power and influence issues related to the process. McQuiston (1989, 69) defines influence in a buying center as "the extent to which the communication offered by an individual for consideration is perceived to affect the actions of other participants in the decision-making unit." Thomas (1982, 172) defines interpersonal purchasing influence as "the change in the multiattribute product evaluation of a decision maker (involved in organizational buying) brought about by the state (e.g., bases of influence) of another organization member, through some method." The concept of influence in this context relates closely to the concept of power. Most definitions of power have an aspect that the concept refers to as "the capability of one social actor to overcome resistance in achieving a desired objective or result." (Pfeffer 1981, 2).

The concept of power is closely interlinked with the concept of politics. When power is considered as the potential to influence events, "politics involves those activities or behaviors through which power is developed and used in organizational settings." Political decision making in organizations involves an aim to overcome resistance or opposition and is mutually exclusive with rational or bureaucratic decision making. In rational and bureaucratic models of choice decisions are made using the best information and options available, or rules and procedures evolved in the organization are used in order to best achieve the organization's goals. Political decision making, by contrast, emphasizes individual goals and aims to overcome the opposition in a choice situation not the organization's goals (Pfeffer 1981, 7).

Understanding how influence is distributed within a buying center is a critical but still a fuzzy area in organizational buying research. Kohli (1989) has reviewed studies of the influence of organizational position or a department in buying decisions. He divides his research into two research streams. The studies of the first stream indicate that relative influence depends

on various factors: *product type* (Bellizzi 1979, Bellizzi & McVey 1983; Jackson, Keith & Burdick 1984) *the stage of the decision process* (Bellizzi & Walter 1980, Naumann, Lincoln & McWilliams 1984) *the buyclass* (Naumann, Lincoln & McWilliams 1984) *the decision type* (Jackson, Keith & Burdick 1984) *organizational size* (Bellizzi 1981) and *organizational structure*. These studies provide insights into patterns of influence but the behavioral reasons for the variation in the influence have not been examined. The second research stream comprises of individual studies that explicitly examine the underlying reasons for influence and/or the sources of variation in it. The studies have shown that an individual's influence is related to his or her *expertise* (Patchen 1974, Spekman 1979, Thomas 1982*), informational access and control* (Pettigrew 1972), *referent power* (Spekman 1979), *formal authority* (Thomas 1982), *reward power* (Spekman 1979), *stake in a decision* (Patchen 1974) and *specific self confidence*. The specific pattern of influence of these influence antecedents is, however, not targeted in these studies.

Despite the contribution of both approaches during the long research tradition there are still gaps in understanding the influence of individuals within a buying center, especially in cases of a new task buying situation in which new knowledge is usually generated during the process (Daves, Lee & Dowling 1998). Sets of information may be affected by a position in an organization or personal needs and characteristics. Pettigrew (1972) found the control of information to be an important base for influence and the critical role of information with limited access has since been confirmed by various researchers (e.g. Conrad 1990; Pfeffer 1981). The next section will focus on the buying process in an attempt to finally incorporate the research discussed into a conceptual model of organizational buying behavior.

5.4.4 Modeling the organizational buying process

Most empirical research on organizational buying has focused on buying decision inputs or outputs; e.g. type of product or situation, industry, or stage in the buying process. These models can be characterized as "black box" models, as a mechanism which results in certain outcomes that are not directly observed but rather understood with reference to inputs and outcomes. This choice oriented research can be further classified as research on product choice, supplier choice, buying from a sole source or reciprocity relationships, to buy or lease, and to make or buy (Sheth 1977). This concentration has positive influences as deeper knowledge can be gained by focusing more effectively on a certain aspects of buying but on the other hand a cross fertilization of results among the studies is not likely and hence this tendency

to conduct research inhibits overall knowledge accumulation in the field (see Hunter, Bunn, Perreault 2006, 156). According to Kauffman (1996, 94), the focus of organizational buying related studies has been on separate topics and hence, "little has been done to review and categorize influences in a more general framework".

In addition to the research on certain aspects of buying, there is another research stream, which focuses on the sequential nature or steps of the decision making process (Sheth 1977). The early comprehensive models attempted to take into account various influences affecting product and vendor selection. The later research targeted specific aspects of organizational buying such as methodological or measurement issues, or attempts to validate subparts of the models or even whole models (Ward & Webster 1991, 419).

The classification of economic, organizational and behavioral decision making approaches is reflected in task and nontask classification. The *economic approach* concentrates on the economic aspects of buying and neglects the behavioral and organizational aspects of the process. The *organizational approach* lies between economic and behavioral approaches as it considers buying as a process targeting the attainment of certain organizational goals. This approach builds around organizational goals and the achievement of them rather than individuals performing these tasks in an organization. The *behavioral approach* focuses on individuals and their behavior in an organizational context. The most well known single study within this approach is perhaps the behavioral theory of the firm made by Cyert and March (1963). Based on the idea of seeing buyers in organizations as neither purely economic actors nor as purely emotional and irrational, Webster and Wind (1972, 12–27) presented a classification of task, nontask and complex models. This classification widely characterizes the literature on organizational buying (Johnston & Spekman 1987; Lichtenthal 1988, 124).

According to Webster and Wind (1972, 13–16), *task models* often focus on economic aspects of organizational buying behavior such as price or related costs (see also Johnston & Spekman 1987, 93–94). These models ignore the influence of the characteristics of an individual decision maker, interaction among members of the buying organization and the nature of the formal organization on the decision process outcome. These models lack behavioral explanations and consider the individual as a rational decision maker synonymous with the firm.

Nontask models (Webster & Wind 1972, 16–20) introduce nonrational and noneconomic factors that affect the decision process and concentrate on the psychological aspects of an individual (see Simon 1955). These models, being more holistic, have a better understanding of the circumstances of the decision process than task models, but lose the point that the organizational decision

process is problem solving and has specific objectives and goals. The decision maker is also considered synonymous with the firm but interested primarily in self gain (Webster & Wind 1972, 20; Johnston & Spekman 1987, 94–95). On an individual level perceptual bias, belief structures, perceived risk, and decision style inhibit rational information processing and decision making (Wilson 1977, 355). The problem with the task and nontask models is that they both emphasize some set of factors while excluding others. An attempt has been made to overcome these problems by presenting *complex models* that combine the best features of both types of model (Webster & Wind 1972; Johnston & Spekman 1987, 95). The most well known complex models are discussed in the next section.

5.4.4.1 The four seminal models

Johnston and Spekman (1987, 95) argue that the *buygrid model* (Robinson, Faris & Wind 1967), a *general model for understanding organizational buying behavior* (Webster & Wind 1972), a *model of industrial buyer behavior* (Sheth 1973) and *the industrial market response model* (Choffray & Lilien 1978) are four of the most well developed and comprehensive complex models presented. These models view organizational buying as a complex process of decision making. According to Johnston and Lewin (1996, 1), the first three mentioned models compose the conceptual foundation for the study of organizational buying behavior [Johnston and Lewin (1996) exclude the industrial market response model from the most widely referenced models, perhaps because it builds around these three first mentioned and only after some time was the real influence of the model revealed]. The first three models were significantly influential in generating academic interest in organizational buying behavior (Sheth 1996, 8). The concepts presented in these models (make-buy and modified rebuy, the buying center, the behavioral aspects of decision making, the joint versus autonomous decisions and conflict resolution in joint decision making processes) initiated a stream of further research (Sheth 1996, 8). In addition to the process nature of the models, they all present variable categories for influencing the buying process.

The *buygrid model* (RFW model) developed by Robinson, Faris and Wind (1967) presents a classification of purchase situations. In their model the buying process is seen to be composed of eight stages following each other and strongly influenced by the buying situation. A straight rebuy takes place when a buyer rebuys from the last supplier without considering alternative sources of supply. A modified rebuy describes a situation in which the need to replace the existing solution leads to the consideration of new information and

alternatives. A new task refers to a buying situation in which the buying organization has no prior experience of the purchasing of a product and therefore needs a large amount of information on various alternatives. For consideration of the model, see Robinson, Faris & Wind 1967; Lichtenthal 1988, 125; Johnston & Spekman 1987, 95–97; Woodside 1989, 44–48.

In addition to buying tasks the model considers stages whose existence and duration depends on the buying task. Eight stages are presented (Robinson, Faris and Wind 1967, 14–18): The anticipation or recognition of a problem (need) and a general solution, the determination of characteristics and the quantity of needed item, a description of the characteristics and quantity of a required item, the search for and qualification of potential sources, the acquisition and analysis of potential sources, the evaluation of proposals and the selection of supplier(s), the selection of an order routine, performance feedback and evaluation.

A problem and/or recognition of needs may derive from internal or external sources. The general solution refers to the direction from which the search for a solution is expected to be found. In the *second phase* the problem and the possible solution are defined in more detail in order to continue a more specific analysis. In the *third phase* the need or problem is well defined and translated into a form of specific solution which can be communicated further. In the *fourth phase,* alternative ways of satisfying needs are targeted and suppliers and their qualifications are sought. After this phase a buyer has a short list of potential suppliers. In the *fifth phase* the buyer approaches the suppliers by enquiring for specific proposals and in the *sixth phase* the buyer chooses one or more suppliers to continue to work with. The *seventh phase* may take place after or before the final purchase and relates to item delivery and acceptance. The seventh phase includes some evaluation of the supplier but a more detailed evaluation is made in the *eighth phase* when the purchased item is in use. The evaluation refers to problem solving ability of the purchased product and supplier's performance. This evaluation forms a base for more effective buying processes in the future. Even though the phases have been presented as separate acts they are highly interlinked and in reality may take place in parallel. Also, it is not guaranteed that the process, once initiated will end up with a purchase, it may also be halted or aborted during the process.

In addition to the bought item Robinson, Faris and Wind (1967, 19) take into account other options available in the problem solving process and state that "decision making actually involves a sequence of incremental choices, each of which eliminates certain alternative solutions from further consideration. As each successive decision is made, the number of possible alternatives is reduced."

According to Lichtenthal (1988, 125) the major contribution of the RFW model arises from (1) an explicit recognition that a decision is composed of many stages following a sequence, (2) the identification and classification of different types of purchases, (3) the combination of these aspects resulting in the notion that extensiveness and the duration of the eight phases varies in terms of purchasing type. The limitations of the model Lichtenthal (1988, 125) defines as; (1) the lack of the explicit consideration of the influence or participation of individuals who are not participants from the buying center involved, (2) the implicit task orientation of the perspective, (3) the static view of roles during the process and in the different buying situations, (4) the narrowness of the empirical data. Furthermore, the buygrid model does not take into account environmental elements that affect the buying organization and the buying center (Woodside 1989, 47).

A general model for understanding organizational buying behavior (WW-model) (Webster & Wind 1972) provides a conceptual framework for building a general theory of organizational buying behavior. The framework fails to identify and consider the different buying situations in detail but instead provides a wider picture of the relevant variables to consider when analyzing any organizational buying circumstances. The model builds around the behavioral theory of the firm developed by Cyert and March (1963). The main idea is that a member of the buying organization recognizes a problem that can be solved by buying. The model takes into account both the socio-emotional and economic factors, which are put into four broad categories; environmental, organizational, social and individual factor categories. Each category also incorporates two subclasses of variables: task and nontask variables.

Environmental factors include: the availability of goods (the physical and technological environments), general business conditions (the economic and political environments), values and norms guiding inter-organizational and interpersonal relationships (the cultural, political and legal environments). The environment is both a source of information and a source of constraints for buying.

Organizational factors incorporate: The *buying task* (the organizational purpose being served by the purchase, external and internal problem solving, routinization and the decentralization of the buying process), *organizational structure* comprising a communication system (information, command and instruction, influence and persuasion, integration), an authority subsystem (the power of different organizational actors), a status system (a formal organizational chart), and a reward system (the consequences for the decision maker), *buying technology* (what has been bought and how the buying took place) and *buying center* (the group of people involved in a buying decision).

Social factors refer to interpersonal interaction within a buying center that is conceptualized into five different roles for the members of a buying center: users, buyers, influencers, deciders and gatekeepers. *Individual factors* reflect the influence of individual members participating in the process (age, education, and personality).

The work done by Webster and Wind (1972) contributed to the literature on organizational buying behavior by providing the first solid conceptual model, in which the knowledge of organizational buying behavior is integrated in a comprehensive and easily understandable manner and by recognizing the four groups of variables that influence the buying process outcome. These are; a lack of operationalization procedures or measures, the assumption of a causal sequential one way flow from macro to micro, the specified relationships that are not quantified for predictive purposes, and the narrow empirical evidence that also limits the applicability and accuracy of a model (Lichtenthal 1988, 126–127; Johnston & Spekman 1987, 97–98; Ward & Webster 1991, 428–430).

Sheth's (1973) *model of industrial buyer behavior* consists of three major parts: *individual members* (individuals' backgrounds, the information sources available for them, their motivation to use these sources, perceptual distortion and prior purchase experiences), *product specific factors* (perceived risk, type of purchase, time pressure) *company specific factors* (company orientation, company size and degree of centralization) and *situational factors,* which are similar to the buygrid model. The model makes a distinction between the *joint* and *autonomous* decisions of a supplier or a brand choice. In a joint decision making case four conflict resolution tactics are presented: problem solving, persuasion, bargaining and politicking. (Sheth 1973; Ward & Webster 1991, 430–431; Lichtenthal 1988, 127)

The style of decision making raises an interesting point if there are disagreements. Sheth (1973) suggests that disagreement concerning the decision criteria is resolved through persuasion but disagreement about the style of decision making is resolved through politicking. In his model Sheth (1973) developed a useful insight into organizational buying behavior research. The model is comprehensive on the organizational level as it differentiates between joint and autonomous decision making and recognizes the associated consequences of conflict resolution. The model also highlights the need to study the psychological world of all members engaged in the buying process. The exclusion of environmental factors distinguishes the model from Webster and Wind's (1972) model (Lichtenthal 1988, 128; Ward & Webster 1991, 430).

The most relevant limitations that hinder the power of the model are its lack of operationalization procedures or measures, the lack of a comprehensive

integration of situational variables into the model, and the fact that the mutual exclusiveness of the three major components is unlikely, and similarly the integration of a buying center into the model and the consideration of it as a small group with a role structure remains incomplete (Lichtenthal 1988, 128).

The industrial market response model (CL model) (Choffray & Lilien 1978) aims to go beyond the superficial level of a loose description of factors and influences that each affect the buying process. The model targets the capture of a more operational level understanding of the buying process, which is lacking in the three previous models presented. The model is based on two major assumptions: buying center members in the same position have similar evaluation criteria and information sources and the position of the buying center in the buying process are similar across organizations.

The buying center is seen as being composed of individuals' responsibilities that are combined with three factors: information sources, evaluation criteria and interaction structure, of which the latter two have the most influence on the buying process. The role of information sources is to pass on the information of a set of alternatives that are absorbed through the technical and financial requirements of an organization, as well as the constraints posed by physical, technological, economic and social environments. A feasible set of alternatives as an output of this screening process ends up being scrutinized in more detail through individual preferences and associated evaluation criteria. The organizational preference is formed through interaction.

The conceptual model has four parallel interlinked submodels: an awareness model, an acceptance model, an individual evaluation model and a group decision model. The *awareness model* describes an individual's reaction to information about the alternative solutions available. This information may come through various channels (e.g. advertising, personal selling etc.) and is then aggregated on the buying group level. The relationship of product design and organizational interest in it is captured by the *acceptance model*. *Individual evaluation models,* covering approaches such as, the expectancy value model, regression models, conjoint analysis, logit models and utility theory models, examine how a set of alternatives are preferred by individual members. *Group decision models* study the interaction patterns between the individual members that produce a group's choice. By combining these four submodels a marketer can develop a picture of the likelihood of an organization to choose a given product by identifying the buying process at four levels: market, customer organization, buying center members and managerial (Choffray & Lilien 1978; Lichtenthal 1988, 128–129; Ward & Webster 1991, 431–432).

Lichtenthal (1988, 129) has evaluated the industrial market response model. The main benefits of the approach of Choffray and Lilien (1978) are that it is

the first operationally quantifiable model of organizational buying behavior and that it has an explicit focus on group decision making. Its limitations derive from its ignorance of the behavioral stages at an individual member level (which are considered in the buygrid model) and from the assumption that claims the position of a buying center in the buying process is similar across organizations but does not take into account the functional roles of members. Also, the evaluative criteria among members in certain positions are assumed to be similar across firms with regard to their functional roles. Finally, it has limited applicability due to the required sample size (N>10), which hinders the quality of the model.

Woodside (1989, 43–55) evaluates the four models in accordance with comprehensiveness, specificity, fruitfulness, testability, accuracy, practical application, and parsimony. *Comprehensiveness* relates to the models' richness in incorporating the possible influences that may affect the buying organization. *Specificity* refers to the identification level of the model elements on a micro level rather than on macro level. *Fruitfulness* is the tendency to generate new theories and formally testable hypotheses. *Testability* refers to the operationalization possibilities of the constructs (and is related to the comprehensiveness and specificity of the model). *Accuracy* is the tendency of the model to reflect the real world. *Practical application* refers to degree of practical usefulness and implementation refers to the possibilities of the model. Finally *parsimony* characterizes a model that explains the phenomenon with a minimum number of variables. Table 3 summarizes the models with reference to these dimensions. The plus sign refers to a high score and the minus sign to a low score with reference to the dimension.

Table 3 A comparison of the four classical models of organizational buying

	Model			
Dimension	RFW-model	WW-model	Sheth-model	CL-model
Comprehensiveness	-	++	+	- -
Specificity	+	-	+	++
Fruitfulness	+	+	+	+
Testability	+	-	+	+
Accuracy	+	-	+	+
Practical Application	+	-	++	+++
Parsimony	+	-	-	+

A distinctive result of the comparison of the models is the difference between the WW model and the CL model in almost every dimension. For example, the WW model is comprehensive but the CL model has a parsimonious focus on specific issues of buying. The RFW and the Sheth models lie somewhere between the WW and CL models.

5.4.4.2 A synthesis model of organizational buying process

Johnston and Lewin (1996) analyzed and summarized research on organizational buying behavior as initiated by Robinson, Faris and Wind (1967), Webster and Wind (1972) and Sheth (1973), by reviewing 165 articles on the topic. Since the presentation of these models, they have established the conceptual foundation for the study of organizational buying behavior to this day and followed this with hundreds of articles extending or testing it (Johnston & Lewin 1996, 1–2 see also Wilson 1996, 7). The idea of seeing organizational buying behavior as a process composed of a sequence of phases or stages is common to the three models. Although the number of stages in the process varies between the models, the nature and sequence of the events are quite similar. In addition to the process nature of the models, they present variable categories for influencing buying behavior (the buying process). Of the nine different categories three are shared between the models, namely the category of *environmental influences* (physical, political, economic, suppliers, competitors, technological, legal, cultural and global), the category of *organizational influences* (size, structure, orientation, technology, rewards,

tasks and goals), and the *individual participants' characteristics* (education, motivation, perceptions, personality, risk reduction and experience). In addition to these, the Robinson, Faris and Wind model and the Sheth model have *purchase characteristics* (buy task, product type, perceived risk, prior experience, product complexity and time pressure) and *seller characteristics* (price, ability to meet specifications, product quality, delivery time and after sales service) in common.

The sixth category, *group characteristics* (size, structure, authority, membership, experiences, expectations, leadership, objectives and backgrounds) is presented in the Webster and Wind model, and the two final categories in the Sheth model: *informational characteristics* (sales people, conferences, trade shows, word of mouth, trade news, direct mail and advertising) and *conflict negotiation characteristics* (problem solving, persuasion, bargaining and politicking). After empirical testing these nine fundamental concepts (the process nature of buying and the eight influencing factors presented) of the models still hold valid (Johnston & Lewin 1996).

As the buying influences presented have been defined differently in various articles an exact and unanimous defining of them is impossible. In addition, in different models the relationships between the constructs have been presented differently. The following however focuses on sharpening the meanings of some of the most complex presented influences in order to apply them to the empirical section of the study.

Environmental influences (physical, political, economic, suppliers, competitors, technological, legal, cultural and global) affect the buying process by forming the widest context for the buying process and organization (for a discussion of this see e.g. Webster & Wind 1972, 40–52). Organizational influences (size, structure, orientation, technology, rewards, tasks and goals) form a closer and more direct context for a buying process and a buying center. According to Webster and Wind (1972, 55–60) an organization structure can be split into communication, authority, status, rewards, and work flow. Communication possesses information, command, instructive, influence, persuasive, and integrative functions. In the presented classification this is related to buying center and conflict negotiation factor groups as well. At this point the definitions for the concepts of rewards and technology are borrowed from Webster and Wind (1972, 59–62). Rewards may be both financial and nonfinancial and are related to the evaluation of an individuals' contribution to accomplishing organization objectives. Individual members tend to apply their own criteria, which is consistent with how they themselves will be evaluated and rewarded or what their relation with the product under procurement will be. Potential savings are important for managers who are responsible for that side but less relevant for users or

technical staff. Both rational and emotional motivations can be identified and emphasized differently by different members of a buying center (Berkowitz 1988). Technology refers to a physical plant and the equipment owned and used by a company, as well as the programs and procedures used to manage the company. Technology may facilitate or inhibit the buying of certain products depending on their fit with a company's prevailing technology (Webster & Wind 1972, 60–62).

Individuals hold a key position in buying organizations as organizational behavior is, in the end, the behavior of individuals in an organizational context (Webster & Wind 1972, 88). Cognition refers to the process by which an individual receives and interprets information from an environment (e.g. Webster & Wind 1972, 96). The presented *individual participants' characteristics* (education, motivation, perceptions, personality, risk reduction and experience) can be seen to have an influence on the behavior of individuals in this buying process. Perceptions are related to individuals' information gathering and processing and discussed in relation to distortion by Sheth (1973, 53). Perceptual distortion refers to individuals' tendency to make objective information consistent with their own prior knowledge and expectations. For example in a buying center composed of individuals with various backgrounds the same information is likely to be understood in different ways and given different meanings by those individuals (Sheth 1973, 53). Perceptual distortion is also related to expectations, which are also included in the category of group characteristics. Expectations refer to the perceived potential of alternatives to satisfy explicit and implicit objectives and are closely related to past experiences regarding these alternatives, if they exist (Sheth 1973, 52–53).

The following model (Figure 26) builds around these nine original constructs as well as two additional ones, namely *decision rules* and *role stress*.

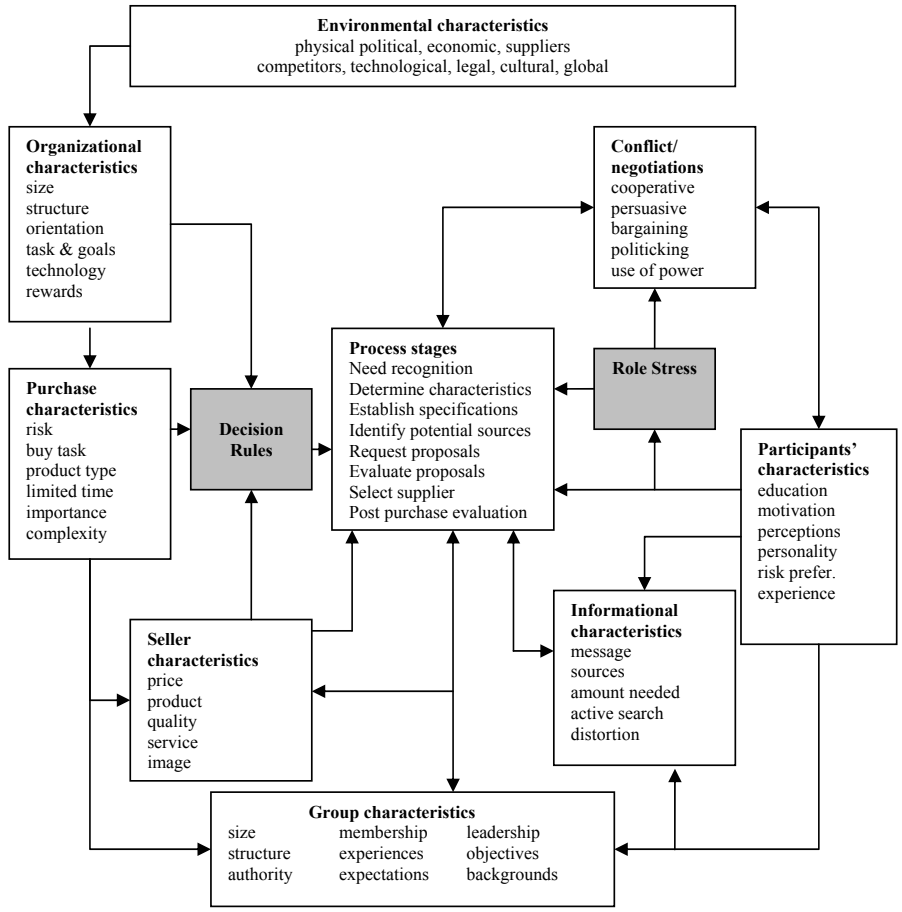

Figure 26 An integrated model of organizational buying behavior (Based on Johnston & Lewin 1996, 3)

The relationships between the constructs in the model are based on the three original models as well as on the reviewed articles (Johnston & Lewin 1996). The buying process is affected either directly or indirectly by environmental, organizational, purchase, group, participants', conflict and negotiation, informational, and seller characteristics. On the basis of the review, decision rules and role stress have been added in the model. These two concepts partially filter the influence of the factor groups. Decision rules refer to the rules used by a buyer to handle different buying situations. These rules vary in their degree of formality (and during the buying process stages see Vyas & Woodside 1984). Decision rules are influenced by environmental, organizational, purchase and seller characteristics and are expected to vary during the buying process. Role stress means ambiguity or conflict in buying

objectives. Role conflict refers to the degree of incongruity or incompatibility among purchase expectations. Role ambiguity is interpreted as a lack of information about the expectations related to a purchase and role, the methods for satisfying known purchase and role expectations and the consequences of role performance. For more on role conflict and ambiguity, see Michaels, Day and Joachimsthaler (1987).

In addition to these two novel constructs, Johnston and Lewin (1996) introduce two other additional constructs lacking in the original models: buyer seller relationships and communication networks. An inter-firm level concept, *buyer seller relationship* refers to a dyadic and network perspective on organizational buying. The implicit view, of this addition, is that factors affecting buying behavior also combine to affect a firm's supply relationships. The other added concept, *communication networks*, refers at an intra-firm level, to communication in a buying center and, at an inter-firm level, to communication between different actors (see Johnston & Lewin 1996, 2–5). The consideration here in this section is strictly limited to a focal firm approach. Therefore, communication in a buying center is only taken into account in these two additional concepts. Buyer seller relationships and inter-firm communication networks will be discussed in the network and interaction (IMP) section of the study.

The buying process has been depicted in eight stages according to the buygrid model (Robinson, Faris & Wind 1967) in the synthesis model (Figure 26). It is easy to think that there is not a fixed number of stages in a buying process as one can never observe all the mental processes and decision stages within a multiperson buying process. Thus, the stages identified by different research and in models reflect a few acts in the process i.e. they represent major behavioral events, rather than hundreds of behavioral acts (see Lichtenthal 1988, 138).

According to Bunn (1993) a more important aspect than the order of the stages is the mix of the buying activities related to a specific buying decision. Nicosia and Wind (1977, 102) also emphasize the importance of the activities but note that the activities that take place during a buying process (comparable to the buying process stages) are not themselves enough to concentrate on. This suggests that we should target our efforts on tracing the people performing these activities, at both individual and group level, and, eventually, why these activities are performed. However the research on organizational buying behavior falls short in this area. The cause of this is that organizational buying has been conceptualized as a process consisting of stages that buying center members pass through over time (Robinson, Faris & Wind 1967; Webster & Wind 1972; Sheth 1973). Studying a buying center only as a factor affecting a process, or as a passive group that drifts through a process, restricts

our view of the whole process. A buying center should be studied as an active unit that through its actions creates a buying process. Accordingly, the process stages can then be seen as the outcome of a buying center's functioning in a certain buying situation, not as pre-determined stages.

5.5 The organizational buying behavior approach as applied to the cases

The following adopts the synthesis model of buying (Figure 26) as a starting point for analysis. A difference to the adoption processes analysis is that the buying stages are not assumed to be fixed in the analysis in this section. In the adoption approach the theoretical focus of the approach was laid on the generation of adoption. In the buying behavior approach the theoretical focus emphasizes the active role of a buying organization. Therefore the process stages reflect the functioning of a buying center and may vary between the cases.

The position of the affecting factors is not fixed. As these factors derive from a mixture of studies focusing on buying choice or buying process and different buying situations their effect in the studied buying processes may vary. Also different from variance research is the idea of introducing these variables and using them as a starting point for recognizing critical process elements. In no sense are they meant to be strictly attached to the process steps in order to attain a clear affect.

In each case the affecting factors were presented only if they were identified elements of the processes. New factors have been added that follow the same logic. The timing of the presence of these factors is illustrated by arrows attaching them to the process stages in the figures below.

5.5.1 Foodsmall1 and a new packing machine

The buying process is depicted in Figure 27 as being influenced by the contextual factor groups of *organizational*, *informational* and *seller characteristics* placed on the left hand side of the figure. The buying process is seen as the intentional joint activity of a buying group's members as characterized by the factor groups of *participants'* and *group characteristics* on the right hand side of the figure. The process is initiated by and takes place within the interplay between the company and its *environment*. Finally, the interaction between these different factor groups over the process creates *purchase characteristics*. On the other hand, purchase characteristics are not

only the end result of the interaction between the other building blocks of the model but, in fact, stimulate them during the process and hence have a dual relationship with them. The following scrutinizes the buying process in terms of the process phases conducted by a buying center, which are influenced by the contextual factor groups.

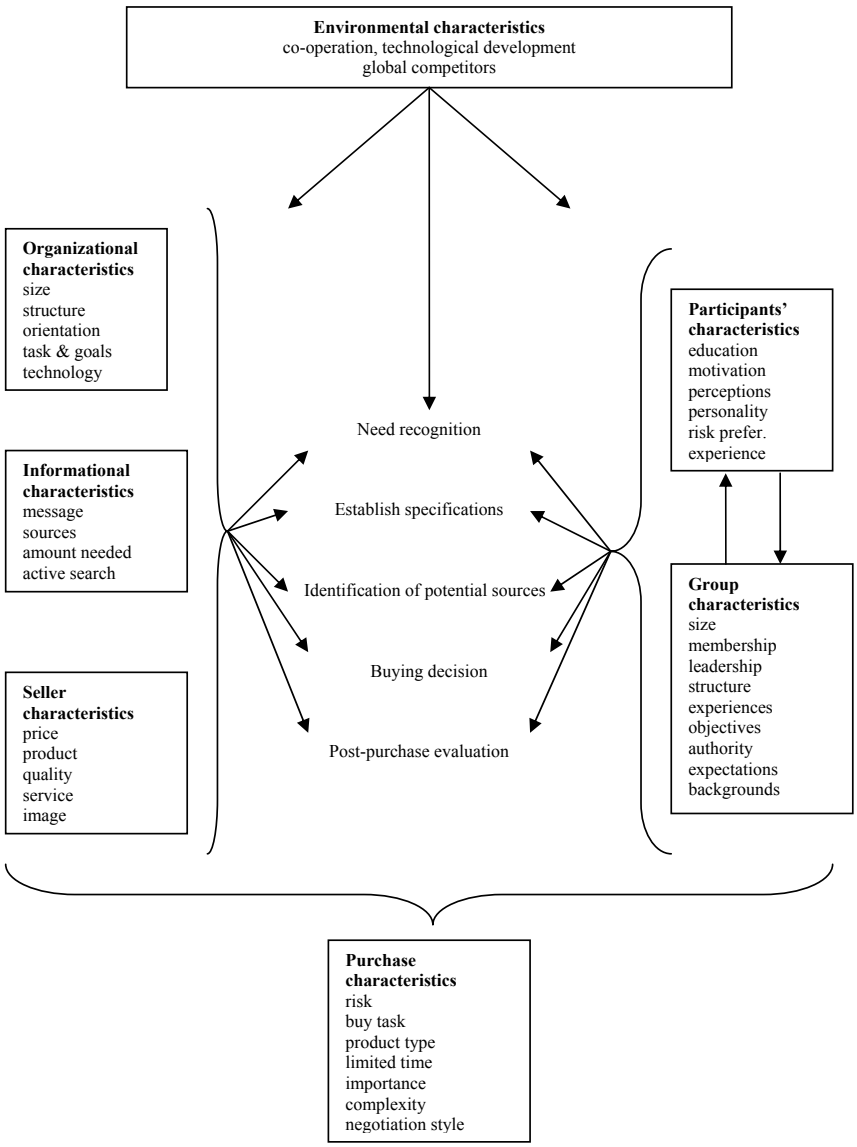

Figure 27 Foodsmall1's buying process

At the end of 2003 Foodsmall1 anticipated that there would be a fast increase in the demand for its product and hence the volume of the production line needed to be increased. An evident bottleneck was packing volume, and hence there was a clear need for a new packing machine to replace the old packing machine's insufficient capacity. The new packing machine was to be run in parallel with Foodsmall1's most recently purchased packing machine. The need derived from the success of Foodsmall1's product and the pressure to raise its production amount in order to meet the rising demands of consumers and hence retailers.

The buying center refers to the two owners of the company. As they are a married couple the *roles* and the *negotiation style* between the owners were not formal in any sense. As the business is their own there was no formality related to the decision process. The roles of husband and wife were naturally more significant than the roles of CEO and chairman of the board that these people also hold. The buying center in this case is comparable to the whole organization. The buying center is not formed as a result of some other decisions because all the decisions within Foodsmall1 are made by these two owners. The owners' personalities are reflected in the *firm's characteristics*, as are their *personal goals* and *rewards,* too. This is because not only do they own the firm they also represent it. Due to their curiosity about new technologies and their enthusiasm to acquire new technologies and invest in the company this process was nothing really special for them, although the machine was worth 20% of the annual turnover of the company. Both have long *experience* in the field and the history of the firm is part of their personal histories.

The wife said that perhaps she would have waited for a while, maybe a year, but the husband trusted in a projected strong increase in market demand. On the other hand, the wife said that when they decided to increase the packing volume she thought that it should be done extremely well. After agreeing that the purchase must be made Foodsmall1 turned to the supplier who had supplied the latter of the two packing machines Foodsmall1 had.

Foodsmall1 was mainly looking for more packing volume but was introduced to the different disinfection functions that can be added to the ordinary model. Hence the basic model of the packing machine was similar to the previously purchased one but the feature of aseptic packing was new. The wife was more active in establishing the specifications of the capacity and the technical details and the level of disinfection in close co-operation with the supplier. The husband calculated the finance and negotiated a loan with the bank. This separation of work roles arose due to the *orientation* and *education* of the owners. The wife has an M.A. in food chemistry and the husband has an M.A. in business studies.

Due to their earlier relationship the image of the seller was positive and Foodsmall1 trusts the seller. Due to the high price of the machine and the disinfection function Foodsmall1 also tried to identify, but not extensively, other possible sources of supply. In this respect it asked some food processing companies it had relationships with for advice about other suppliers. One of these partner companies gave a reference of another supplier whose packing machine was 170 000 euro cheaper. Foodsmall1 investigated this option only indirectly and never contacted the supplier, because those machines lacked the disinfection function that the owners considered essential to their production philosophy of product purity and safety. Despite the criticism of the innovation by other companies the owners did not let this negative opinion affect their decision. Finally Foodsmall1 bought a packing machine with a semi-disinfection function. The decision was made in cooperation and unanimously. The timing of the purchase proved to be perfect because they heard that it would take about eight months from purchase to get the machine and this sped up the decision making process.

> *We started to think that if we don't act now, it would be 2003 before the machine arrived, and we had a feeling that 2004 would be a growth year. (The owners)*

The buying decision was made in spring 2003 and the machine was installed and in use in October 2003. After purchase the owners had conflicting feelings about the disinfection function and its performance and also the supplier. The machine functions well but the owners are not sure whether the disinfection function makes any difference when compared to the older model they had without this feature. This is due to the fact that they had not had any quality problems related to the previous machine. Therefore, they were not sure if this additional feature was only a waste of money.

> *Afterwards I thought, as I felt really annoyed, that I had probably made the right decision… I can't say whether the machine brought any advantages in the end, but there haven't been any problems either. It provides some kind of assurance, because you can't keep doing controls all the time. (The owners)*

On the other hand they have since thought that perhaps they should have bought the full disinfection function, instead of the semi-disinfection version. They thought that the supplier should have better known the differences between these two different levels of disinfection and should have guided and supported their decision making more in the specification establishment stage. As a small company they do not have technical staff of their own and therefore need to trust the supplier's expertise. However the disinfection function has brought, for example, an extension to the valid shelf life of the product and

this can be seen to be beneficial. Since the purchase, Foodsmall1 has been satisfied with the maintenance service supplied by the supplier but general service, in terms of availability or willingness to solve Foodsmall1's problems, has not been satisfactory.

Partly, the purchase characteristics are the results of the buying process and, partly, they affected the buying process during it. The risk of a bad decision as well as product type related complexity and commitment characterized the process and is shown as post purchase dissonance in this case. On the other hand these aspects are related to a small company and inexperienced buyer who did not consult any outsiders, who might have had the expertise to advise them about the technology. Similarly, the *buying task* reflects the attitudes of the buyers. Due to their earlier relationship, the *negotiation style* between the buyer and the seller was cooperative.

5.5.2 Foodsmall2 and a new dry disinfection method

The buying process is depicted in Figure 28 as being influenced by the contextual factor groups of *purchase*, *organizational*, *informational* and *seller* characteristics placed on the left hand side. The buying process was the intentional activity of the production manager characterized by the factor group of *buyer's characteristics* (as there were no others engaged in the process) on the right hand side. The process took place in continuous interplay between the company and its environment. Finally the interaction between these different factor groups over the process created *purchase characteristics*. On the other hand, the purchase characteristics were not the only end result of the interaction between the other building blocks of the model. In fact, they stimulated them during the process and hence they had a dual relationship between them. The following scrutinizes the buying process in terms of the process phases conducted by the buyer and influenced by the contextual factor groups.

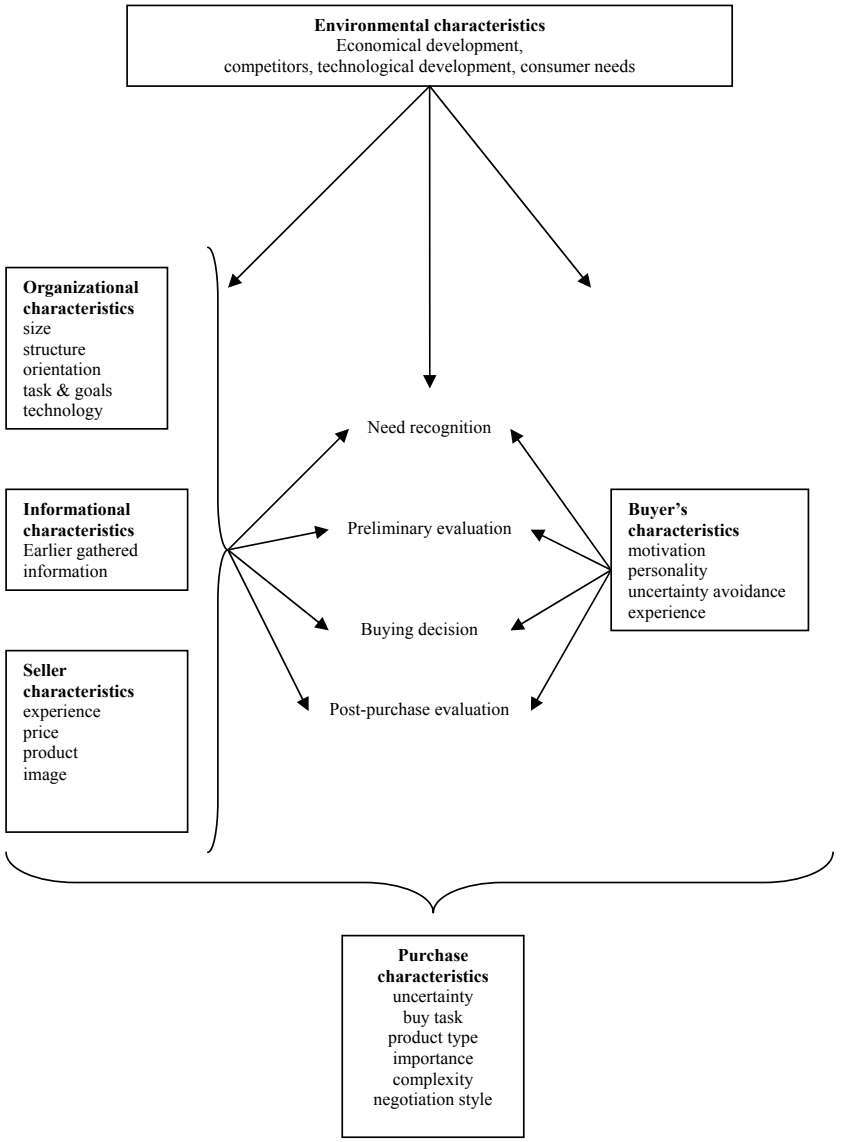

Figure 28 Foodsmall2's buying process

Foodsmall2's business is based on additive and preservative free production. This business strategy was chosen in order to differentiate the company from bulk manufacturers when competing for customers. The company believes that additive and preservative free products meet the needs of consumers whose dietary requirements have developed in a certain direction. For example, economic development has provided consumers with more purchasing power and enabled consumers to choose slightly more expensive products instead of bulk products, if these provide more value for

the consumer. The purity and safety of food is currently an increasing source of consumer value due to global raw material sourcing and various food related scares and hazards, which have been widely discussed in the media. Foodsmall2 has been looking for different solutions in order to find tools that support an additive and preservative free production process, which is very vulnerable to microbiological and other contaminants. Hence there has been a constant *need* for solutions that facilitate and make safe this production process.

Foodsmall2 is a small family business owned by two brothers. They occupied the position of the production manager and the CEO of the company during the buying process. The production manager handled the buying process virtually alone. The buying process started when the CEO, also the owner, of the technology supplier came to meet the production manager and demonstrated a cover for a UVC light. The production manager was naturally interested in the solution as the cover makes the use of the UVC possible in washable production facilities. The production manager had been aware of UVC lights but as far as he knew there had not been a solution that allowed the light to be applied to a washable production process.

The idea of the applicable solution was being developed during the buying stage and can be said to have been immature. The seller had approached Foodsmall2 in order to convince the company to become a co-developer for a dry disinfection method based on UVC lights. The seller had almost no experience in the field and was looking for new partners in order to develop the system further.

> *It was a completely new business. In fact, they had nothing. The rational reasons were not very good, knowhow was lacking and there was no strong entrepreneurial base or experience, the equipment wasn't all that great either, but what they needed was a really good reference, and probably for that reason we were a dream customer for them. (Production manager)*

The *product,* as it was, was mainly UVC lights and covers for these lights. The price of the product was not excessive, and by buying the product Foodsmall2 would be engaged in developing the method.

The potential opportunities related to the application of the cover were tempting. As an entrepreneur the production manager ignored the *uncertainty* related to the immature development of the solution and was eager to start working on the project. Earlier positive *experiences* of carrying out this kind of project within the company also helped to encourage development.

> *For me, there was no need to sell hygiene, as it was already a very strong point for us, more than anywhere else. However, it was the assuring and improving of hygiene, well more the improving of hygiene that we were aiming at. But then I became interested in assurance and these methods*

> *offered an opportunity for dry disinfection and disinfection during production, which had not been done anywhere else before. …UVC lights have been sold and they are used in all sorts of places, but let's say that we began consciously to build dry disinfection during the production run because the consumer is not really interested in how clean or hygienic it is when production is not running, but they are interested in how their products are produced and manufactured and how quality can be assured and what the hygiene result is at the moment when production is running. That's the main point, to concentrate on that… We've had fantastic experiences of being at the forefront of development. It's gone well and we've got really good results, so maybe it's been easier this way and things will work out for the best. (Production manager)*

The production manager had also known the CEO of the supplier earlier and had a positive view of him. Also the earlier *experiences* of the tools and devices being used in order to assure an additive and preservative free production encouraged the consideration of the building of a totally new system. The production manager was also interested in new technologies and in developing the production process in new ways.

Preliminary evaluation was very brief and based only on the instinct and ideas of the production manager on the potential use for the covered UVC lights. These views were based on experience in the field and information gathered before this buying process. The production manager did not seek any other information during the process. The other of the two brothers, who was the CEO of the company, had a minor role in the buying decision phase of the process. The production manager convinced his brother that these covered UVC lights were worth buying and received his approval for the *buying decision*.

The system is still in use but the views on its performance are not uniformly positive. The production manager is sure that the method works. However, the production manager has since left the company and sold his share of it to his brother, the other owner. However, the staff at Foodsmall2 is not fully familiar with the method as the project was led and carried out by the production manager. The current feelings about the method are mixed but in general it is believed that the system is beneficial. Some modifications have been made to the system since its installation. However, the production manager regrets that the method was not quite a complete solution.

> *It didn't quite get finished. There wasn't an awful lot that still needed to be done for us to have reached the final stage. Then it would have been a total hygiene solution. (Production manager)*

Purchase characteristics partially influence the buying process but are also partially an end result of the process. The product to be bought was basically a

UVC light and a cover for this light. However the complexity related to this product was the prerequisite for an installation and co-development process with the supplier in order to build up a system and use it. Some *uncertainty* was related to this immature development of the product. Nevertheless, the personal characteristics of the production manager and the importance of the function to be developed diminished this uncertainty. Thus, the buying task was not very difficult and was handled by the production manager with little effort. Due to the aim of co-development, the buying process can be characterized as very *co-operative* between the buyer and the seller.

5.5.3 Foodmedium and a new packing machine

The buying process is depicted in Figure 29 as being influenced by the contextual factor groups of *organizational*, *informational* and *seller characteristics* placed on the left hand side of the figure. The buying process was intentionally a joint activity of the buying group members characterized by the factor groups of *participants'* and *group characteristics* on the right hand side. The process took place in continuous interplay between the company and its *environment*. Finally the interactions between these different factor groups over the process created *purchase characteristics*. On the other hand, these purchase characteristics were not the only end result of the interaction between the other building blocks of the model but, in actual fact, stimulated them during the process and, hence, there was a dual relationship between them. The buying process is scrutinized in terms of the process phases conducted by the buying center and influenced by the contextual factor groups.

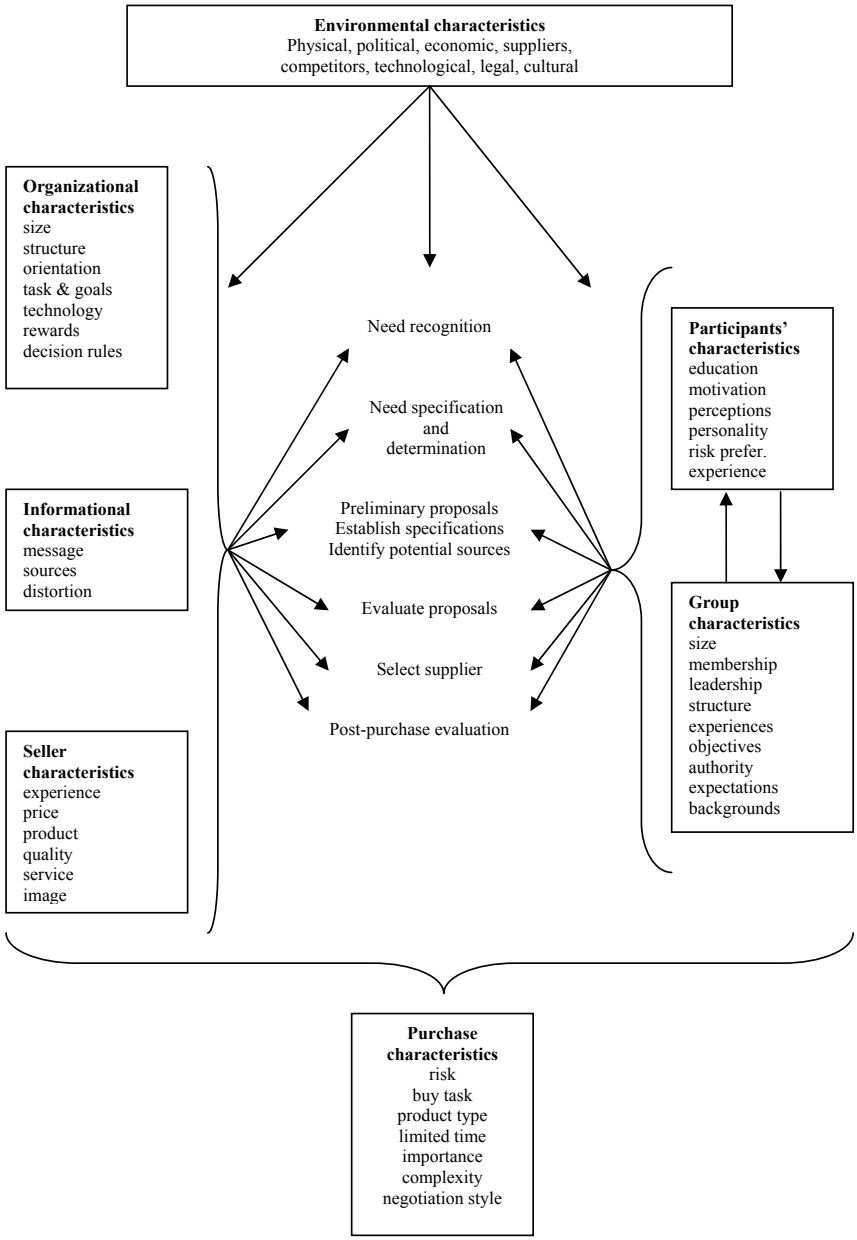

Figure 29 Foodmedium's buying process

The manufacturing of the product, for which the production line was under development, was begun in order to narrow the gap in production that was left when the former principal company transferred its production of a similar product from Foodmedium to another contract manufacturer. When Foodmedium started the new product's production with a very labor intensive, fast and cheaply built production line it was evident that the line would need

improving in the near future. Hence, the *need* for improvement was present from the very beginning. Due to the size of the commitment in terms of money in relation to the small size of the company Foodmedium postponed the acquisition of the machine. The company decided to wait until it had gained a more stable position in the market.

The process of consumer acceptance of the product, leading to an adequate market share and the subsequent decision to invest in new machinery reflects the interplay between the company and its environment. Different forces in the cultural and business environment affected product penetration and, hence, Foodmedium's decision to begin considering the improvement of the packing function. The most powerful single factor of these was the outrage and resentment that the production transfer caused. The product that was transferred by the former principal company strongly reflected certain aspects of Finnish culture and due to these strong cultural bonds a movement against this action was organized by ordinary citizens. Despite this protest production was transferred abroad. This was considered a callous act by many Finns and Foodmedium's new product gained a lot of media attention and support and became the preferred product for many.

When it became evident that the product would succeed, Foodmedium prepared for the purchase of a new packing machine. The packing machine purchase was preliminarily discussed with suppliers during contacts and meetings they had related to other issues. Also a group composed of a quality assurance manager, a marketing & sales manager and an outside consultant scanned for packing machine options at exhibitions in Germany. The quality assurance manager and the sales and marketing manager visited the exhibitions for other reasons as well but the consultant was there in order to find potential technology suppliers and examine the products they offered. After the product had gained a 20% market share the company was encouraged to start seriously considering the improvement of its insufficient packing function.

After moving to an actual buying process an *expert team* was dedicated to this process. This expert team was comparable to a *buying center* and composed of the production manager, marketing & sales manager, and maintenance manager. The production manager had started in spring 2004 at Foodmedium and had the least *experience* of the group regarding the machinery of this industry as she had earlier worked at meat processing companies. However, she had a degree in food engineering and knew the principles of the production process at this new company. The lack of a working history with this type of food processing was only negatively reflected in terms of a lack of knowledge of and contacts with potential technology suppliers in the field. The marketing & sales manager, who also

holds a degree in food engineering, had earlier worked as the production manager at Foodmedium and had a fairly long working history in the company. For this reason he had a lot of personal contacts with and knowledge about the technology suppliers. The maintenance manager had a working history at Foodmedium of over 20 years and was the most experienced of the three in this industry.

The functioning of the buying center was based on the company's habit of usually dedicating an expert team to evaluate and solve different issues. Hence, the protocol of *decision rules* and the pattern of the evaluation and selection of the supplier were shaped by *organizational characteristics*. As Foodmedium is still quite a small and family owned company the culture of doing things is different to that of bigger and more formal companies. The atmosphere between the buying center members was relaxed and not very formal and there were no attempts to show power or try politicking within the buying center. The process was led in a friendly manner, as the participants knew each other well, and there was no rivalry between them. The position of the production manager and sales and marketing manager were equal but the maintenance manager was subordinate to the production manager in the company hierarchy. This difference in *organizational positions* was not reflected during the process. The decisions were made in co-operation and unanimously. The maintenance manager put it like this; "We are like brothers together" and this was said without any irony.

The first task of the buying center was to *specify the need,* in order to narrow and identify a group of potential solutions. In the beginning a very preliminary idea was to modify a robot that was left over from another project to be used in this packing. Foodmedium called for bids on this modification but it became clear that this machine could not be converted into the packing machine needed and it was determined that an appropriate packing machine needed to be bought. Therefore Foodmedium contacted four potential suppliers in order to hear their ideas on how to solve the problem and in order to *preliminary establish specifications*. Two of these suppliers were chosen on the basis of earlier transactions with them and a belief that they had the capability to solve the problem in question. The other two were newer and less familiar suppliers. They were taken into the project in order to provide alternatives and reference points in the evaluation phase. The production manager did not know the two more familiar supplier candidates that well but invited one of the less known suppliers into the project when a representative of the supplier visited the new production manager concerning another issue. The other unfamiliar supplier was a contact of the marketing & sales manager from an exhibition in Germany. However, this supplier never answered a

request for a bid and only the other three answered and came to see the exact place in which the machine was intended to be placed.

During the first meeting the potential suppliers made measurements and took pictures of the place and discussed preliminary ideas about the plan and the requirements for the machine. In this sense, according to answers on *preliminary proposals*, *the identification of potential sources* and *the establishment of specifications* were done in parallel. At this stage of the process, the consultant's opinion and suggestions, which were based on the visit to the exhibition in Germany and some experiences from the business area, were heard but otherwise the process was handled by the buying center only. This phase was shaped by organizational, seller and information characteristics. Foodmedium wanted to invite two better known and two less known suppliers in order to mix and perhaps combine the different and best qualities of all the seller candidates. This complexity was due to a high need for information and the unstructured nature of available information, which resulted from the complex purchase situation. In addition to this learning perspective, different suppliers were approached in order to put them into a situation designed to stimulate competition and produce better ideas and lower prices.

The production manager was responsible for various calculations related to specification establishment. These were related to production line volume and the speeds of the lines and interrelations between the machines that would produce a good product flow and create financial benefits e.g. cost savings and payback time. The marketing & sales manager approached the issue from the consumers' and retailers' point of view. This was reflected in the packing type, outfitting, and ease of storage. The maintenance manager evaluated the functioning of the packing machine and made sure that the components of it were as compatible with the other machinery at Foodmedium as possible. This was done in order to avoid incompatibility problems and to keep available spare parts storage at Foodmedium to a minimum. It was also important to get to know the machine from the point of view of maintenance and repairing.

The suppliers were again invited to present the specified plans of the machine they had designed. After the presentations the two best known suppliers were considered more seriously and the third one was dropped from the process. Foodmedium were more interested in one solution due to the supplier's *specific experience*, and wanted the supplier to organize a *reference visit*. All the buying center members and the CEO-owner of the company visited the reference site in Germany. They had an opportunity to see the machine function and pose questions to the local staff. For the maintenance manager the visit was perhaps the most worthwhile as he could evaluate the machine in technical terms and details. The buying center members were

convinced of the machine's and the supplier's value and as the CEO-owner of Foodmedium was present he approved and legitimized the choice and a contract was made during the visit.

Unanimous and co-operative decision making was partly due to the newness of the task. As no one had a very structured vision of the end product and technology no one was willing to propose controversial views. Similarly due to the high financial commitment individuals felt safer making a joint decision.

> *We don't, in a way, need to compete about who makes the decisions, and probably no one wants to make the decision alone. That's the truth… No-one's head is on the block, but… (Production manager)*

Even though the buying situation was challenging no one considered the process very difficult. This was perhaps because the problem was challenging enough to separate the qualities of the different suppliers. After the contract was made the supplier started to construct the machine. During this construction period the supplier made some unagreed changes to the machine. These changes would have meant that the machine would not fit into the production facilities. Hence, a slight conflict arose between the buyer and the seller. However, these changes were removed and the machine is now in use and works as was planned.

5.5.4 Foodconcern1 and a new quality assurance system

Figure 30 outlines the buying process and the factors affecting it. *Organizational environment* is placed at the top of the model as that has a close link to the initiation of the buying process and constantly forms a context within which the buying process was played out. Due to competitive pressures Foodconcern1 had just decided to shut down another production plant and to concentrate all production of the product type investigated at one production plant. This production transfer increased quality assurance dramatically and brought into question the raising of the storage capacity of the quality assurance section. In addition, the production manager (who was at first the quality and development manager) had just come from another production plant of the concern. The factory manager describes the production manager's role as follows:

> *He came to the job as a newcomer and obviously brought new perspectives on it. Very soon he was able to notice a very essential point relating to quality assurance. This was, we have so many non-conformities that we're getting bogged down in them, and the organization can't do the right things*

because there are too many non-conformities produced by the system. (Plant manager)

The quality and development manager realized very soon that the conventional method had some clear disadvantages and there were some problems due to that. In this sense there was a clear *need* for quality assurance improvement. A concrete starting point for the buying process was a phone call made by the CEO of the supplier who, without knowing these details and the requirements of Foodconcern1's quality assurance, contacted the new quality and development manager and agreed an appointment for demonstrating a new quality assurance method.

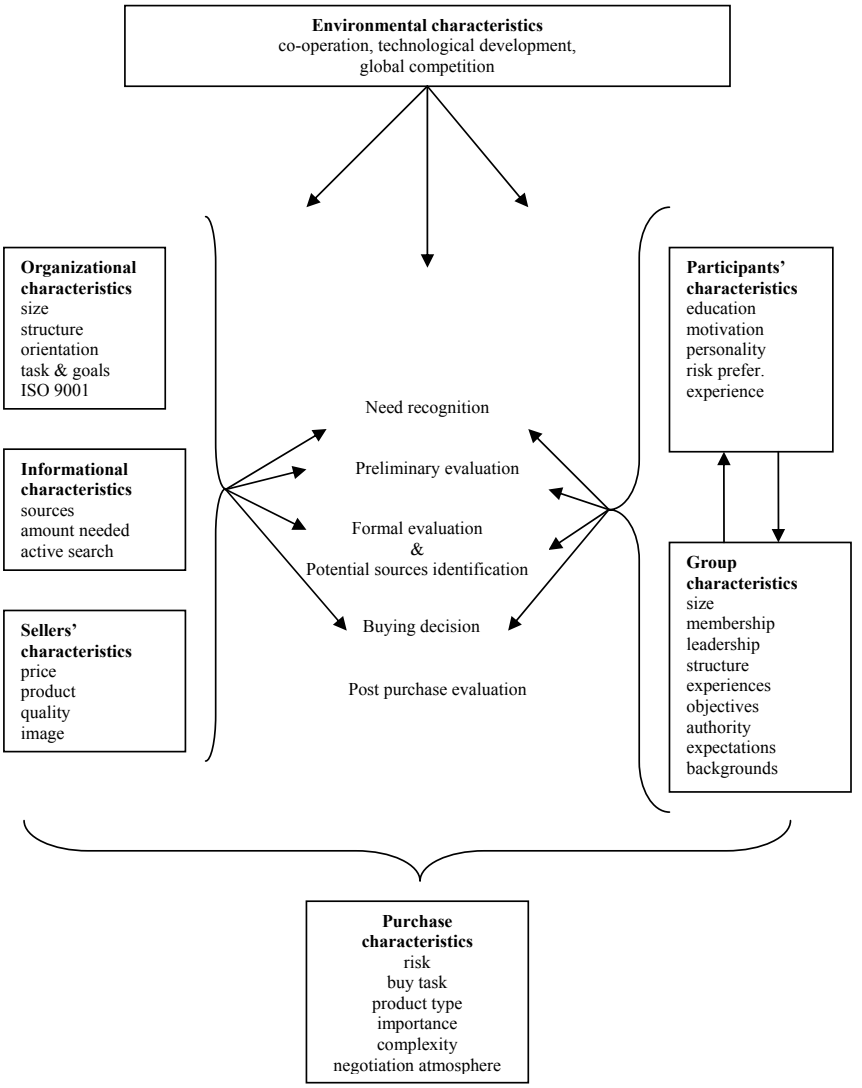

Figure 30 Foodconcern1's buying process

On the right hand side of the model are *participants'* and *group characteristics*. These factor groups are related to the individual employees and the buying center these employees constituted in order to find a solution to the need. *Organizational*, *informational* and *seller characteristics* factor groups are presented on the left hand side. These factor groups affect the buying process contextually. Finally, the interaction between these different factor groups, during the process, created *purchase characteristics*. On the other hand purchase characteristics were not only the end result of the interaction between the other building blocks of the model but, in fact, stimulated them during the process and therefore they had a dual relationship. The following scrutinizes the buying process in terms of the process phases conducted by the buying center and is influenced by the contextual factor groups.

The *preliminary evaluation* started when the CEO and the laboratory assistant of the supplier met the quality and development manager and two laboratory assistants of Foodconcern1 at the production plant. In this meeting the quality and development manager gained an idea of how the method works and became interested in it as it seemed to provide tools to meet the evident need. The supplier left the method so that it could be investigated in more detail at the plant. The method felt promising, even though it seemed that there were some problems with its accuracy. In order to investigate the method more carefully a formal project needed to be established, which is company policy. In order to do that the quality and development manager needed to convince the factory manager, who acts as a gateway to the central administration. The factory manager found the product worthy of further investigation and approved the process. The quality and development manager made the proposal that a project should be established in order to investigate the applicability of this technology at the plant. The central administration was in favor, authorized the setting up of a formal project, and chose two official unbiased evaluators from inside the concern. This act was done to build a gateway to a formal evaluation and potential sources identification phase, for which it took its structure from a certified quality assurance system (ISO 9001), in which different types of projects are categorized and depicted.

A project group or a *buying center* was dedicated to taking care of the process. The buying center was composed of the former quality and development manager, who had now become the production manager (and was the project manager for this project), a new quality and development manager and a laboratory assistant, who worked at the production plant, and two microbiologists from the concern's central laboratory. The production manager and the new quality and development manager conducted the project in parallel with their other responsibilities but the laboratory assistant was

dedicated to it on a full time basis. The central laboratory coordinated the quality assurance in the company and consequently held a key position in this project. In addition to the buying center, a formal supervisory board of two unbiased internal executive level employees from Foodconcern1's other production plants evaluated the project.

Formal evaluation and potential sources identification phase was the core of the buying process. The entry into this phase was accepted by a supervisory board. This phase included the subprocesses of searching for other potential suppliers and methods, comparing these with each other, and implementing and testing the chosen method. One supplier and its method were briefly considered in addition to the selected one. The members of the buying center had different roles in this phase. *The microbiologists* were the main communication links for supplying information. They acquired and refined information on the technology options, and on the chosen method, for facilitating evaluation. They brought in the necessary expertise to arrange the implementation and testing procedures, to interpret the test results, and to make sure that the process complied with the restrictions imposed by the authorities.

Due to the importance of the quality assurance function under development a lot of data was gathered on the method. The main channels the microbiologists used were *academic community* (journal publications of the method), *Foodconcern1's main competitor*, *the chosen technology supplier* and the *other technology supplier* whose product was under consideration. The method was not officially validated by any specific validation organization but it was widely used for similar purposes around Europe. According to EU principles, this whole range of references legitimized the use of the method. Nevertheless, implementation validation was needed to internally assure the concern that the method was reliable and that they were able to learn how to use it.

The other function of the references, in addition to gaining the governmental bodies' approval, was to demonstrate to Foodconcern1 that it was promising and worthwhile inspecting the method more carefully. According to the other microbiologist involved in the process, a condition for closely considering a new method is that it has to be validated by an official validation organization or then it has to be used, for the same purpose, by other trustworthy companies. Before the project started the R&D laboratory knew that these methods had been further developed since they last tried them. This knowledge was based on information the suppliers provided and also on reviews from international academic journals. This information gave the impression that the method might work and was, at least, worth testing. Foodconcern1 also considered another supplier's product but a lack of

references and their much higher price gave the feeling that it was not even worth testing and it was not seriously considered during the process.

The main competitor of Foodconcern1 in this area was consulted by one of the microbiologists. She knew the quality and development manager there and contacted him during the testing process at the production plant. She explained that she did this due to her curiosity and to gain confirmation of her ideas but she also received some of their test results. According to the other microbiologist this was important in the sense that it showed that the relevant authorities had already accepted this testing method in Finland for the same purpose. This then facilitated the validation process at Foodconcern1.

The *roles* of the three other members of the buying center who worked at the plant were more oriented to the actual doing related to the method. In the beginning of the phase the quality and development manager made a calculation comparing the method of the chosen supplier with the method currently in use and with another fast analysis method provided by another supplier. The quality and development manager, in addition to the production manager, was in contact with the supplier during the testing phase. The production manager had established the project and as a project manager was a communication link to the microbiologists on issues concerning the project on a more general level. The laboratory assistant did the practical testing. As the quality assurance function in question is at the core of the manufacturing process, the *risks* related to this project were significant. Furthermore, the *newness* and *complexity* of the method made the buying task challenging. For this sake the new method was run in parallel with the former for six months in order to make a statistical analysis of the results.

After the testing period the test results were shown to the evaluation board. The microbiologists' role was crucial in the final examination, conducted by the assigned project evaluators, in terms of giving it credence. After the approval of the project the plant made a proposal for investment to the central administration of the concern. After the approval of the proposal the machine that had been leased thus far *was bought*. Since the purchase, no formal evaluation has been made of the process. However, the informants thought that they should do some short of calculation in order to see what the net influence of the purchase has been.

> *There are so many benefits, in spite of everything, that they are clear as day, and it's difficult to question them. The only thing is that they haven't checked whether the price of the reagents has risen so much that they are no longer viable, but that's just speculation. And it's very easy to calculate that if we hadn't made the decision, we probably would have had to build an additional wing, and that would have cost money too. (Production manager)*

As a result of the interplay between the different factor groups over the process the *negotiation atmosphere* within Foodconcern1's members and between Foodmedium and the seller was very *cooperative*. This was very much due to the clear aims of the process. Everyone worked together in order to get the method working at the plant. Only during final negotiations concerning prices and other conditions of the purchase was the buyer and seller setting more clearly reflected.

5.5.5 Foodconcern2 and a new cutting and deboning method

Figure 31 outlines the buying process and the factors affecting it. At the top of the model is *environment* which has a close linkage to the initiation of the buying process. The *need* was to improve the cost effectiveness of the highly labor intensive production line. Due to intense global competition cost effectiveness had become a critical determinant of a company's success in the field. The need for this purchase had been clear for a long time and the company had been waiting for a technological development which would ensure all aspects of production in order to meet the need for success.

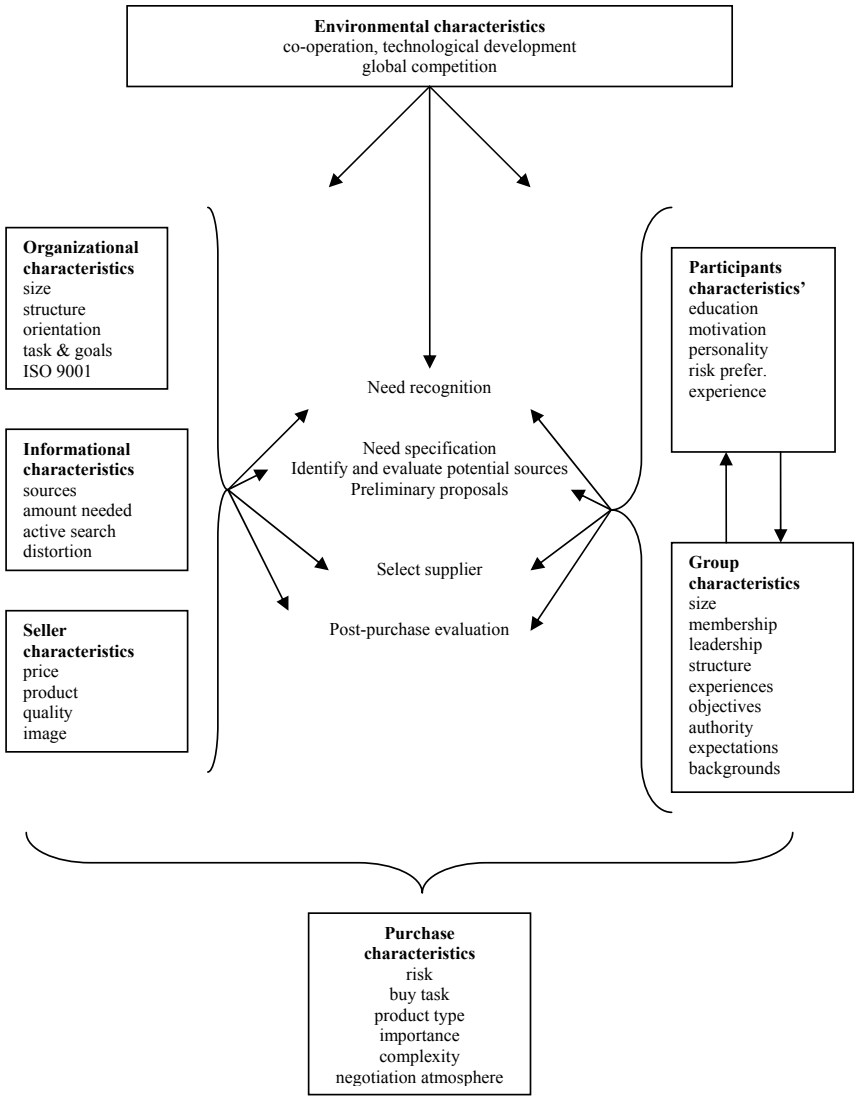

Figure 31 Foodconcern2's buying process

The buying process was intentionally a joint activity of the buying group members. On the right hand side are the *participant* and *group characteristics*. These factor groups are related to the individual employees and the buying center that they composed, which was dedicated to finding a solution to meet organizational need. *Organizational, informational* and *seller characteristics* factor groups are presented on the left hand side. These factor groups affected the buying process contextually. Finally the interactions between these different factor groups over the process constituted its *purchase*

characteristics. On the other hand, purchase characteristics were not only the end result of the interaction between the other building blocks of the model. In addition, they stimulated them during the process and thus had a dual relationship with them. The following analysis scrutinizes the buying process in terms of the process phases conducted by the buying center and examines how they were influenced by the contextual factor groups.

The buying process started as the company became aware of the technological development of these solutions. It seemed that the technology was mature enough to be applied to the production process. The informants could not address any specific event or person related to this awareness. However, it was believed to be the sum of various company visits, informal discussions, and exhibition visits through which this positive notion of the current status of the technology's development had been gained. These scanning activities served constant production development due to the intense competition under which Foodconcern2 operates. As a big company Foodconcern2 is constantly approached by various suppliers and vice versa Foodconcern2 is also interested in being in touch with key suppliers and other big companies in the industry. After the recognition that the level of technology was satisfactory the buying process started and a buying center was formed.

The buying center consisted of three people; the production manager, the head of project organization, and a project manager. The production manager was involved as he was responsible for the production within this area and thus it was to his benefit to affect a decision on machinery he needed to work with. He had been in that position for ten years and had envisaged a new production line as one building block in the production department's development. The head of project organization was involved for two reasons. Firstly, as a former production manager of this section he had also had a role in building the long term vision of production in the past and also had a lot of contacts and knowledge within the field. Secondly, the buying process (and also the construction and installation phase of the production line after the purchase) was to be coordinated by a project organization. The head of the project organization thus dedicated a project manager to the project. For the project manager this was the first large scale process he had to run. He had earlier worked for different sections and run smaller scale projects. There would have been another more experienced project manager at the plant to run the process but he was engaged in another project at that time. The project manager was also involved in the buying process due to his involvement in the construction and installation phase after the buying, in which his role was more significant.

In addition to these three people, a few section supervisors were involved in the need specification phase. Also the ideas of the staff of the section were listened to during this phase. However, all this communication was mediated by the production manager. All three members of the buying center held a degree in food engineering.

The roles within the buying group were very clear. The buying process was to a large extent centered on the production manager's wishes. There was no need for bargaining or politicking because the interests of the production manager and his section were being focused upon. This was reflected everywhere as he was considered an internal customer and the project organization was recruited to serve his purposes. For this reason the production manager carried all the risks related to the purchase. His activeness was mostly due to his personality. One of the informants put it as follows:

> *There are production managers, who avoid change, some who gravitate to change, and those who lead change. (Head of implementation subproject)*

The informant clearly puts the production manager in the last category. Also the head of the project organization was influential in the buying process due to his deep knowledge and contacts within the field. As the setting within the buying center was to find a solution for the production manager's automation need, the negotiation atmosphere between the group members was very cooperative.

At first the *need was defined in more detail* with the two potential suppliers. According to Foodconcern2's earlier experiences, these two suppliers were the only potential ones for providing the machinery. In this sense the *potential sources identification* was easily made. Both suppliers were well known. Both had supplied some machinery to Foodconcern2, but nothing this big before. The images of both suppliers were perceived as positive. The production manager and the head of the project organization had done planning and design work together with the potential suppliers even before the buying process and had a well developed layout plan from which to start. Joint development with suppliers was conducted through discussions, as the suppliers visited the company, each three to four times, and twice at foreign exhibitions, and by email discussion. The ideas generated resulted in the layout plans. The layout plans evolved throughout the process and were cross-fertilized as Foodconcern2 combined and cross-transferred the ideas of the both suppliers. The atmosphere between Foodconcern2 and the suppliers was cooperative. The suppliers knew that only one of them would be finally chosen, but that the choice would be fair and based on the layout plan and on the machinery they had to offer.

The *high risk, complexity, importance* and *newness* related to the buying task affected the process in terms of the depth of consideration and the

resources dedicated to the process. Similarly, in addition to these *purchase characteristics*, *organizational characteristics* provided a context and structure for the buying process. As a big company Foodconcern2 has a certified quality system ISO 9001 in which different types of buying processes have been depicted. This blueprint gave a structure for the buying process.

After the layouts had been developed and sharpened the buying center members *visited the reference sites* of both suppliers. This was done in order to see and evaluate the production machines. Before the visits the buying center preferred the supplier which was eventually not chosen. The visit did not reveal any major differences between the companies. However, the chosen supplier gave Foodconcern2 a comparison of these two methods that was made by a user who had both of these machines in use within its production facility. This rough comparison favored the finally chosen supplier and resulted in the buying center preferring this supplier. Also some other information was sought during the process but much of the information, on which the buying decision was based, was gathered previously and related to the buying group's participants' personal contacts and years of experience.

After the layout development and reference visits the buying center presented the results of the comparison to the local plant and also to the concern's management and received *permission to buy* the product. After the buying decision, close co-operation with the supplier began in order to customize and build the production line. As the project was large some outsider companies were engaged in this phase. The post purchase evaluation phase was extended to cover, in addition to the sole buying process, the installation phase. In the installation phase the company realized that some issues should have been considered and negotiated in more detail during the buying process but that the process had been carried out, for the most part, in a satisfactory way.

5.6 Summarizing the organizational buying behavior approach

On the basis of the literature review the organizational buying process was modeled as buying center actions in an organizational and environmental context. This idea, together with the synthesis model (Figure 26) of buying, formed the basis for the empirical investigation. All the cases support the viewing of the buying process as the accumulation of the individual participants' actions in a buying center within an organization's context in order to find a solution to meet an organizational need. The buying center functioning was both enabled and restricted by the contextual factors of organizational, informational, and seller characteristics in a certain general

environment. The organizational policy of setting up a buying center brought the buying centers to life in the cases of Foodmedium, Foodconcern1, and Foodconcern2 and also structured and restricted the functioning of these buying centers. In Foodsmall1's case the two owners of the company formed a buying center that was comparable to the organization as they made all the decisions and ran the business together. Their personalities are strongly reflected in their company's actions. In Foodsmall2's case the second of the two owners ran the buying process and hence there were no other participants to form a buying center. In this case this owner was inextricably linked to the company as his ideas and personality very strongly reflected in production and attempts to improve it.

All the buying processes were new task buying situations. The buying processes in every case were very much about *information gathering* and *information processing activities* conducted by the individuals in the buying center context. The notion of the centricity of information related activities in a buying center's functioning is in line with Spekman and Stern (1979) who defined the primary objective of a buying center as being the acquisition, importation, and processing of purchase related information.

The information was scattered throughout different structures e.g. personal experience and personal relationships, organizational relationships, and other more general forums, like academic journals, such as in Foodconcern1's case. The buying center members consulted these bodies of information for the gaining and further processing of information in their then current buying situations. Information processing activities also precede and parallel information gathering to some degree with regard to the fact that an individual first considers where to gather information and while gathering information evaluates this information. In turn, this directs further information gathering. Most of the information related to the buying process had been gathered and processed over time and had been accumulated into personal experience and relationships or organizational relationships. This was especially emphasized in the cases of Foodconcern1 and Foodconcern2 and also in Foodmedium. Suppliers were seen as a source of information that was considered to be, to some degree, biased.

Predominantly, though, the suppliers were seen as targets for *negotiation activities*. The buying processes included negotiation with the suppliers about the solutions and terms of purchase. These activities are separated from information gathering and processing activities related to suppliers because negotiation activities aim to change conditions and terms of purchase, as well as products under consideration, for ones more favorable to the buyers.

In Foodsmall1's case the buying center's negotiation activities led to the buying decision, but in Foodsmall2, Foodmedium, Foodconcern1 and

Foodconcern2's cases the buying was conducted after the organizational *legitimation activities*. Legitimation refers to organizational acceptance of a proposal to initiate a purchase. In Foodsmall2's case the other owner was asked for legitimation before making the purchase. In Foodmedium's case the CEO-owner of the company gave authorization after the buying center proposed the best candidate. Also in Foodconcern1 and Foodconcern2's cases the decisions were legitimized by the central administrations. The purchase characteristics factor group both affected the buying process and was a result of it. Figure 32 illustrates the organizational buying process in terms of content and context.

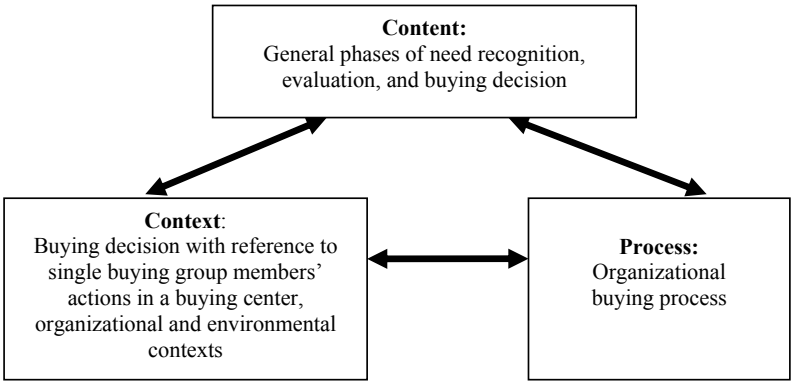

Figure 32 Content and context of the organizational buying process

The organizational buying behavior approach views the process as need recognition, the evaluation of different solutions to meet the need, and finally the buying of a solution that best meets the need. The process is not deterministic but is built up of the actions of the buyer organization that are conducted by the buying center members in the buying center context. Hence the buyer organization and the buying center are focused on instead of the buying process. The buyer organization has an active linkage to the environment. The buyer organization seeks possible alternatives from the environment to find the tools to meet the need and also information facilitating the evaluation of the alternatives. Hence the buying process in Foodsmall1, Foodmedium, Foodconcern1, and Foodconcern2 refers to the evaluation of more than one alternative. This means that in addition to the bought option the buying process results in the not chosen options being regarded as end results.

Role taking and acting in a process of mutual interaction and communication was based on organizational positions but also on other relationships between the individuals. In Foodsmall1's case the decision makers were a married couple. In this context it is easy to understand that the

marriage and the roles of husband and wife are more significant than their working roles or any organizational positions. In Foodsmall2's case as there was only one decision maker the role approach was irrelevant. In Foodmedium's case the researcher found the setting of the three buying group participants fruitful for the analysis of role formation and communication. However, in the interviews no other basis for role development, in addition to organizational positions was found. The informants had roles consistent with their expertise (technical, production, and marketing) and which correlated with their organizational position. Ultimately, the different roles and expertise did not prevent shared agreement and were not mutually exclusive. This is revealed by comments such as, "we all did everything", "we were unanimous in this case", and "the finally chosen option was clearly the best and this was not a difficult decision". In Foodconcern1's case the roles are mostly related to expertise rather than organizational position and this naturally structured the tasks. In Foodconcern2's case the process was concentrated on and organized by the production manager and thus the results of role formation and communication within the buying group were very marginal. In order to capture a richer understanding on role development observations (see e.g. Vyas and Woodside 1984) action research would perhaps have produced better instruments than the interview method used.

The other roles people had, in addition to their role in the buying processes, were found to affect the buying processes studied here. In Foodmedium, Foodconcern1, and Foodconcern2 peoples' roles in other temporary projects had an influence on the buying processes studied. This was shown as a reduction in the amount of time they could dedicate to each project. From the organizations' point of view the availability of individuals was an issue of resource allocation between temporary parallel projects.

5.7 The network and interaction approach (IMP)

5.7.1 Positioning the network and interaction approach

The interface between the firm and its environment is a central topic in all approaches developed to discuss managerial problems (see e.g. Anderson, Håkansson and Johanson 1994, 2). Traditionally, clear boundaries between a firm and its environment have been suggested and environment has been defined, similarly to Miles (1980, 195), as anything outside the organization. This environment has been considered unknown and faceless to the firm (see Astley 1984, 526). The network view does not consider the environment as a faceless context. Instead its view is the idea that actors are in interaction with

identifiable counterparts (Anderson et al. 1994) and managers perceive the structures and meanings of an environment and learn about them (Möller 1994, 363). The space between organizations is the focus here (see e.g. Axelsson & Easton 1992). Relationships are seen as a means for a firm to control the counterparts of a network and this removes the idea of a faceless (see Håkansson & Snehota 1989) and uncontrollable environment (see Anderson & Narus 1990). The environment is not totally given but an active actor may have the ability to influence and manipulate the environment through different actions (Anderson, Håkansson & Johanson 1994, 4).

The network and interaction approach is a multidisciplinary school of thought. The theoretical backgrounds of the network and interaction approach derive from channels research, resource dependency theory, social exchange theory, institutional economics and institutional theory, dynamic industrial economics, organizational sociology, resource based theory, and finally within marketing discipline they derive from organizational buying behavior. (Möller & Halinen 2000, 36; Easton 1992, 4–8). The transfer from an organizational buying behavior approach towards a dyadic perspective was suggested by various scholars (see Håkansson 1982, Campbell 1985) in order to widen the understanding of the interdependencies of buyer and seller organizations. The interaction approach evolved as a reaction against the organizational buying behavior approach that concentrates on analyzing different categories of single industrial purchases and decision processes (Håkansson 1982). The interaction approach states that, in contrast to organizational buying behavior, most business purchases do not exist as individual events and hence cannot be fully understood as isolated activities. This relativity was discussed from the buyer's perspective only in organizational buying behavior literature and is called the focal firm approach.

The interaction between the seller and the buyer in the business markets is believed to better characterize the buyer and seller relation than the action-reaction model of the focal firm approach (Håkansson 1982, Campbell 1985, 389). Hence, the interaction approach considers exchange between the buyer and the seller as relational exchange that refers to interactive relationships between actors characterized by economic, social, legal, technical, informational, and procedural bonds, rather than discrete transactional exchange governed by market forces and containing specified content and duration (Möller 1994, 347). The interaction in the name refers to the notion of both customer and supplier being active.

The early work of the IMP focused on dyadic relationships. However, according to the notion that the organizations involved in dyadic interaction, and relationships between companies, are affected by and affect other companies and their interactions through different relationships, the dyadic

approach was not enough to conceptualize the complex nature of organizational interdependencies. Therefore, a multidyadic view was suggested within related marketing theory and within the IMP Group (see e.g. Håkansson 1987; Mattsson 1987; Anderson, Håkansson and Johanson 1994). According to Anderson, Håkansson and Johanson (1994) this development in marketing related interaction and network studies was linked to a parallel development in organization theory (e.g. Miles & Snow 1992). A similar paradigm shift to that of the shift from single transactions towards dyadic relationships was the shift from single relationships towards interconnected relationships. Anderson, Håkansson and Johanson (1994) argue that the dyadic business relationships should be considered as being embedded in wider business networks and as part of networks of interrelated relationships.

While the interaction approach deals with a closed dyadic system, the network approach rejects the dyadic boundaries and considers an open system position. Hence, the context of the phenomenon is much more ill defined in the network approach and varies from study to study (Easton 1994, 374). The underlying philosophy of the network view is the recognition that various actors are engaged in continuous interaction that is shaped by interdependence, prior experiences and the current expectations of other actors (see e.g. Håkansson & Snehota 1989, 190, 196). The interaction approach and network approach have evolved from work carried out by the same researchers (Möller 1994; Easton 1994, 376) and thus the network approach can be seen as an upgrade to the interaction approach or a new component of it, and it is here called the IMP approach.

According to Möller (1994, 352) the basic goal of network research is to understand systems of relationships from positional and network perspectives. These systems are composed of actors who govern of resources and who are linked by relationships to each other. Instead of a single dyad a network of relationships forms the unit of analysis within network research (e.g. Möller 1994, 352). In this sense a network approach represents an application of systems thinking that can be defined according to Senge (1990, 68) as "a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snapshots'".

The network and interaction approach of IMP presents only one type of network research from among several others (see e.g. Ebers 1997). Möller and Halinen (2000, 39) have presented three goals of the IMP tradition. Firstly, they note that network and interaction tradition focuses on understanding exchange behavior between organizations and relationship development at a dyadic level Secondly, it focuses on how the networks of these relationships evolve. Thirdly, it focuses on how markets evolve and function from a network perspective. This approach assumes a strong *interdependence*

between the actors due to their *heterogeneous resources*. Here, *embeddedness* and its related construct *interdependence* are discussed. Then the other central concepts of the network and interaction perspective are presented.

5.7.2 The embedded and interrelated nature of business markets

Granovetter (1985, 481) states, "how behavior and institutions are affected by social relations is one of the classic questions of social theory." The solution for dealing with these relations can be separated into two (Granovetter 1985, 481–482). Because these relations constantly interplay with behavior and institutions we can attain the targeted phenomenon only through a thought experiment by using our imagination. At the other extreme is the argument that because these relations are always present, an attempt to ignore them would lead to a total misunderstanding.

In the context of business to business marketing the concept of *embeddedness* has a key role. Halinen and Törnroos (1998, 189–190) have stated that the idea of firms being embedded in wider, far extending business networks is the major argument of the IMP approach and has been manifested by the expression "no business is an island" (Håkansson & Snehota 1989). The concept refers to companies' dependence on and relations with different kind of networks (Halinen & Törnroos 1998, 187–188). In this respect, the approach had adopted the latter presented solution in order to deal with relativism (Granovetter 1985).

Halinen and Törnroos (1998) separate six types of embeddedness: technological, temporal, spatial, social, political and market. *Temporal embeddedness* refers to a current organizational operation's engagement with past, present and future modes of time (see Halinen & Törnroos 1995). The present actions of the firms, dyads, and nets are shaped by historical development and future expectations. *Spatial embeddedness* refers to the role of location and the idea of space and spatial hierarchy. *Social embeddedness* refers to a pattern through which business actions are embedded into various social structures constructed by and through individual employees. Informal individual contacts within and between organizations affect businesses in various ways (see also Granovetter 1973). *Political,* and *market embeddedness* refer to the dynamics and patterns of political pressures under which the actors within a certain market operate and are interconnected through other actors like customers, suppliers, competitors and distributors. Among the other forms of embeddedness *technological embeddedness* refers to structures that are technological in nature and compatibilities and incompatibilities within

different technologies in and between organizations (see also Håkansson 1989).

Ritter (2000) considers a concept of interconnectedness that can be seen to relate more closely to actors' structural positions whereas embeddedness describes dynamics in an overall context. Ritter (2000) illustrates a situation where two actors (A and B) are linked to the same focal actor F that mediates the effect of acts on relationship FB to FA and vice versa. Nine different kinds of effects are exposed as having a negative or positive effect on one or both of the actors A and B and there is one situation where the effect is neutral. The concept of position and the concepts related to direct and indirect relationships, bonds, links, and ties as reflections of the concept of embeddedness and interconnectedness have been extensively studied (see Halinen and Törnroos 1998, 190). These constructs are examined in the following section.

5.7.3 Relationships as interaction

Relationships refer to general and *long term* aspects of behavior. Interactions, in turn, are more *temporary* by nature and constitute the dynamic aspects of relationships. Relationships can be seen as interrelated acts that have linked together to form coherent episodes that have taken place in the past shaping and forming of a relationship (see e.g. Håkansson 1982). Håkansson and Snehota (1995, 25) define relationship as "mutually oriented interaction between two reciprocally committed parties". As a relationship consists of learnt behavior rules and norms it provides an atmosphere for individual interaction episodes taking place within a relationship that is affected by history as well as the future (Häkansson & Snehota 1995, 25; Håkansson & Ford 2002, 133). Hence, a relationship and its episodes affect and are reciprocally affected by each other (Turnbull, Ford, Cunningham 1996, 45; cf. Giddens 1984 idea of duality between structures and processes). In this sense current interactions can be understood only within the context of a relationship. In this respect Håkansson and Gadde (1997) have considered interaction episodes in terms of complexity and in relation to the history of relationships between the different parties involved. On this basis, they have formed a matrix consisting of four situations; a simple episode or complex episode taking place within a well developed relationship or in a context that lacks a previous relationship.

The events that have had an exceptional effect on relationship development are called *critical events* (also critical incidences or critical episodes) (see e.g. Halinen 1997, 272). Critical events may be generated within relationships,

within a network, or outside a network within the wider business environment (see Anderson et al. 1994, 4; Håkansson & Snehota 1995, 271; Halinen, Salmi & Havila 1999).

The IMP model (Håkansson 1982) was the first attempt to model dyadic interaction. The model is constructed by four reciprocal concepts: an *interaction process*, between the interacting *parties* (organizational and individual levels), affects and is affected by *atmosphere* (power dependence, cooperation, closeness, and expectations) and takes place in a certain *environment* (market structure, dynamism, internationalization, position in the manufacturing channel and social system) that forms a context for the process. An *interaction process* in the model is composed of short term exchange *episodes* (exchange of product or service, and information, and financial and social exchange) and long term *relationships* (institutionalization and adaptations).

Campbell (1985) presents *a buyer and seller interaction model* which develops the first IMP model. Campbell's model consists of four building blocks: *buyer's, seller's* and *product characteristics,* and *an interaction process*. The characteristics of the seller and the buyer are further divided into industry, company and individual characteristics. *Individual characteristics* refer to preferred interaction style, perceived importance, relative familiarity and risk aversion. Individual characteristics are important in the sense that relationships ultimately depend on the interaction between the individuals who participate in the process. *Company characteristics* refer to relative size (command buying is likely to take place if the buyer is the bigger party), preferred interaction style (the number of sourcing partners preferred), relative familiarity (how well actors know each other relative to other partners, and how well the buyer knows the technology and the costs of the supplier) and the centralization of purchasing. Finally, *industry characteristics* refer to business concentration, number of alternative partners, intensity of competition, rate of technical change, and traditions and norms.

The *product characteristics* consist of frequency of purchase, switching costs due to physical and human investments, and product complexity. Frequency of purchase distinguishes between capital goods that are acquired infrequently and raw materials and components that are bought more regularly. Campbell assumes that relationships are likely to be more interdependent if transactions occur frequently and less interdependent if more competitive aspects and infrequency is related to purchases. Switching costs refer to the costs of changing supplier. The greater the relationship specific investments, both mental and physical, made by the interacting parties are the higher the switching costs are. Campbell (1985, 271) includes six types of product complexity: functional complexity, manufacturing complexity,

specification complexity (requires an extensive trial period before use), application complexity (extensive training needed before use or there is uncertainty related to a customer's pattern of demand), commercial complexity (refers to a commercial arrangements' complexity) and political complexity. The more complex the product is the more interdependent the buyer and seller relationship is likely to be.

An interaction process is the result of three components: the *buyer's* and *seller's interaction strategy* (competitive, cooperative and command), and *interaction mechanisms* (information exchange, conflict resolution, adaptations, personal contact patterns, interaction atmosphere, closeness, commitment and trust). In terms of how it analyzes Campbell's model is more sophisticated, when compared to the IMP Interaction Model, as it maintains a difference between the environment of a seller and the environment of a buyer.

With reference to the IMP Interaction Model, interaction research examines marketing and consumer behavior, strategic decision research and interaction studies between marketing departments and other organizational units. Möller and Wilson (1995) present *a dyadic interaction model of buyer and seller interactions*. Although they consider the model "fairly speculative" it has been logically derived from earlier literature and makes sense intuitively. The *environmental context* of the model, consisting of factors characterizing the markets and society in which the focal business takes place, influences a *supplier's task specific characteristics*, a *buyer's general characteristics* and *task characteristics*. These in turn affect the interaction level *organizational characteristics of buyers and sellers*. In addition task characteristics influence the *interaction process* (coordination, resource exchange, social exchange and adaptation process) that is affected by and affects the *outcomes of an interaction* (bonds and performance).

The most distinctive and perhaps noteworthy feature of Möller and Wilson's model that differs from the original IMP Interaction Model is the addition of *task characteristics*. In their model, task characteristics are related to the object of interaction. For Möller and Wilson, the simplicity or complexity of an object, its innovativeness, importance, substitutability, and exchange frequency directly characterize the nature of the focal task and tasks that need to be carried out in both selling and buying firms. The task characteristics dimension is hence related to resource and social exchanges and coordination and the adaptation processes needed in order to conduct the focal task. As task characteristics are elements perceived by management and embedded in both interaction processes and the participant actors they form a theoretically ambiguous part of the model.

Möller and Wilson (1995, 25, 32) also take the environmental context of a relationship into account. They use the idea that an environment is perceived or enacted and they separate the contexts of each interacting participant and their common context. This specificity also differs from the original IMP model.

Möller and Wilson (1995, 24) present four elements they consider essential in order to understand an interaction relationship: the *reasons or motivation* for which firms engage in relational exchange, the *actions and processes* that constitute and affect the relationship, the *knowledge*, both organizational and individual, to carry out these actions, and finally the *context* in which the relationship takes place. The following section focuses on the network as a context of single relationships and actors.

5.7.4 Relationships as network

According to Alter and Hage (1993, 46) "networks constitute the basic social form that permits inter-organizational interactions of exchange, converted action, and joint production. Networks are unbounded or bounded clusters of organizations that, by definition, are nonhierarchical collectives of legally separate units". The interdependence of the individual firms aggregates a certain structure for the network these firms comprise (Easton 1992, 16–17). The stronger the interdependence the clearer the structure and its affect on a single firm's behavior is.

An individual firm is both affected by structure and affects structure (see Giddens 1984 for the duality of structures and processes). Håkansson & Snehota (1995, 3) state that "what is happening in a certain relationship can be searched for, to some extent, in factors "external" to the relationship itself". Similarly Anderson, Håkansson and Johanson (1994, 4) present a categorization of the primary and secondary functions of influences on interaction relationship. *Primary functions* refer to "the positive and negative effects on the two partner firms of their interaction in a focal dyadic relationship." By *secondary functions* they mean "the indirect positive and negative effects of a relationship" as it is directly or indirectly related to other relationships. Secondary functions concern activity chains that involve more than two firms, resource constellations controlled by various actors and the shared network perceptions of these actors.

Firms are part of a network that constitutes connected relationships (Easton 1992). Håkansson and Ford (2002, 133) define network as "a structure where a number of nodes are related to each other by specific threads". They continue that "a complex business market can be seen as a network where the nodes are

business units – manufacturing and service companies and the relationships between them are the threads". Both the actors and relationships have their own particular contexts. Each relationship and actor is bound together with various others. Hence, networks are constructions that extend far but lack clear boundaries (see e.g. Halinen & Törnroos 2005) and operate in an environment (Anderson, Håkansson & Johanson 1994, 4).

The systems of such relationships can be seen either from a network's perspective on investigating network dynamics on an aggregate level or from a particular focal firm's perspective (see Easton 1992; Möller 1994, 362–363). Anderson et al. (1994, 4) use the concept of *network horizon* to refer to the extension of an individual actor's view of the network. A network's context is the part of a network horizon that an actor feels is relevant for it (Håkansson & Snehota 1989). Salmi (1995, 44–45) uses the term "focal net" to refer to the construction of a network from an individual actor's point of view in terms of direct and indirect relationships with other actors. In this sense the focal net is an individual's interpretation of its perceived environment and other actors (Salmi 2000, 1377).

Grandori and Soda (1995) distinguish between different types of networks in terms of formalization, centralization and coordination mechanisms. They suggest three different types of networks: social networks, bureaucratic networks and proprietary networks. *Social networks* are not coupled with formal agreements, they may be based on parity or not (decentralized or centralized) and they are coordinated by social control mechanisms (e.g. personal and confidential contacts) or more institutionalized measures (e.g. interlocking directorate). Centralized networks are most often coordinated by vertical or transactional interdependencies between firms, whereas decentralized or parity based networks are linked with horizontal interdependencies. The view adopted here supports the idea that even though a relationship between firms is based on vertical interdependencies the possible contract between the parties only specifies the terms of exchange not the structure of a relationship or the interaction patterns between the firms. This means that the network as the coordination measure is not determined in the contract.

Bureaucratic networks are coordination modes that are formalized in agreements specifying the organizational relationship between the parties. Due to the incompleteness of contracts and contracting the bureaucratic network never fully covers the relationship as a coordination mode, but instead it is complemented by a social network. Additionally, bureaucratic networks can be separated into classes of symmetric and asymmetric coordination structures. The third category, *proprietary networks*, covers bureaucratic

forms of formalized networks that are founded on some proprietary commitment (Grandori & Soda 1995, 201–203).

Melo Brito (1999, 93) defines the concept of *an issue based net* as "a form of association mainly based on cooperative relationships amongst actors who aim to cope with a collectively recognized issue by influencing the structure and evolution of the system(s) to which they belong through an increased control over activities, resources and/or other factors". He continues that if the net has been legitimated by an explicit contract and it takes the form of a formal structure and organization it is called a *formalized issue based net* and, on the other hand, this lack of formality means a *non formalized issue based net*.

Möller and Svahn (2006, 986) divide research perspectives on networks into three: *social networks*, *self-organizing inter-organizational networks*, and intentionally created networks, which they refer to as *nets*. It seems that a clear distinction can be made depending on whether it is a formal contract that ties the actors together or free will. The formal based contracts contain more restrictions, while informal ones are more evolving in nature.

The network perspective implies that employees within organizations are engaged in a set of exchange relations including knowledge, information, and expertise exchange with other social actors within and across industrial sectors. In that sense, it is also consistent with Rogers' (2003) view of the importance of interpersonal relationships in allowing information exchange across organizational boundaries (Rogers call these cliques and not boundaries) (Robertson et al. 1996, 336). Tushman and Scanlan (1981) call individuals who facilitate information exchange, boundary spanners. These individuals are involved in both the construction and the diffusion of knowledge (Robertson et al. 1996, 336).

5.7.5 Relationships as actors, resources and activities

Relationships between different actors (organizations or individuals) allow the functions of the accessing, controlling and creating of resources (Möller & Halinen 2000, 36). These dynamics between actors, resources and activities are presented in the ARA model (actors, resources and activities) (see Håkansson & Johanson 1992; Håkansson & Snehota 1995) that is a widely applied framework for conceptualizing industrial networks within the IMP approach. Actors control resources and are linked to other actors via the different activities they perform. The actor may be a single individual, group of individuals or a company. Actors control resources directly or indirectly. Indirect control refers to other companies' resources that can be reached by an

actor through relationships and interdependencies that link actors. The links between the constructs; actors, resources, and activities were the focus of work by Håkansson and Snehota (1995). They made a distinction between *actor bonds*, *activity links* and *resource ties*. These constructs compose a *substance dimension* of a relationship.

A company can be seen as a coordinated *activity structure* because several activities are performed and coordinated within companies. *Activity* is defined as "a sequence of acts directed towards a purpose". The idea of viewing a company as an interdependent activity unit is that the very existence of a company lies within the activities it performs. These activities are directly related to dyadic business partners' activities and also indirectly to other actors' activities in a business network. Due to this interrelatedness of activities a key point is to understand how these activities are *linked* to the other actors' activities, instead of understanding the activities that a single company performs. This linking poses two interrelated problems to be solved: who does what and how are the activities to be carried out in the most efficient manner? According to this view, activities can be divided in various ways which poses the problem that there is no longer any specific activity unit (Håkansson & Snehota 1995, 50–131; see also Dubois 1998).

A partitioning of a complex activity pattern is always, to some extent, arbitrary and poses problems for analytical purposes. Activities can be put into *internal activities*, those that do not cross company boundaries, and *external activities*, directed towards and involving others. Activities in a relationship take place within exchange episodes and are undertaken by either of the actors. These activities in a relationship link the activities of the two actors'. *Activity links* can thus be seen as possessing some characteristics of coordination measures as they affect how and when the various activities are carried out. In addition to sequential activity links, horizontal (parallel) activity links may exist. A buyer trying to influence its suppliers to cooperate is an example of a parallel activity link (Håkansson & Snehota 1995, 50–131).

If we consider a company as consisting of these activities, that are performed by individuals, who form an activity structure, it is evident that clear organizational boundaries cannot be set. In this respect, the identity of a company, as it is an entity with an unclear boundary, is dependent and related to the viewpoint of a counterpart and yet that identity may be different from the viewpoint of a different counterpart. Håkansson and Snehota (1995 192) state that "companies and individual actors in business networks are never independent, isolated or alone; they are formed in their perceptions, knowledge, capabilities and intents by others". We may say that resources and activities refer to the character of an organization but identity is related to the dimensions that a company attains in relationships with others. Thus, current

identity is a result of previous experiences and develops as a relationship develops. The development of these soft features or the social dimension of a relationship can be described in terms of bonds and bonding. *Bonds* and *bonding* refer to results and activities leading to the results of the ties between the firms. As a result of the various activities and dependencies between the firms, the firms are not entirely free to terminate or control the existing bonds. Strong bonds provide a more solid structure for a relationship and bring stability and predictability to it. Strong and weak bonds in an industrial context are analogous with communication network studies that provide tools to measure and depict the network structure. Bonds are very much about individual social contacts that enrich relationships and bring in a social dimension and thus extend and enforce relationships beyond the organizational level towards the individual level (see Hamfelt & Lindberg 1987) (Håkansson & Snehota 1995, 194).

In the early or pre-stages of a relationship *mutual orientation* is a precondition for it (Easton 1992, 9). Halinen (1997) uses the concept of *attraction* to explain this. This is because identity is always incomplete and uncertain. In addition to this identity construction process, the actor bonds between the actors take the form of trust and commitment formation as a relationship develops (see Håkansson & Snehota 1995, 192–268; Halinen 1997). *Trust* can be seen as a condition for commitment. Trust can be further separated into specific and general trust. *General trust* is based on indirect information provided by other parties and the known reputation of another. *Specific trust* is generated within dyadic interaction and is thus based on direct experiences of another. *Commitment* is related to mutual orientation i.e. the joint forming of shared interpretations that reflect historical episodes and interaction within a relationship in the past, but also the idea of future interaction. The actor bonds affect the identity and behavior of the companies and are dependent not only on direct interaction between actors, but also on indirect clues, such as the perceived relationship of other actors with third parties.

The *resource view* of a company considers the resources a company has and how these resources are linked to other companies' resources (Håkansson & Snehota 1995, 44–51). The idea is that a company is a collection of resources that are activated through interaction with other actors. The value of the resources is therefore defined in terms of usefulness to others. The companies in business markets interact in order to exploit and enhance the own resources and, on the other hand, to gain the benefit of other actors' resources. As many of the resources are more or less fixed they are both enabling and restricting with regard to what companies can do for each other.

The resources possessed by the companies are the key reason for the interdependence and hence the interaction between companies (see Håkansson & Snehota 1995 136–137). This is because through interaction companies may exploit and develop resources (see Turnbull and Wilson 1989). Heterogeneity is simultaneously both a product and a source of interdependence because firms specialize and perform transaction specific investments (Easton 1992, 17). Due to their heterogeneity, firms are dependent on the resources of other firms (Mattsson & Johanson 1992). Resources are linked through business relationships between the actors. As the relationship develops the resources are directed and oriented towards each other when resource features and their combinations are adapted. Through deepening relationships and investments made in a relationship *resource ties* strengthen and companies become more and more mutually interdependent. Hence the resource boundaries between the companies become fuzzier. The relationships are not only a means to exploit and use others' resources but are also a learning environment in which, as a result of interaction, companies learn how and for what purposes the different resources can be used. In addition to resource access and acquisition, relationships are a means to bring together, confront and combine the resources of actors and, due to this, an instrumental value relationship eventually becomes a resource on its own. In a network context the actors involved can be seen as resource providers forming an aggregated resource structure. Interconnected resource ties form a *resource constellation.*

Turnbull, Ford and Cunningham (1996, 47–48) made a distinction between three types of resources: financial resources, a company's network position and its skills. *Financial resources* can be used to acquire new resources or to use the resources of the others'. According to Mattsson and Johanson (1992) financial resources and skills refer to internal assets that are both tangible and intangible. These are used to carry out production, marketing, development and other activities and are controlled by the firm. Network position refers to market assets that facilitate an access to other firms' internal assets. *Network position* refers to companies' relationships and rights and the obligations related to them. Examples of this type of resource include a good reputation or an access to certain markets. In this regard, a network position is a relational setting between individual actors in a network structure (see also Easton 1992, 19) in terms of an individual actor's function, role and identity as defined by other actors within that network (see Mattsson & Johanson 1992; Håkansson & Snehota 1989, 196). This position can be communicated through *references* for example. Salminen and Möller (2004, 135) define reference as "the supplier's relationship to its existing or former customer that can be evaluated by the said customer in terms of the supplier's product, service, management, and cooperation performance." A key position in this definition is the

relationship and its experience based evaluation. Correspondingly *reference information* is defined as "evaluation in the written or oral form about the supplier's performance from its existing or former customer's viewpoint" (Salminen & Möller 2004, 135).

The concept of position is close to the concept of *role* in an industrial setting. The activities of an actor determine the position of it within a network but also characterize the actor in the eyes of the others. Anderson et al. (1998, 172) state that "an actor has a position but acts in a role". They see a role as reflecting an actor's own intentions to express and fulfill a position with meaning and change it. Mattsson and Johanson (1992, 213) see a role as comprising the function given it by the industrial logic of an actor and the relative importance of the actor. The first characterization reflects an actor's own intentions and is more voluntaristic compared to the latter, which is rather deterministic and views a role as being given to an actor. It seems that the concepts of a position and a role are somewhat inseparable in business markets.

The third resource category, *the skills,* refers to a set of technologies that can be used to product technology (an ability to design products), process technology (an ability to manufacture or produce these products) and marketing technology (an ability to analyze the requirements of others', influence the others' categories and deliver them to a recipient). Marketing technology also includes relationship competence which refers to "skills in managing relationships themselves". (Turnbull, Ford, Cunningham 1996, 47–48)

The discussed concepts, *actor bonds*, *activity links* and *resource ties* are more or less abstract and complex theoretical constructions and to some extent overlapping. The idea beyond the constructs and the interplay between the layers of actors, resources and activities that these constructs depict is, however, powerful in providing theoretical tools to conceptualize dynamic interactions in business markets. The following briefly summarizes the discussion above.

The *internal activities* of actors are linked through *activity links*. Activities are based on actors' *resources* which are bound together with *resource ties* and hence make one actor's resources accessible to the other and vice versa. A resource tie is also, by itself, a resource that can be exploited and used. *Transformation activities* refer to the generation of new resources and *transfer activities* in transferring control over the resources within a network. Transfer activities enable the transformation of other companies' resources. *Actor bonds* are both the result and a reflection of the interaction process and, in addition to connecting actors, they affect how the actors perceive each other and form their identities with reference to each other. The bonds between

companies enable them to develop activity links and resource ties. However activity links enable bonds to develop. Activity links, resource ties and actor bonds characterize the nature of a relationship.

5.7.6 Modeling the network and interaction approach in the context of the innovation adoption process

The network and interaction approach links the organizational adoption process on a wider context. The *adoption process* can be seen as a temporal interaction between an adopter and a seller composed of *coordination*, *resource exchange*, *social exchange*, and *adaptation activities* (see Håkansson 1982; Möller & Wilson 1995). This interaction process creates an *episode* of interrelated acts and takes place within a relationship between the adopter and the technology supplier or is the first joint episode between these companies, if there has been no earlier relationship. If there is already an established relationship, interaction between an adopter and a supplier during the adoption process is affected by and affects this relationship in terms of *norms* and *rules* developed and learnt over time (Håkansson & Snehota 1995, 25; Håkansson & Ford 2002, 133) that are characterized in the model in terms of power dependence, co-operation, closeness and expectations (Håkansson 1982). The relationship can be seen as *social bonds* (attraction, trust, and commitment) and *resource ties between* the *actors*. If a previous relationship does not exist, an adoption may initiate a new relationship between companies. Figure 33 represent a synthesis model of the network and interaction approach to organizational innovation adoption.

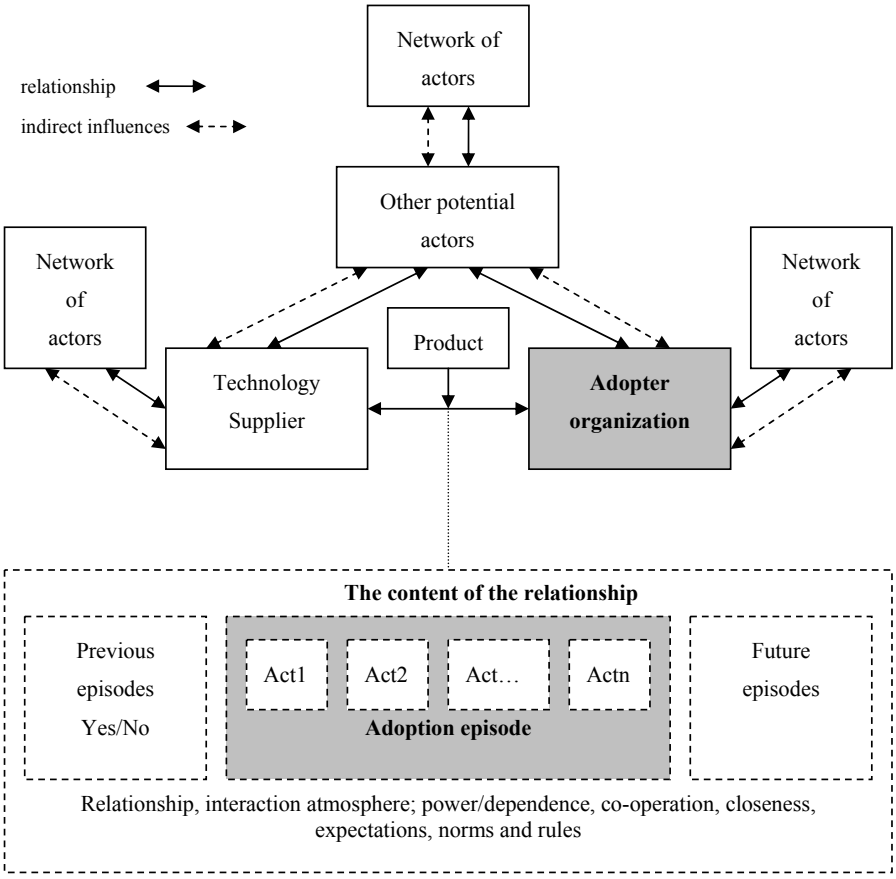

Figure 33 A synthesis model of the network and interaction approach to organizational innovation adoption

The characteristics of a supplier and the adopter organization, as well as those of the product to be adopted, affect the nature of the interaction process (Campbell 1985). The interacting *actors' related characteristics* derive from *individual characteristics* (preferred interaction style, perceived importance, relative familiarity, and risk aversion), *company characteristics* (relative size, preferred interaction style, relative familiarity, and centralization of purchasing), and *industry characteristics* (concentration, number of alternative partners, intensity of competition, rate of technical change, and traditions and norms) (Campbell 1985). The *product* as an object of interaction has a crucial affect on the interaction process through its characters of simplicity and complexity, innovativeness, importance, substitutability, switching costs (Campbell 1985), and the exchange frequency (Möller & Wilson 1995, see also Campbell 1985). Campbell (1985, 271) includes six types of product complexity: functional complexity, manufacturing complexity, specification

complexity (a product requires an extensive trial period before use), application complexity (extensive training needed before use or uncertainty related to the customer's pattern of demand), commercial complexity (refers to the complexity of commercial arrangements) and political complexity. The more complex a product is, the more *interdependent* the buyer and seller relationship is likely to be.

Both the technology supplier and the adopter organization are part of a network that constitutes connected relationships (Easton 1992). In this respect, other actors and their networks, in addition to the technology supplier and the adopter organization, may influence an adoption process through a network. The arrows in the model refer to *relationships* and the dashed arrows refer to *indirect influences* actors may have with each other without being in a direct relationship. For example, another organization's use of an innovation and demonstration of this through references by a supplier is a critical way of reducing a potential adopter's perceived risk (see Robertson, Swan, Newell 1996). *References* give a concrete hint of a supplier's well established network position within a network relevant for an adopter. Networks are surrounded by an *environment* that is characterized by features that are related to market structure, dynamism, internationalization, actors' social systems and positions in distribution channels (Anderson, Håkansson & Johanson 1994; see also Håkansson 1982 for environment of interaction process).

5.8 The network and interaction approach as applied to the cases

5.8.1 Foodsmall1 and a new packing machine

The adoption process was an episode within a relationship between Foodsmall1 and a technology supplier. The supplier was a small technology agent company in this case. The companies had already had a well established relationship before the adoption process began. This ongoing relationship between Foodsmall1 and the technology supplier influenced and structured the adoption process. The owners of Foodsmall1 and the CEO of the technology agent company had learnt how to deal with each other. Both companies were small and dependent on each other. The influence of their earlier relationship and their dependence was similar to the different types of *embeddedness* as discussed by Halinen and Törnroos (1998).

The small technology agent was dependent on almost every customer and especially Foodsmall1 types of customers who, once in a while, adopt quite expensive machinery. Foodsmall1 is dependent on the technology supplier as Foodsmall1 has a maintenance service for an earlier acquired machine.

Furthermore, technological compatibilities with the previously acquired packing machine from the same supplier were clearly beneficial (technological embeddedness) and the technology supplier was the agent for this brand in Finland. Hence Foodsmall1 was quite dependent on the resources of the supplier.

> *However, it was not an emotional decision, as the benefits of choosing the same supplier were so evident. And the first one has functioned well and the maintenance engineer who comes once a year is perfect. (The owners)*

The maintenance of the machine has been superb and the maintenance engineer was highly appreciated by the owners of the company (social embeddedness). Foodsmall1 has a very positive view of the technology supplier due to earlier positive experiences (temporal embeddedness). The international manufacturer has a Finnish agent company (the supplier in this case), with whom Foodsmall1 was in contact during the process. It was easier to turn to a local representative than look for other sources of supply that do not perhaps have an agent in Finland (spatial embeddedness). Foodsmall1 had been satisfied with the supplier and due to the small size of both companies the relationship has been very close as the CEO-owner of the supplier company has been the contact person for the owners from the very beginning. As both companies are small the company characteristics are more or less the same with regard to personal characteristics.

In the beginning of the adoption process Foodsmall1 expected the supplier to be the best partner for the process due to their previous well functioning relationship. Foodsmall1 approached the supplier as the need for a new packing machine was recognized. As there were quite clear *social norms, routines* and *trust* between the actors the adoption event within this relationship was effective. The aim was to find a solution to meet Foodsmall1's need without much intentional emphasis on bonding. The companies trusted each other and had carried out a similar project already.

The interaction between Foodsmall1 and the supplier was fairly continuous during the adoption process. The characterizing feature of the interaction was *co-operation* to define and specify the solution to meet the current need. The supplier brought in technical expertise and the buyer the conditions and expectations for the machine in order to build up the best fitting solution for itself. In addition to the role of co-operator, the supplier had the role of seller and was not fully aware of all issues concerning the adoption choice and the factors affecting it. Irrespective of that, interaction between the companies has continued and after the adoption process the technology manufacturer installed the machine and continues to overhaul it, and the previously acquired one, once a year. This interaction is coordinated by the agent company as well.

Due to the small *size* of both companies the *personal characters* of the buyers and seller were strongly reflected in the process. There were no official standards or routines within the companies on how to accomplish the task. During this four months period the adoption referred to *need specification* with the supplier (what kind of packing would be used, what the volume would be, etc.) and, in addition to that, the buyers needed to convince themselves of the need for the machine. The self-convincing refers to a process and time that was needed in order to build the courage to make the final decision. This aspect of their behavior was linked to informal discussions with other firms, the owners' emotions, and intuition and business hunches rather than the hard economic facts available. This tendency was present in earlier investments made by Foodsmall1 and demonstrates a certain culture that indirectly affects the process. This culture of developing courage derives from riskier investments that Foodsmall1 had successfully made in their recent history. The owners had a very positive attitude towards risk taking and risks in their business:

> *Taking risks is necessary in business, without risks it is quite difficult to progress... (The owners)*

This culture can also be called an innovation supporting culture. This is because, even though they mostly received criticism instead of support from other firms, they trusted their own vision and pioneering spirit. Figure 34 depicts the process and actors involved in it.

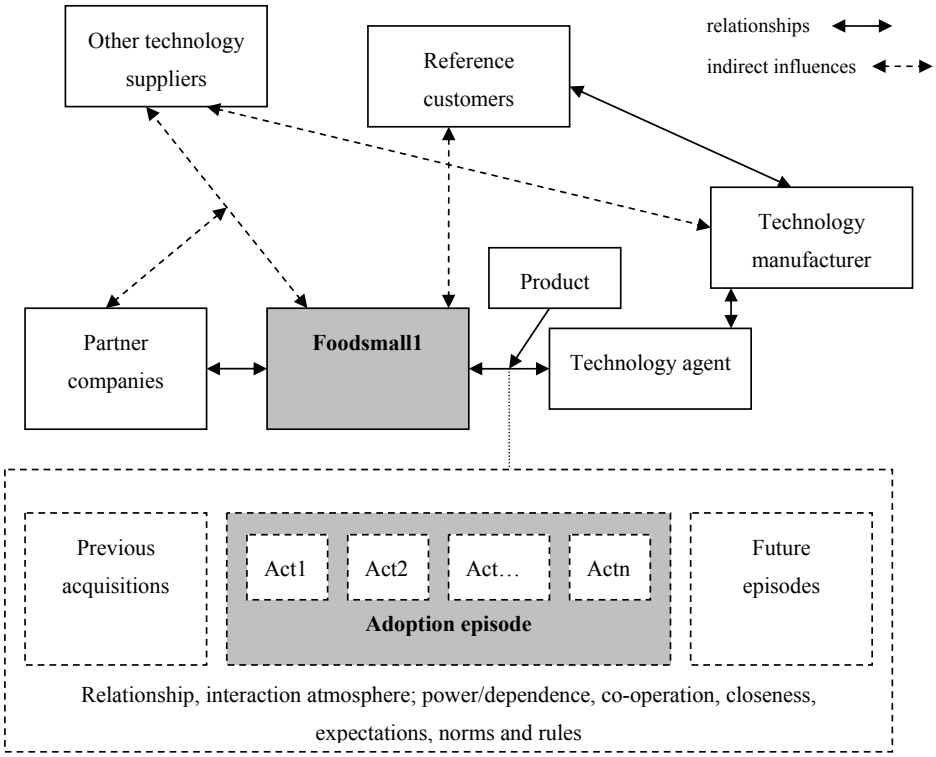

Figure 34 The adoption episode in Foodsmall1's case

The interaction process was very much characterized by the *product*. The complexity related to the packing machine mostly involved the functional complexity of the disinfection function in terms of how different types of disinfection functions work and how the most suitable one was chosen for Foodsmall1's purposes.

> *We were not able to assess the technical performance and details but we trusted the supplier. (The owners)*

Otherwise as the packing machine was similar to the one purchased earlier, it was not perceived as being very complex. Its innovativeness was related to its disinfection function, which made the process more thorough. The price of the product was high and as it was tailored for Foodsmall1's purposes it could not be resold easily.

In addition to the buyer and supplier interaction, the adoption process dealt with the other actors and influences in the network environment. Due to various types of embeddedness in the relationship and strong *actor bonds* with the chosen supplier Foodsmall1 did not consider other suppliers to any great extent. However, due to the high price and importance of the product

Foodsmall1 asked for and received advice from another food processing firm. They passed on information about a Danish technology manufacturer who supplied a much cheaper aseptic packing machine. This gave rise to some consideration that lengthened the process. However, that machine proved to be very different and lacked a disinfection function. Foodsmall1 was never in direct contact with this Danish company. During the interviews the owners said that they are usually interested in discussing issues with companies involved in their field in order to develop their own ideas and seek advice. On the other hand, they claimed not to pay too much attention to the opinions of others but did what they felt was right. Most other companies were critical of the potential decision to adopt an aseptic packing machine. However the entrepreneurs ignored this criticism believing it demonstrated a lack of knowledge of the solution and envy.

> *Encouragement we did not receive, mostly partner firms didn't understand this choice… We think that these people do not understand our vision of purity and therefore cannot understand the investment. They think that it is too little a market, but it's growing… In general we have become used to discovering our own paths when it comes to this product and its production. (The owners)*

One reason for ignoring the opinion of others is that they think that no one else has as good a vision of their business as they themselves have. Thus, they make decisions with respect to their vision not according to others' ideas or advice.

> *The backbone of our business is a strong vision of purity and all our decisions are subordinate to this. Hence, we are not so worried about the opinions of others. (The owners)*

In this sense the information acquisition related to the social system in this case was very incoherent. The decision making process in the firm was not a separate and clearly recognized function but it was conducted more or less intuitively. In brief, some information was gathered and analyzed but not systematically. This feature was related to firm size as the decision makers own the company and they are not responsible to shareholders and are not forced to follow certain routines or scan alternatives in order to avoid personal risk.

Information on the packing machine was gained from, among other sources, a *reference list* and *reputation*. The owners said that it was important for them was to know how many of these machines had been sold in Europe: Hence, the use of the machine by the reference customers and their perceptions of it indirectly affected the adoption process of Foodsmall1. The

supplier acted as a mediator here as it linked Foodsmall1 to other users of the machine

5.8.2 Foodsmall2 and a new dry disinfection method

The adoption began when the CEO-owner of the technology supplier came to meet the production manager, who was one of the two owners of Foodsmall2 and demonstrated a cover for a UVC light. They had previous knowledge about each other that facilitated interaction in the early phases. The chemistry between the two (social bonding) was favorable for further co-operation. As both of the companies are small these people were the only ones involved in the interaction. Even though the supplier did not have any concrete evidence of the method or any relevant knowledge or network resources, the production manager was interested in the innovation being offered. This was due to his entrepreneurial character and the importance of this issue to him. The production manager had actively sought options to improve the production facilities of Foodsmall2 and been aware of the UVC light technique. However, as far as he knew a solution for adding the light to a washable production process did not exist.

In the beginning *expectations* about future performance and its possibilities were higher than the current situation. From the very beginning the idea was to enter into a deep *co-development relationship* in order to develop a commercial system around UVC light and a cover that the supplier had developed for the light. The supplier thought that Foodsmall2 would be a potential partner for developing this further as a dry disinfection solution. There were two main reasons for this. First, Foodsmall2's business profile was in developing its production process to become additive and preservative free. This is a core value statement of Foodsmall2's business and differentiates it from bulk manufacturers. Foodsmall2 had already invested in sterile production and the culture that supported this idea had evolved. Secondly, Foodsmall2 was a small family business and thought to be more approachable and easy to engage in this kind of project, even though the supplier did not have a proven track record yet. This supplier's belief in Foodsmall2's innovativeness proved to be right.

> *We started cooperating well, so that it would be a win-win partnership. The cooperation went well, and both sides benefited. We were the spearhead for creating the new technology and showed others how to use it. When the supplier came here all he had was a light. He didn't really even know anything about hygiene and how the system was used. I, on the other hand,*

had an idea of how to use it and benefit from it. And, in a way, we became a product development laboratory for supplier X. (Production manager)

The adoption was the result of co-operation between the supplier and Foodsmall2 in developing, installing and modifying a functional disinfection solution based on UVC lights. If the project would have failed to develop a solution the technology would not have been adopted.

In the first phase, the UVC lights were located in the ceiling in the packing facilities. The packing function was the most critical part of the process as the hot product coming from the oven is sterile and can be contaminated only up until packing. The first phase disinfection was applied when the production process per se was not running. UVC light is harmful to humans and hence could not be in use when employees were in the facilities. However, online disinfection was required as sterility is much more critical when production is online as opposed to offline.

In the second phase, the UVC lights were installed in different phases of the cell in which the product is cut and packed by a robot. Placing the lights in that cell was possible because it is covered and production workers are not exposed to uncovered light. In order to prevent contaminants finding their way into the packing facilities via the production workers, a so-called “human lock” was constructed. UVC lights were placed in a cabin through which the employees entered the production facilities to disinfect their hands and feet.

The third phase involved assuring online disinfection by bringing in active oxygen generators to be added to the UVC disinfection process. The active oxygen generators were in use for a while but are not used anymore.

During the adoption process various other actors in addition to the supplier and the adopter were engaged in the process (see Figure 35).

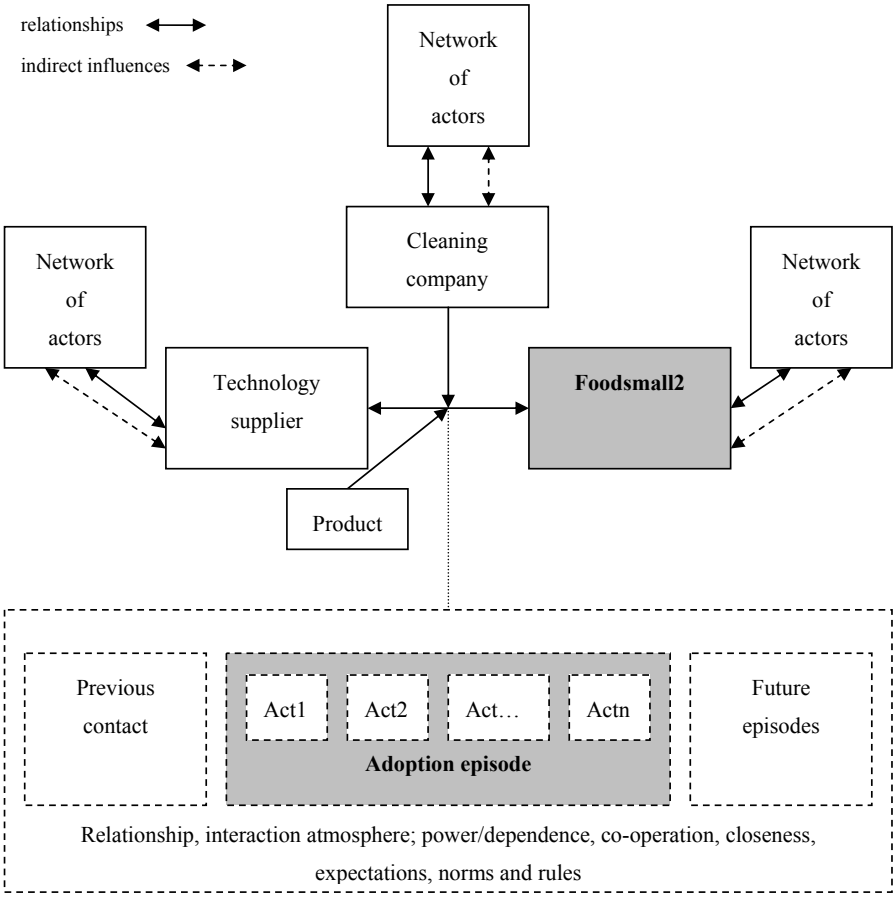

Figure 35 The adoption episode in Foodsmall2's case

The technology supplier developed a network of experts from different fields by selling shares in the company and thus committing the investors to the company. The expertise of the network was in need in order to realize the ideas that were, for the most part, the creation of Foodsmall2's production manager. In this network there were actors such as physicists, an engineering shop, other food processing companies and a consultancy for measuring the microbial results of the disinfection. Foodsmall2's network also influenced the adoption process. The production manager had good social relationships with various food processing firms and had visited various production plants when developing his ideas about sterile production facilities. These companies had an indirect influence on the relationship between the technology supplier and Foodsmall2 because without them the innovation would have not become reality.

> *I (the production manager) visited places in the pharmaceutical industry and the meat packing industry, and of course I was familiar with the industry, and, having been in many different production plants I knew, I had seen how things were done in different places. Let's say I had a kind of multidisciplinary 'helicopter view', and then it was simply a matter of bringing the good points together and making something new from the building blocks. (Production manager)*

The innovation directly affected a cleaning company that cleans Foodsmall2's production facilities. The CEO-owner of the cleaning company participated in a meeting between the CEO of the technology supplier and the production manager and provided his ideas on some technical details related to the requirements for a washable system. These ideas derived from his activities with other companies.

> *So when I, being a straight talking kind of person, shot down their ideas about putting the UVC light in certain places I was, fortunately, able to get them on the right track. (CEO-owner of the cleaning company)*

The adoption process episode initiated a relationship between Foodsmall2 and the supplier. However the relationship was mostly between the CEO-owner of the technology supplier and the production manager of Foodsmall2 as other social bonds did not evolve during the process. Later the production manager became a shareholder of the technology supplier and sold his share of Foodsmall2 to his brother and left the company.

Since then, the relationship has become more passive and the development of the system has stalled. For example, the oxygen generators that were purchased just before his departure have not been installed. This is because the other staff in the company did not rely as much on the method and because the oxygen generators were felt to have not been beneficial. The production employees were very concerned about the oxygen generators possible negative influences on their health and, on the other hand, company management and the technical staff did not perceive any benefit from using them. Hence, this part of the solution has been shut down.

At the moment the UVC light based dry disinfection method is still in use and this is believed to be useful. However, no improvement or maintenance has been made. The maintenance manager of Foodsmall2 said that if they need UVC lights or some other spare parts they will acquire them from ordinary electrical supply shops. On this basis it can be said that the relationship is sleeping, or even finished. However, the results of the co-development interaction between the companies are now affecting other actors in different industries as the product is being further commercially applied by the technology supplier. In addition, Foodsmall2's case is still on the web pages of

the supplier and is used as a reference to market the method to potential customers.

5.8.3 Foodmedium and a new packing machine

Foodmedium started to manufacture the new product due to a change in its network horizon. This resulted because the principal company for whom Foodmedium had contract manufactured a product decided to close down its production at the facility and transfer it to another contract manufacturing company. This decision was a hard blow for Foodmedium to take as the product had been one of the core areas of its production and business:

Foodmedium decided to replace the loss of the product by starting to manufacture a similar kind of product under its own brand. With the support of publicity related to this production transfer decision Foodmedium built a new production line from a scratch when the principal company transferred the old line and all its machinery to the new contract manufacturer. Foodmedium launched its own product in March 2003. This act converted Foodmedium from being a partner company to a competitor from the principal company's point of view. This change is depicted in Figure 36 by the replacing of a continuous line arrow with a dashed line arrow between the companies. The dashed arrow refers to the indirect influences the companies still have on each other, even though the reciprocal relationship has ended. This change did not please the principal company at all and legal proceedings were undertaken against Foodmedium. The case was settled in Foodmedium's, favor and production of the new product continued. *Retailers* accepted the new product and it received much support as result of all the publicity that was generated by the production transfer (market embeddedness).

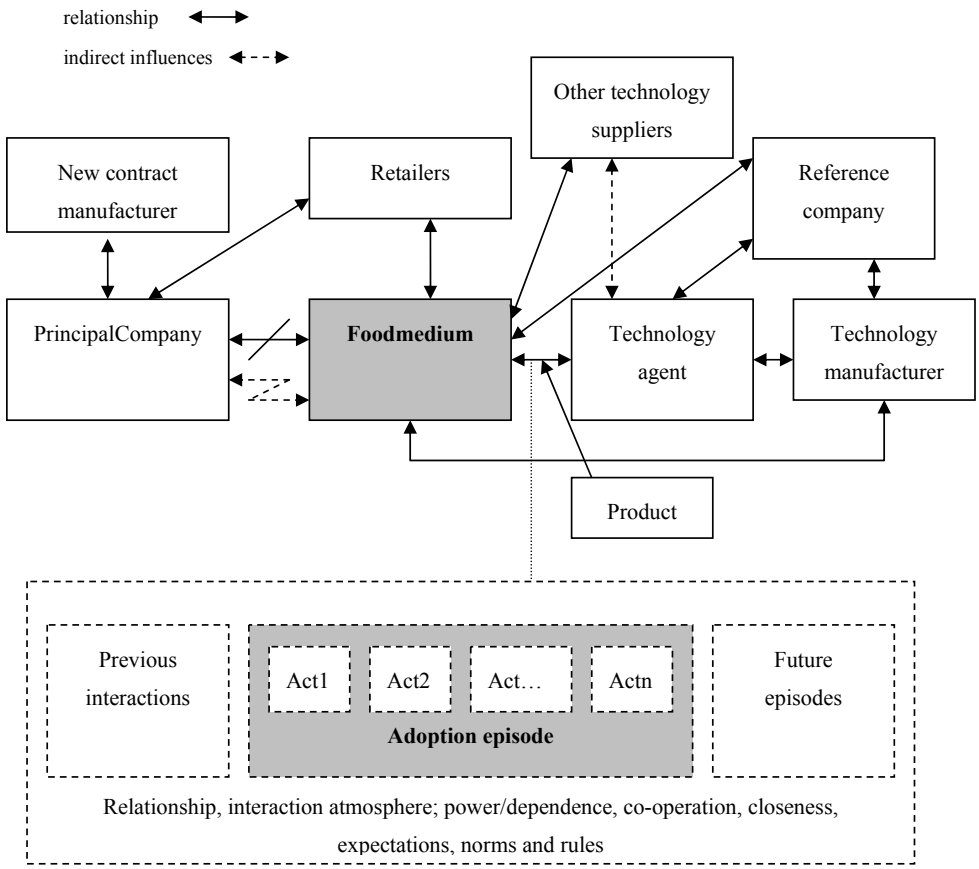

Figure 36 The adoption episode in Foodmedium's case

The adoption of a new packing machine was an episode within an established relationship between Foodmedium and the technology supplier as well as an episode between Foodmedium and the other suppliers considered. The chosen supplier here refers to both the technology manufacturing company and the technology agent company. Foodmedium's relationship has always been with both of these companies. The role of the agent was mostly to mediate communication between the manufacturing company and Foodmedium.

Foodmedium had known the chosen supplier for years and acquired production machinery from it for other production areas and considered the acquisition of a similar kind of packing machine before production was transferred. Due to this joint history the supplier was naturally invited into the project as a potential supplier (*temporal embeddedness*). Foodmedium also invited three other suppliers, one of which it had acquired machines from previously, and it had had some interaction with the two other suppliers as

well. The two other suppliers were invited in order to cross learn from the candidates and to feel more comfortable about the finally adopted solution's performance and price compared to other possible options. This thoroughness was mostly due to Foodmedium's *low risk aversion* and the *relative familiarity* and *high perceived importance* the individuals at Foodmedium attached to the process. They wanted to secure their own positions and were very eager to widen the consideration process. Furthermore, rivalry between the four potential suppliers worked in favor of Foodmedium in terms of better thought out solutions and a lower price.

All the considered suppliers had an agency in Finland and one company was also manufacturing in Finland. However, this spatial distance did not play any role in the process (*spatial embeddedness*), but the social relationships with all four were perhaps a prerequisite for being considered as a potential supplier (*social embeddedness*). The two suppliers that had earlier supplied machinery to Foodmedium were considered to contain the most potential. The one that was not chosen had supplied machinery for the packing section and had *technological embeddedness* on its side. However the packing machinery of this brand was not competitive enough.

The rivalry setting does not reflect the very close joint development relationship between Foodmedium and the potential suppliers it had already co-operated with. This was due to *low resource dependency* in this specific task. A packing machine forms a rather individual unit and can be acquired from any capable supplier. Despite the competition there were no conflicts with the supplier candidates according to Foodmedium and the chosen supplier interviews. The owner of the agent company, of the company finally chosen, considered such competition a normal part of this kind of decision making that involved *high commitment* due to the *high importance*, *complexity*, and the *switching costs* of the product. In addition, the product's related characteristics are very much *perceived* as being dependent on the characteristics of Foodmedium. Foodmedium had only *limited experience* of the related technologies and hence to reduce the complexity a *reference visit* was organized by the supplier.

At the reference plant the Foodmedium representatives saw a similar but larger machine in action and had a chance to discuss it with the worker's there. This reference visit convinced Foodmedium but equally important was the *network position* of the supplier. The reference company was a much bigger actor in the market than Foodmedium and a significant player in various markets. Thus, it was reasoned that, if that large a company had similar machines, it demonstrated that the supplier would probably be a reliable partner. The adoption decision and a contract were made during the visit.

After the adoption decision cooperation between the supplier and Foodmedium tightened. The supplier started to build the machine in Germany and was in email contact with Foodmedium in Finland. This co-operation after purchase was, however, not emphasized during the adoption phase and it did not affect the adoption decision.

5.8.4 Foodconcern1 and a new quality assurance method

Foodconcern1 had followed technological development in the field of quality assurance technologies for a long time. The first experience of the chosen technological platform came from the late 1970s. After the year 2000, faster methods of analysis were discussed more actively within the company. This was mainly the result of active suppliers presenting the developments and the close monitoring of developments in the field. There had been some earlier experiments on new quality assurance techniques but the company had continued to trust in the conventional method until the beginning of this adoption process. Figure 37 illustrates the process and actors involved into it.

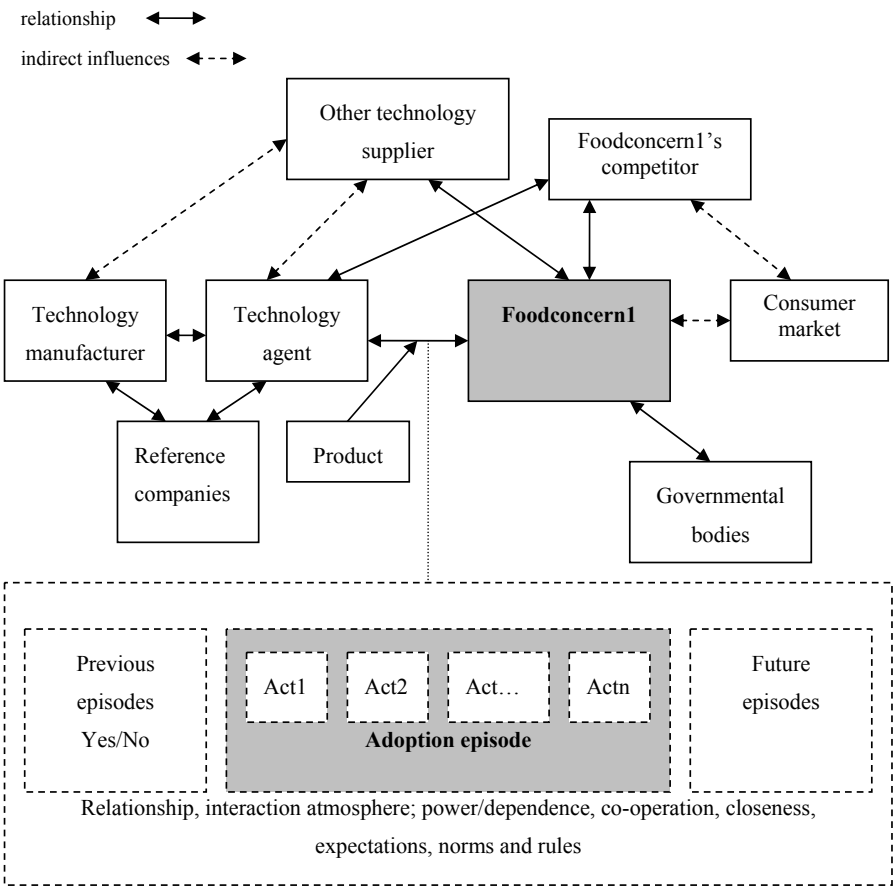

Figure 37 The adoption episode in Foodconcern1's case

The CEO of the supplier contacted the quality and development manager (who soon became production manager in this case), who agreed to meet him in autumn 2001. The supplier in this case is the technology agent company. The method seemed promising and the potential benefits sounded lucrative. After some weeks of preliminary investigation the quality and development manager was interested enough to look at the product in more detail, and decided to take the idea further within the company. He needed to convince the factory manager, who was a gateway to the central administration, of the value of the product. The factory manager found the product worthy of further investigation and decided to put it forward as a proposal to the concern's central administration. The central administration was in favor, authorized the setting up of a formal project, and chose two official unbiased evaluators from inside the concern. Following the establishment of the project in March 2002

the supplier performed a series of tests in order to adapt and fine tune the method to suit the products to be tested at the production plant. During this testing period Foodconcern1 sent its products to a supplier for analysis. Hence, interaction between the supplier and Foodconcern1 was very *co-operative* and *close*. The supplier contributed validation and implementation in terms of expertise and previous experience it had gained through earlier customer validation and implementation processes and also through its own use of the method, as it had been used in the supplier's own laboratory to produce commercial laboratory testing services. The close co-operation was also partly due to the importance of the product to Foodconcern1 and the importance of getting Foodconcern1 as a customer for the supplier. Foodconcern1 is a large food processing company in Finland and as a *reference* would facilitate the selling of the product in the future. Also the personal chemistries between the CEO of the supplier and the quality and development manager of Foodconcern1 were in favor of this type of interaction.

The method was adjusted accordingly, and the testing period began at the production plant in August 2002. At first the supplier had to assure the microbiologists at the central R&D laboratory of the concern that it was worthwhile engaging in a deeper testing phase. This was because of their role as seller, in addition to that of co-operator. The microbiologist wanted to be sure that the method worked as described. Furthermore, the microbiologists' role as coordinators and experts in microbiological testing methods within the concern meant that they had the power to kill the project if they found it lacking in promise. The supplier visited the central laboratory and performed a set of tests to demonstrate the method.

At first the microbiologists were doubtful about the technology because they had had some negative experiences with the technology platform previously in the late 1970s and 1980s. One of them said he summed up his skepticism by sarcastically asking, *"Are we again testing a long drawn out promising new method?"* On the other hand the microbiologists knew that these methods had been further developed since they last tried them. This knowledge was based on information the suppliers provided and also on international academic journals about the field. This information gave the impression that the method might work or was at least worth testing. Hence the supplier received permission to continue. In addition to the success of this project, the microbiologists were interested in the method as they wanted to see if it could also be used somewhere else within Foodconcern1. Hence there were clear expectations about the potential use of the method in the future.

The new method was run in parallel with the old one until January 2003 in order to allow comparisons. The number of tests conducted, which was as high

as 10,000, was sufficient for statistical analysis. After the testing period it seemed that the method was specific and sensitive enough for the purpose.

After having convinced themselves, the project group decided to present the results to the evaluators. It was their job to make sure that the project followed formal internal guidelines, and that the results served that purpose, before they accepted it. The production plant was then in a position to make an investment proposal to Foodconcern1's central administration, which authorized the investment. Once approval had been granted the machine that had been leased thus far was bought. It has been used for analyzing some product groups since April 2003.

The aim of the interaction between the supplier and Foodconcern1 was *risk reduction*. Thus the method was a fairly ready solution, except for the need for fine tuning by the supplier, the main reason for the project was to be assured of the method's reliability and the applicability to the targeted task. In this regard, the CEO of the supplier was a key person as he possessed various roles and because it is quite a small firm. In addition to him, the laboratory staff of the supplier was also important because they were involved in the practical testing and user training. The supplier provided user training for the machine, installed it and supplied the required chemicals. However, despite this close co-operation the technology supplier could not attend all Foodconcern1's internal meetings on the project and was not fully aware of all the issues concerning adoption choice and the factors affecting it. Foodconcern1 also discussed using *another technology supplier* during the process and contacted a company. As the product is *complex* and *important* Foodconcern1 wanted to find out about other possible technologies and their performance. These two technologies were formally compared at Foodconcern1 before selecting the supplier for the testing period. However the other option was never tested.

In addition to the two suppliers and the adopter, some other actors were also engaged in the adoption process. *The main competitor of Foodconcern1* was an actor from Foodconcern1's social network through the other microbiologist who knew the quality development manager from this firm. Both of these firms were included in an informal self-organizing network that consisted of key players in this industry within the Nordic countries, who attend seminars once or twice a year. Hence, the *interconnectedness* of this network was quite solid, and more specifically the interconnectedness between Foodconcern1 and its main competitor is high.

The co-operation in terms of the joint coordination of the quality analysis builds on the idea that the actors are interlinked through *consumer markets*. A consumer does not make a difference between the different brands if there is a significant quality hazard in some product category. Instead a consumer is likely to extend the problems of one brand to other brands as well. The

competitor had acquired exactly the same method from the supplier earlier and had experience of it. The purpose of consulting the main competitor was to reduce the risk associated with this method. These networking activities link the actors' and their resources. The ARA model illustrates this and as one of the microbiologists put it:

> *Networking is a good thing because you can't do everything on your own. It is cheaper to listen to others' experiences and ideas and exchange them instead of everybody trying on their own. [Microbiologist (male)]*

In addition to the main competitor, the other food processing companies' use of innovation indirectly affected the adoption process. This was communicated through *references*. The references had two functions in this case. Firstly they helped in the very first evaluation. According to the project manager a general problem is the methods do not always deliver what they promise. Thus, the problem is that how to screen out effectively the least promising ones. The *reference list* in this case facilitated this screening process and evoked trust and reduced risk.

Secondly, the references facilitated the governmental bodies' approval for the method to be used at Foodconcern1. The method was not validated by any specific validation organization but it had been widely used for similar purposes around Europe. According to EU principles this whole range of references legitimized the use of the method, although implementation validation was still needed to assure those inside the concern that the method was reliable and could be learnt. According to the other microbiologist a condition for closely considering a new method is that it has to be validated by an official validation organization or then it has to be used for the same purpose by other reputable companies. All of the project members at Foodconcern1 said that an idea to consider a product that was totally new and did not have references was not a very tempting one.

> *Let's say that if it seems that the product hasn't been thought through to the end, the investment in development tends to be so great that we then have to consider whether it's our job to get involved in the development work. [Microbiologist (male)]*

The CEO of the chosen supplier also emphasized the role of references in this case and put it as *"I think that in this case, and especially in the beginning when convincing the microbiologists, the role of the international references was significant, without them this could easily have been a dead end."*

The supplier had provided Foodconcern1 with a list of references which included the contact of the main competitor that was consulted. However, the supplier was not aware that Foodconcern1 had consulted the competitor in this case. It was also interesting that the *network position* of the supplier was

demonstrated by references from the cosmetics and pharmaceutical industries in addition to the food processing industry. Hence the prestigious network position in industries other than the food processing industry was exploited in order to convince Foodconcern1. The lack of references of the other supplier and also their much higher price produced the feeling that it was not worth testing them.

The adoption process was a *relationship establishment process* between the supplier and Foodconcern1 and afterwards can be seen as an *initiation episode* within this relationship. The companies did not have any prior contacts before this project (see Håkansson and Gadde 1997). The relational bond *attraction* developed during the early phases of the project. The quality and development manager understood the potential benefits of the method and got along well with the CEO of the supplier. The CEO considered a certain discussion between him and the quality and development manager concerning microbiological analyzing procedures, at the very beginning of the project, to be crucially important. The CEO assumed that the quality and development manager found his views, based on his wide experience, useful and applicable. The quality and development manager thought that during the testing period at the supplier's laboratory the adjustment of the reagents to better fit Foodconcern1's products was the proof that showed that the supplier, although being a small firm, was capable of meeting the needs of Foodconcern1, and was also willing to adapt to meet them. In addition to this *social bonding,* the companies *committed* to each other through different *structural bonds* during the process (machine leasing contract, testing phase at TestCo) and after the implementation (the continuous need for TestCo's chemical reagents for analysis).

Trust here mostly refers to the method and can be called *subjective* and *objective trust*. The laboratory assistant started to trust the method (having been quite skeptical at first) after a certain test, in which the method recognized a failure in a test product, which she did not recognize by tasting and smelling. The objective of trust evolved through the testing period in which the method was run in parallel with the older one and 10 000 samples were gathered and analyzed. Due to the fact that the method is not in full scale use yet product specific trust could well rise higher.

5.8.5 Foodconcern2 and a new cutting and deboning method

Foodconcern2 has closely monitored the technological development in the fields attached to its manufacturing. In the mid 1990s the company planned and foresaw, together with a Danish technology consultant organization, a

production process and product flow for the future. The created vision, of an ideal production process was at the back of the mind of the company and it made modifications and improvements to its production process accordingly. In 2000 the company reconstructed a section of its production (which was automated in this project scrutinized here). However, the technology was still immature in terms of the larger automation at that time. In 2006 the company realized the acquisition and automated the production line and replaced the former machines. Figure 38 depicts the process and actors involved in it.

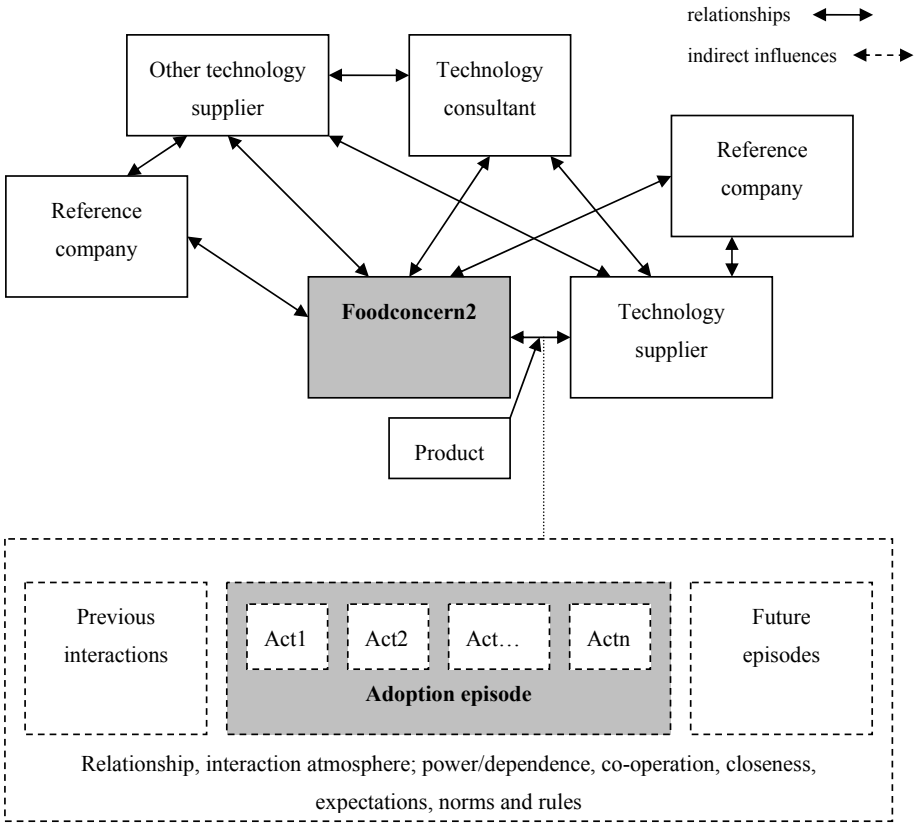

Figure 38 The adoption episode in Foodconcern2's case

Foodconcern2 monitored this development by closely *co-operating* with the *suppliers* and *other food processing companies* in the field. The key technology suppliers, food processing firms and the technology consultant formed a coherent network built on technological developments in the field. According to Foodconcern2, there are four key technology suppliers in the world with regard to automation projects related to this issue, three of them are Danish and one is Dutch. The Danish companies co-operate closely with a

Danish technology consultant firm in research and development and also in marketing. As a larger food processing firm, Foodconcern2 is naturally interested in this development and wants to be a part of it. The representatives of Foodconcern2 said that they want to have good relationships with all these key players because of their clear *resource dependency*.

> *Well, as far as personal relationships are concerned, we have a correct, friendly, but strict attitude with all the actors involved. We want to keep up good relations with everyone. And good relations doesn't mean we suck up to them or bribe them, but that; we want to keep relations on a correct but friendly basis, because we don't know who will invent something next and what. That's why we have been pretty careful about that, and in the past, as now, we have made sure that those who were left out of a deal and not selected as suppliers, are told the reasons why, because they are interested to know why a particular supplier was chosen and not them. So, we have made it clear from the start that when it is time for the selection process, we'll tell them why we made the choice we did. (Production manager)*

However, it seems that Foodconcern2 tries to avoid consciously the soft aspects or *social bonds* of the relationships to be evolved.

The adoption process was a part of this technological development and *an episode in the relationship* between Foodconcern2 and the supplier as well as in the relationship between Foodconcern2 and the other considered supplier. From Foodconcern2's point of view the interaction process aimed to provide the company with a new production line. The suppliers were interested due to the high value of this acquisition and potential future projects. From the beginning there were two potential suppliers with whom the company interacted. These two were the only suitable candidates in this case. All the companies knew each other well and the focus was on the concrete doing, not on developing *bonds* to facilitate the process. The two potential suppliers were taken into the process due to the *complexity, switching costs* and *importance* of the delivery. For the same reason the interaction was *intensive* and *deep*. In both relationships the characterizing feature of interaction was *close co-operation*. The suppliers worked intensively on the layout and affected each other as Foodconcern2 passed the best ideas around during the process.

In addition to the adopter company and the suppliers, the process was affected by other actors as well due to the *complexity*, *switching costs*, and *importance* of the product. Foodconcern2 visited the *reference sites* of both suppliers. During the reference visits the representatives of Foodconcern2 saw the machines in action. The role of the reference visits was significant in the sense that before the visits the supplier that was eventually not chosen was preferred. After the reference visits, and especially after having received a written report by the finally chosen supplier in which both machines were

evaluated, and which was in favor of the one finally chosen, Foodconcern2 decided to select the one which had been least favored initially. The chosen supplier delivered this evaluation to Foodconcern2. After the adoption co-operation tightened and resulted in the building of a production line that is currently in use.

5.9 Summarizing the network and interaction approach

The idea of the network and interaction approach is to view single organizations in a context that is composed of *identifiable counterparts*. These actors are linked *directly* and *indirectly* to each other via *social bonds* and *resource ties* and form a system of interrelated relationships that is called a *network*.

The network and interaction approach views organizational innovation adoption as an *interaction episode* between a supplier and an adopter that is directly and indirectly affected by other actors in the network. This episode may take place in an *established relationship* or *initiate a new relationship* between companies. In Foodsmall1, Foodmedium, and Foodconcern2's cases the adoption processes happened in the context of already established relationships. These relationships structured the interaction as the interaction atmosphere had already been developed between the parties due to earlier interaction. This was, for example, shown in the cases by the fact that much of the focus was dedicated to concrete doing rather than the development of social bonds and adapting and learning from each other during the process. In Foodsmall2 and Foodconcern1's cases the adoption episode established new relationships between the companies. In Foodconcern1's case the development of trust in the new supplier and in the method chosen first needed to be built and developed before the formal project phase was entered into.

In addition to interaction between the adopter and the supplier, the interaction between other actors also affected, both directly and indirectly, the adoption process. Suppliers exploited their *references,* in order to convince the adopters, by presenting their references as the end results of earlier interaction with the other adopter companies. The adopters also interacted with other actors in order to evaluate the innovation.

Figure 39 summarizes the network and interaction approach in terms of process, content and context.

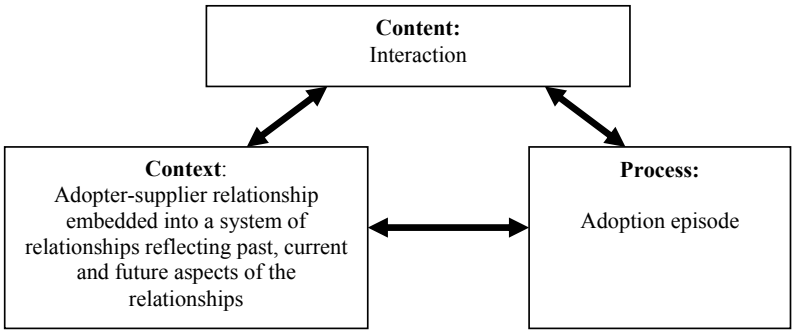

Figure 39 The content and context of an adoption episode

The network and interaction approach links the process to its wider environmental context. This refers to relationships and networks that influence and are influenced by the process. The process activates the already established relationship of the adopter with the supplier and with other potential suppliers, or potentially initiates new relationships with the suppliers considered. In addition to these direct influences, the process indirectly influences and is influenced by other actors through interlinked relationships.

This *holistic perspective* takes into account *past and future dimensions,* in addition to the temporal adoption process. Past development in the cases had led to a company occupying a certain position in certain networks. This history and their earlier development helps determine which companies would be a suitable supplier and helps discover information sources outside the company. For example, in Foodsmall1's case their earlier relationship with the technology supplier restricted potential solutions. This is because the technological compatibility and mental compatibility they had earlier built up with the supplier was considered to have evident benefits, which inhibited the consideration of other options. In Foodconcern1's case a microbiologist asked for information about another company's previous experiences with the technology and then received testing results on the innovation from that company, who already had the same method in use. This consultation was possible due to previous personal and company level relationships. This information gathering and processing also seemed to be a continuous action within Foodconcern1, Foodconcern2, and Foodmedium's networks and operates parallel to organizational functioning. Thus, information is not only gathered and processed for a temporary adoption process.

6 TOWARDS THE ACTIVITY BASED PERSPECTIVE

The organizational innovation adoption process refers to the development of organizational commitment to innovation through the knowledge, persuasion and adoption phases. Commitment refers to an orientation to use the innovation now and in the future. This definition resulted from the review of the adoption and diffusion approach. Hence, the role of the adoption and diffusion approach is *descriptive* in the study. It is applied to define and set boundaries for the adoption phenomenon, to describe it.

The organizational buying behavior and network and interaction approaches hold key positions in building understanding of the mechanism generating adoption (functional content). Thus the role of these approaches is *explorative* in the study. The careful review and application of the approaches in Chapter 5 produced knowledge on their underlying assumptions and functioning mechanisms. The examination throughout this chapter builds on the reviewed theoretical approaches and their application in the cases.

This chapter starts with comparisons of the theoretical approaches that are conducted in order to get an idea of the degree of overlap of the empirical phenomena that the approaches depict. On the basis of a shared empirical domain, a careful transfer of the conceptualizations from the complementary approaches to the adoption process becomes possible. First, innovation adoption is compared with organizational buying behavior, and then innovation diffusion with the network and interaction approach. Splitting the innovation adoption and diffusion approach into two parts, namely adoption and diffusion, follows the logic of seeing adoption as a micro level and diffusion as a macro level phenomenon. This classification was drawn in order to emphasize and communicate to the reader that the comparison of the adoption and diffusion approach with the organizational buying behavior and the network and interaction approaches focuses on the different aspects related to the adoption process. The former refers to the adoption as organizational activity and the latter to the context of the adoption process. This classification was presented in the introduction to the study.

The comparisons identified the linkages between the approaches and hence allowed conceptualizations to be transferred to the scrutiny of adoption. The idea is that each approach is seen as contributing “a layer of meaning” (Lewis

& Grimes 1999, 687). This is essential in identifying the mechanism generating the adoption process.

The second section of the chapter reveals in detail the mechanism producing organizational innovation adoption, namely, what the adoption process is a result of (functional content). The examination begins from the activities leading to adoption and continues to the interplay between the activities and different structures embedded into different contexts. Due to their inseparability, the structures and the contexts covering these structures are used synonymously in this study. Both the activities and the structures are conceptualizations transferred from the explorative approaches and discussed together generating the adoption process.

6.1 Comparing the theoretical approaches

6.1.1 Innovation adoption – organizational buying behavior approach

Sheth (1977, 21–25) placed the innovation adoption paradigm under the heading of the behavioral approach to buying and Webster and Wind (1972, 19–20) incorporated diffusion models into nontask buying models. However, what was once a tight relationship has become fuzzier as it has moved towards the present. Wilson (1987, 322) highlighted the beginning of the divorce of the approaches, arguing that the industrial adoption process has long been studied without considering it as a part of the organization's normal buying process. He suggested that the innovation adoption process can be seen as a *new task buying situation*. The current literature includes some cross-references between the approaches but mostly they are implicit rather than explicit.

Both the organizational buying behavior and innovation adoption approaches focus on intra-firm processes and are linked to organizational decision making. Based on the literature review and case studies, the buying behavior approach focuses on organizational actions that relate to *need recognition*, *evaluation of alternatives to meet the need*, and finally to *buying the most suitable alternative*. The adoption process was defined as organizational commitment development to innovation comprising knowledge, persuasion and adoption phases. The following model (Figure 40) depicts the phases of these two processes and their linkages.

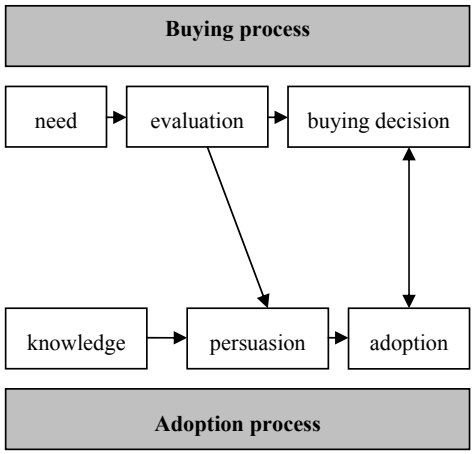

Figure 40 The relationship between buying process and adoption process

These two approaches are to some extent different sides of the same coin. The buying process is purposeful organizational action taken to meet the perceived need. The buying approach considers the organization as an active object that acts through a buying center and is surrounded by an unknown environment. The adoption approach pays only scant attention to purposeful organizational actions focusing instead on their outcomes, namely knowledge, persuasion, and adoption.

Persuasion may result from an evaluation of the innovation alone, or of that and other potential solutions, and their comparison. In Foodsmall1, Foodmedium, Foodconcern1 and Foodconcern2 the consideration of the chosen innovation as well as the other available solutions, and their comparison with the chosen innovation during the evaluation phase, was persuasive for the innovation. In Foodsmall2, the production manager did not evaluate other solutions, and the evaluation of the innovation alone led to persuasion.

The buying decision was mainly considered in the literature (e.g. Barclay 1992, 53) as a closing phase of the buying process, despite some models extending the process to cover the post-purchase evaluation phase that related largely to performance/purchase evaluation (see also Lambert, Dornoff & Kernan 1977). In this sense, the buying process is much more explicitly depicted in the current literature than is the innovation adoption process. Based on the literature review, *the point of commitment* to the innovation was defined as the last step in the adoption process.

The buying decision and adoption decision were interlinked in the cases. In Foodsmall1, Foodmedium and Foodconcern2 the buying decision equates to the adoption decision. In making the buying decision, these companies

committed to take the solutions from the chosen suppliers who then started to build them. As all these solutions are tailored specifically for these companies, they cannot easily dispense with them without incurring significant costs after the buying decision, and hence these companies have committed to the chosen innovations.

Foodconcern1 case was atypical here in the sense that the innovation was first implemented and then adopted. Foodconcern1 implemented the innovation to put it to use and compare it with the solution was currently in place. The new quality assurance machine was leased for that purpose in order to evaluate it with little financial commitment. The results seemed promising after the test period, the company was convinced of the benefits of the machine and thus decided to continue using it. After stating its intention, the production plant submitted an investment proposal and on its acceptance by central administration the machine was bought from the supplier. Again, the adoption decision equated to the buying decision.

In Foodsmall2, some elements of the disinfection system had already been bought prior to the adoption, and others came after it. As the project proceeded, the company bought devices and materials in order to construct and implement the innovation. First the UVC lights were installed in the ceiling of the production facilities. This first phase of the disinfection method was used when production was not running. The usefulness of the method was perceived at that point, the company committed to it and *adoption* occurred. The first phase was followed by the second and third phases in which the system was upgraded. In the second and third phases, the company bought additional elements for the system. Some of these, active oxygen generators, were later downsized. Figure 41 depicts the buying processes and adoption processes in parallel in these cases.

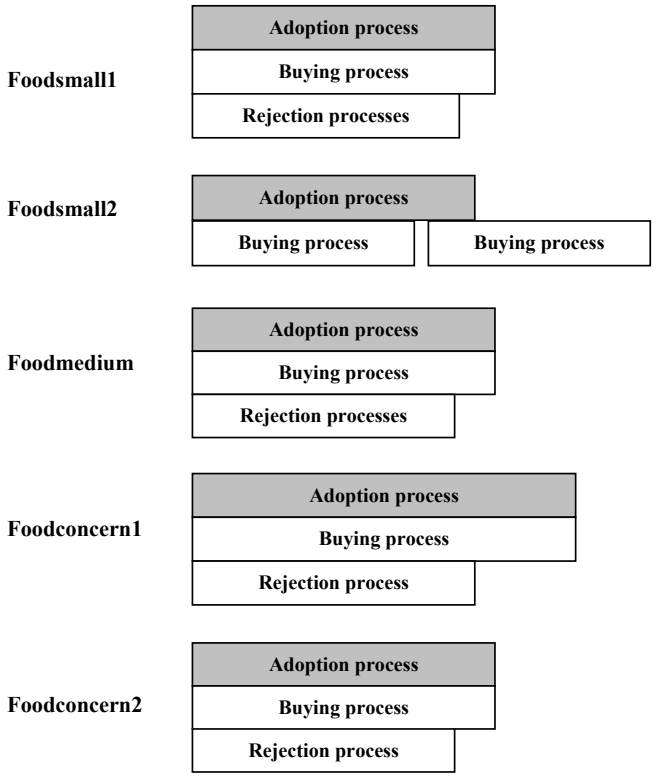

Figure 41 The correspondence of the buying processes and the adoption processes in the cases

It seems that the adoption and buying processes are highly interlinked in the cases. This allows conceptualization transfer from the buying behavior approach to be discussed in consideration of the mechanism producing the adoption process. The active role of the organization reflected in the *buying center* notion is lacking in the adoption approach. The buying center function is related to the adoption of the innovation but also to *possible rejection* of other considered solutions. In Foodsmall1, Foodmedium, Foodconcern1 and Foodconcern2 the buying center rejected the other solutions considered. In Foodsmall2, no other solutions were considered. In this sense, other than in Foodsmall2, the adoption processes paralleled the rejection processes of the other solutions considered. In the cases, the organizational buying process and then also both the rejection and adoption processes were largely outcomes of *information gathering, information processing, and negotiation* activities that were performed in order to meet the organizational need. Organizational *legitimation* authorized the buying center actions and closed the buying processes and also the adoption processes.

6.1.2 Innovation diffusion – network and interaction approach

The diffusion phenomenon can be defined as a context for a single adoption process. Diffusion as a social process of formal and informal information exchange among members of a social system is a core idea in Rogers' (2003) diffusion theory. This approach accentuates the importance of interpersonal networks in the diffusion process. The idea of applying the network approach (similar to the IMP approach) to the diffusion process in an industrial context has been suggested by Robertson, Swan and Newell (1996). This endeavor enhanced the context-specificity of the diffusion approach to cope with a different area of application but was not an exhaustive presentation, as a single piece of work never can be.

The adoption and diffusion approach understands the *communication flow,* within the *social system,* between the adopter and *opinion leaders* and between the adopter and a *change agent*, but fails to capture the motives or basis for this communication. The diffusion approach does not inform the previous development or relationships in the field. Secondly, the adoption and diffusion approach views the adoption process as a unique and temporary phenomenon rather than a part of normal continuous organizational activity. This uniqueness and the static roles of opinion leaders and a change agent were incoherent with the empirical data.

Compared to diffusion ideology, the network and interaction approach adopts a wider and perhaps more realistic perspective on the context of adoption. The network and interaction approach considers the adoption to be linked to both past and future. Applying the network and interaction perspective, we may focus on identifying different actors affecting the process *directly* or *indirectly* from different social systems and different networks. This relativity has not, to its full extent, been demonstrated by the diffusion approach.

The network and interaction approach sheds light on the *previous relationships* between the adopter and the suppliers as well as in the social system, both between the companies and individuals. Also, more specifically, reasons for the interaction in terms of *interconnectedness* or *resource dependency* have been provided. Between the adopter and suppliers, the adoption process activates an already established relationship with the supplier and other potential suppliers or potentially *initiates new relationships* with the considered suppliers. In Foodsmall1, Foodmedium, and Foodconcern2 the adoption processes occur in a context of formerly established relationships. These relationships structured the interaction, as the *interaction atmosphere* had already developed between the parties due to earlier interaction. This was, for example, shown in the cases in that much of the focus was dedicated to

concrete action rather than the development of social bonds, adaptations or mutual learning during the process. In Foodsmall2 and Foodconcern1, the adoption episode established new relationships with supplier companies. Especially in Foodconcern1, the development of trust in the supplier and on the method had first to be grown before entering the formal project phase. In this respect, the microbiologists as coordinators of the technology at Foodconcern1 needed to be convinced first. In Foodsmall2, the lack of a previous company level formal relationship was compensated as the persons knew each other to some extent before the process started.

In addition to these direct influences, the process indirectly influences and is influenced by other actors in the suppliers' networks through interlinked relationships. This refers to suppliers' earlier *references* and relationships that impact the focal adoption process, which will in itself probably influence the coming adoptions of the chosen supplier's customers as it has left a trace in the form of a reference. For example, in Foodconcern1 the supplier's earlier references affected the adoption process and the choice of supplier, and as a reference is also likely to affect supplier's future sales initiatives. Figure 42 presents the adoption process with reference to the diffusion approach and the network and interaction approach.

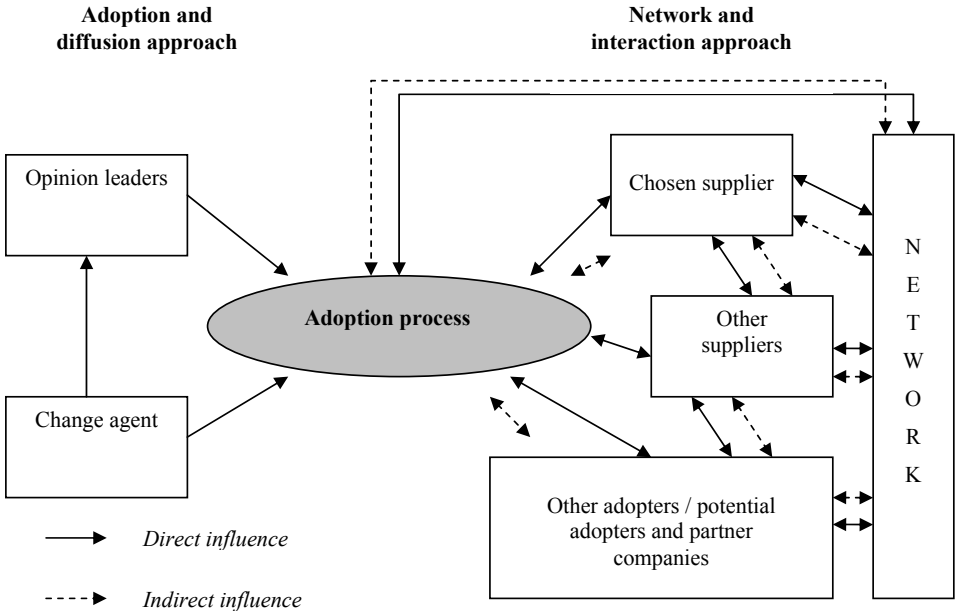

Figure 42 The relationship between adoption and diffusion approach and network and interaction approach

The opinion leaders and change agents were not unambiguously identified in the cases. Rather these labels were attached to actors only as minor reflections at the time, not as dominant or permanent features. For example, when Foodconcern1 approached another company that had adopted the technology earlier, the case company did not consider the other as an opinion leader. The feature of this interaction was information gathering and the other company was considered no more than a source of specific information on the innovation. Also, no support was found for the concept of change agent. It was more the case that the chosen suppliers and the group of suppliers were known from other circumstances and the "change" in terms of innovation did not appear suddenly and was not advocated only by these suppliers. For example, in Foodconcern2 the adopter company had also been promoting change and co-operated with the suppliers in this respect. The need for this type of development was constantly present in all the case companies and was known by the suppliers who had been a part of, or would like to join in, this development. As it is in fact a part of a continuous process, companies, at least the bigger ones, tended to posses general knowhow regarding the product category or technology platform related to the innovation. In this study, the different types of *embeddedness* favored choosing the supplier with whom the company had a relationship.

Partly because of the "innovation as unique" view, the innovation adoption and diffusion approach ignores the *competing technology suppliers*. The approach originally developed to describe the spread of radical, new-to-the-world innovations, but commonly stretched to cover minor innovations, demanding only newness to the adopter as the qualification for an innovation. This has been influenced by the rarity of radical new innovations in a business market context, innovations being more or less variations on known themes which may occur as a translation of an idea or a product from one market or application to another (Cobbenhagen 2000, 26). For radically new innovations, the lack of substitutes would remove the alternative solutions and the other suppliers from the picture and return the adoption process closer to the major change and single change agent ideology inherent to the diffusion and adoption approach.

Rogers (2003) states that innovations are sometimes not instantly ready for application. Instead they need modification or redesign in the context of the customer in order to perform as intended. This concerns especially technological innovations (see e.g. Robertson et al. 1996, 336; Clark 1987; Fleck et al. 1990; von Hippell 1982). This tailoring and cooperation between customer and supplier creates a new role for the change agent, strengthened by the complex nature of most technology innovations. The technology attributes evaluated by an adopter are not rigid and fixed but rather socially constructed

(Newell, Swan, & Galliers 2000, 245) in a process that might be highly affected by the supplier. Due to this *learning process* during an evaluation phase, the role of the supplier may differ greatly from the traditional context, being more *co-operative* in nature, as in the cases here. Also of interest is what the roles of the other suppliers are in a situation where there is an established relationship between the adopter and one of the suppliers, and why these other suppliers are involved by the adopter; is it due to a learning process or to set up a rivalry between the suppliers? In the cases under study, it was due to both.

In briefly drawing together the above discussion, one could conclude that both approaches can be seen to capture the nature of information spread and consider a context in which a focal adopter firm and adoption process is embedded. The innovation diffusion is a kind of memory that draws together the individual adoption choices and presents them in the form of an historical curve that is specific to the innovation examined. The diffusion approach based on the early work of Rogers (1962) is as such incapable of capturing the idea of the adoption process in complex B2B markets. The cumulative pattern of adoption was shown in the number of already adopted companies and hence the potential opinion leaders. However, it was problematic to define the relevant social system in the case companies' contexts. For example, in Foodsmall1 the other food processing companies it discussed with during the adoption process belong to the same social system as Foodsmall1. However, these companies may or may not be future adopters of this specific technology of this supplier or adopters of some related innovation by the same or some another supplier. Hence, viewing the diffusion process as a static process related to some specific technological application or social system is a very difficult and restrictive idea. It is not so easy to define a group of potential adopters. We must first define a relevant unit of adoption, to determine whether it is a single company or a dyad, or maybe a value chain. The problem of defining a relevant unit of adoption implies that we cannot define what a social system actually is in an industrial context. Not necessarily it needs to be an industry. For example, in Foodconcern1 the supplier had references from the cosmetics industry as well. Webster and Wind (1972, 7) had hypothesized that each buying organization is likely to differ from each other to the extent that it might require considering each organization as a separate market segment. This difference in industrial markets compared to consumer markets is a result of different objectives, resources, people and abilities of the companies.

6.2 Building blocks of the activity based perspective on the organizational innovation adoption process

This section of the study identifies the mechanism producing adoption, the organizational commitment development to innovation that occurs as a result of the knowledge, persuasion and adoption phases that form the *descriptive content* defining the adoption process. These phases, however, do not reveal the underlying mechanism, the active organizational functioning that generates adoption. The *functional content* focuses on the organizational activities that took place beyond the three phases generating them and the adoption process. Figure 43 illustrates the levels of the consideration.

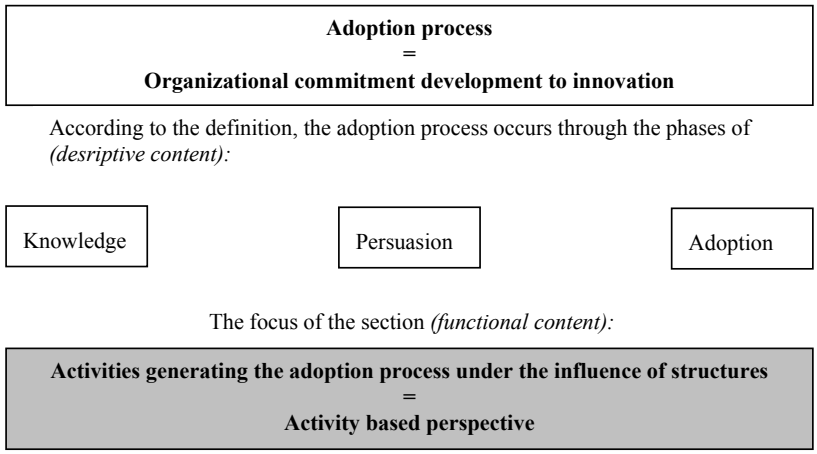

Figure 43 The descriptive and functional content of adoption

Since the adoption process has been defined as an outcome (commitment development) rather than active organizational operations to achieve commitment, the activities (functional content) that generate the adoption process could be viewed as a different process external to adoption. However, due to the fact that these activities are actually *content* of the adoption phases and the interconnections between the adoption process and these activities generating the adoption process through the adoption phases, it is reasonable to consider these activities as a functional content of the adoption process. In sum, descriptive content answers the question *what does the adoption process comprise*, and functional content answers the question *what is the adoption process a result of*.

The consideration builds on the comparisons in the previous sections. Based on the adoption process and buying process connectedness, the *information*

gathering, information processing, negotiation and *legitimation* activities producing the buying process (that includes the adoption process and rejection processes) are taken into detailed consideration and attached to the adoption process phases. These activities take place in and are influenced by different contexts or structures. Due to the inseparability of the contexts and structures they are considered synonymously in this study. Table 4 presents the key focus of the approaches and the building blocks they offer for theory generation.

Table 4 Building blocks provided by the theoretical approaches

Theoretical approach	Adoption & Diffusion	OBB	Network & Interaction
The key focus	Commitment development to innovation with reference to change agents marketing attempts and social system communication	Organizational actions of need recognition, evaluation and buying taken by individual employees in a buying center and organizational context	Adoption episode and adopter-supplier relationship embedded into a system of relationships reflecting past, current and future
Building blocks provided to theory generation	The boundaries of the adoption process: awareness-knowledge of the innovation as the start and the point of commitment as the end of the adoption process The timing of the adoption with reference to other members's adoption decisions in a social system	The information gathering, information processing, negotiation and legitimation activities The contexts of individuals, buying center, and buying organization The idea of adoption process as interlinked to rejection processes and other intra-firm activities	The context of time, and the idea of adoption as a temporal process affected by the past and the future The inter-firm context of networks of interrelated relationships directly and indirectly affecting the adoption process The idea of adoption process as interaction episode

The network and interaction approach emphasizes the context of the adopter organization and adoption process. Both contexts of actors and interactions are related to the adoption process, but also the context of time and interconnections of the temporary adoption process with the past and future. The activities are discussed through the contexts provided by the organizational buying behavior approach; *individual*, *group, organization* and

the network and interaction approach; the *network* of recognized identifiable counterparts interacting with the adopter and other more unknown actors indirectly affecting the adoption organization and adoption process. The activities under the influence of the identified structures form the adoption process.

The main building blocks, activities and structures that were raised in the organizational buying behavior and network and interaction approaches, fit with the ideas of Pettigrew and Giddens. According to those authors (see Pettigrew 1997, 338; Giddens 1984), actions drive processes but are embedded into contexts. Actors are both producers and products, contexts are shaping and shaped. The interchange between the two occurs over time and is cumulative in character. The concentration on activities facilitates taking into account the linkages between past, present and future through their reflection in the activities (see Pettigrew 1992, 8–10; Pettigrew 1990b, 9). The discussion below is based on these ideas on the dual relationship between the activities and structures.

6.2.1 Emergence of the activities and their functioning

In order to understand the mechanism producing adoption, the focus is fixed on activities rather than on sequential steps of the process. *Activity* in this context refers to a group of related actions that form the process (see Sarkis, Meade & Presley 2006, 757). The activities as concrete actions are believed to be more interesting and "real" than the (imaginary) sequential steps (see Van de Ven 1992) and hence deserve the greatest amount of attention in this perspective. Of course one might criticize the choice of activities as well on the basis that they are a collection of acts performed by individuals in the process and hence are also constructs created by the researcher after the fact rather than pure observations of reality. However, the focus on activities enables a more fluid consideration of the process without as strict a restriction of chronological sequence as in the process stages. This focus means the approach challenges deterministic linear sequence theories. Instead of sequential stages, reality is depicted by applying the activities and the structures whose reciprocal interplay is not fixed. This allows a fluid presentation in terms of time and takes into account widely different levels of contexts affecting the process.

Information gathering, *information processing* and *negotiation activities* lie at the heart of producing adoption and adoption phases. Information gathering and processing activities are performed for two reasons. First, they produce *need-solution pairs*. The activities forming the pairs can be a part of

continuous information gathering and processing activities that the companies perform constantly, or process specific i.e. performed only for the process in question depending on the order of the existence of need and awareness regarding the innovation. The following presents the generation of the need-solution pairs in the cases.

In Foodconcern1, the adopter company had been aware of a number of faster methods for quality assurance analysis, also including the adopted one, before the adoption process had started. The knowledge of these products had not led to the initiation of the process since there was no clear extant need. The company level decision to shut down another production plant and transfer production to the plant under examination generated the need for faster analysis methods. This led to the initiation of the adoption process; the already known faster analysis method was considered as a solution to meet the newly risen need. In this phase, the company had awareness-knowledge of the innovation to meet the specific need.

Also Foodconcern2 was aware of new technologies related to the new production line before the adoption process was initiated. Foodconcern2 has a policy of continuous improvement with regard to efficiency and is therefore interested in related technologies. Due to the early stages of the technology development, the company did not rely on the technology at the outset and it could not be considered a solution to meet the need. Once the company realized that the technology had developed, the need was established:

> *We had been mulling the idea over for a while, and actually the whole idea arose when we were on a tour of one of the reference sites and we decided that now the technology was at the stage where we can take the risk and embark on the project. We would have liked to start earlier, but we didn't really have confidence in the technology. But now we've been around quite a lot of places and looked and listened, and we came to the conclusion that maybe now the technology has reached the stage where we can go ahead. (Production manager)*

In Foodmedium, the adopter company was aware prior to the adoption process of a number of novel packing machines and their suppliers. The adoption process was linked to the process of consumer acceptance of Foodmedium's new product, and was initiated once the company had achieved a 20% market share generating a clear need for the machine. In Foodsmall1, the need to increase packing volumes arose due to sales growth. In searching for alternatives to meet the need, the company became aware of the innovation and some other solutions.

The presented examples of the generation of need-solution pairs have emphasized the role of the adopter company as a creator of these pairs. However, the technology supplier may also be active in facilitating the adopter

forming the pair. Due to the reputation of Foodsmall2, the supplier's CEO knew the firm and anticipated that when the underlying need meets the innovation the adoption process begins:

> *He knew me and our firm and so he knew to come to us and present the technology. It wouldn't have got off the ground otherwise – I wouldn't have known that they have this kind of technology if the salesman hadn't come to us. He knew from the past that it was worth coming to us – that we take these things seriously. (Production manager)*

All the case companies felt the need for continuous operational improvement and were thus interested in acquiring knowledge of new technologies. In Foodconcern1, Foodconcern2, and Foodmedium, the adopter companies had a general overview of the technology platform and product category involved, and a precise picture prior to the adoption process of the innovation to be adopted. In Foodsmall1 and Foodsmall2, the general understanding was much weaker. Solution awareness resulted from continuous information gathering and processing activities if it preceded the need (Foodconcern1, Foodconcern2, Foodmedium), and from more specifically process related information gathering and processing activities when it followed the need (Foodsmall1, Foodsmall2).

Despite the varying sequences of the need for and awareness of an innovation, or the degree of activity on the part of the adopter or supplier, the co-existence of the awareness of an innovation and a need is a powerful tool through which to define adoption process initiation. Even were the potential adopter exposed to and aware of the innovation, this general knowledge does not equate to awareness-knowledge. *Awareness-knowledge refers precisely to awareness of an innovation as a potential solution to a defined need.* Figure 44 depicts the two possible routes to awareness-knowledge via the order of appearance of need-solution pairs.

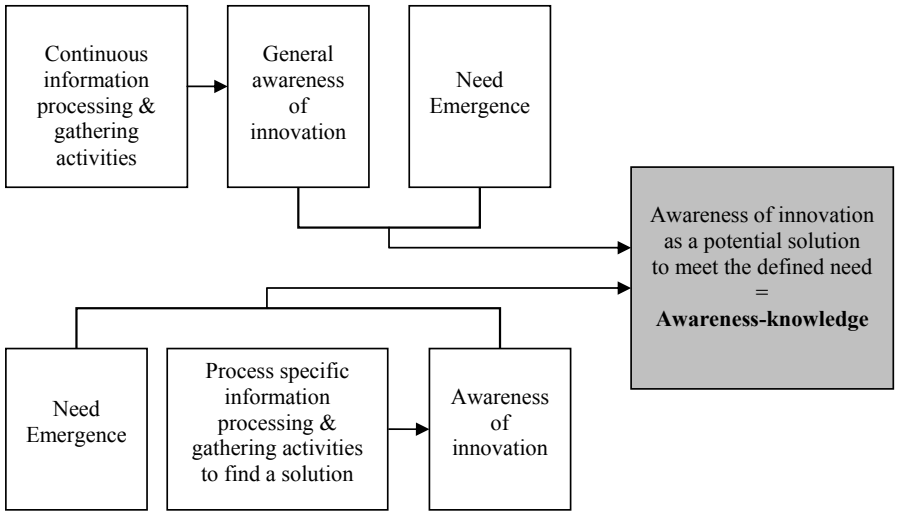

Figure 44 The two routes of appearance of defined need-solution pair forming awareness-knowledge

Without a need in which the innovation is considered as a potential solution, knowledge relating to the innovation qualifies as *general knowledge* alone; being aware of something in general is different to being aware of something as a defined potential tool to meet a defined need. This definition is in line with the adoption and diffusion ideology, according to which the adoption process and awareness-knowledge as a first phase thereof will inevitably lead to adoption. Without a need, the adoption will not take place, and so the awareness of the innovation's existence without a need for it cannot be considered as awareness-knowledge.

The second function of the information gathering and processing activities is to specify the *fit* between the need and the located solutions. When the adoption process was initiated (awareness-knowledge of the innovation was generated), the information gathering and processing activities targeted the scrutinization of the innovation as a solution to meet the need. These activities resulted in *how-to knowledge* (how to use innovation) and *principles-knowledge* (principles of innovation functioning) (Rogers 2003, 171–174), as well as two novel types of knowledge, *context-specific knowledge* (knowledge of the innovation functioning for the target context and purpose) and *how-to knowledge of the supplier* (knowledge on how the supplier performs). Some knowledge on these different types was already possessed in varying degrees in the study cases, for example due to earlier experiences of the supplier (Foodsmall1) and technical education (Foodconcern1).

The frequency and specificity of the information gathering and processing activities increased in every case during the adoption process. The general knowledge of an innovation that preceded the need and hence adoption processes was the result of continuous information gathering and processing activities. However, once the adoption process was started, the companies shifted from more preparatory information gathering and processing activities to activities with a clear aim and a restricted group of need related solutions. It is noteworthy that the innovation can be the only considered solution to meet the need (only one need-solution pair), or there can be also other possible solutions in addition to the innovation to be adopted (a number of need-solution pairs).

Information gathering and processing activities target both intra- and inter-firm sources of information. The upper half of Figure 45 summarizes the above discussion on information gathering and processing activities.

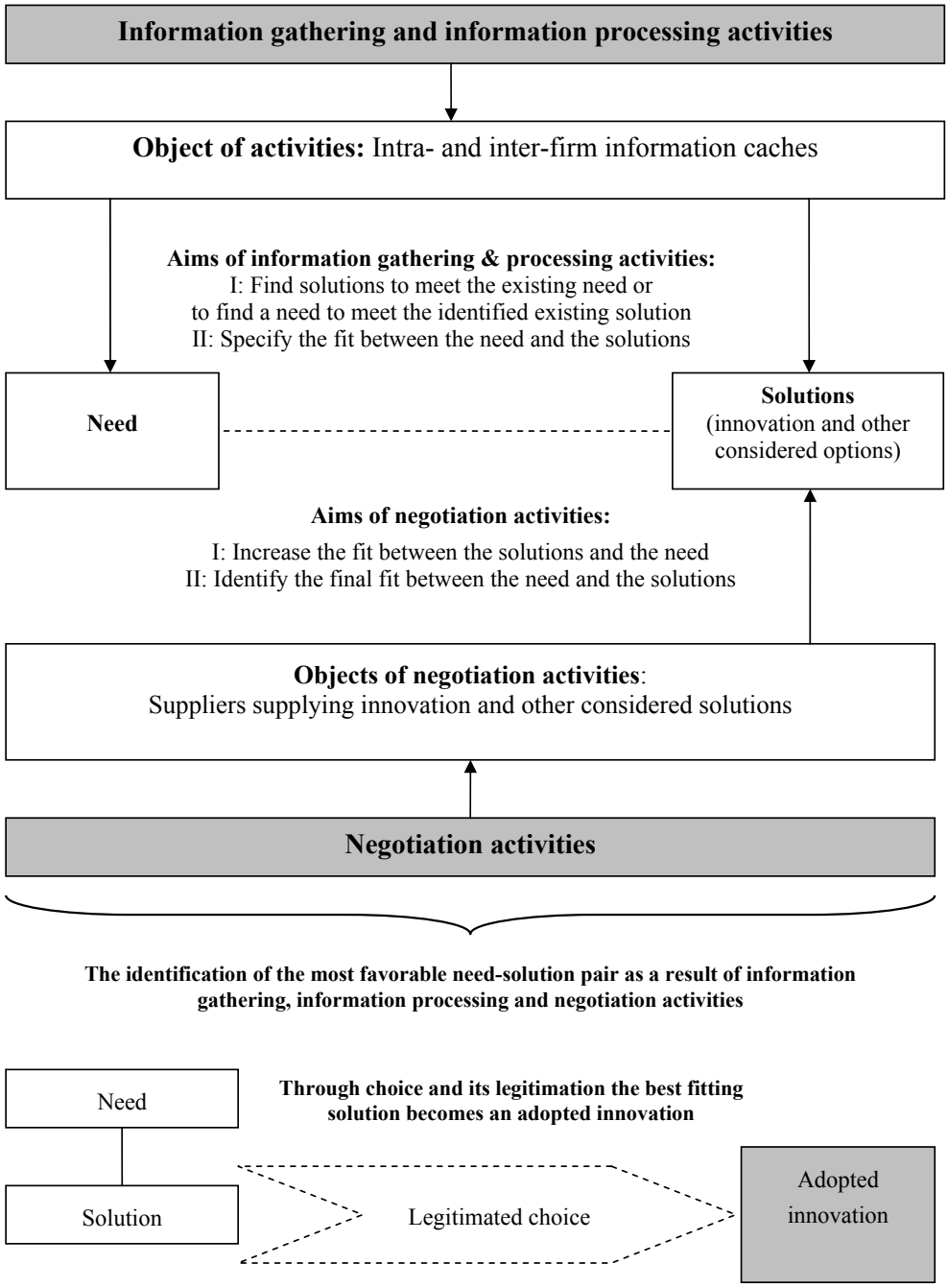

Figure 45 The activities producing the adoption process

The generated knowledge about an innovation provides an idea of its fit with the need. Prior to the negotiation activities, the adopter does not know the final fit as it depends on how much the supplier is willing to work on

improving that fit. In this phase there can be various lucrative solutions to which *persuasion* is attached. Negotiation activities are conducted to enhance the fit by influencing the supplier(s) to change the solution(s) to meet the need more effectively. This can happen through changing technical elements of the solution or changing the conditions (commercial terms) related to the solution for a better fit and that are more favorable to the adopter.

Another aim of the negotiation activities is to establish the final fit between the innovation and the need and between the potential other solutions and need. Negotiation activities may hence feature information gathering and processing activities. However, negotiation activities are separated from information gathering and processing activities, since the negotiations aim to influence the supplier. This feature of influencing the object of activities is not a purpose of information gathering and processing activities (see Figure 45) but is conducted to collect information from these caches.

The occurrence of the activities is not fixed; they may occur in parallel or in a different sequential order. The activities can also be specific to the solutions considered; for one particular solution and its supplier, all the activities may be performed, while other solutions and suppliers are still after under very first activities in considering their fit with the same need. As well the subject, the performance of the activities may change in relation to the identified need-solution pairs during the process. In this sense, the consideration of activities allows for a more fluid approach to the mechanism producing the adoption process, as does the sequential analysis.

The negotiation and information gathering and information processing activities comprise the main body of those activities producing adoption, and are hence termed *primary adoption activities*, which result in knowledge regarding the need-solution pairs and their fit. On this basis, the adopter can rank the solutions according to their favorability, which forms the basis for choosing the solution that best fits the need (bottom of Figure 45). The adoption choice is not an activity, rather an act. All the information is already available in this phase and it is just a question of choosing the most lucrative solution.

The *adoption choice* refers to organizational commitment to the best fitting solution. *Organizational* commitment implies that the adoption choice needs organizational legitimation. *Legitimation* attaches the results of the primary adoption activities, and the adoption choice based on those activities, to the formal organization. Legitimation may precede the adoption process, occur during it, or coexist with the adoption choice. Legitimation can be a process, an immediate act, or derive implicitly from the organizational structures. Legitimation produces a *legitimized adoption choice*. Examples of legitimation include that given, at the beginning of or prior to the process, to

an adoption unit by a company's board to choose a solution, a board legitimizing the adoption unit's proposal of a solution to be adopted, or the position of a company owner to legitimate the decisions he/she takes.

6.2.2 The interplay between the activities and the structures

The activities in the cases studied took place in a multilayer context. The context here comprises vertical and horizontal dimensions (see Pettigrew 1990a, 269). The *vertical context* refers to a net of interdependencies between higher and lower levels of analysis affecting and being affected by the focal process. In all the cases except Foodsmall2 there were a number of individuals engaged in the processes. They comprised an adoption unit that was set up to meet an organizational need. Hence, three *intra-firm levels* can be identified forming the intra-firm context of activities; *individual*, *adoption unit*, and *organizational contexts* (see Figure 46). The adopter organization is embedded in a network that forms the context for these activities at the *inter-firm level*.

The horizontal context brings time into the analysis, the focal process connectedness to the past, present and future. The horizontal context is included in the analysis with reference to each vertical context. Hence, the approach here can be said to be *contextual* in character (Pettigrew 1990a, 269).

Two characteristics, depth and breadth, are ascribed to activities. *Depth* here refers to the intensity of primary adoption activities related to a single covered option; how much information gathering, information processing, and negotiation is devoted per covered solution. *Breadth* refers to the number of solutions targeted by primary adoption activities; how many solutions are subject to information gathering, information processing and negotiation activities. *The context of the activities increases or decreases the depth and breadth of the activities.*

The negotiation activities were an area that the informants did not discuss in great detail. Perhaps this was related to the sensitivity of the issue, but also the negotiation activities were not as significant as the information gathering and processing activities. Hence, most of the description that follows focuses on the interplay between the structures and information gathering and information processing activities. Legitimation and adoption choices that are not included in the primary adoption activities were reflected to varying degrees in the processes and also presented in the following discussion.

6.2.2.1 Intra-firm context and activities

This section discusses the interplay of primary adoption activities with the intra-firm level structures, and begins with a consideration of the *individuals*; their cognitive structures, position, role in the focal adoption process and other professional and non-professional roles tying them together. In Figure 46, the larger ovals represent the individual adoption unit members. The dotted line linking the individuals refers to all the links between them. These can be roles in other professional tasks, non-professional roles or position or hierarchy related to their roles. The shaded ovals are the roles in the focal adoption process and the unbroken arrow refers to linkages related to these roles in this adoption process.

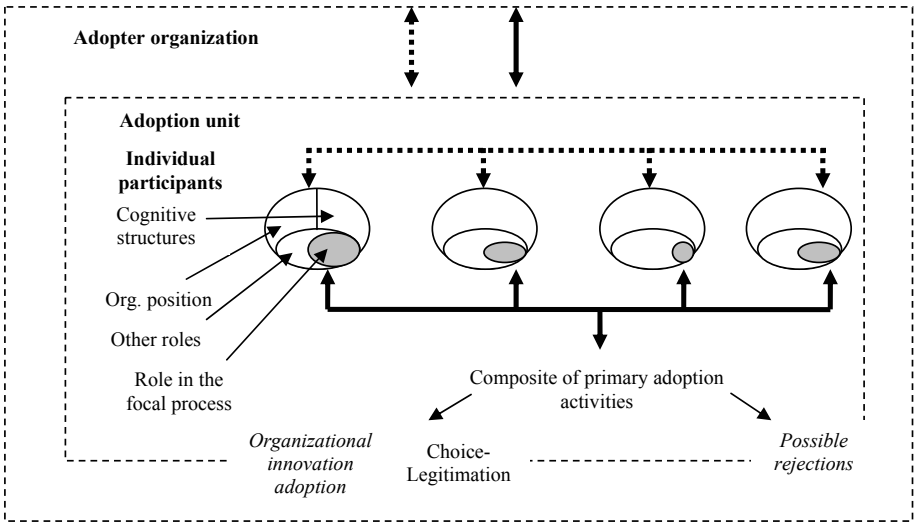

Figure 46 Activities and intra-firm structures

The individuals and focal process related linkages form an adoption unit. *Adoption unit* is directly linked to organizational context through the focal adoption process (unbroken line between the adoption unit and organization), and is also under indirect organizational influences (broken line between the adoption unit and organization). The composite of primary adoption activities (information gathering, information processing, and negotiation) leads to organizational innovation adoption via *organizational legitimation*. The process may also produce rejections. Both adoption and rejection are positioned in Figure 46 to cross the line between the adoption unit and organization in order to emphasize that the adoption process deals with *organizational* commitment, and end results are not restricted to adoption unit

level. The following discusses in more detail the individuals, adoption unit, and adopter organization as contexts of primary adoption activities and further scrutinizes the presented linkages and parts of Figure 46.

6.2.2.1.1 Individual adoption unit members

Individuals hold the key position in affecting the primary adoption activities, and hence the adoption process. They perform and also form a context for these activities which are in effect *mental processes* of the individuals and influenced by the individual *cognitive structures*. Cognition refers to the process in which the individual receives and interprets information from the environment (e.g. Webster & Wind 1972, 96). This study recognized that individuals perform primary adoption activities with reference to the structures presented by Johnston and Lewin (1996); these structures were *education*, *experience*, *motivation*, *perceptions*, *personality*, and *risk preference*. The following gives examples of the interplay between these structures and primary adoption activities in the cases studied.

In Foodconcern1, the microbiologists were skilled in gathering and processing information due to their education and work experience. This knowledge facilitated their gathering and processing specific information in depth. *Depth* here refers to the intensity of information gathering and processing activities related to a single covered option. The chosen innovation was scrutinized in detail:

> *You can't believe rumors, you have to get hard facts and perhaps that's the role of the expert, to go through the information and dig out the real facts. (The other microbiologist, she)*

Perceptions were thus based on analysis rather than feelings.

Also the experience and education based understanding of the conditions for the method and its targeted production circumstances enabled the microbiologists to scrutinize and compare other solutions as well. Another solution based on a different technology platform was considered. The number of scrutinized solutions on which information was gathered and processed refers to the *breadth* of information gathering and processing activities. As the microbiologists in this case did not primarily negotiate with the suppliers, the primary adoption activities referred to information gathering and processing.

Due to the product's complexity, its application to the specific purpose, and the potentially severe consequences of misuse or nonsuitability in production, neither education nor prior experience were adequate for adoption without new information gathering or processing. Work experience also inhibited the initiation of the primary adoption activities through individuals' initial attitude of suspicion towards the method. Due to earlier negative experiences of the technology platform in late 1970s, the microbiologists were not particularly

eager to start the process. One of the microbiologists (he) used to ask at the beginning of the process *"Are we again testing a long drawn out promising new method?"* Hence the negative experiences laid the basis for expectations regarding how the innovation would function.

In Foodmedium, the lack of experience was considered to hamper information gathering on specific issues:

> *It's far easier to discuss purchases in the Equipment Group, or to negotiate with the salesman when you know what it is you're buying and you know exactly what you're talking about; you know how the machine works, you have earlier experience, and you're able to question how things are done. You understand the technical side, for example, why is this piston formed like this or whatever specific detail it happens to be. So you're in a strong position to negotiate. At least for myself, I realize that this was very different from other purchases we've made. (Production manager)*

In Foodsmall2, the primary adoption activities were scant due to the personality of the production manager. As an entrepreneur, the production manager ignored the uncertainty related to the non-mature ideas in the solution to be built around the UVC light covers and was eager to start working on it without detailed scrutiny or consideration first. The project description from the production manager reflects his strong personal relation and subjective perception of the innovation: "*It was my baby, my child, the focus of my interest. It became a kind of baby for me."* Also the personal *motivation* to work on diminishing quality problems was restricted by the fast process when introduced to a solution that seemed to facilitate the purpose.

In Foodmedium, as no participant had a particularly structured vision of the technology, no-one was willing to put forward significantly provocative views. The production manager in this case put it as follows.

> *We don't in a way need to compete over who makes the decisions, and probably no-one wants to make the decision alone, that's the truth… No-one's head is on the block, but… (Production manager)*

Hence, the information processing tended to be conducted more on a group than individual basis due to the personal risk. This refers to the need to make a decision on the most favorable need-solution pair to conduct the adoption decision and legitimation. In Foodconcern2, it was more the other way around. The production manager of Foodconcern2 was the most active of the three buying group members and primary adoption activities related mostly to him. This degree of activeness was strongly linked to his personality, which one of the informants described as follows:

> *There are production managers, who avoid change, those who gravitate to change, and those who lead the change. (Head of implementation subproject)*

This informant definitely placed the production manager in the last category. The earlier experiences and knowledge of the technology in this case were adequate to limit the group of potential suppliers and hence reduced the breadth of primary adoption activities.

In Foodmedium, the marketing & sales manager's negotiating experience increased the depth of the negotiation activities involved regarding the chosen solution during the final phases. According to the production manager, the marketing & sales manager's skills drove the final price down tens of thousands below what it would have been if she had led the negotiations. This increased the fit between the need and the solution despite the fact that the solution under consideration would have been chosen anyway.

6.2.2.1.2 Adoption unit

The adoption unit presents a context of individuals and primary adoption activities in terms of adoption unit *size*, *structure*, *authority*, *membership*, *experiences in group work*, *expectations*, *leadership*, *objectives*, and the *joint backgrounds* of *the group members* (Johnston & Lewin 1996). These factors structure the individual participants' behavior and primary adoption activities performed.

In the study cases, the tasks related to focal processes were structured and allocated on the basis of the number of participants and their experience and expertise. For example, in Foodmedium the production manager was the maintenance manager's superior but fields of expertise rather than organizational position structured the activities' composite. The primary adoption activities' composite refers to the composite process of outcomes of the individual task processes and hence to collective information gathering, information processing and negotiation. The maintenance manager was the technical expert and his views were not questioned by the other participants. When asked about the relationships and atmosphere in the group he said, without a trace of irony, that "*We were all brothers together*". Group membership and size were in general based on the expected input of the individuals, not their organizational position.

None of the cases reported the selection of clearly defined group leaders; democracy was very much the order of the day. Democracy ruled in Foodmedium due to the need for a variety of areas of expertise, as well as the individual fear of making a "bad" decision and the personal consequences that entailed. Experience of running earlier projects was a significant factor in all the cases, and was manifested in the way projects were lead and activities

structured. In Foodconcern2, experience in the organization wide system also encouraged its strict application, although deployment stemmed from organizational policy, too. The production manager described the use of the blueprint during the adoption phase but also in the implementation phase:

> *We tried to implement the plan as far as possible (the project blueprint), that's the truth. And not because we had to or anything, like that, but our earlier experiences have somehow proved that when you have this type of progress plan and act accordingly and follow it quite slavishly, costs are kept under control, the work progresses and is completed on schedule, and people's responsibilities are clear. So on the basis of earlier experience we agreed that we would try to follow the plan quite strictly. (Production manager)*

The joint history of the group members in working or more generally interacting together was shown in processes. For example, in Foodsmall1 group behavior was mostly determined by marriage as the owners were a married couple. In this respect, other than purely professional aspects between the individual participants may greatly influence the group process and the primary adoption activities. Hence, contemporary behavior in the adoption process may be greatly shaped by history, making the focal behavior path-dependent. This is illustrated in Figure 46 by the dotted arrow that connects the participants. The solid arrow demonstrates the connection between the participants in the context of the focal adoption process and the roles (shaded ovals) that these individuals take in these processes. The ovals surrounding the smaller shaded ovals represent the whole role set of the individual. This includes other professional roles (in parallel projects for example) and also non-professional roles such as that of husband or wife. The objectives presented under the adoption unit category guide the functioning of the adoption unit, but those derived from the organizational context tasks and goals are discussed in the next section.

6.2.2.1.3 Adopter organization

Both individual behavior and group behavior take place in an *organizational setting*. The influences of firm *size*, *structure*, *orientation*, *tasks* and *goals*, *technology*, and *rewards* presented by Johnston & Lewin (1996) structure the discussion at the beginning of this section. The focus lies next on the adoption process as a part of wider organizational behavior and dynamics with regard to primary adoption activities resulting from the wider setting.

The size and structure of the company greatly determines the existence and composition of the adoption unit. In Foodsmall1, the adoption unit comprised the two owners, who take all the company decision jointly. In Foodsmall2, one of the owners, the production manager, performed the primary adoption

activities, but legitimation for the decision was needed from the other owner. In these cases, it was natural that the owners took part in the processes. In the bigger firms, the reasons underlying the form of the adoption units or their composition were a bit more complicated. In Foodmedium, there was a clear, concrete group (comprising the production manager, marketing & sales manager and maintenance manager) which handles the company's larger production related investment processes. However, the clear criteria for when tasks are performed individually or through the adoption unit were fuzzy. When the Foodmedium CEO-owner was asked about the rules he replied:

> *That's a good question, I've sort of forgotten about the Equipment Group altogether – we've just made investment decisions on the bigger machines, and the Equipment Group wasn't assigned to it. The production manager looked after the whole thing on her own. She does the calculations and everything else. I think I'll take this up at the next management group meeting and put the Equipment Group onto it, so that it's not just her view of the matter that decides it. Only last week we decided on some major investments, and it was she who was given the job of preparing them. (CEO-owner)*

In Foodconcern1 and Foodconcern2, the adoption units took their form with reference to the area under development, the organizational sections concerned, and organizational procedures to handle this type of processes. This was especially so in Foodconcern1, where the project blueprint that is a part of the certified quality assurance system (ISO 9001) had a great influence in shaping the process.

In addition to the existence and composition of the adoption unit, the organizational context affects the share and position of the primary adoption activities in the adoption process. In Foodsmall1, the adoption unit was comparable to company management and hence legitimation for the adoption decision derived from the structure of the unit; the adoption process constituted in effect the primary adoption activities and an adoption decision. In Foodsmall2, legitimation for the adoption choice was needed from the other owner. This was largely an announcement in this case company. The following citations from the Foodmedium CEO-owner and the production manager show that the adoption unit and the primary adoption activities were the largest part of the adoption process.

> *Yes it's the management group that gives its blessing, like the Board of Directors with us; the Equipment Group made the proposal and the payback calculation, what the machine's return would be and so on, so that we didn't think about the matter a lot – it was the Equipment Group that was decisive. (CEO-owner)*

> *In our firm, of course, decision making is really easy, as we're directly under the owners. You don't have to ask around, the owners decide directly. (Production manager)*

In Foodconcern1, legitimation activities played a bigger role as part of the adoption process and comprised a variety of acceptance decisions. The first was made by the production plant manager, to submit the project proposal to central administration, which then approved it. The project was monitored and accepted by a committee nominated by central administration. Following the committee's acceptance, an investment proposal was submitted to central administration, which finally approved the investment (adoption decision). The production manager describes the process and procedure in the company:

> *But it is a bureaucratic system – it's quite true that the bigger the organization the more bureaucratic it is. A lot of paper pushing has to be done. There are some places, like say in a small family business, where all you have to do is open a door and ask whether we're going to do something or not, and the answer comes right away – yes or no. But the way it is in a big firm like this, you have to make investment plans first and put them forward in good time for the next year, and then someone goes through them with a red pen, and then you get a budget, and even after that each production unit goes through it separately, and finally the investments are approved or turned down. A year is a short time to go through the whole process… the bigger the slower. (Production manager)*

This reflects that from the emergence of the need-solution pair, there can still be a long road to travel to adoption choice. Also in Foodconcern2, legitimation was required from the very inception of the process:

> *This preliminary investigation of ours was crystallized down into one A4 sheet of paper, so we could show how things stand. Then, if I remember rightly, it was discussed at some level in the local management group, which gave us the go-ahead for the investigation. Then the issue was passed on to the Corporate Management Group which said OK; this is worth investigating. (Production manager)*

After the initial legitimation decisions, the adoption choice needed legitimation once again by concern level management. In this sense, it could be hypothesized that the less hierarchical organization structures diminished the legitimation activities, and primary adoption activities are a greater part of the adoption process, as adoption units are more empowered than in more hierarchical companies.

The adoption unit's dedication to the processes and the share of the legitimation activities went hand-in-hand with the procedures to handle this

type of processes. In Foodconcern1 and Foodconcern2, there were formal systems and guidelines for different types of processes and their handling. In Foodsmall1 and Foodsmall2, the process formed more serendipitously and was related to the personality of the owners and their thinking concerning the situation. Foodmedium lay somewhere between these two ends of the continuum. A firm's orientation towards adopting new technologies and in general developing operations systematically was related to larger size. On the other hand, the smaller firms were much more flexible in adopting new technologies because of their less hierarchical structures.

The prevailing technology at the organization set the limits on the options that could be considered. One of the informants regarding Foodconcern2 emphasized technological capabilities in enabling adoption of new technology: If we allow the factory to get into quite a bad state while we wait for the new technology – like we just say that we'll manage now with these old machines until things develop further. This would at first sight seem quite an attractive option. In that case what the future means is that we don't have financial or mental resources to go along with it any more. To me it seems that this is a place where we have to go step by step and not take a huge leap all at once. (Head of implementation subproject)This notion is in line with the seminal article by Cohen and Levinthal (1990) on absorptive capacity. They (1990, 148–149) concluded that organizations with prior experience or knowledge concerning related technology are more ready to adopt new technology innovations. Technological compatibility in Foodsmall1 favored choosing the supplier that delivered the previous machine.

The needs to be met and problems to be solved by the adoption units derive from organizational purposes:

> *The main issue is the economics of it – that is if we invest in new technology, it will bring savings, either in time or money. Of course it's always, especially in production machinery purchases, the payback time that counts – we buy a machine in order to save something with it. (Product development & quality assurance manager, Foodmedium)*

> *In fact we make development plans every year and usually the projects have to be based on the plant's targets, in other words, how these projects will affect the plant's targets – the targets for the coming year, that is. (Production manager, Foodconcern1)*

The aims of the case organizations were not to adopt the specific innovations, but to solve certain organizational problems or more generally to meet certain organizational needs at that time. In this sense, the problem solving process, of which the adoption process is a part, is a temporary process in a wider range of *organizational behavior* that comprises temporary and continuous processes.

In Figure 47, the shaded box represents problem solving process A that includes the adoption process.

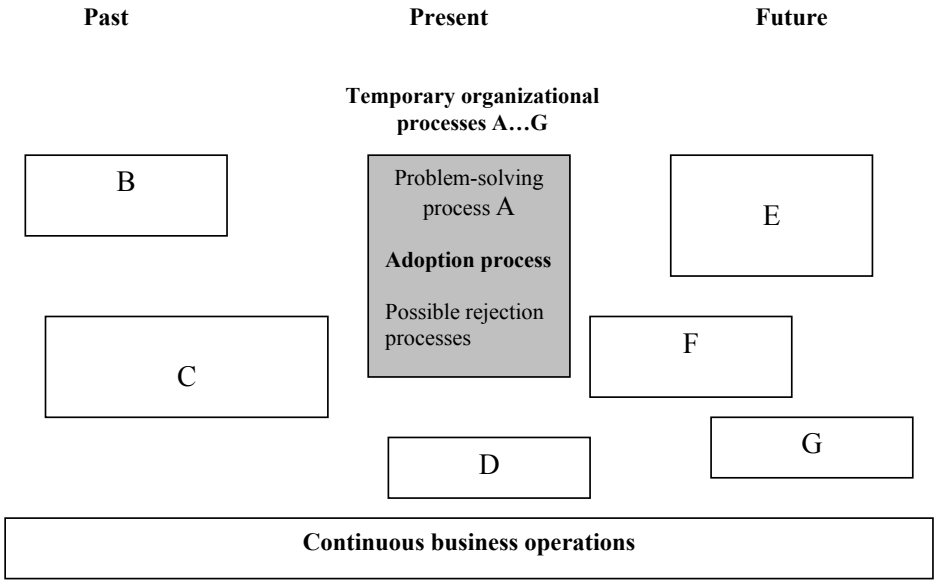

Figure 47 Adoption process within wider organizational behavior

Despite Figure 47 not precisely depicting any of the cases, in every case other temporary processes in the past (B and C), in parallel (D), and expected processes in the future (E, F, G), as well as continuous business operations that extend from the past to the present and to the expected future, can be recognized in the past-present-future continuum. The view of adoption as a *part of wider organizational problem solving behavior* brings rejection processes into the picture. The primary adoption activities are aimed chiefly at *problem solving* and are formed as an end result of the adoption process among *possible rejection processes*.

The problem solving context led to interactions between the adoption process and rejection processes facilitating the evaluation. In Foodmedium, the existence of other solutions in addition to the chosen innovation facilitated the depth of information gathering and processing activities targeted at the chosen solution, in a situation in which individuals' previous experience or knowledge concerning the issue was scant:

> *Someone wanted to do the packing in a different order, so that they first made the tray and then put the perforated board on top of it even if someone else did it the other way around. And then you ask: why is it being done this way? And you decide in your own mind which of these ways is better: when*

> *both assure you that their way is better, you still think no... this is the better solution… At least I think that it's really important to make the comparison: if you listen to only one of the three, say the weakest proposal, and don't listen to the others, you're likely to be quite happy with that person's suggestion if you have no previous experience of a similar investment. (Production manager)*

Organizational purposes to some degree subsume the individual personality affecting the process, personal goals being subordinate to organizational goals (except in Foodsmall1 and Foodsmall2). For example, in Foodmedium the solution that was finally chosen was perhaps recognized as the best by all the individuals from the early stages, and the formal evaluation was executed partly in order to separate personal feelings and rational organizational goals. This added breadth and depth to primary adoption activities, as also did the rewards, including negative rewards or punishments (or at least the fear of them), that were set to motivate the individuals to operate according to the interests of the organization. These examples clearly show that the individual and organizational contexts are not (and neither are the other contexts) separable but quite highly interwoven.

The initiation of the adoption process was usually related to other organizational processes. For example, in Foodconcern1 the downsizing of another production plant and production transfer to the plant under scrutiny partly created the need for awareness-knowledge and kickstarted the adoption process. Similarly, the production transfer episode in Foodmedium impacted the building of the production line for which the packing machine was later needed. In addition to need emergence, another type of influence in the past may facilitate (or hamper) process initiation as is shown in the following examples.

In Foodsmall2, prior to the initiation of the adoption process, the company had started to build new production facilities. The innovation (a new disinfection system) was a perfectly fit with those facilities, and the construction process formed a favorable basis for the adoption process to begin. On the other hand, if the construction process had been in full swing, it could have postponed the adoption process:

> *But then, which was a bit of a relief, there was enough time, so that the biggest investment, the building of the clean room, was really already complete. Then we could begin to implement the supplier's method in the already existing clean room. (Production manager)*

In this sense, adoption process initiation was supported by the company's previous development, as well as by the success of previous projects and the company's resource availability:

> *We've had really good experiences with these kinds of pioneering projects – they've succeeded quite well and a lot of good results have been achieved. So maybe it's been easier to believe that this will work out well, too. If we had had a worse history in these things, maybe it would have affected the amount of the investments… (Production manager)*

These examples present occurrences that refer to the prioritization of organizational activities. Based on the first citation, it can be said that the availability of time and resources may disable the initiation of the adoption process, if the organization is engaged in other time and resource consuming tasks. The lack of resources means the need does not emerge and hence neither does the need-solution pair. Need is defined here as an organizational problem on which the organization has to start working in order to find a solution to meet the need. If the problem solving process can be postponed, there is no extant need. The latter citation refers to trust in this type of project influencing the organization to prioritize other such projects. Without this trust based on earlier positive experiences, the adoption process would not perhaps have been initiated.

Prioritization is related to financial resources and their allocation between contemporary projects. In Foodsmall2, the firm's prosperity had from the financial resources perspective facilitated various kinds of project:

> *Our ability to make profits has been great, or let's say, the financial side has been in such good shape that it's much easier to make decisions than in a situation where there's no money. But we really haven't had a lot of restrictions like that and we've been able to do things and develop. (Production manager)*

In Foodconcern1, the production manager speculated on the competition for resources between the plants and its implication for the focal adoption process:

> *Well, of course, there is money there (in central administration), but it always goes according to how and what is considered sensible and what's not. So some years the resources are so small that nothing is done, and it's very typical that, for example, in the case of a project like this, if there's no money, then it means that things won't get done that are not obligatory, so to speak. There's no way this would have been obligatory either, so it would have been put off. (Production manager)*

Despite resources constituting the link between the adoption process and other organizational processes, the direction of influence seems to be determined by organizational policy to *allocate* these resources. The latter example from Foodconcern1 illustrates the vulnerable position of the focal adoption process due to its lower significance status in the organizational hierarchy.

The cumulative influence of earlier occurrences must be enabling rather than disabling, otherwise an adoption process would not come into existence. However, certain occurrences can of course be assumed to be disabling but not sufficiently so amongst others to disable adoption process initiation. The succession of occurrences in the past that brings the adoption process to life is termed *enabling development*.

The prior, current and anticipated future organizational activities that are directly or indirectly linked to primary adoption activities shaping them during the adoption process are termed *secondary adoption activities.* These may have a facilitating or inhibiting effect on primary adoption activities, increasing or decreasing their depth and breadth during the adoption process. Secondary adoption activities differ from enabling development, which refers to adoption process initiation but does not affect the ongoing process, while secondary adoption activities do not affect process initiation, but do shape the ongoing process. This view accentuates the embeddedness of the primary adoption activities and the adoption process in wider organizational behavior among other temporary and continuous organizational functions. The following illustrates examples of the secondary adoption activities in the cases, in the categories of *prior* and *current activities* and *expectations of future activities*.

In Foodsmall1, compared with the earlier investments, the focal adoption process was less risky and smaller and, hence, was not considered especially demanding or complex. These earlier investments eased the primary adoption activities in terms of depth and breadth. In Foodmedium, a group of three persons attended an exhibition prior to the initiation of the adoption process. One of these individuals, who was an external consultant, was there in order to pre-examine the potential candidates for the potential adoption process. The other two, the product development & quality assurance manager, and marketing & sales manager, were there for other purposes that were more acute at that time. However, since they were present, these individuals also visited the potential suppliers' stands with the consultant, and heard presentations on the solutions on offer. When the adoption process started, the marketing & sales manager was a member of the adoption unit and brought in a contact established at the exhibition. Hence, their presence at the exhibition as a result of the more acute project meant they acquired general knowledge concerning the options and increased the breadth of primary adoption activities in the focal adoption process.

The *parallel activities* had various interlinkages with the focal adoption processes. *Resources and their allocation* between the ongoing projects were a significant factor affecting the primary adoption activities. All these processes consume resources from the same pool and hence are interlinked via

resources. Since the individuals are also shared *human resources*, the *available time* to dedicate to the focal process rose. In general, it was noted that there should have been more time for the studied processes, and that they were actioned in parallel with a variety of other temporary tasks and routines related to the position and everyday work.

> *This is a really important project, but unfortunately it has been carried out on the side, so to speak. But as there are two other projects on the side, of course, as far as your own time allocation is concerned, you sometimes wish your boss would prioritize; it would help if he said that now this is what you have to do, and he would accept that the other job will get neglected a bit. When you're like me, basically conscientious by nature, it's quite stressful when you feel that something has been left unattended to. (Production manager)*

In addition to the individuals' available time, the *individuals' availability* was affected by the other ongoing tasks. In Foodconcern2, the project manager was dedicated to this project partly because the more experienced and perhaps more suitable individual was involved with another major project at that time. In this respect, the individuals' other engagements due to organizational resource allocation decreased the possible depth and breadth of the primary adoption activities, thus inhibiting the adoption process. However, despite the fact that the chosen project manager was less experienced, he was enthusiastic and succeeded quite well according to the other participants. In this sense, the nature of the influence of the allocation in this case cannot be determined as concrete evidence of better or worse performance, compared with the more experienced project manager's performance.

Resources exerted an influence on the initiation of the adoption process (enabling development), but may also have affected the ongoing process via organizational allocation activities. Despite acting as the link between the adoption process and other organizational processes, the direction of the influence of the resources is determined by organizational allocation. The adoption process can be positioned at the top of the hierarchy, as in the Foodmedium and Foodconcern2 cases:

> *Then, when it began to become clear what a useful investment it would be, it was prioritized and made the number one project. (Board member, Foodmedium)*

> *At that time, when it was presented there, I think it was the Managing Director who asked why it hadn't been implemented. I thought it was quite a positive statement from him at that point. It was a clear message, to get it done as quickly as possible. (Production manager, Foodconcern2)*

These prioritizing activities increase the effort dedicated to the processes. In general, it was said in Foodconcern2 that multiprojects and their changing priorities are a normal part of everyday work:

> *It's a very typical situation here that there are always several projects underway at the same time. But that's how it is in all the groups really, as the same people are involved, so that resourcing and prioritizing and so on, if they live a life of their own within the project, they still affect every project. (Head of IT subproject)*

The influence on the focal adoption process may derive also from other organizational tasks and structures beyond temporary projects. Both in Foodconcern1 and Foodconcern2, there were some changes in organization structures and positions that affected the shape of the adoption process:

> *In our firm, changes were made in the corporate management group and here it had been agreed jointly that the job would start, and the Management had been there, the three of them, when I told them and they said to get the preliminary planning started, and after that we got on with it and did the further planning. But when we were at the point of bringing the investment decision before the corporate management group, I don't remember in detail what happened there, but anyway people had been changed around, areas of responsibility were changed and so on. If I remember rightly, there was a transition period of about 2–3 months, which postponed the project compared with the original schedule. But after that, when the management group had settled down, we knew who was doing what job and who to introduce to whom, and about what, and then the investment decision was made and the project was rolled out on schedule. That was it – it wasn't so much about this project, it was more about the changes in the corporate management at that time. (Production manager, Foodconcern2)*

In addition to prior and current activities, the *expectations of the future activities* may affect the focal adoption process. In Foodsmall1, ideas concerning the future intended use of the machine increased the depth of primary adoption activities. The supplier characterized the impact of future expectations as follows:

> *Yes, we went through the options pretty carefully, and generally I try to stress to customers that it's worth thinking a bit further ahead, that at the stage when the machine is being manufactured, then it's possible to take the details into consideration a lot more, and then it's easier to make changes later – when you have thought them out beforehand, so yes we did discuss all sorts of things there. (CEO-owner of the supplier)*

Similarly, in Foodmedium, the potential future uses of the machine suggested by the (final) chosen supplier increased the depth of primary

adoption activities related to all the solutions considered, as the new ideas were passed to other potential suppliers as well. In Foodconcern1, the microbiologists were more interested in participating in and dedicating their time to the process, due to their expectations of a potentially wider application within the company, at other production plants. In the same way as the adoption process is affected by other organizational processes, the effects go both ways, as in Foodsmall1:

> *It was a big investment, so that year we didn't make many other investments… For that reason we took people from the other products side and stopped making unprofitable products on the other line. This speeded up the rundown of the operations – some of them, that is. We trimmed down our operations because we saw that this was where the business is. We might have cut down operations anyway, but in this case it wasn't possible to increase costs, so we had to make cuts. (The owners)*

The primary adoption activities have a direct relationship with the structures, as similarly do the secondary adoption activities. Hence, both types of activity are reflections or products of the activation of the organizational structures, and are affected by them, but at the same time they activate these structures and have an effect on them as well. In general, all the occurrences or activities that take place prior or parallel to adoption process, or that are expected to take place in the future, and have some sort of influence on the focal adoption process, can be defined as secondary adoption activities. In some cases, the adoption process can be viewed in terms of secondary adoption activities from the perspective of another adoption process. However, the discussion on and definition of secondary adoption activities is always linked to the perspective of a focal adoption process.

Organizational needs are directly or indirectly bound to the wider business context of the adopter organization. The business context shapes and directs the behavior of the adopter company. Also the business context comprises a range of actors that convey information to be gathered and processed by the adopter. The adopter's network has a significant effect on the primary adoption activities of the focal adopter. Thus, in addition to the intra-firm contexts of the individual as discussed earlier, the adoption unit and organization at an inter-firm level can be incorporated into the analysis. The next section examines the adoption process from the inter-firm perspective.

6.2.2.2 Inter-firm context of activities

The primary adoption activities targeted, in addition to intra-firm objects such as individual and organizational information caches, also information caches

and actors outside the company boundaries. The primary adoption activities thus bind the adoption process to the network context. In Foodconcern1, at the beginning of the adoption process, one of the microbiologists (she) asked a company that had already applied the same method about their experiences and test results regarding the innovation under consideration:

> *Because I knew their former and also their current head of development, or the development manager responsible for quality, I asked him, because I had heard that they had been doing this, what he thought about it and whether or not it had gone well. And I even got an e-mail afterwards with some results and comments. ([Microbiologist (female)]*

The citation clearly shows that the connection was based on previous contact between the persons concerned. The previous development at both the individual and organizational level in Foodconcern1 was strongly linked to the focal adoption process and temporary information gathering and processing activities. Foodconcern1 had been a part of the technology development in the area of quality assurance by co-operating with different partners for many years. The microbiologists (especially she) had been active participants of the *IndustryX-Network*. The company from which testing results were requested is also a part of this network.

IndustryX-Network gathers around different topics related to production development and particularly to the quality assurance issues. This collaborative network was formally established by companies in the industry in the Nordic countries together with research funding organizations. In this sense, participation engages both the organizational and individual levels of Foodconcern1. The microbiologists as experts in the field have represented their company in these meetings, but the company itself has been the formal actor in establishing the network and funding the operation. The formal part of the IndustryX-Network project has concluded but the network continues to function on an informal and voluntary basis as the companies still get together once or twice a year in order to consider quality assurance and quality development issues.

> *I belong to an unofficial Nordic discussion group, where people in the industry – representing ten or so companies – meet to discuss hygiene and product safety, analytics and that sort of thing. It's on the principle that hygiene is not a question of competition, but these are common problems to the industry as a whole and we exchange experiences. Of course, we don't reveal any trade secrets but we tell how we solved a washing problem or an analytics problem – so it's to everyone's benefit. ([Microbiologist (female)]*

The network facilitates continuous information gathering and processing activities. When asked, the microbiologist (she) put it as follows:

> *This is a continuous activity. We always keep our eyes and ears open so we know what's going on elsewhere and we listen to what other people in the industry are doing and whether they have any references and so on… So we do this all the time. ([Microbiologist (female)]*

Despite the organizational level formal networking, the individual level interactions based on personal contacts seemed to go further. Or at least the individuals had different views on the networking and information exchange between the companies who are also competitors. The manager of the plant at which the innovation was adopted thought this kind of personal level information exchange "quite exceptional". From the microbiologists' perspective, it qualifies as normal procedure. One of the microbiologists (he) put it thus: *"Networking is a good thing because you can't do everything on your own. It's cheaper for all concerned to listen to the others' experiences and ideas and exchange them instead of everybody trying on their own."* Also the *interconnectedness* of the companies within the industry supports the joint aim to prevent quality hazards and problems:

> *So any problem or scandal that affects anyone in the industry harms the whole industry. Everyone suffers and the consumers become suspicious about anything that's similar. So if someone has a problem they soon start phoning or people start phoning and asking what it's all about. ([Microbiologist (female)]*

Foodconcern1 had also co-operated with a commercial institute in developing another technology platform for quality assurance. This technology was not sufficiently accurate and could not in fact be applied to quality assurance. This earlier organizational level co-operation was accumulated in the microbiologists' experiences and was reflected as experience in dealing with this process. Also technology suppliers had actively approached the company facilitating general knowledge on a variety of available methods:

> *Well, suppliers rarely have to be invited. There are plenty of them, suppliers and so on, and nowadays they're very active, almost too active, so they become a nuisance. And there are all sorts of applications for every purpose and that's just it – how to discriminate between what is just fiction and what is fact. That's the problem – if you knew that you could go somewhere and rely on them and not waste your efforts. Quite often it turns out that something just doesn't make sense. The salespeople will always tell you that this is exactly what you need. (Production manager)*

All these structural elements facilitated primary adoption activities during the actual process. The microbiologists had contacts from where to gather information, and partially due to the networking had expertise and also outsider help in processing the information. This enhanced the depth of

information gathering and processing because the network was used to acquire detailed knowledge of the finally chosen innovation that was already in use in a partner company. The network narrowed the breadth of information gathering and processing activities during the focal adoption process as Foodconcern1 was aware and had an idea of the different faster methods and their suitability:

> *So, yes we do know what methods there are and of these we only looked at the one we were intending to implement in our production. ([Microbiologist (male)]*

In the focal process, the company already had knowledge about ill-fitting options that no longer merited consideration.

In Foodconcern2, the actual adoption process was only the tip of the iceberg, the result of an evolutionary process that had started in the mid 1990s. Due to the competitive nature of the global market in their sector, the company has for years been in close co-operation with the key technology manufacturers as well as with the other food processing firms, in order to follow and be a part of the technology development. Similarly to the Foodconcern1 case, the relationships with other food processing firms include also relationships with competitors in the context of technology development:

> *Yes, we want to have this contact, and in a way it would be strange if someone (a competitor company) is trying to develop something the same without knowing what the other is doing and is putting loads of money into it. We've been able benefit from certain things in this way. (Head of project and development organization)*

As with Foodconcern1, the lucrative preconditions had not led to an adoption process. In this case it was due to the non-matureness of the technology and hence a lack of need for it. As the company was well-integrated into the network of key food processing firms and the technology suppliers, it effectively acquired knowledge on developments in the field. These relationships were based both on organizational level as well as individual level relationships. The production manager described these relationships as follows:

> *They certainly are extremely important. We do have a relatively good reputation. Of course, that's due to people and then of course operations, what you do business in and how it's managed, and these relationships are on quite a personal level. They are definitely important for opening doors when you go to Denmark or Britain or when you go to some plant – it's not automatic that you will be given access. (Production manager)*

This access and other actors' attitudes was also a factor that came into play in the relationship with a foreign technology consultant firm that is widely recognized within the industry in international terms:

> *But of course there is one thing – we want to know that our relations are good and that we are taken seriously elsewhere in the world. And this involves a lot of very small nuances. But they have very extensive professional competence in this process and we wanted to bring more of it into this family. (Production manager)*

On this basis, it is easy to understand that the existence of these relationships is a key factor in providing sources for information gathering and also knowledge for processing this information. When the production section was last modified in the year 2000, the time was not mature for adopting these machines then:

> *We were ahead of our time. You see, when I talk about contacts, we knew a lot about it already and we saw that others were struggling with it, and we didn't want to go along that road – to the stage where the going is heavy. (Head of project and development organization)*

This knowledge was again transmitted by the network that inhibited the adoption at that time. The earlier modification was made according to knowledge of the machines at that time and some idea of their future development. Based on this very accurate knowledge of the state of the technology in 2000, due to being a part of the development, the company had quite perfect vision of the coming solutions.

> *We stayed with manual operation, although we did have to modernize the manual line and increase its efficiency (2000). But it was done in such a way that we had places for the automatic machines all ready. We had a pretty good picture of what size they are and what they're like – and it was a damn good picture. I mean, we just had to drop them in there (2006). (Head of project and development organization)*

Most of this knowledge concerning the technology development and the company's own needs was possessed by the key individuals and acquired through their personal relationships:

> *Well, the vision was of course that as head of the project organization I had my own ideas – I've been in the business a long time and I've been around. And then secondly, there's this guy, the customer (production manager). …and I had already taken him to see them, and said look, this is what we have and we've got contacts in common and… (Head of project and development organization)*

This proactiveness and future orientation was driven by the constant need for the continuous improvement of current practices in terms of dealing with the international competition.

> *Probably one of the most important things is that one, two or three people have made an effort to keep up with developments, with what's happening in this field globally. We have in fact been following closely for years what the world has to offer us and our process, so we can keep up with the international competition even to some extent. We've seen it and assessed the situation in Finland, and through it, the company's situation and relation to these markets. So we know that we have to change this manual, traditional artisan-dominated field and look towards automation. And we've come to that conclusion when we recognize our own efficiency and productivity and the cost of the work. In Finland the cost of labor in this field has developed to such a high level over the years that we realized automation was a definite option… It (the vision) has just grown over the years, and we have tried to keep up with the times. You won't be up to speed if you don't go out there and talk to people and listen… So we try to keep ourselves up to date all the time with what's really going on in the world, what the competitors are doing, what the equipment manufacturers are doing, what they have to offer. (Production manager)*

This development in the past and future visions and expectations regarding the competition and the company's position in the field with reference to other actors in the market formed a context for primary adoption activities.

The earlier relationships and knowledge in the field narrowed the primary adoption activities in terms of depth and breadth. It was known at the outset that there was a maximum of four possible suppliers in the world suitable for this project. It was easily identified that only two of these four would be in contention. The depth of the primary adoption activities was reduced due to earlier relationships between these two suppliers. Hence, the primary adoption activities related mostly to the methods offered, not to the suppliers in general as Foodconcern2 already had *how-to knowledge of the suppliers*.

In Foodmedium, the adoption process was eased due to earlier relationships with the key suppliers. The company knew and had had similar types of smaller production development projects with the two suppliers that showed the greatest potential. These relationships focused largely on the maintenance manager and marketing & sales manager. The production manager had worked in a different subfield of the food processing industry and hence did not possess knowledge of the potential technology suppliers.

The two less known suppliers were taken into consideration more serendipitously but are examples of the continuous information gathering process. One was a contact of the marketing & sales manager established at the exhibition. Primarily he attended with regard to other projects, but also

visited packing machine suppliers' stands for possible future projects. The other was a company that supplies packing materials for Foodmedium. When the representative of the packing materials supply company came to meet and introduce himself to the new production manager of Foodmedium, it appeared that the company also supplies production equipment in addition to packing materials. This was largely a result of the production manager's habit of continuous information gathering. Also due to the continuous information gathering, the maintenance manager had, prior to the project, already processed information to be applied in this process:

> *And before I've got the job, or before we in the Equipment Group have been given the assignment to make the purchase, we've sometimes quite independently asked whether there is any interest in this kind of thing and what something like this might roughly cost... before the Equipment Group has actually been given the assignment and I've sometimes asked around just for the hell of it. Because people phone me several times a month, from different firms about whether we have any projects underway… and we've been to so many fairs and visited so many different plants and so on, that we knew all this before. So there's this knowledge, and everyone who's been in the field for any length of time, they know what's going on in the world – there are no secrets in that sense. (Maintenance manager)*

This earlier information gathering reduced the need for information gathering and processing for the focal adoption process. The continuality of the information gathering and more generally the continuality of interaction between the firms in the context of production development was confirmed by the finally chosen supplier:

> *This has been talked about for so long already, that it's difficult to give any definite reason but probably it was just the right time for it then. Of course we knew before that the need existed, or in general when an investment decision is made, it has already been investigated and discussed, these things have usually been in the pipeline for quite a while, so at the stage when decisions are made there are plenty of ideas about what it will involve in any firm. It doesn't just happen right off, today – it's not like: come on, let's get that investment on the road, let's get on with it tomorrow, hurry it up, so usually it doesn't come as a surprise to anyone. (CEO-owner of the supplier)*

Also, similarly to the Foodconcern1 and Foodconcern2 cases, collaboration with competitors was mentioned in the context of new technology adoptions in Foodmedium:

> *Of course contacts are exploited if you know that someone has something like that, and it's quite common that whether it's a big piece of production machinery or a small machine, the food processing business in Finland is so*

> *small that even though we are competitors in technology purchases, if someone has a machine, you can usually get to see it. (Product development & quality assurance manager)*

In Foodsmall1, the earlier relationship with the chosen supplier and experiences of the previous packing machine from this supplier eased the primary adoption activities: *"We made the decision on the basis of very little investigation – we relied on the Finnish agent in this matter"*. Also there were clear compatibilities between the previously purchased machine and the one under adoption, as well as the benefits of using the same supplier, that narrowed the primary adoption activities. When the previous machine was acquired, the primary adoption activities were reduced also by general trust due to the small size and limited resources for continuous information gathering:

> *At first we relied on the firm being German, we couldn't know the company, as we are just a small buyer. (The owners)*

In this sense, the company does not have a similar volume of network partners, or the resources to build these networks as the bigger companies do.

Despite the scant information gathering and processing activities, Foodsmall1 also had some discussions on the topic with a couple of firms it has social relationships with. As these firms are small, they also possess quite limited knowledge. For example, the hint dropped by a small partner company regarding a Danish technology manufacturer supplying a much cheaper aseptic packing machine lead to consideration that lengthened the process. In the end, this packing machine was not comparable to the one finally adopted. The views of the others were mostly negative on the adoption of a disinfection function and its usefulness:

> *We really got no encouragement from anywhere… Do it yourself and take the risks yourself, but we did find positive sides ourselves for the project… Those who made comments didn't perhaps understand our philosophy about organic products. It is in a way important what others say, but we're such a specialized firm that we are up against the major industry players. And their attitude to us is always a bit ambiguous… So we are used to going our own way, and of course the vision has an influence – if we have a vision of being a preservative free product manufacturer, then it does dictate the direction of the purchases we make. (The owners)*

In this respect, it seems that as a small company Foodsmall1 has limited potential and collaborators even were it to dedicate more resources to networking. Thus, the company's own ideas and vision regarding organic production and the market for those products, factors which have developed

over the years and that are more important than the views of others who do not have the same knowledge ideas or opinions in the context.

In Foodsmall2, the production manager's perspective on the production process garnered from various visits to other food processing firms was:

> *But all the same, I had enough sense to get a helicopter view of these things and look at them from quite a different perspective, so that I (the production manager) visited places in the pharmaceutical industry and the meat packing industry, and of course I was familiar with the industry, and having been in many different production plants I knew, I had watched how things were done in different places, and let's say I had a kind of multidisciplinary 'helicopter view', and then it was simply a matter of bringing the good points together and then making something new from the building blocks. (Production manager)*

With respect to this perspective, the idea proposed by the technology supplier of joint technology development felt like a good fit. The actual adoption process did not include much information gathering or processing.

Information gathering and processing were not simply the adopter's intra-firm activities, despite this aspect having dominated the cases and the discussion in this section. Information gathering and processing was partly a matter of interaction between the adopter and the chosen supplier as well as the potential suppliers. In Foodsmall1 and Foodmedium, the requirements for the machines according to ideas for future use were enacted in cooperation with the suppliers. In Foodsmall2, the whole system was developed in interaction between the supplier and adopter. In Foodconcern1, the supplier made a contribution to the evaluation phase and ran a test period in its own laboratory. In Foodconcern2, the layout plan was developed in interaction with both potential suppliers. In this sense, in addition to the passive context of information gathering and processing activities or information caches, the suppliers and possibly other actors may have a more active role in the joint performance of the primary adoption activities hand in hand with the adopter.

Expectations with regard to the future of the relationship affected the negotiation activities of Foodconcern2. The negotiations were conducted from this point of view as strictly as was considered best from this project's perspective.

> *We did look for the right way to do things; now there were only two, but it was discussed that the next building block in our production process world be that we would have as many as 10 alternative suppliers. This now chosen supplier has no rights there. (Production manager)*

However, strict negotiation activities need to be based on argumentable issues. The informant underlined the idea that the focal process needs to be handled in such a way that it does not harm potential future co-operation with the supplier

or with the other technology suppliers in the field, as the suppliers are few and highly concentrated and interlinked and there is evident resource-dependence.

> *We have gone through it among ourselves – it is wiser to have good contacts with everyone. You easily find out that the world is very small in this context. There are four alternative suppliers and the people don't change very often. They discussed things together in Copenhagen, around the breakfast table, maybe not the details, but anyway… they do know who they are dealing with, and we have come to the conclusion that it's wiser to have good and correct relations with everyone – it's never a good idea to deceive people. (Production manager)*

In Foodconcern1, the value of the adopter as a reference affected the negotiation activities, in as much as it would facilitate the supplier's future business in Finland. The supplier thought that the adopter used, and to some degree that it was reasonable to do so, the reference value as a negotiation tool in the final negotiations on the terms. On the other hand, the adopter thought that the supplier was quite strict in these final negotiations and did not give them any special deal. However, the negotiation activities had no great influence on the future expectations for the relationship or its atmosphere. Both in Foodsmall1 and Foodsmall2, neither the adopters nor the suppliers thought there was anything of notable significance related to negotiation activities or their influence on the future of the relationships.

6.3 The activity based perspective on organizational innovation adoption – a result of interplay between the activities and the structures

Figure 48 briefly summarizes the discussion above. The individuals performing the primary adoption activities are placed at the very center of the model. The adoption unit, adopter organization, and network surround these individuals and primary adoption activities. Individuals are linked in the context of performing primary adoption activities and behaving in terms of the roles in the focal process. This connection refers to the primary performance of the adoption unit and is depicted by the solid arrow linking the individuals. In addition, there are other linkages between the individuals that are illustrated by the broken arrow. These linkages comprise a setting that shapes the individual and group performing primary adoption activities. This refers to other non-professional and professional roles the individuals have. These may be, for instance, the roles of a husband and wife as was the case in Foodsmall1 or those of a superior and a subordinate as in Foodmedium (see Figure 48).

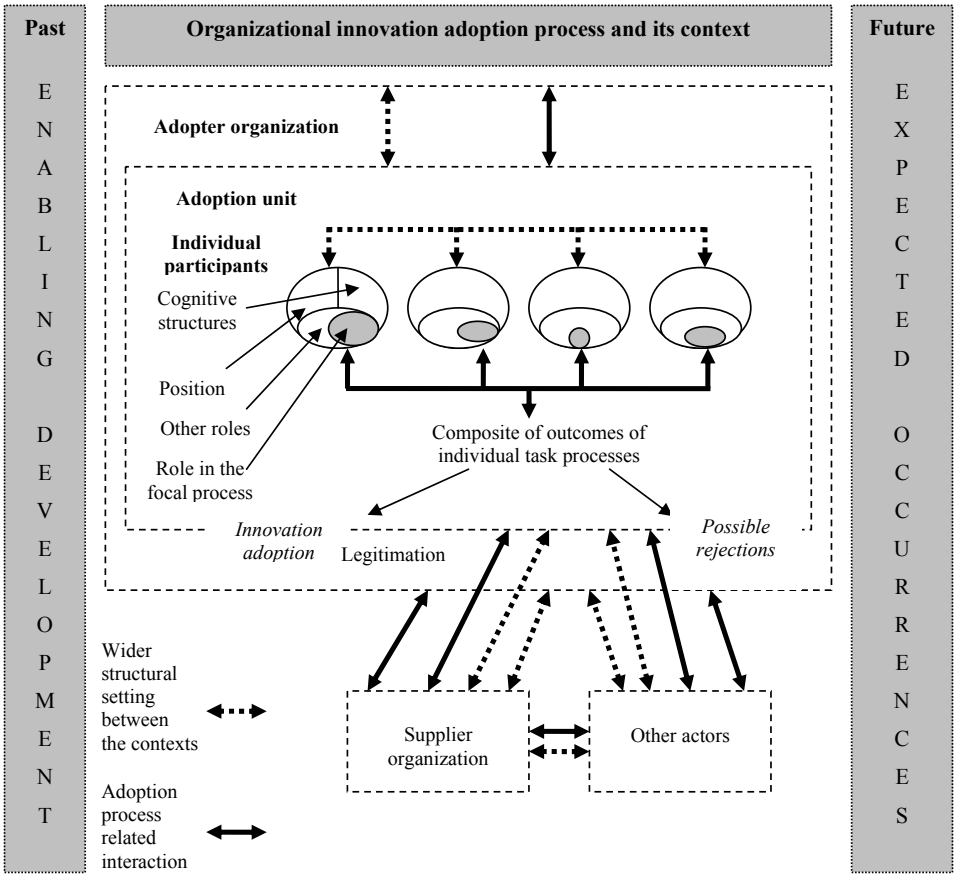

Figure 48 Activity based perspective on innovation adoption process

The adoption unit actions are linked to the adopter organization in the context of this focal process (the unbroken arrow) and also indirectly influenced by secondary adoption activities that the company performs (the broken arrow). Secondary adoption activities refer to other organizational temporary and continuous tasks that influence the adoption process. The broken arrow between the organization and adoption unit individuals refers also to other interactions the individuals have with the organization in addition to the focal adoption process.

The primary adoption activities cross the boundaries between network actors and adoption unit individuals, as well as between network actors and the organization (unbroken arrows). The relationships and future expectations between adoption unit individuals and network actors, and organization and network actors, influence the focal adoption process (broken arrows). It can be concluded that the broken arrows in general refer to the structural setting between the presented contexts, tying them more widely together than just in

the context of the focal adoption process. This structural setting has demonstrated effects on the primary adoption activities. Organizational innovation adoption is an end result of the interplay between context (individual, adoption unit, organization, and network) and primary adoption activities shaped by structural influences. As a side product, this interplay potentially produces one or more rejections.

The temporary adoption process is linked both to the past and future. Enabling development refers to process initiation affecting elements. These are elements, both at the intra-firm and inter-firm level, from the past that have in total an enabling influence on the process initiation. The expected future occurrences shape the focal adoption process and take the form of secondary adoption activities together with the secondary adoption activities that derive from the parallel processes.

Similarly to Sheth (1973, 56), it is worth noting that not all industrial decisions are outcomes of a systematic decision making process, rather there will also be situational factors and ad hoc decisions, and variance between these two extremes. The chosen innovation adoption processes in this study were as similar as possible in terms of adopter perceived radical newness, and the intensive commitment needed to conduct the adoption process. Also in all the cases except Foodsmall2 there was a high risk was associated with these processes. The suitability of the presented approach will vary for example depending on the company, innovation, business context, and timing. However, it is easy to imagine that to some extent the three primary adoption activities, adoption choice and legitimation, will exist in most adoption processes. The presence of individual and organizational structures can also be hypothesized to be in place in every adoption process. The network context is thus reflected through individual and organizational contexts in most of the processes. Not all adoption processes are group processes, and hence the adoption unit context may or may not exist.

7 SUMMARY AND DISCUSSION

Given the key position of innovations and their effective adoption in business, one might expect this to be a solid and well established field of research. On the contrary, the current body of academic knowledge in this area of how organizations adopt innovations is considerably less than the sum of its parts. This study set out to shed light on this clear and crucial shortfall in understanding and conceptualizing organizational innovation adoption processes. *The purpose of the study was to examine how companies adopt technology innovations.* According to the classification of process, content, and context, the purpose was divided further to four subquestions:

1. What is the nature of the organizational adoption process?
2. What activities underlie the organizational adoption process?
3. What structures are linked to these activities?
4. How do the structures affect activities in the generation of organizational innovation adoption?

In order to achieve the research purpose, organizational innovation adoption was approached from both the conceptual and empirical perspectives. Based on the review of the relevant literature on organizational innovation adoption, the organizational innovation adoption process was defined as the development of organizational commitment to innovation enacted through the phases of knowledge, persuasion and adoption. This synthesis of the various definitions and conceptualizations of adoption described the phenomenon and delineated the domain of the organizational innovation adoption process for empirical consideration. Hence the role of the adoption and diffusion approach was descriptive; it described the research phenomenon.

Suggestions related to conducting *contextual process research* (see Pettigrew 1990b, 10; Featherman & Lerner 1985, 659) led to the adoption of two theoretical approaches in addition to the adoption and diffusion approach; organizational buying behavior and network and interaction approaches. These approaches were reviewed and applied separately to the data collection and case analysis. This was in order to reveal the underlying assumptions of each approach and make the approaches comparable. Based on the comparisons, the most striking concepts of the organizational buying behavior and the network and interaction approach were then transferred to the discussion on the adoption process. See Gioia & Pitre 1990, 598–599 for parallel studies of the same set of events; also Lewis & Grimes 1999, 687 for different layers of

meanings under contribution of the applied theories. The organizational buying behavior approach and network and interaction approach were used in an *exploratory manner* to gain a deeper and more contextual understanding of the organizational adoption process. This research strategy is known as *metatriangulation* (Lewis & Grimes 1999). As the applied approaches operate at different levels, the research is *multilevel* in nature.

The study adopted an action-oriented approach and combined case research strategy with metatriangulation research strategy. The study was characterized as an explorative multiple case study that aimed to generate theory (e.g. Eisenhardt & Graebner 2007, 26). The empirical section was based on five adoption process cases within five food processing companies. The innovation adoption processes selected were as similar as possible in terms of adopter perceived radical newness, and the intensive commitment needed to carry the process through. Also, in all the cases except one there was a high risk associated with the adoption. The data collection within these cases was based on interviews and in part on some secondary materials where available. 40 case interviews and three expert interviews were conducted.

The analysis culminated in the activity based perspective, which reveals the mechanism that generates the adoption process and its phases. Thus it can be considered a functional content of the adoption process. *Functional content* answers the question *what is the adoption process a result of* and is separated from the three defined phases of the adoption process that form the *descriptive content* of the adoption process answering the question *what does the adoption process comprise*.

The activity based perspective views adoption as a result of *primary adoption activities* (information gathering, information processing and negotiation activities) attached to the *adoption decision* confirmed by *legitimation activities*. The primary adoption activities interplay with individual, adoption unit, organizational and inter-firm structures. This interplay affects the depth and breadth of the activities. *Depth* refers to intensity of primary adoption activities related to one covered option; how much information gathering, information processing, and negotiation, is devoted per covered solution. The number of solutions targeted by primary adoption activities refers to the *breadth* of these activities; how many solutions come under information gathering, information processing and negotiation activities.

Individuals are in a key position affecting the adoption process. Individuals perform primary adoption activities that are largely cognitive functions. Hence individuals and their cognitive structures form the closest context of these activities. With the exception of one case, there were various individuals engaged in the adoption processes who together constituted an adoption unit.

The adoption unit as a context of individual activity forms the second context for the adoption process. Within the adoption unit, individuals are connected through their roles in the focal adoption process and also through roles and linkages in the other professional as well as non professional areas. All these roles affect the group behavior and primary adoption activities.

The adoption unit is formed in order to find solutions to meet the organizational need. The organizational need and organization as a context for the adoption unit and the individuals directly affect the primary adoption activities. In addition, the organizational context of the process brings in the indirect affect of secondary adoption activities. These influence the interplay between primary adoption activities and the organization, the path through which the organizational need is converted into adoption. Secondary adoption activities refer to other organizational temporary and continuous tasks that shape the adoption process.

Inter-firm dynamics form the fourth and final context for the adoption process. The primary adoption activities targeted, in addition to intra-firm objects, such as individual and organizational information caches, information caches and actors outside the company boundaries. The primary adoption activities thus bind the adoption process to the network context. In addition, a network comprising different actors influences the individuals, adopter organization, and primary adoption activities directly and indirectly.

The activity based perspective is a coherent description of the organizational innovation adoption process and is based on the reviewed research tradition of organizational innovation adoption and the related fields within the industrial marketing literature; organizational buying behavior, and the network and interaction approach. The perspective tries to ease the tradeoff or controversy between intra- and inter-firm orientations by focusing on the activities that penetrate and attach to these two levels. Also it is a more “real” presentation of reality than the sequential stage models. Instead of sequential stages, reality is depicted by applying the activities and structures whose reciprocal interplay is not fixed. This allows a fluid presentation in terms of time and takes into account widely different levels of contexts affecting the process.

7.1 Theoretical contribution

The study clearly contributes to the research on organizational innovation adoption, which can be characterized as variance research. The process view on adoption has been only a sparse minority of the current body of research in which adoption tends to refer to the diffusion research stream. First of all, the

study delineates an explicit difference between adoption attached to *diffusion research* and adoption attached to *organizational behavior research*. The recognition of an explicit boundary between these separate fields, both labeled under "innovation adoption", provides a basis for more coherent future research.

A mixture of concepts and definitions can be found referring to the organizational innovation adoption process. Taking these into account, the study offers a new definition of the organizational innovation adoption process: organizational commitment development to innovation. This appears to be a joint theme of the majority of the definitions presented in the literature. What seems to produce inconsistency in the literature is that organizational adoption usually seems to refer to *employee level adoption* in organizations or takes that into account as a part of the organizational adoption process. The employee level adoption of innovations that are first adopted at organizational level takes place for innovations that are targeted to single employees separately. New software that the organization has adopted for individual use is a good example. However, for innovations like production machinery, for example, this employee level adoption does not occur. For the sake of clarity, this study suggests dedicating the phrase *organizational adoption* to primary adoption only, and excludes employee level adoption from this concept. I believe this conceptual sharpening of the field facilitates a more explicit classification of the innovation adoption research. This would help scholars recognize their theoretical and methodological stances with reference to others in the field, and facilitate communication and comparability between different perspectives.

The conceptual clarification served the theory generation that is the main aim of the study. Whetten (1989, 492–493) suggests three ways of making a theoretical contribution in *theory development aims*; adding or subtracting factors from an existing model and explaining the relationships between the factors with the other parts of the model, applying an old model to a new setting and discussing its functionality in this setting, and finally borrowing a perspective from other fields that challenges the underlying rationales supporting the current theories. These different types of theoretical contribution are suitable in evaluating the types of contribution in theory generation, as evidence can be found with regard to each category.

Based on the provided synthesis definition of adoption as commitment development, the reviewed models of organizational innovation adoption were reorganized and adjusted to meet the definition. The idea was that the definition reflects the essence or ultimate idea of the innovation adoption and diffusion approach. This spirit of the approach should reflect on the conceptual

model (Figure 17) that is a tool to attach the empirical world to the theoretical consideration.

Controversy was found especially in terms of whether adoption is seen as action (reflected in active phases like evaluation) or outcome (reflected in phases like persuasion). As the adoption process outcome is always adoption, due to the theoretical focus of the approach, and hence known, the process stages are also more descriptive and elegant at the outcome level rather than on the level of actions. This definition is in line with adoption ideology and clarifies the conceptual field. That in turn led to a conceptual model (Figure 17) which comprises the stages of knowledge, persuasion and adoption, and two types of factors affecting this process; *diffusion factors* including social system and environment factor groups, and *adoption factors* including adopter and innovation factor groups. This new model is a reorganized model of organizational innovation adoption.

Secondly, the *two complementary theoretical approaches*; organizational buying behavior and network and interaction approaches were applied into the organizational innovation adoption. This application enabled revealing the underlying assumptions and mechanisms of organizational innovation adoption and diffusion approach and viewing adoption phenomenon in a wider organizational context. The *activity based perspective* was presented as an end result of the analysis.

The activity based perspective views adoption process as an end result of wider organizational behavior that aims to find solution to meet organizational need. In this presentation adoption process is a subprocess of problem solving process parallel to possible rejection processes. Thus the perspective sheds light on the relationship between adoption and rejection processes and answers the call for more research on rejection (see Woodside 1996 for rejection).

The presented model of organizational innovation adoption (Figure 17) based on synthesis definition and the presented activity based perspective are not contradictory rather *complementary*. The adoption model *defines and describes* the organizational innovation adoption phenomenon and activity based perspective binds this focal phenomenon into a wider context and *fulfils it with details and functioning mechanisms*. Adoption model (Figure 17) is mostly a loose framework that organizes the previous adoption and diffusion research. However it does not tell us much about adoption mechanisms as it lacks with concepts of group decision making or organizational relationships. Activity based perspective is a wider but also more in detail view on organizational innovation adoption process that takes into account both intra-firm and inter-firm levels and considers them jointly from the activities point of view. The activity based perspective is thus a *contextual* and *processual approach* to organizational innovation adoption.

The study created conceptual clarity to identify adoption process from the other organizational actions in which it is embedded. First, the activity based perspective provides tools to conceptualize the initiation of the adoption process. In the key position in identifying the adoption process initiation was the emergence of a need-solution pair that led to awareness-knowledge on innovation. The new definition views awareness-knowledge as *awareness of an innovation as a potential solution to a defined need.* This definition that is a result of metatriangulation differs from the one offered by Rogers (2003, 171). Rogers defines awareness-knowledge as knowledge of innovation's existence that might motivate the adopter to find further knowledge on innovation. Within the activity based perspective this knowledge refers to general knowledge on innovation and is not included into the adoption process. Due to the theoretical focus of adoption and diffusion approach on adoption processes only the process once set in motion always ends to adoption. Hence according to the definition the awareness-knowledge as a first step of the process always starts the process ending to adoption. The knowledge of innovation's existence (according to Rogers refers to awareness-knowledge and according to activity based perspective refers to general knowledge) is powerless to set the adoption process in motion if there is not a need related to the innovation.

Secondly, the clear definition of the initiation of the adoption process facilitates separating continuous activities and adoption process specific activities. The initiation of the adoption process, the appearance of the need-solution pair (awareness-knowledge) was partly a result of continuous information gathering and processing activities that the companies performed constantly, but after that these activities were conducted from the perspective of the focal adoption process. This increased their innovation related specificity and frequence. The process specific information gathering, information processing and negotiation activities were influenced by different indentified structures.

Thirdly, according to the view of adoption as commitment development, the adoption process ends at the point where commitment is developed. This view clarifies the controversies related to the phases to be included into the adoption process. For example, the implementation phase was included or excluded in the definitions and models of adoption and thus problematic. In the activity based perspective, implementation can be a part of adoption if commitment development occurs via implementation, or then excluded from adoption if it happens after the point of commitment and thus refers to execution of the adopted change.

Methodologically the study applied metatriangulation strategy, which seems to be a quite rarely applied approach. Due to the relatively sparse academic discussion on the topic, the previous literature left various themes

undiscussed. In this respect, the research provides guidance and an example of how to conduct this type of research. The study especially clarifies the consideration of the relationships of the applied approaches, conceptualizing the phenomenon in this type of approach, and metatheorizing on the basis of the separate analysis of the approaches.

The previous literature does not provide a good covering solution to deal with the conceptual issue that arises from the different approaches and their different concepts, with which to capture the empirical phenomenon. Lewis and Grimes (1999) propose using each paradigm to "paradigm-compatible issue" (e.g. Hassard 1991) or to define broadly the common abstract phenomenon across the approaches. The first solution would lead to partial views of the broader phenomenon connecting the approaches, and the second to ambiguous and challenging attempts to express the phenomenon in an unbiased fashion. In the context of this study, the latter would result in expressions of the process under scrutiny as something like "the process in which new technology pops up for a company". This characterization is not value free and would scatter the interest and lose the primary theoretical field for contribution. In general, this problem refers to the question "where does a theorist stand when viewing paradigm representations simultaneously?" See Lewis & Grimes 1999, 687; Parker & McHugh 1991; and Scherer 1998 for this discussion. It is evident that whatever the solution for the "standpoint" is, it does not totally release the phenomenon from the old conceptualization but leads to a new conceptualization that is not a pure overarching view of the reality (see Popper 1970).

The empirical investigation in accordance with the three approaches results in three separate empirical accounts of three different phenomena (innovation adoption process, organizational buying process, and interaction episode) that were used in generating theory on adoption process (see Table 4). The problem in metatheorizing on this basis is that there are three different phenomena that should be converted into one. The result of this conversion cannot be anything other than one of these three phenomena or then some new more abstract defined phenomenon.

Keeping this discussion in mind, the focal study preferred to focus on contributing to a specific area of the literature (organizational innovation adoption), while still attempting to take into account the richness of the empirical phenomena surrounding the phenomenon under scrutiny. As a concrete solution, the research offers a classification of the descriptive and functional contents of the focal phenomenon.

In this case, descriptive content answers the question *what does the adoption process comprise* and refers to the definition of the process (organizational commitment development). Functional content answers the

question *what is the adoption process a result of* and refers to the activities generating the adoption process. To be precise, the activities (functional content) that generate an adoption process could be viewed as a different process external to adoption. This is because adoption process was defined as an outcome (commitment development) rather than active organizational operations conducted in order to reach commitment. However, due to the fact that these activities are actually *content* of the adoption phases and the interconnections between the adoption process and these activities generating the adoption process through the adoption phases, it is reasonable to consider these activities as a functional content of the adoption process. In this regard, other processes that are in reality intertwined with the focal process under scrutiny can be included into the functional content category. In this case the organizational buying process and interaction episode could be included into the adoption process without conceptual controversy when considering them as parts of functional content.

As a side product, the study reviews and presents applications of the organizational buying behavior approach and network and interaction approach. The following discusses the organizational buying behavior and network and interaction approaches together.

Consideration of relationships is not a novel idea in terms of the IMP approach. The classical organizational buying behavior approach already took the relationships into account. Robinson, Faris and Wind (1967, 139) wrote that "the central importance of the user-supplier relationship in the industrial procurement situation is stressed throughout this book". Webster and Wind (1972, 1) already considered relationships in their early work, describing organizational buying as "a complex process of decision making and communication which takes place over time, involving several organizational members and relationships with other firms and institutions". Parkinson and Baker (1986, 80) assumed that "past trading relations with individual suppliers are also likely to influence the buyer's choice of the suppliers to whom enquiries are made for any specific requirement".

Despite considering relationships, the view thereon in the classical buying approach is significantly different from that in the network and interaction approach. The classical approach considers relationships as external variables influencing the buying process while the network and interaction approach adopts the processual, time oriented and embeddedness emphasizing view as a backbone against which a single purchase process is understood. Clearly the network and interaction approach provides tools to capture the dynamic and embedded nature of organizational buying behavior, which has not been a primary focus in the traditional "unit" paradigm organizational buying behavior models (See e.g. Wilson 1996, 13).

The network and interaction approach has been criticized for having produced loose and general rather than specific theory, having attached the produced conceptualizations relatively weakly to the available work done within the sociology and social psychology of organizations (organizational learning), and because of largely ignoring *individual intentions* in the analyses (Möller 1994, 361, 363). The classical buying approach could be useful in providing tools to consider intra-firm issues and individual intentions with reference to inter-organizational level dynamics.

I tend to take a different view to that of Sheth (1996), who made the point that the knowledge generated in the early studies of organizational buying behavior is likely to be increasingly less valuable as the perspective of seeing organizational buying as a transaction oriented administrative function is changing towards that of a strategic and relational oriented function. One reason for theory transition in organizational buying behavior is the changes in a business environment (Wilson 1996), but this does not make the classical approach completely useless. This study clearly shows that this field of research has concepts to offer that are still applicable and could be borrowed for other research contexts as well.

7.2 Managerial implications

Continuous improvements are essential in gaining and maintaining competitive positioning. Improvement in manufacturing effectiveness refers largely to investing in new technology (see e.g. Winch 1997, 318). The identification and explicit discussion of different activities and their interplay with the presented structures facilitates management in identifying and managing these activities and structures in their companies. Mapping the primary and secondary activities from each process' perspective results in a portfolio of temporary and continuous processes and reveals their linkages. This knowledge facilitates resource allocation between the processes and reveals potential bottlenecks in the resources and knowhow the company possesses.

From the technology suppliers' perspective, the study offers ideas concerning industrial customers' behavior as emphasized for example by LaPlaca (1997, 184): "The foundation for all successful marketing is a firm understanding of customers and their needs, how they make buying decisions, and how purchasing is actually implemented." This knowledge facilitates suppliers in adapting their actions to satisfy customers' behavior by supplying their product offerings. Based on the knowledge gained with regard to the attributes related to the product and the supplier, which the adopter

emphasizes during the process, these attributes could be strengthened. The knowledge concerning the information gathering and processing patterns facilitates attempts to affect the potential information caches to stimulate positive statements on the product.

The joint information gathering and processing performed by the supplier and the customer, and the insights into the adopter's motives for this interaction, was a remarkable notion. With this in mind, the supplier should aim to achieve a co-operative role in the adoption process, and to work on transferring the positive experiences from the temporary process to the level of the relationship with the customer. This would probably pay dividends in terms of future projects with the customer or through positive statements concerning the supplier made by the customer to other potential adopters.

The supplier's viewpoint and knowledge concerning customer behavior can be transferred to national economy level. For example, the Finnish economy is ever more dependent on innovations and knowledge-intensive products (Zegweld, McCarthy & Lemola 1999, 7) whose success is ultimately related to their adoption by customers.

An alarming finding relates to small companies' capabilities and resources to gather and process information on innovations. For example, in Foodsmall1, the company's owners said it was difficult or even impossible to know about different technologies and compare them. The situation is even worse for small firms if the partner companies are also small, as was the case for Foodsmall1. These partner firms do not possess any greater knowledge that could help the focal adopter firm. The hints given in the Foodsmall1 case actually misled the information gathering and processing activities. In this respect, the use of technology consultants would perhaps be useful for small firms. Also, further practically oriented research on this topic could be useful to define the scope of the problem and its consequences, forming the basis for corrective measures.

7.3 Quality and limitations of the study

Miles and Huberman (1994, 277) discuss the difficulties related to knowing whether or not the findings of a study are valuable, and what that value might imply. Various different dimensions have been proposed for the quality assessment of a study. Perhaps the most often used criteria comprise the dimensions of *construct validity*, *internal validity*, *external validity* and *reliability* (e.g. Yin 2003, 33–39).

Lincoln and Cuba (1999, 398; 1985, 290) present the value of the study as *trustworthiness*, raising the issue of "how can an inquirer persuade his or her

audiences (including self) that the findings of an inquiry are worth paying attention to, worth taking account of?" Lincoln and Cuba (1999, 398–400; 1985, 290–292) also consider the mainstream classification of dimensions positivistic and ill-fitting in assessing research strategies that abandon the positivistic methodologies (see also Morgan 1983, 396). Hence, Lincoln and Cuba (1985, 294–301) offer *credibility*, *transferability*, *dependability* and *confirmability* for application in the assessment of qualitative research.

Credibility refers to truthfulness in the interpretations of the data; i.e. are the interpretations and meanings related to the data in line with the informants' insights on the topic. Transferability refers to the extent to which the results can be transferred to other contexts, and relates closely to the explicitness of the chain of evidence or depth of description in the study. The researcher must provide a decent database for others to evaluate the transferability of the study. Dependability was proposed to replace reliability and attached to research quality and consistency. Confirmability refers to objectivity in conventional settings and is related to an unbiased way of conducting research as opposed to distortion or the researcher's interests and motivation leading the research process.

Despite the criticisms directed towards the so-called positivistic criterion, the four dimensions presented by Lincoln and Cuba (1999) seem not to be so very different thereto, and there are interlinks between these two classifications. Miles and Huberman (1994, 278–280) discuss the most widely presented criteria in the previous literature, finally presenting a category of four dimensions including terms that refer to a high degree to the same feature; *objectivity/confirmability*, *reliability/dependability/auditability*, *internal validity/credibility/authenticity*, *external validity/transferability/fittingness*, and finally *utilization/application/action orientation*. The categorization includes all the dimensions presented by Lincoln and Cuba (1999, 1985), and the most used "positivistic" dimensions applicable in a qualitative approach. In addition to these, the utilization dimension has been added to this synthetisation category. Due to its sound coverage of dimensions related to research quality, this categorization is used in evaluating this study. The following discusses these dimensions and their presence here.

Objectivity relates to unbiased and value free scrutinization of the research object. This is close to neutrality described by Lincoln and Cuba (1985, 290) which refers to "how can one establish the degree to which the findings of an inquiry are determined by the subjects (respondents) and condition of the inquiry and not by the biases, motivations, interests, or perspectives of the inquirer". Hence, the influence I exerted as a researcher was noteworthy (see Bonoma 1985, 204, Bogdan & Taylor 1975, 11–12) in terms of affecting objectivity. I chose the research phenomenon due to my interest in this sort of

organizational process. My attitude towards scrutinizing adoption processes in five case organizations was positive from start to finish. This positive enthusiasm for the topic may have influenced the research process. My attitudes, beliefs and experiences must have had an influence on the results. It would have been impossible to conduct the research without these variables intervening in the process. However, all the interpretations have been made on the basis of the theoretical understanding or empirical data.

In qualitative research, objectivity is closely related to *reliability*. McKinnon (1988, 36) sees the reliability of the study referring to the reliability of the data, which is, in addition to the qualities of the researcher and the data collection method, dependent on the informants. Huber and Power (1985) present four reasons as to why informants might provide biased or inaccurate data: motivation to distort, inadvertent errors due to perceptual and cognitive limitations, lack of information, and an inappropriate data collection procedure. The first, motivation to distort, may be derived from the needs for achievement, security and social acceptance, for example. The motivation to distort the narrative increases if the informant is afraid of a negative impact on his/her career due to the information he/she is giving (see Athanassiades 1973). Athanassiades (1973) studied upward communication distortion, how subordinates distort the communication process to their own benefit. These findings are applicable to the context of this study, as the informants may have considered the researcher a communication link who mediates the interview information to their superiors. However, this was unlikely given the atmosphere during the interviews and how the informants behaved towards me as the researcher. The second reason is a natural aspect of human behavior. People have limited cognition capabilities that dispose them to errors in perceiving, processing and recalling different real life phenomena (see March & Simon 1958; Simon 1955). It is evident that the informants in this study experienced difficulties in remembering correctly or unbiasedly all the details of what took place during the adoption processes studied. Rather, their stories were cocktails of real episodes and actions attached to their subjective interpretations thereof. Information overload (see Driver & Streufert 1969) due to the insufficient cognitive capabilities inherent to the human state may also lead to biased or inaccurate data.

With regard to these two discussed sources of inaccuracy, Minzberg, Raisinghani and Theoret (1976, p. 250) wrote that “tapping the memory of decision makers could introduce two forms of error, distortion and memory failure.” They reported that multiple interviewing was used to reduce the possibility of random distortion in their study. With respect to memory errors, they believed that there is no doubt that some features or bypaths were left unreported. Similarly in this study I employed the multiple interview method,

as a result of which distortion is less likely compared to relying on single interviewing or a single informant. During the interviews, given the atmosphere in which they were conducted, I felt and believe that the minor inconsistencies between the interviews concerning some small details were in some cases memory errors not distortion. There seemed to be no difference between the telephone interviews and face-to-face meetings in terms of data quality. An effort was made in the focal study to diminish memory errors were by choosing adoption processes that took place quite recently and using secondary data.

The third reason given by Huber and Power (1985), a lack of information, is inherent in situations where multiple individuals were engaged in the phenomenon under scrutiny and therefore a significant number of informants lack a complete set of information covering all the details. These gaps can perhaps be filled by second hand narratives. Bailey (2007, 172–174) discusses critical events in qualitative research. Critical events refers to actions that facilitate understanding of the whole even without knowing the whole story (see also Wolcott 1994, 19). In this study, in addition to asking informants to describe the adoption process in the form of a narrative, they were asked about critical events that were especially important from the adoption process perspective. The complete narratives, stories about some special parts of the process and critical events were then woven together to form a coherent description of the adoption process.

Fourthly, inappropriate data gathering procedures may result in inaccuracies. The questions posed to the informants can limit and distort the information. Data collection was an essential factor affecting the reliability of the study. All the interviews were carefully planned and structured via the interview framework that derived from the theoretical framework of the study. The interview method was applied in order to reduce misunderstandings between the researcher and informant (see the data collection section of the study). All the informants were told at the beginning of an interview that all the materials gathered would be sent to them for approval prior to publication. Some of the companies, however, wanted from the outset to remain anonymous in the context of the study. For the sake of consistency, the decision was therefore taken to disguise all the companies. This created more freedom in consideration of more sensitive issues. However, there is a tradeoff between accuracy and sensitivity. In the case descriptions or in the analyses, the most detailed considerations, in terms of the specific field of the company, its finished products and specific location, were therefore not revealed. (For confidentiality see e.g. Bailey 2007, 24–29.) This anonymity hampers the opportunity and potential for others to evaluate the justification of the interpretations in this study.

Finally, the retrospective data collection procedure may have had an influence on the data. The cases were historical and hence the adoption process outcome was already known during the data collection. This retrospective approach may have affected the research findings, as Van de Ven (1992, 181) suggests. The researcher may have been able to gain a deeper understanding and more specific answers to the "how, what and why" questions by applying real-time data collection techniques. However, the research targeted the innovation adoption processes and hence the end result of the process needed to be known prior to the collection.

Reliability in qualitative research refers not only to the data but also more broadly to consistency and care in the research process and the appropriacy of the research methods. In conventional studies, generalizability is added to reliability, but in qualitative research generalizability is not a prerequisite for reliability, which In turn refers to deep understanding and trustworthy and careful reporting of that understanding (Lukka & Kasanen 1993, 370).

Due to the metatriangulation strategy, reliability is predicated on the logic through which the results are generated in the analysis, and analysis of the analysis (metatheorizing process) and reporting thereof. A danger in this type of study can be that the main focus is laid on the "home" approach and giving it a more favorable position compared to the others, which will lead to inadequate knowledge of the other approaches (see Lewis & Grimes 1999, 687). The roles of the study approaches were explicit from the outset; the adoption and diffusion approach being supreme and the organizational buying behavior and network and interaction approaches being complementary. The research phenomenon was described and defined by applying the adoption and diffusion approach and the complementary approaches were used to explore this phenomenon.

Understanding and defining the research phenomenon stems here from the extensive literature review based on which this understanding is plausible in terms of depth and in line with the literature. The complementary approaches were also carefully reviewed in order to gain a deep understanding thereof. The researcher attended three conferences on the network and interaction approach (IMP); they also supported knowledge with regard to organizational buying behavior, although that came mainly through reading since discussion on the topic is largely over in the classical sense and special conferences are no longer held on the matter. The reviews of these approaches were extensive and viable as separate entities and show that the researcher is familiar with them. They were not brief glimpses garnered for an adoption process perspective in order to break away from the prevailing assumptions and restrictions related to adoption. This expansion or proliferation is the underlying idea of the whole metatheorizing approach, as opposed to

subjugating or homogenizing the differences between the approaches (see Lewis & Grimes 1999, Gioia & Pitre 1990; Popper 1970).

The careful review and application of the approaches produced knowledge on their underlying assumptions and functioning mechanisms. The comparisons of the approaches were made in order to get an idea of the degree of overlap of the empirical phenomenon that the approaches depict. The comparisons confirmed the widely shared empirical domain the approaches tackle. On this basis, the transfer of the concepts from the complementary approaches to the adoption process context became possible. This consideration produced the activities underlying the adoption process which were defined as the *functional content of adoption* and presented together with the identified structures in the form of the *activity based perspective*. This careful stepwise progression and detailed reporting enhanced the reliability of the study and supported its validity.

Broadly defined, *validity* refers to the issue of whether the object of the study is what the researcher believes it to be (McKinnon 1988, 36). Validity can be split into internal and external notions. *Internal validity* refers to the truthfulness of the study; are the results and conclusions credible. Stake (2008, 125) wrote that "damage occurs when the commitment to generalize or to theorize runs so strong that the researcher's attention is drawn away from the features important for understanding the case itself". I was inspired by the potential to enrich the understanding of the adoption process through combining the analysis of different approaches. Especially since all the cases highlighted the importance of past and future actions, the idea of the activity based perspective started to evolve. Sometimes the idea of the new perspective outshone the empirical evidence and started to live a life of its own. However, due to the strength of the qualitative method, the data collection and also the analysis developed over time and these temporary inspirations were balanced out.

The empirical part and interpretations were sent to the companies involved for checking. The contact person in every organization, who was in each case the key informant due to their central role in the process, qualified the materials (Hirsjärvi & Hurme 2002, 192–194). To some degree the relatively small amount of data on which the interpretations were based might be considered to hamper the internal validity of the study. However, the main issues that arose from the data were fully coherent between the cases. As the cases were chosen by size, this cohesion strengthens the theoretical interpretations. Due to the qualitative nature of the case strategy, I had a detailed understanding of the data and their interconnections, which further facilitates the interpretations (Eisenhardt 1989, 542). Also, for every interpretation there were clear theoretical connections.

Utilization refers to the applicability of the results (see Miles & Huberman 1994, 279–280). According to Lukka and Kasanen (1993, 365), at its worst a case study produces a vague description of the real life phenomenon under scrutiny. The empirical section would neither support nor question a loosely constructed theoretical framework making that section and the whole study useless. Here, the clear aim was to achieve contextual and deep understanding of the organizational innovation adoption process. The theoretical framework was built and the empirical part conducted in order to serve this aim. The study culminates in chapter 6 which presents a joint analysis of the separate results. The contribution of this study constitutes grounds to assume the study is applicable for future research. Utilization of the results is linked to the external validity of the study.

External validity refers to the generalizability of the study; are the results transferable more generally to some other context as well. According to Lincoln & Cuba (1985, 316), in qualitative studies researchers cannot make precise statements about external validity, but can report results for a particular timeframe and context, and whether or not the results hold in some other context or in the same context at some other time is again an empirical issue. This study aims to develop theory. Eisenhardt and Graebner (2007, 27) discuss the issue of generalizing on the basis of case research, and it is a common misunderstanding that cases should be representative in order to develop theory. Vice-versa they state that theoretical sampling is appropriate as the cases are selected only because they are particularly suitable for illuminating and extending relationships and logic among constructs in the theory (p. 27). In this sense, in this study, generalizability refers mainly to theoretical generalization.

In addition to the empirical cases, the three chosen theoretical perspectives provided material for theory building. Hence these approaches have an influence on the generalizability of the theory to some extent. The three theoretical approaches are not fixed to any particular empirical context. The innovation adoption and diffusion approach has been widely applied in different contexts, but its use has been restricted to innovations. The organizational buying behavior approach has been applied in order to understand various kinds of buying process in any kind of organizational context. The network and interaction approach has been applied also widely to various kinds of situation in which interactions and relationships between industrial organizations have been in focus. On this basis, the ideas and theoretical constructs from these fields are appropriate to the context of this study and fit with the produced activity based perspective.

The results of the study may carefully be transferable to some other contexts as well. However, the empirical context and the type of innovation

(technological) scrutinized in the study set some limitations for direct application. The results are based on empirical data from the Finnish food processing industry and three theoretical perspectives applied to this data. The food processing industry as an empirical context may affect the results but not perhaps to a dramatic extent. There are no good reasons to expect this field of industry to differ greatly from others in terms of innovation adoption. A restrictive factor related to the empirical context is its single country specificity. However, the two larger firms, Foodconcern1 and Foodconcern2, have a profile in international operations and as part of that network imitate and learn from other actors, and may thus be quite similar to foreign firms. But there are perhaps great differences at the individual level when compared to foreign players, as individuals to a great degree reflect the national culture.

The study scrutinizes the adoption of radically new technology innovations related to manufacturing processes. This focus naturally limits the transferability of the results to other types of innovation. The author believes that the activities involved were more intensive for this type of innovation than for more familiar or less commitment oriented innovations, where adoptions are lighter processes to which less attention is paid. Also for minor or more familiar innovations the adoption may be handled by a single person rather than an adoption unit. Despite the differences in innovation types, the results of this study can be considered something like a "worst case scenario" representing highly demanding adoption processes. In considering the lighter nature of the innovations, this extensive road map provides a good starting point in widely taking into account the possible process dynamics.

7.4 Future research avenues

This study establishes a point of departure for further research on organizational innovation adoption processes. The researcher strongly proposes that future research work in this stream should still contextually focus on actions and episodes prior to, during and after the adoption process. That kind of approach can contribute to the field of innovation adoption and diffusion at both the micro and macro levels. The understanding of a single adoption process would facilitate understanding on macro level diffusion. On the other hand, the activity based perspective presented here would serve more focused research that aims to build and test hypotheses on the presented connections.

The focus in this study lay on technology innovations in manufacturing organizations. In future research, the applicability of the presented ideas to other types of innovation could be scrutinized. Also, the organizational context

could be changed from business operations to other types of organization. Or more specifically, further research could focus sharply on some category of the presented small, medium-sized and large companies in this study. Further research in a small business context could open our eyes to some factor that has been ignored in studies concentrating primarily on big businesses. At least the interplay between the *individual characteristics* of the entrepreneurs and the *organizational characteristics* presented in the model merit a closer look in the context of small business adoption research.

In addition to the type of innovation and adoption process context examined here, further research could continue borrowing from other fields as this study explicitly has. The focal study approached the organizational innovation adoption phenomenon primarily from the marketing theory perspective. As adoption and diffusion research has been conducted within a variety of disciplines, there must be interconnections between the adoption and diffusion approach and other relevant theoretical approaches within other disciplines. Continuing the pattern of borrowing from other fields and presenting the results to other adoption and diffusion researchers would greatly contribute to and open up this field of study.

The activity based perspective presented here was an end result of applying the innovation adoption and diffusion approach, organizational buying behavior approach and network and interaction approach to the organizational innovation adoption process phenomenon. Despite the fact that this perspective was developed in such a context, I strongly believe it is applicable to other organizational processes, too. I would imagine this perspective could provide a fruitful basis for approaching other processual organizational phenomena that engage various organizational contexts and levels. The activity based perspective would help us move beyond "levels thinking" to approach phenomena and other research theories contextually and in an integrative manner. However, further research on refining the presented activities and structures and categorizing them is obviously needed.

Methodologically this research raises some issues that should be targeted in future studies. There is an evident conceptual dilemma inherent to the metatriangulation approach that needs to be addressed. It is impossible to pick up value free concepts that would not favor one of the applied theoretical approaches over another in characterizing the empirical domain and the phenomenon in focus. This leads to labeling one approach as a leading approach and others as complementary approaches of the study. The phenomenon is thus conceptualized using the terminology of the leading approach. In order not to lose the potential contribution of the complementary approaches, the lack of commensurability of the approaches needs to be overcome.

A partial solution to this challenge of transferring the conceptualizations from the complementary approaches to the leading approach was here to delineate the *descriptive content* and *functional content* of the focal process. In any process research, the other processes that strictly speaking are not defined as a part of the scrutinized process but are closely related to it in an empirical reality, can be included in the functional content. A more intellectual discussion on finding a sound solution to dealing with the lack of commensurability and cross-fertilizing different approaches in a metatriangulation study is clearly needed.

REFERENCES

Abbot, Andrew (1995) Sequence analysis: New methods for old ideas. *Annual Review of Sociology*, Vol. 21, No: 1, 93–113.

Ackoff, Russell L. (1981) *Creating the corporate future*. Wiley: New York.

Ajzen, Icek – Fisbein, Martin (1980) *Understanding attitudes and predicting social behavior*. Prentice-Hall: Englewood Cliffs, New Jersey.

Alter, Catherine – Hage, Jerald (1993) *Organizations working together*. Sage: Newbury Park, CA.

Anderson, Erin – Chu, Wujin – Weitz, Barton (1987) Industrial purchasing: An empirical exploration of the buyclass framework. *Journal of Marketing*, Vol. 51, No: 3, 71–86.

Anderson, Helén – Havila, Virpi – Andersen, Poul – Halinen, Aino (1998) Position and role-conceptualizing dynamics in business networks. *Scandinavian Journal of Management*, Vol. 14, No: 3, 167–186.

Anderson, James – Narus, James (1990) A model of distributor firm and manufacturer firm working partnerships. *Journal of Marketing*, Vol. 54, No: 1, 42–58.

Anderson, James C. – Håkansson, Håkan – Johanson, Jan (1994) Dyadic business relationships within a business network context. *Journal of Marketing*, Vol. 58, No: 1, 1–15.

Anderson, Paul F. – Chambers, Terry M. (1985) A reward/measurement model of organizational buying behavior. *Journal of Marketing*, Vol. 49, No: 1, 7–23.

Ansoff, Igor H. (1971) *Corporate strategy. An analytic approach to business policy for growth and expansion*. Penguin Books Ltd.: Harmondsworth, Middlesex, England.

Astley, G. W. (1985) Administrative science as socially constructed truth. *Administrative Science Quarterly*, Vol. 30, No: 4, 497–514.

Astley, Graham W. (1984) Toward an appreciation of collective strategy. *The Academy of Management Review*, Vol. 9, No: 3, 526–535.

Athanassiades, John C. (1973) The distortion of upward communication in hierarchical organizations. *The Academy of Management Journal*, Vol. 16, No: 2, 207–226.

Aubert, Benoit A. – Hamel, Geneviéve (2001) Adoption of smart cards in the medical sector: the Canadian experience. *Social Science & Medicine*, Vol. 53, No: 7, 879–894.

Axelsson, Björn – Easton, Geoffrey (1992) *Industrial networks*. *A new view of reality*. Routledge: London.

Bailey, Carol A. (2007) *A guide to qualitative field research*. 2nd ed. Pine Forge Press: Thousand Oaks, CA.

Barclay, Donald W. (1992) Organizational buying outcomes and their effects on subsequent decisions. *European Journal of Marketing*, Vol. 26, No: 4, 48–64.

Barnett, Homer G. (1953) *Innovation: The basis of cultural change*. McGraw-Hill: New York.

Bass, Frank M. (1969) A new product growth model for consumer durables. *Management Science*, Vol. 15, No: 5, 215–227.

Bates, Frederick L. – Harvey, Clyde C. (1975) *The structure of social systems*. Gardner Press Inc.: New York.

Becker, Selwyn W. – Whisler, Thomas L. (1967) The innovative organization: A selective view of current theory and research. *The Journal of Business*, Vol. 40, No: 4, 462–469.

Bellizzi, Joseph A. (1979) Product type and the relative influence of buyers in commercial construction. *Industrial Marketing Management*, Vol. 8, No: 3, 213–220.

Bellizzi, Joseph A. (1981) Organizational size and buying influences. *Industrial Marketing Management*, Vol. 10, No: 1, 17–21.

Bellizzi, Joseph A. – Walter, C. K. (1980) Purchasing agents' influence in the buying process. *Industrial Marketing Management*, Vol. 9, No: 2, 137–141.

Bellizzi, Joseph A. – McVey, Phillip (1983) How valid is the buy-grid model? *Industrial Marketing Management*, Vol. 12, No: 1, 57–62.

Berger, Peter – Luckman, Thomas (1966) *The social construction of reality: A treatise in the sociology of knowledge*. Anchor Books: Garden City, NY.

Berkowitz, Marwin (1988) End users and technical staff as influencers in buying new industrial products: High stakes, but do they really matter? In: *Advances in Business Marketing*, ed. by Arch G. Woodside, Vol. 3, 27–48. Jai Press Inc.: London.

Blankenfeld-Enkvist von, Gabriela – Brännback, Malin (2002) *Technological trends and needs in food diagnostics, Teknologiakatsaus 132/2002*. Tekes.

Bogdan, Robert – Taylor, Steven J. (1975) *Introduction to qualitative research methods. A phenomenological approach to the social sciences*. John Wiley & Sons: New York.

Bonoma, Thomas – Bagozzi, Richard – Zaltman, Gerald (1978) The dyadic paradigm with specific application to industrial marketing. In: *Organizational Buying Behavior*, ed. by Thomas Bonoma – Gerald Zaltman, 49–67. American Marketing Association: Chicago.

Bonoma, Thomas V. (1985) Case research in marketing: opportunities, problems, and a process. *Journal of Marketing Research*, Vol. 22, No: 2, 199–208.

Bristor, Julia M. – Ryan, Michael J. (1988) The buying center is dead, long live the buying center. *Advances in consumer research*, ed. by Paul F. Anderson – Melanie Wallendorf, 255–258. Association for Consumer Research: Provo, UT.

Brown, L. A. (1981) *Innovation Diffusion*. Methuen & Co.: London.

Bunn, Michele D. (1993) Taxonomy of buying decision approaches. *Journal of Marketing*, Vol. 57, No: 1, 38–56.

Burrell, Gibson – Morgan, Gareth (1979) *Sociological paradigms and organizational analysis. Elements of the sociology of corporate life*. Ashgate: Aldershot.

Burton, Richard M. – Obel, Børge (1984) *Designing efficient organizations: Modeling and experimentation*. Elsevier Science: Amsterdam.

Butler, Richard (1990) Decision-making research: Its uses and misuses. A comment on Mintzberg and Waters: "Does decision get in the way?". In: *Studying Deciding: An Exchange of Views Between Mintzberg and Waters, Pettigrew, and Butler*. *Organization Studies*, Vol. 11, No: 1, 11–16.

Calder, Bobby J. (1977) Structural role analysis of organizational buying: A preliminary investigation. In: *Consumer and industrial buying behavior*, ed. by: A. G. Woodside – J. N. Sheth – P. D. Bennett, 193–199. North Holland: New York.

Camisón-Zornoza, C. – Lapiedra-Alcamí, R. – Segarra-Ciprés, M. – Boronat-Navarro, M. (2004) A meta-analysis of innovation and organizational size. *Organization Studies*, Vol. 25, No. 3, 331–361Campbell, Nigel C. G. (1985) An interaction approach to organizational buying behavior. *Journal of Business Research*, Vol. 13, No: 1, 35–48.

Campbell, Rex R. (1966) A suggested paradigm of the individual adoption process. *Rural Sociology*, Vol. 31, No: 4, 458–466.

Carter, Franklin J. Jr. – Jambulingam, Thani – Gupta, Vipul K. – Melone, Nancy (2001) Technological innovations: a framework for communicating diffusion effects. *Information & Management*, Vol. 38, No: 5, 277–287.

Cestre, Ghislaine – Darmon, René Y. (1998) Assessing consumer preferences in the context of new product diffusion. *International Journal of Research in Marketing*, Vol. 15, No: 2, 123–135.

Child, John (1972) Organizational structure, environment and performance: The role of strategic choice. *Sociology*, Vol. 6, No: 1, 1–22.

Choffray, Jean Marie – Lilien, Gary L. (1978) Assessing response to industrial marketing strategy. *Journal of Marketing*, Vol. 42, No: 2, 20–31.

Choffray, Jean Marie – Lilien, Gary L. (1980) *Market planning for new industrial products*. John Wiley: New York.

Choffray, Jean Marie – Lilien, Gary L. – Yoon, Eunsang (1988) New industrial product performance: Models and empirical analysis. *Advances in Business Marketing*, Vol. 3, 49–77.

Clark, Peter A. (1987) *Anglo–American innovation*. DeGruyter: New York.

Cobbenhagen, Jan (2000) *Successful innovation: towards a new theory for the management of small and medium-sized enterprises*. Edward Elgar: Cheltenham, UK.

Cohen, Wesley M. – Levinthal, Daniel A. (1990) Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, Vol. 35, No: 1, 128–152.

Coleman, J. S. (1986) Social theory, social research, and a theory of action. *The American Journal of Sociology*, Vol. 91, No: 6, 1309–1335.

Coleman, James – Katz, Elihu – Menzel, Herbert (1957) The diffusion of an innovation among physicians. *Sociometry*, Vol. 20, No: 4, 253–270.

Conrad, Charles (1990) *Strategic organizational communication: An integrated perspective*. Holt, Rinehart, and Winston Inc.: Forth Worth, Texas.

Corey, E. Raymond (1983) *Industrial marketing: cases and concepts*. Prentice Hall: Englewood Cliffs, NJ.

Cumming, Brian S. (1998) Innovation overview and future challenges. *European Journal of Innovation Management*, Vol. 1, No: 1, 21–29.

Cyert, Richard M. – Simon, Herbert A. – Trow, Donald B. (1956) Observation of a business decision. *The Journal of Business*, Vol. 29, No: 4, 237–248.

Cyert, Richard, M. – March, James G. (1963) *A behavioral theory of the firm*. Prentice-Hall: New Jersey.

Dadzie, Kofi Q. – Johnston, Wesley J. – Dadzie, Evelyn W. – Yoo, Bonghee (1999) Influence in the organizational buying center and logistics automation technology adoption. *Journal of Business & Industrial Marketing*, Vol. 14, No: 5, 433–444.

Daft, Richard L. – Becker, Selwyn W. (1978) *Innovation in organizations: Innovation adoption in school organizations*. Elsevier: New York.

Daft, Richard L. (1978) A dual-core model of organizational innovation. *Academy of Management Journal*, Vol. 21, No: 2, 193–210.

Damanpour, Fariborz (1991) Organizational innovation: a meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, Vol. 34, No: 3, 555–590.

Damanpour, Fariborz (1992) Organizational size and innovation. Organization Studies, Vol. 13, No: 3, 375–402

Damanpour, Fariborz – Evan, Wiliam M. (1984) Organizational innovation and performance: The problem of "organizational lag". *Administrative Science Quarterly*, Vol. 29, No: 3, 392–409.

Damanpour, Fariborz – Gopalakrishnan, Shanth (2001) The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, Vol. 38, No: 1, 45–54.

Damanpour, Fariborz – Gopalakrishnan, Shanthi (1998) Theories of organizational structure and innovation adoption: the role of environmental change. *Journal of Engineering and Technology Management*, Vol. 15, No: 1, 1–24.

Damanpour, Fariborz – Schneider, Marguerite (2006) Phases of the adoption of innovation in organizations: Effects of environment, organization and top managers. *British Journal of Management*, Vol. 17, No: 3, 215–236.

Das, Ajay – Handfield, Robert B. (1997) A meta-analysis of doctoral dissertations in purchasing. *Journal of Operations Management*, Vol. 15, No: 2, 101–121.

Daves, Philip L. – Lee, Don Y. – Dowling, Grahame R. (1998) Information control and influence in emergent buying center. *Journal of Marketing*, Vol. 62, No: 3, 55–68.

Davis, Fred. D. (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, Vol. 13, No: 3, 319–340.

Dawes, Philip L. – Patterson, Paul G. – Lee, Don Y. (1996) Internal and external buying center membership in high technology business market. *The Journal of High Technology Management Research*, Vol. 7, No: 1, 107–127.

Denzin, Norman K. (1989) *The research act*. McGraw-Hill: New York.

Dewar, Robert D. – Dutton, Jane E. (1986) The adoption of radical and incremental innovations: An empirical analysis. *Management Science*, Vol. 32, No: 11, 1422–1433.

Dimaggio, Paul – Powell, Walter (1983) The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, Vol. 48, No: 2, 147–160.

Dos Santos, Brian L. – Peffers, Ken (1995) Rewards to investors in innovative information technology applications: First movers and early followers in ATMs. *Organization Science*, Vol. 6, No: 3, 241–259.

Dougherty, Deborah – Heller, Trudy (1994) The illegitimacy of successful product innovation in established firms. *Organization Science*, Vol. 5, No: 2, 200–218.

Downs, George W., Jr. – Mohr, Lawrence B. (1976) Conceptual issues in the study of innovation. *Administrative Science Quarterly*, Vol. 21, No: 4, 700–714.

Draper, Alan (1994) Organizational buyers as workers: the key to their behaviour? *European Journal of Marketing*, Vol. 28, No: 11, 50–62.

Driver, Michael J. – Streufert, Siegfried (1969) Integrative complexity: an approach to individuals and groups as information processing systems. *Administrative Science Quarterly*, Vol. 14, No: 2, 272–285.

Drury, Donald H. – Farhoomand, Ali (1999) Innovation diffusion and implementation. *International Journal of Innovation Management*, Vol. 3, No: 2, 133–157.

Dubois, Anna (1998) *Organising industrial activities across firm boundaries*. Routledge: London.

Dubois, Anna – Gadde, Lars-Erik (2002) Systematic combining: An abductive approach to case research. *Journal of Business Research*, Vol. 55, No. 7, 553–560.

Eastin, Matthew S. (2002) Diffusion of e-commerce: an analysis of the adoption of four e-commerce activities. *Telematics and Informatics*, Vol. 19, No: 3, 251–267.

Easton, Geoff (1992) Industrial networks: a review. In: *Industrial networks. A new view of reality*, ed. by Björn Axelsson – Geoffrey Easton, 1–27. Routledge: London.

Easton, Geoff (1994) Commentary by Geoff Easton. In: *Research traditions in marketing*, ed. by Gilles Laurent – Gary L. Lilien – Bernard Pras, 373–377. Kluwer Academic Publishers: Boston.

Ebers, Mark (1997) *The formation of inter-organizational networks*. Oxford University Press: Oxford.

Eisenhardt K. M. (1989) Building theories from case study research. *Academy of Management Review*, Vol. 14, No: 4, 532–550.

Eisenhardt, Kathleen – Graebner, Melissa E. (2007) Theory building from cases: opportunities and challenges. *Academy of Management Journal*, Vol. 50, No: 1, 25–32.

Evaristo, Roberto J. – Kaharanna, Elena (1998) The impact of mental workload in the evaluation of innovations. In: *Information systems and diffusion: issues and directions*, ed. by Tor J. Larsen – Eugene McGuire, 48–70. Idea group publishing: Hershey.

Everdingen van, Yvonne – Wierenga, Berend (2002) Intra-firm adoption decisions: Role of inter-firm and intra-firm variables. *European Management Journal*, Vol. 20, No: 6, 649–663.

Everdingen van, Yvonne M. – Bamossy, Gary J. (2000) Marketing of a financial innovation commercial use of the Euro by European companies prior to mandatory adoption. *Journal of Business Research*, Vol. 48, No: 2, 123–133.

Featherman, David – Lerner, Richard M. (1985) Ontogenesis and sociogenesis: problematics for theory and research about development and socialization across the lifespan. *American Sociological Review*, Vol. 50, No: 5, 659–676.

Fisbein, Martin – Ajzen, Icek (1975) *Belief, attitude, intentions, and behavior: An introduction to the theory of research*. Addison-Wesley: Boston, MA.

Fleck, J. – Webster, J. – Williams, R. (1990) Dynamics of information technology implementation: a reassessment of paradigms and trajectories of development. *Futures*, Vol. 22, No: 6, 618–640.

Ford, David (1997) *Understanding business markets: interaction, relationships and networks*. 2nd ed. The Dryden Press: London.

Frambach, Ruud T. – Schillewaert, Niels (2002) Organizational innovation adoption: A multi–level framework of determinants and opportunities for future research. *Journal of Business Research*, Vol. 55, No: 2, 163–176.

Frambach, Ruud T. (1993) An integrated model of organizational adoption and diffusion of innovations. *European Journal of Marketing*, Vol. 27, No: 5, 22–41.

Gadde, L.-E. and Persson, G. (2004) Developments on the supply side of companies, In: *Rethinking marketing: developing a new understanding of markets*, ed. by H. Håkansson – D. Harrison – A. Waluszewski, 161–186. John Wiley & Sons Inc.: Chichester.

Garcia, Rosanna – Calantone, Roger (2002) A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management*, Vol. 19, No: 2, 110–132.

Gatignon, Hubert – Robertson, Thomas S. (1985) A propositional inventory for new diffusion research. *Journal of Consumer Research*, Vol. 11, No: 4, 849–867.

Gatignon, Hubert – Robertson, Thomas S. (1989) Technology diffusion: An empirical test of competitive effects. *Journal of Marketing*, Vol. 53, No: 1, 35–49.

Gatignon, Hubert – Robertson, Thomas S. (1991) Innovative decision processes. In: *Handbook of Consumer Behavior*, ed. by Thomas S. Robertson – Harold H. Kassarjian, 316–348. Prentice-Hall: Englewood Cliffs, New Jersey.

Gee, Sherman (1981) *Technology transfer, innovation, and international competitiveness*. John Wiley & Sons: New York.

Giddens, Anthony (1984) *The constitution of society. Outline of the theory of structuration*. Polity Press: Cambridge.

Gioia, Dennis – Pitre, Evelyn (1990) Multiparadigm perspectives on theory building. *Academy of Management Review*, Vol. 15, No: 4, 584–602.

Glueck, W. F. – Willis, R. (1979) Documentary sources and strategic management research. *The Academy of Management Review*, Vol. 4, No: 1, 95–102.

Golden, Brian R. (1992) The past is past – or is it? The use of retrospective accounts as indicators of past strategy. *Academy of Management Journal*, Vol. 35, No: 4, 848–860.

Gopalakrishnan, Shanthi – Damanpour, Fariborz (1997) A review of innovation research in economics, sociology and technology management. *Omega, International Journal of Management Science*, Vol. 25, No: 1, 15–28.

Grandori, Anna – Soda, Giuseppe (1995) Inter-firm networks: Antecedents, mechanisms and forms. *Organization Studies*, Vol. 16, No: 2, 183–214.

Granovetter, Mark (1978) Treshold models of collective behavior. *American Journal of Sociology*, Vol. 83, No: 6, 1420–1443.

Granovetter, Mark (1985) Economic action and social structure: The problem of embeddedness. *The American Journal of Sociology*, Vol. 91, No: 3, 481–510.

Granovetter, Mark S. (1973) The strength of weak ties. *American Journal of Sociology*, Vol. 78, No: 6, 1360–1380.

Greenhalgh, Trisha – Robert, Glenn – MacFarlane, Fraser – Bate, Paul – Kyriakidou, Olivia (2004) Diffusion of innovations in service organizations: systematic review and recommendations. *The Milbank Quarterly*, Vol. 82, No: 4, 581–629.

Grønhaug, Kjell – Kauffmann, Geir (1988) *Innovation: A cross-disciplinary perspective*. Norwegian University Press: Oslo.

Grønhaug, Kjell – Venkatesh, Alladi (1991) Needs and need recognition in organizational buying. *European Journal of Marketing*, Vol. 25, No: 2, 17–32.

Grønhaug, Kjell (1975) Autonomous vs. joint decisions in organizational buying. *Industrial Marketing Management*, Vol. 4, No: 5, 265–271.

Grover, Varun – Fiedler, Kirk – Teng, James (1997) Empirical evidence on Swanson's tri-core model of information systems innovation. *Information Systems Research*, Vol. 8, No: 3, 273–287.

Hage, Jerald – Aiken, Michael T. (1970) *Social change in complex organizations*. Random House: New York.

Hassard, J. (1991) Multiple paradigms and organizational analysis. A case study. *Organization Studies*, Vol. 12, No: 2, 275–299.

Håkansson, Håkan – Ford, David (2002) How should companies interact in business networks. *Journal of Business Research*, Vol. 55, No: 2, 133–139.

Håkansson, Håkan – Gadde, Lars – Erik (1997) Supplier relations. In: *Understanding business markets*, ed. by David Ford, 400–429. The Dryden Press: London.

Håkansson, Håkan – Johansson, Jan (1992) A model of industrial networks. In: *Industrial networks. A new view of reality,* ed. by Björn Axelsson – Geoffrey Easton, 28–34. Routledge: London.

Håkansson, Håkan – Snehota, Ivan (1995) *Developing business relationships*. Routledge: London.

Håkansson, Håkan (1987) *Industrial technological development*. Routledge: London.

Håkansson, Håkan (1989) *Corporate technological behavior: cooperation and networks*. Routledge: London.

Håkansson, Håkan (ed.) (1982) *International marketing and purchasing of industrial goods and an interaction approach*. John Wiley & Sons: Chichester.

Håkansson, Håkan – Snehota, I. (1989) No business is an island. The network concept of business strategy. *Scandinavian Journal of Management*, Vol. 5, No: 3, 187–200.

Halinen, Aino – Salmi, Asta – Havila, Virpi (1999) From dyadic change to changing business networks: An analytical framework. *Journal of Management Studies*, Vol. 36, No: 6, 779–794.

Halinen, Aino – Törnroos, Jan-Åke (1995) The meaning of time in the study of industrial buyer-seller relationships. In: *Business marketing: an interaction and network perspective*, ed. by Kristian Möller – David Wilson, 493–530. Kluwer: Boston, MA.

Halinen, Aino – Törnroos, Jan–Åke (1998) The role of embeddedness in the evolution of business networks. *Scandinavian Journal of Management*, Vol. 14, No: 3, 187–205.

Halinen, Aino – Törnroos, Jan–Åke (2005) Using case methods in the study of contemporary business networks. *Journal of Business Research*, Vol. 58, No: 9, 1285–1297.

Halinen, Aino (1997) *Relationship marketing in professional services: A study of agency and client dynamics in the advertising sector*. Routledge: London.

Hamfelt, C. – Lindberg, A.-K. (1987) Technological development and the individual's contact network. In: *Industrial technological development : a network approach*, ed. by Håkan, Håkansson, 177–209. Croom Helm: London.

Handfield, Robert B. – Melnyk, Steven A. (1998) The scientific theory-building process: a primer using the case of TQM. *Journal of Operations Management*, Vol. 16, No: 4, 321–339.

Hannan, Michael T. – Freeman John (1977) The population ecology of organizations. *American Journal of Sociology*, Vol. 82, No: 5, 929–964.

Henthorne, Tony L. – LaTour, Michael S. – Williams, Alvin J. (1993) How organizational buyers reduce risk. *Industrial Marketing Management*, Vol. 22, No: 1, 41–48.

Hernández Ortega, Blanca – Jímenez Martínez, Julio – Martín De Hoyos, Jose (2007) Influence of the business technological compatibility on the acceptance of innovations. *European Journal of Innovation Management*, Vol. 10, No: 1, 7–24.

Hippell von, Eric (1982) The customer-active paradigm for industrial products generation. *Research Policy*, Vol. 7, No: 3, 240–266.

Hirsjärvi, Sinikka – Hurme, Helena (2002) *Tutkimushaastattelu Teemahaastattelun teoria ja käytäntö*. Yliopistopaino: Helsinki.

Hislop, Donald (2002) The client role in consultancy relations during the appropriation of technological innovations. *Research Policy*, Vol. 31, No: 5, 657–671.

Hislop, Donald (2003) Knowledge integration processes and the appropriation of innovations. *European Journal of Innovation Management*, Vol. 6, No: 3, 159–172.

Hitt, Michael A. – Beamish, Paul W. – Jackson, Susan E. – Mathieu, John E. (2007) Building theoretical and empirical bridges across level: multilevel research in management. *Academy of Management Journal*, Vol. 50, No: 6, 1385–1399.

Howard, John A. – Hulbert, James M. – Farley, John U. (1975) Organizational analysis and information system design: A decision process perspective. *Journal of Business Research*, Vol. 3, No: 2, 133–148.

Howard, John A. – Sheth, Jagdish N. (1969) *The theory of buyer behavior*. Wiley: New York.

Huber, George P. – Power, Daniel J. (1985) Research notes and communications. Retrospective reports of strategic-level managers: Guidelines for increasing their accuracy. *Strategic Management Journal*, Vol. 6, No: 2, 171–180.

Huber, Joan (1991) *Macro-micro linkages in sociology*. Sage: New York.

Hunter, Gary K. – Bunn, Michele D. – Perreault, William D. Jr. (2006) Interrelationships among key aspects of the organizational procurement process. *International Journal of Research in Marketing*, Vol. 23, No: 2, 155–170.

Hurley, Robert F. – Hult, G. Tomas M. (1998) Innovation, market orientation, and organizational learning: An integration and empirical examination. *Journal of Marketing*, Vol. 62, No: 3, 42–54.

Hurmerinta-Peltomäki, Leila (2001) *Time and internationalization. The shortened adoption lag in small business internationalisation*. Publications of Turku School of Economics and Business Administration, A–7:2001: Turku.

Jackson, Donald W. Jr. – Keith, Janet E. – Burdick, Richard K. (1984) Purchasing agents' perceptions of industrial buying center influence: A situational approach. *Journal of Marketing*, Vol. 48, No: 000004, 75–83.

Jemison, David B. (1984) The importance of boundary spanning roles in strategic decision-making. *The Journal of Management Studies*, Vol. 21, No: 2, 131–152.

Johannessen, Jon-Arild – Olsen, Bjørn – Lumpkin, G. T. (2001) Innovation as newness: what is new, how new and new to whom? *European Journal of Innovation Management*, Vol. 4, No: 1, 20–31.

Johnston, Wesley J. – Bonoma, Thomas V. (1981) The buying center: structure and interaction patterns. *Journal of Marketing*, Vol. 45, No: 3, 143–156.

Johnston, Wesley J. – Spekman, Robert E. (1987) Industrial buyer behavior: Where we are and where we need to go. In: *Research in Consumer Behavior*, ed. by J. N. Sheth, Vol. 2, 83–111. JAI Press: Greenwich, CT.

Johnston, Wesley J. – Lewin, Jeffrey E. (1996) Organizational buying behavior: Toward an integrative framework. *Journal of Business Research*, Vol. 35, No: 1, 1–15.

Kasanen, E. – Lukka, K. – Siitonen, A. (1993) The constructive approach in management accounting research. *Journal of Management Accounting Research*, Vol. 5, 241–264.

Katz, Daniel –Kahn, Robert L. (1966) *The social psychology of organizations*. Wiley: New York.

Katz, Elihu – Lazarsfeld, Paul. F. (1955) *Personal influence. The part played by people in the flow of mass communications.* The Free Press: Glencoe.

Katz, Michael L. – Shapiro, Carl (1994) Systems competition and network effects. *The Journal of Economic Perspectives*, Vol. 8, No: 2, 93–115.

Kauffman, Ralph G. (1996) Influences on organizational buying choice processes: future research directions. *Journal of Business & Industrial Marketing*, Vol. 11, No: 3, 94–107.

Kautz, Karlheinz – Larsen, Even Åby (2000) Diffusion theory and practice, disseminating quality management and software process improvement innovations. *Information Technology & People*. Vol. 13, No: 1, 11–26.

Kim, Namwoon – Srivastava, Rajendra K. (1998) Managing intraorganizational diffusion of technological innovations. *Industrial Marketing Management*, Vol. 27, No: 3, 229–246.

Kimberly, John R. – Evanisko, Michael J. (1981) Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal*, Vol. 24, No: 4, 689–713.

Kimberly, John R. (1976) Issues in the design of longitudinal organizational research. *Sociological Methods and Research*, Vol. 4, No: 3, 321–347.

Kincaid, Harry V. – Bright, Margaret (1957) Interviewing the business elites. *American Journal of Sociology*, Vol. 63, No: 3, 304–311.

King, Ronald H. – Patton, W.E. – Puto, Cristopher P. (1988) Individual and joint decision-making in industrial purchasing. In: *Advances in Business Marketing*, ed. by Arch G. Woodside, Vol. 3, 95–117. Jai Press Inc.: London.

Klein, Katherine J. – Conn, Amy B. – Sorra, Joann Speer (2001) Implementing computerized technology: An organizational analysis. *Journal of Applied Psychology*, Vol. 86, No: 5, 811–824.

Klein, Katherine J. – Kozlowski, Steve W. (2000) From micro to meso: Critical steps in conceptualizing and conducting multilevel research. *Organizational Research Methods*, Vol. 3, No: 3, 211–236.

Klein, Katherine J. – Sorra, Joann S. (1996) The challenge of innovation implementation. *Academy of Management Review*, Vol. 21, No: 4, 1055–1080.

Klein, Katherine J. – Dansereau, Fred – Hall, Rosalie J. (1994) Levels issues in theory development, data collection, and analysis. *Academy of Management Review*, Vol. 19, No: 2, 195–229.

Klonglan, Gerald E. – Coward, Walter E. Jr. (1970) The concept of symbolic adoption: a suggested interpretation. *Rural Sociology*, Vol. 35, No: 1, 77–83.

Knight, Kenneth (1967) A descriptive model of the intra-firm innovation process. *The Journal of Business*, Vol. 40, No: 4, 478–497.

Knorr-Cetina, Karin (1988) The micro-social order, towards a reconception. In: *Actions and structure, research methods and social theory*, ed. by Nigel G. Fielding, 21–53. Sage: London.

Kohli, Ajay (1989) Determinants of influence in organizational buying: A contingency approach. *Journal of Marketing*, Vol. 53, No: 3, 50–65.

Krapfel, Robert E. Jr. (1982) An external interpersonal influence model of organizational buyer behavior. *Journal of Business Research*, Vol. 10, No: 2, 147–157.

Kriger, Mark P. – Barnes, Louis B. (1992) Organizational decision-making as hierarchical levels of drama. *Journal of Management Studies*, Vol. 29, No: 4, 439–457.

Küppers, Günther (2002) Complexity, self-organization and innovation networks: A new theoretical approach. In: *Innovation networks: theory and practice,* ed. by A. Pyka – G. Küppers, 22–52. Edward Elgar: Cheltenham, UK.

Lagnevik, Magnus – Sjöholm, Ingegerd, – Lareke, Anders – Östberg, Jacob (2003) *The dynamics of innovation clusters: a study of the food industry*. Edward Elgar: Cheltenham, UK.

Lambert, David R. – Dornoff, Ronald J. – Kernan, Jerome B. (1977) The industrial buyer and the postchoice evaluation process. *Journal of Marketing Research*, Vol. 14, No: 2, 246–251.

Lancaster, G. A. – White, M. (2001) Industrial diffusion, adoption and communication. *European Journal of Marketing*, Vol. 10, No: 5, 280–298.

Langley, Ann (1999) Strategies for theorizing from process data. *Academy of management review*, Vol. 24, No: 4, 691–710.

Langley, Ann – Truax, Jean (1994) A process study of new technology adoption in smaller manufacturing firms. *Journal of Management Studies*, Vol. 31, No: 5, 619–652.

LaPlaca, Peter J. (1997) Contributions to marketing theory and practice from Industrial Marketing Management. *Journal of Business Research*, Vol. 38, No: 3, 179–198.

Lawrence, Paul R. – Lorsch, Jay W. (1967) *Organization and environment: managing differentiation and integration*. Graduate School of Business Administration, Harvard University: Boston.

Lee, John Y. – Chan, Kam C. (2003) Assessing the operations innovation bandwagon effect: A market perspective on the returns. *Journal of Managerial Issues*, Vol. XV, No: 1, 97–105.

Leonard-Barton, Dorothy – Deschamps, Isabelle (1988) Managerial influence in the implementation of new technology. *Management Science*, Vol. 34, No: 10, 1252–1265.

Levitt, Theodore (1983) The globalization of markets. *Harvard Business Review*, Vol. 61, No: 3, 92–102.

Lewin, Jeffrey E. – Donthu, Naveen N. (2001) The influence of purchase situation on buying center structure and involvement: a select meta-analysis of organizational buying behavior research. *Journal of Business Research*, Vol. 58, No: 10, 1381–1390.

Lewis, Marianne W. – Grimes, Andrew J. (1999) Metatriangulation : building theory from multiple paradigms. *Academy of management review*, Vol. 24, No: 4, 672–690.

Lichtenthal, David J. (1988) Group decision making in organizational buying: A role structure approach. In: *Advances in Business Marketing*, ed. by Arch G. Woodside, Vol. 3, 119–157. JAI PRESS INC.: London.

Lin, Zhiang – Carley, Kathleen M. (1997) Organizational decision making in and error in a dynamic task environment. *Journal of Mathematical Sociology*, Vol. 22, No: 2, 125–149.

Lincoln, Yvonna S. – Guba, Egon G. (1985) *Naturalistic inquiry*. Sage: Beverly Hills.

Lincoln, Yvonna S. – Guba, Egon G. (1999) Establishing trustworthiness. In: *Qualitative research*, ed. by Alan Bryman – Robert G. Burgess, 397–444. Volume III. Sage: London.

Lissoni, F. – Metcalfe, J. S. (1994) Diffusion of innovation ancient and modern: A review of the main themes. In: *The Handbook of Industrial Innovation*, ed. by Mark Dodgson – Roy Rothwell, 106–141. Edward Elgar: Hants, England.

Lukka, K. – Kasanen, E. (1993) Yleistettävyyden ongelma liiketaloustieteessä. Liiketaloudellinen Aikakauskirja, Vol. 42, No: 4, 348–381.

Lukka, Kari (1991) Laskentatoimen tutkimuksen epistemologiset perusteet. *Liiketaloudellinen Aikakauskirja*. Vol. 40, No: 2, 161–185.

Lyytinen, Kalle – Rose, G. M. (2003) The disruptive nature of information technology innovations: The case of Internet computing in systems development organizations. *MIS Quarterly*, Vol. 27, No: 4, 557–595.

Ma, Agnes – Norwich, Brahm (2007) Triangulation and theoretical understanding. *International Journal of Social Research Methodology*, Vol. 10, No: 3, 211–226.

Mahajan, Vijay – Muller, Eitan – Bass, Frank M. (1990) New product diffusion models in marketing: A review and directions for research. *Journal of Marketing*, Vol. 54, No: 1, 1–26.

Makkonen, Hannu (2008) Beyond organizational innovation adoption – a conceptual and empirical analysis. *Journal of Business Market Management*, Vol. 2, No: 2, 63–77.

Mansfield, Edwin (1961) Technical change and the rate of imitation. *Econometrica*, Vol 29, No: 4, 741–766.

March, James G. – Simon, Herbert A. (1958) *Organizations*. Wiley: New York.

Martilla, John A. (1971) Word–of–mouth communication in the industrial adoption process. *Journal of Marketing Research*, Vol. 8, No: 2, 173–178.

Martin, Joanne (1992) *Cultures in organizations. Three perspectives*. Oxford University Press: New York.

Mattsson, Lars - Gunnar – Johanson, Jan (1992) Network positions and strategic action – an analytic framework. In: *Industrial networks: A new view of reality*, ed. by B. Axelsson – G. Easton, 205–217. Routledge: London.

Mattsson, Lars-Gunnar (1987) Management of strategic change in a "markets-as-networks" perspective. In: *The management of strategic change*, ed. by Andrew Pettigrew, 234–256. Basil Blackwell: London.

McDade, Sean R. – Oliva A. Terence – Pirsch, Julie A. (2002) The organizational adoption of high technology products "for use": Effects of size, preferences, and radicalness of impact. *Industrial Marketing Management*, Vol. 31, No: 5, 441–456.

McKinnon, J. (1988) Reliability and validity in field research: Some strategies and tactics. *Accounting, Auditing and Accountability Journal*, Vol. 1, No: 1, 34–54.

McQuiston, Daniel H. (1989) Novelty, complexity, and importance as causal determinants of industrial buyer behavior. *Journal of Marketing*, Vol. 53, No: 2, 66–79.

Melo Brito, Carlos (1999) Issue and based nets: a methodological approach to the sampling issue in industrial networks research. *Qualitative Market Research: An International Journal*, Vol. 2, No: 2, 92–102.

Menanteau, Philippe – Lefebvre, Hervé (2000) Competing technologies and the diffusion of innovations: the emergence of energy-efficient lamps in the residential sector. *Research Policy*, Vol. 29, No: 3, 375–389.

Meyer, Alan D. – Goes, James B. (1988) Organizational assimilation of innovations: A multilevel contextual analysis. *The Academy of Management Journal*, Vol. 31, No: 4, 897–923.

Michaels, Ronald E. – Day, Ralph L. – Joachimsthaler, Erich A. (1987) Role stress among industrial buyer: an integrative model. *Journal of Marketing*, Vol. 51, No: 1, 28–45.

Miles, Matthew B. – Huberman, Michael (1994) Qualitative data analysis. An expanded sourcebook. 2nd ed. Sage: Thousand Oaks.

Miles, Matthew B. (1983) Qualitative data as an attractive nuisance: the problem of analysis. In: *Qualitative methodology*, ed. by John van Maanen, 117–134. Sage publications: Beverly Hills.

Miles, Raymond E. – Snow, Charles C. (1992) Causes of failure in network organizations. *California Management Review*, Vol. 34, No: 4, 53–72.

Miles, Robert H. (1980) *Macro organizational behavior*. Goodyear: Santa Monica, CA.

Miller, Danny – Friesen, Peter H. (1982) The longitudinal analysis of organizations: A methodological perspective. *Management Science*, Vol. 28, No: 9, 1013–1034.

Mintzberg, Henry – Raisinghani, Duru – Theoret, Andre (1976) The structure of "unstructured" decision processes. *Administrative Science Quarterly*, Vol. 21, No: 2, 246–275.

Mintzberg, Henry – Waters, James A. (1985) Of strategies, deliberate and emergent. *Strategic Management Journal*, Vol. 6, No: 3, 257–272.

Mintzberg, Henry – Waters, Jim (1990) Studying deciding: An exchange of views between Mintzberg and Waters, Pettigrew, and Butler. *Organization studies*, Vol. 11, No: 1, 1–16.

Minztberg, Henry – Waters, Jim (1990) Does decision get in the way? In: *Studying Deciding: An Exchange of Views Between Mintzberg and Waters, Pettigrew, and Butler*, Vol. 11, No: 1, 1–6. Organization Studies.

Mitchell, Vincent-Wayne (1995) Organizational risk perception and reduction: A literature review. *British Journal of Management*, Vol. 6, No: 2, 115–133.

Mittelstaedt, Robert A. – Grossbart, William W. – Devere, Stephen P. (1976) Optimal stimulation level and the adoption decision process. *The Journal of Consumer Research*, Vol. 3, No: 2, 84–94.

Mohr, Lawrence B. (1982) *Explaining organizational behavior, the limits and possibilities of theory and research*. Jossey-Bass Inc: San Francisco.

Möller, Kristian – Halinen, Aino (2000) Relationship marketing theory: Its roots and direction. *Journal of Marketing Management*, Vol. 16, No: 1–3, 29–54.

Möller, Kristian – Laaksonen, Martti (1986) Situational dimensions and decision criteria in industrial buying: Theoretical and empirical analysis. In: *Advances in Business Marketing*, ed. by Arch G. Woodside, Vol. 1, 163–207. Jai Press: Greenwich, CT.

Möller, Kristian – Svahn, Senja (2006) Role of knowledge in value creation in business nets. *Journal of Management Studies*, Vol. 43, No: 5, 985–1007.

Möller, Kristian – Wilson, David T. (1995) Business relationships – An interaction perspective. In: *Business Marketing: an interaction and network perspective*, ed. by Kristian Möller – David Wilson, 23–52. Kluwer Academic Publishers: Boston.

Möller, Kristian (1981) *Industrial buying behavior of production materials: A conceptual model and analysis*. Helsinki School of Economics Publications, Series B–54, Helsinki.

Möller, Kristian (1994) Interorganizational marketing exchange: Metatheoretical analysis of current research approaches. In: *Research traditions in marketing*, ed. by Gilles Laurent – Gary L. Lilien – Bernard Pras, 347–372. Kluwer Academic Publishers: Boston.

Möller, Kristian K. E. (1985) Research strategies in analyzing the organizational buying process. *Journal of Business Research*, Vol. 13, No: 1, 3–17.

Montgomery, Henry – Lipshitz, Raanan – Brehmer, Berndt (2005) Introduction: From the first to the fifth volume of naturalistic decision-making research. In: *How professional make decisions,* ed. by Henry Montgomery – Raanan Lipshitz – Berndt Brehmer, 1–11. Lawrence Erlbaum Associates: Mahwah, New Jersey.

Morgan, Gareth – Smircich, Linda (1980) The case for qualitative research. *The Academy of Management Review*, Vol. 5, No: 4, 491–500.

Morgan, Gareth (1983) Exploring choice. Reframing the process of evaluation. In: *Beyond Method. Strategies for Social Research*, ed. by Gareth Morgan, 392–404. Sage: Beverly Hills, CA.

Morgeson, Frederick P. – Hofmann, David A. (1999) The structure and function of collective constructs: Implications for multilevel research and theory development. *Academy of Management Review*, Vol. 24, No: 2, 249–265.

Moriarty, Rowland T. – Bateson, John E. G. (1982) Exploring complex decision making units: A new approach. *Journal of Marketing Research*, Vol. 19, No: 2, 182–191.

Morris, Michael H. – Berthon, Pierre – Pitt, Leyland F. (1999) Assessing the structure of industrial buying centers with multivariate tools. *Industrial Marketing Management*, Vol. 28, No: 3, 263–276.

Mouzas, Stefanos – Araujo, Luis (2000) Implementing programmatic initiatives in manufacturer and retailer networks. *Industrial Marketing Management*, Vol. 29, No: 4, 293–303.

Nabih, Mohamed I. – Bloem, Sjaak G. – Poiesz, Theo B.C. (1997) Conceptual issues in the study of innovation adoption behavior. *Advances in Consumer Research*, Vol. 24, No: 1, 190–196.

Naumann, Earl – Lincoln, Douglas J. – McWilliams, Robert D. (1984) The purchase of components: Functional areas of influence. *Industrial Marketing Management*, Vol. 13, No: 2, 113–122.

Neilimo, K. – Näsi, J. (1980) Nomoteettinen tutkimusote ja suomalainen yrityksen taloustiede. Tutkimus positivismin soveltamisesta. *Tampereen yliopisto. Yrityksen taloustieteen ja yksityisoikeuden laitoksen julkaisuja*, A: 2–12.

Newell, S. – Swan, J. A. – Galliers, R.D. (2000) A knowledge-focused perspective on the diffusion and adoption of complex information technologies: the BPR example. *Information Systems Journal*, Vol. 10, No: 3, 239–259.

Nicosia, Francesco M. – Wind, Yoram (1977) Behavioral models of organizational buying processes. In: *Behavioral Models for Market Analysis: Foundations for Marketing Action*, ed. by Francesco M. Nicosia – Yoram Wind, 96–120. The Dryden Press: Hinsdale.

O´neil, Hugh M. – Pouder, Richard W. – Buchholtz, Ann K. (1998) Patterns in the diffusion of strategies across organizations: Insights from the innovation diffusion literature. Academy of Management Review, Vol. 23, No: 1, 98–114.

Oliver, Christine (1991) Strategic responses to institutional processes. Academy of Management Review, Vol. 16, No: 1, 145–179.

Olkkonen, Rami (2002) *On the same wavelength? A study of the dynamics of sponsorship relationships between firms and cultural organizations.* Publications of the Turku School of Economics and Business Administration, Series A-7:2002. Turku.

Ozanne, Urban B. – Churchill Jr, Gilbert A. (1971) Five dimensions of the industrial adoption process. *Journal of Marketing Research*, Vol. 8, No: 3, 322–328.

Pae, Jae H. – Kim, Namwoon – Han, Jin K. – Yip, Leslie (2002) Managing intraorganizational diffusion of innovations. Impact of buying center dynamics and environments. *Industrial Marketing Management*, Vol. 31, No: 8, 719–726.

Pappas, Chris (1984) Strategic management of technology. *Journal of Product innovation management*, Vol. 1, No: 1, 30–35.

Parker, M. – McHugh, G. (1991) Five texts in search of an author: A response to John Hassard's "Multiple paradigms and organizational analysis". *Organization Studies*, Vol. 12, No: 3, 451–456.

Parkinson, Stephen T. – Baker, Michael J. (1986) *Organizational buying behavior*. Macmillan Press Ltd.: Houndmills.

Parsons, Talcott (l951) *The social system.* Free Press: New York.

Patchen, Martin (1974) The locus and basis of influence on organizational decisions. *Organizational Behavior and Human Performance*, Vol. 11, No: 2, 195–221.

Patton, Michael Quinn (1980) *Qualitative evaluation methods*. Sage: Newbury Park.

Patton, W. E. – Puto, Cristopher P. – King, Ronald H (1986) Which buying decisions are made by individuals and not by groups? *Industrial Marketing Management*, Vol. 15, No: 2, 129–138.

Pettigrew, Adrew M. (1972) Information control as a power resource. *Sociology*, Vol. 6, No: 2, 187–204.

Pettigrew, Andrew (1985) *The awakening giant. Continuity and change in imperial chemical industries*. Basil Blackwell: Oxford, England.

Pettigrew, Andrew (1990a) Longitudinal field research on change: theory and practice. *Organization Science*, Vol. 1, No: 3, 267–292.

Pettigrew, Andrew (1990b) Studying strategic choice and strategic change. A comment on Mintzberg and Waters: "Does decision get in the way?". In: *Studying Deciding: An Exchange of Views Between Mintzberg and Waters, Pettigrew, and Butler*, ed. by Henry Mintzberg – Jim Waters, Vol. 11, No: 1, 6–11. Organization Studies.

Pettigrew, Andrew (1992) The character and significance of strategy process research. *Strategic Management Journal*, Vol. 13, No: 1, 5–16.

Pettigrew, Andrew (1997) What is a processual analysis. *Scandinavian Journal of Management*, Vol. 13, No: 4, 337–348.

Pfeffer, Jeffrey (1981) *Power in organizations*. Ballinger Publishing Company: Cambridge.

Pfeffer, Jeffrey (1982) *Organizations and organization theory*. Pitman Publishing Inc.: Marshfield.

Pihlanto, Pekka (1994) The action-oriented approach and case study method in management studies. *Scandinavian Journal of Management*, Vol. 10, No: 4, 369–382.

Plouffe, Cristopher R. – Hulland, John S. – Vandenbosch, Mark (2001) Research report: Richness versus parsimony in modelling technology adoption decisions – understanding merchant adoption of a smart card-based payment system. *Information Systems Research*, Vol. 12, No: 2, 208–222.

Poole, Marshall Scott – Van de Ven, Andrew H. (1989) Using paradox to build management and organizations theories. *Academy of Management Review*, Vol. 14, No: 4, 562–578.

Popper, K. (1970) Normal science and its dangers. In: *Critizism and the growth of knowledge*, ed. by I. Lakatos – A. Musgrave, 51–58. Cambridge University Press: Cambridge, England.

Premkumar, G. – Roberts, Margaret (1999) Adoption of new information technologies in rural small businesses. *Omega, International Journal of Management Science*, Vol. 27, No: 4, 467–484.

Puumalainen, Kaisu (2002) *Global diffusion of innovations in telecommunications: Effects of data aggregation and market environment.* Acta Universitatis Lappeenrantaensis, No. 143, Lappeenranta University of Technology: Lappeenranta.

Raunio, Kyösti (1999) *Positivismi ja ihmistiede: sosiaalitutkimuksen perustat ja käytännöt.* Gaudeamus: Helsinki.

Reunis, Marc R.B. – Raaij van, Erik M. – Santema, Sicco C. (2004) Actor-to-actor dissemination of electronic procurement (EP) adoption: an exploration of influencing factors. *Journal of Purchasing and Supply Management*, Vol. 10, No: 4–5, 201–210.

Ritter, Thomas (2000) A framework for analyzing interconnectedness of relationships. *Industrial Marketing Management*, Vol. 29, No: 4, 317–326.

Robertson, Maxine – Swan, Jacky – Newell, Sue (1996) The role of networks in the diffusion of technological innovation. *Journal of Management Studies*, Vol. 33, No: 3, 333–359.

Robertson, Thomas S. – Gatignon, Hubert (1986) Competitive effects on technology diffusion. *Journal of Marketing*, Vol. 50, No: 3, 1–12.

Robertson, Thomas S. (1967) The process of innovation and the diffusion of innovations. *Journal of Marketing*, Vol. 31, No: 1, 14–19.

Robertson, Thomas S. (1971) *Innovative behavior and communication*. Holt, Rinehart and Winston, Inc.: New York.

Robinson, Patrick – Faris, Charles – Wind, Yoram (1967) *Industrial buying and creative marketing*. Allyn & Bacon: Boston.

Rogers, Everett M. – Kincaid, Lawrence D. (1981) *Communication networks: Toward a new paradigm for research*. The Free Press: New York.

Rogers, Everett M. – Shoemaker, F. Floyd (1971) *Communication of innovations. A cross–cultural approach*. 2nd ed. The Free Press: New York.

Rogers, Everett M. (1962) *Diffusion of innovations*. The Free Press: New York.

Rogers, Everett M. (1983) *Diffusion of Innovations*. 3rd ed. The Free Press: New York.

Rogers, Everett M. (1995) *Diffusion of Innovations*. The Free Press, New York.

Rogers, Everett M. (2002) Diffusion of preventive innovations. *Addictive Behaviors*, Vol. 27, No: 6, 989–993.

Rogers, Everett M. (2003) *Diffusion of Innovations*. The Free Press, New York.

Rosenbloom, Richard, S. – Cusumano, Michael A. (1987) Technological pioneering and competitive advantage: The birth of the VCR industry. *California Management Review*, Vol. 29, No: 4, 51–76.

Rousseau, Denise M. (1985) Issues of level in organizational research: Multi-level and cross-level perspectives. *Research in Organizational Behavior*, Vol. 7, No: 1, 1–37.

Ryan, Bryce – Gross, Neal C. (1943) The Diffusion of Hybrid Seed Corn in Two Iowa Communities. *Rural Sociology,* Vol. 8, No: 1, 15–24.

Salmi, A. (1995) *Institutionally changing business networks. An analysis of a Finnish company's operations in exporting to the Soviet Union, Russia, and the Baltic States.* PhD thesis. Helsinki School of Economics and Business Administration: Helsinki.

Salmi, Asta (2000) Entry into turbulent business networks. The case of a Western company on the Estonian market. *European Journal of Marketing*, Vol. 34, No: 11, 1374–1390.

Salminen, Risto T. – Möller, Kristian E. (2004) Use of references in industrial bidding – a decision process analysis. *Journal of Marketing Management*, Vol. 20, No: 1–2, 133–155.

Sarkis, Joseph – Meade, Laura – Presley, Adrien (2006) An activity based management methodology for evaluating business processes for environmental sustainability. *Business Process Management Journal*, Vol. 12, No: 6, 751–769.

Scherer, A. G. (1998) Pluralism and incommensurability in strategic management and organization theory: A problem in search of a solution. *Organization*, Vol. 5, No: 2, 147–168.

Schumpeter, Joseph A. (1934) *The theory of economic development. An inquiry into profits, capital interest, and the business cycle.* 8th ed. Harvard University Press: Cambridge, Massachusetts.

Scott, Richard W. (1995) Symbols and organizations: From barnard to the institutionalists. In: *Organization Theory, From Chester Barnard to the Present and Beyond*, ed. by Oliver E. Williamson, 38–55. Oxford University Press: New York.

Scwenk, Charles R. (1985) The use of participant recollection in modeling of organizational decision processes. *Academy of Management Review*, Vol. 10. No: 3, 496–503.

Senge, Peter M. (1990) *The fifth discipline. The art and the practice of the learning organization*. Doubleday: New York, NY.

Sharma, Arun (1994) Organizational culture and adoption of high-technology products. *Journal of Marketing Management*, Vol. 10, No: 6, 513–526.

Sheth Jagdish N. (1977) Recent developments in organizational buying behavior. In: *Consumer and industrial buying behavior*, ed. by A.G. Woodside – J. N. Sheth – P. D. Bennett, 17–34. North Holland: New York.

Sheth, Jagdish N. (1973) A model of industrial buyer behavior. *Journal of Marketing*, Vol. 37, No: 4, 50–56.

Sheth, Jagdish N. (1996) Organizational buying behavior: past performance and future expectations. *Journal of business & Industrial Marketing*, Vol. 11, No: 3, 7–24.

Simon, Herbert A. (1955) A behavioural model of rational choice. *Quarterly Journal of Economics*, Vol. 69, No: 1, 99–118.

Spekman, Robert – Stern, Louis W. (1979) Environmental uncertainty and buying group structure: An empirical investigation. *Journal of Marketing*, Vol. 43, No: 1, 54–64.

Spekman, Robert (1979) Influence and information: An exploratory investigation of the boundary role person's basis of power. *Academy of Management Journal*, Vol. 22, No: 1, 104–117.

Stake, Robert E. (1995) *The art of case study research*. Sage: Thousand Oaks.

Stake, Robert E. (2008) Qualitative case studies. In: *Strategies of qualitative inquiry*, ed. by Norman K. Denzin, Norman K. – Yvonna S. Lincoln, 119–150. Sage Publications: Los Angeles.

Stoneman, Paul – Ireland, N. (1983) The role of supply factors in the diffusion of new process technology. *Economic Journal*, Vol. 93, No: 369a (Supplement: Conference Papers): 66–78.

Stoneman, Paul – Kwon, Myung Joong (1996) Technology adoption and firm profitability. *The Economic Journal*, Vol. 106, No: 437, 952–962.

Subramanian, Ashok – Nilakanta, Sree (1996) Organizational innovativeness: exploring the relationship between organizational determinants of innovation, types of innovations, and measures of organizational performance. *Omega International Journal of management Science*, Vol. 24, No: 6, 631–647.

Subramanian, Ashok (1996) Innovativeness: Redefining the concept. *Journal of Engineering and Technology Management,* Vol. 13, No: 3–4, 223–243.

Sutton, Robert I. – Staw, Barry M. (1995) What theory is not. *Administrative Science Quarterly*, Vol. 40, No: 3, 371–384.

Swan, Jacky A. – Clark, Peter (1992) Organizational decision-making in the appropriation of technological innovation: cognitive and political dimensions. *European Work and Organizational Psychologist*, Vol. 2, No: 2, 103–127.

Swan, Jacky A. – Newell, Sue (1995) The role of professional associations in technology diffusion. *Organization Studies*, Vol. 16, No: 5, 847–874.

Swanson, Burton E. (1994) Information systems innovation among organizations. *Management Science*, Vol. 40, No: 9, 1069–1092.

Tang, Ming-Je – Zannetos, Zenon S. (1992) Competition under continuous technological change. *Managerial and Decision Economics*, Vol. 13, No: 2, 135–148.

Tanner Jr., John F. (1999) Organizational buying theories: A bridge to relationships theory. *Industrial Marketing Management*, Vol. 28, No: 3, 245–255.

Thomas, Robert J. (1982) Correlates of interpersonal purchase influence in organizations. *Journal of consumer research*, Vol. 9, No: 2, 171–182.

Thompson, James D. (1967) *Organizations in action*. McGraw-Hill: New York.

Tidd, Joe – Bessant, John – Pavitt, Keith (1997) *Managing innovation. Integrating technological, market and organizational change*. John Wiley & Sons: Chichester.

Tornatzky, Louis G. – Klein, Katherine J. (1982) Innovation characteristics and innovation adoption-implementation: a meta-analysis of findings. *IEEE Transactions on engineering management*, Vol. EM-29, No: 1, 28–45.

Töttö, Pertti (2000) Pirullisen positivismin paluu: laadullisen ja määrällisen tarkastelua. Vastapaino: Tampere.

Turnbull, Peter – Ford, David – Cunningham, Malcolm (1996) Interaction, relationships and networks in business markets: an evolving perspective. *Journal of Business & Industrial Marketing*, Vol. 11, No: 3, 44–62.

Turnbull, Peter – Wilson, David T. (1989) Developing and protecting profitable customer relationships. *Industrial Marketing Management*, Vol. 18, No: 1, 1–6.

Turnbull, Peter W. – Meenaghan, A. (1980) Diffusion of innovation and opinion leadership. *European Journal of Marketing*, Vol. 14, No: 1, 3–33.

Tushman, Michael – Scanlan, Thomas (1981) Boundary spanning individuals: Their role in information transfer and their antecedents. *Academy of Management Journal*, Vol. 24, No: 2, 289–305.

Valente, Thomas W. (1995) *Network models of the diffusion of innovations*. Hampton Press Inc.: Cresskill, New Jersey.

Van de Ven, Andrew (1992) Suggestions for studying strategy process: a research note. *Strategic Management Journal*, Vol. 13, No: Special issue, 169–188.

Van de Ven, Andrew H. – Huber, George P. (1990) Longitudinal field research methods for studying processes of organizational change. *Organization Science*, Vol. 1, No: 3, 213–219.

Van de Ven, Andrew H. (1986) Central problems in the management of innovation. *Management Science*, Vol. 32, No: 5, 590–607.

Venkatraman, Meera P. (1991) The impact of innovativeness and innovation type on adoption. *Journal of Retailing*, Vol. 67, No: 1, 51–67.

Vyas, N. – Woodside, A. G. (1984) An inductive model of industrial supplier choice processes. *Journal of Marketing*, Vol. 48, No: 1, 30–45.

Waarts, Eric – van Everdingen, Yvonne M. – van Hillegersberg, Jos (2002) The dynamics of factors affecting the adoption of innovations. *The Journal of Product Innovation Management*, Vol. 19, No: 6, 412–423.

Ward, Scott – Webster, Frederick E. Jr. (1991) Organizational buying behavior. In: *Handbook of Consumer Behavior*, ed. by Thomas S. Robertson – Harold H. Kassarjian, 419–458. Prentice-Hall Inc.: Englewood Cliffs, New Jersey.

Webster, Frederick E. – Wind, Yoram (1972) *Organizational Buying Behavior*. Prentice-Hall: Englewood Cliffs, New Jersey.

Weick, K. E. (1989) Theory construction as disciplined imagination. *Academy of Management Review*. Vol. 14, No: 4, 515–531.

Weigand, Robert E. (1968) Why studying the purchasing agent is not enough. *Journal of Marketing*, Vol. 32, No: 1, 41–45.

Weiss, Allen M. (1994) The effects of expectations on technology adoption: some empirical evidence. *The Journal of Industrial Economics*, Vol. 42, No: 4, 341–359.

Wejnert, Barbara (2002) Integrating models of diffusion of innovations: A conceptual framework. *The Annual Review of Sociology*, Vol. 28, No: 1, 297–326.

Whetten, David A. (1989) What constitutes a theoretical contribution? *Academy of Management Review*, Vol. 14, No: 4, 490–495.

Wieseke, Jan – Lee, Nick – Broderick, Amanda J. – Dawson, Jeremy F. – Van Dick, Rolf (2008) Multilevel analyses in marketing research: Differentiating analytical outcomes. *Journal of Marketing Theory and Practice*, Vol. 16, No: 4, 321–339.

Wiklund, Patricia – Orava, Markus – Brännback, Malin – de Heer, Aart Jan (2002) *The present state of the field of food diagnostics*. Technical Reports No. 10, Turku School of Economics and Business Administration: Turku.

Wiklund, Patricia – Orava, Markus – de Heer, Aart Jan – Brännback, Malin (2001) *A study of technological trends and needs in food diagnostics*: Intermediate Report, December.

Wilke, Ricky – Ritter, Thomas (2006) Levels of analysis in business-to-business marketing. *Journal of Business-to-Business Marketing*, Vol. 13, No: 3, 39–64.

Wilson, David T. (1977) Dyadic interactions. In: *Consumer and Industrial Buyer Behavior*, ed. by Arch G. Woodside – Jagdish N. Sheth – P. D. Bennet, 355–365. North Holland: New York.

Wilson, David T. (1987) Merging Adoption Process and Organizational buying models. *Advances in Consumer Research*, Vol. 14, No: 1, 323–325.

Wilson, E.J., Lilien, G.L., Wilson, A.T. (1991) Developing and testing a contingency paradigm of group choice in organizational buying. *Journal of Marketing Research*, Vol. 28, pp.452-66.

Wilson, Elizabeth J. – Lilien Gary L. (1992) Using single informants to study group choice: an examination of research practice in organizational buying. *Marketing Letters*, Vol. 3, No: 3, 297–305.

Wilson, Elizabeth J. – McMurrian, Robert C. – Woodside, Arch G. (2001) How buyers frame problems: revisited. *Psychology and Marketing*, Vol. 18, No: 6, 617–655.

Wilson, Elizabeth J. (1996) Theory transitions in organizational buying behavior research. *The Journal of Business & Industrial Marketing*, Vol. 11, No: 6, 7–19.

Winch, Graham W. (1997) The dynamics of process technology adoption and the implications for upgrade decisions. *Technology Analysis & Strategic Management*, Vol. 9, No: 3, 317–328.

Wind, Yoram – Thomas, Robert J. (1980) Conceptual and methodological issues in organizational buying behavior. *European Journal of Marketing*, Vol. 14, No: 5, 239–263.

Wolcott, Harry F. (1994) *Transforming qualitative data: Description, analysis, and interpretation.* Sage: Thousand Oaks, CA.

Woodside, Arch G. – Biemans, Wim G. (2005) Modeling innovation, manufacturing, diffusion and adoption/rejection processes. *Journal of Business & Industrial Marketing*, Vol. 20, No: 7, 380–393.

Woodside, Arch G. – Liukko, Timo – Vuori, Risto (1999) Organizational buying of capital equipment involving persons across several authority levels. *Journal of Business & Industrial Marketing*, Vol. 14, No: 1, 30–48.

Woodside, Arch G. (1994) Network anatomy of industrial marketing and purchasing of new manufacturing technologies. *Journal of Business & Industrial Marketing*, Vol. 9, No: 3, 52–63.

Woodside, Arch G. (1996) Theory of rejecting superior new technologies. *Journal of Business & Industrial Marketing*, Vol. 11, No: 3, 25–43.

Woodside, Arch G., – Biemans, Wim G. (2005) Modeling innovation, manufacturing, diffusion and adoption/rejection processes. *Journal of Business & Industrial Marketing*, Vol 20, No: 7, 380–393.

Woodside, Elizabeth Wilson (1989) *Formal models of group choice in organizational buying: Toward a contingency paradigm*. UMI: Ann Arbor, Michigan.

Yin, Robert K. (2003) *Case study research. Design and Methods*. 3rd ed. Sage: Thousand Oaks.

Zaltman, Gerald – Duncan, Robert – Holbek, Jonny (1973) *Innovations and organizations*. John Wiley: New York.

Zegweld, Walter – McCarthy, Sean – Lemola, Tarmo (1999) *Innovaatio- ja keksintötoiminta Suomessa, Verkostoitumisen srategioita, Kansainvälinen arviointi.* Kauppa- ja teollisuusministeriön julkaisuja 2/1999, Edita Oy.

Zmud, Robert W. (1982) Diffusion of modern software practices: Influence of centralization and formalization. *Management Science*, Vol. 28, No: 12, 1421–1431.

APPENDIX 1 The interviews

Expert interviews
FoodconcernX, Research director, 12th September 2004
FoodtestingconcernX, Development manager, 12th September 2004
FoodconcernY, Quality assurance manager and chairwoman of an association of food sciences, 25th October 2004

FOODCONCERN1 CASE
Foodconcern1
Production manager (quality & development manager in the beginning of the process) & Laboratory assistant, 14th February 2006
Quality & development manager, 2nd March 2006
Microbiologist (she), 3rd March 2006 & 16th March 2006
Microbiologist (he), 7th March 2006 & 17th March 2006
Head of production, 13th April 2007
Factory manager, 18th April 2007
Supplier company
CEO, 27th September 2005 & 8th March 2006

FOODCONCERN2 CASE
Foodconcern2
Head of project and development organization, 17th January 2007
Project manager, 7th February 2007
Production manager, 7th February 2007
The heads of the subprojects:
IT, 31st May 2007
Hygiene, 31st May 2007
Facilities construction, 31st May 2007
Implementation, 6th June 2007
Third party: consultancy
Automation engineer, 26th June 2007

FOODMEDIUM CASE
Foodmedium
Production manager, 8th December 2005 & 17th March 2006
Product development & quality assurance manager, 12th January 2006 & 12th April 2007
Maintenance manager, 8th February 2006 & 15th February 2006
CEO-owner, 29th January 2007
Board member, 12th April 2007

Supplier company (technology agent)
CEO-owner, 7th March 2006
Third party: consultancy
CEO-owner, 12th April 2007

FOODSMALL1 CASE
Foodsmall1
The two owners of the company, 3rd March 2006 & 1st March 2007
Supplier company
The CEO-owner, 12th April 2007

FOODSMALL2 CASE
Foodsmall2
Former production manager-owner, 8th December 2006
Maintenance manager (electricity), 8th December 2006
CEO-owner, 20th June 2007
Production manager, 20th June 2007
Former production assistant, 25th June 2007
Supplier company
CEO-owner, 21st June 2007
Method developer professor, 26th June 2007
Third party: cleaning company
CEO-owner, 21st June 2007
Third party: consultancy
Microbiologist, 21st June 2007

APPENDIX 2 The interview themes

Open discussion on the process
Narrative on the process, key incidents, key actors (organizations, individuals)?
Current state of the process?

THE ORGANIZATIONAL BUYING BEHAVIOR APPROACH

Process stages
need recognition, determine characteristics, establish specifications, identify potential sources, request proposals, evaluate proposals, select supplier, post purchase evaluation

Environment
physical, political, economic, suppliers, competitors, technological, legal, cultural, global

Organizational characteristics
size, structure, orientation, task & goals, technology, rewards

Purchase characteristics
risk, buy task, product type, limited time, importance, complexity

Seller characteristics
price, product, quality, service, image

Decision rules

Group characteristics
size, membership, leadership, structure, experiences, objectives, authority, expectations, backgrounds

Informational characteristics
message, sources, amount needed, active search, distortion

Participants' characteristics
education, motivation, perceptions, personality, risk prefer., experience

Conflict/negotiations
cooperative, persuasive, bargaining, politicking, use of power

Role stress
roles formation, positions

THE INNOVATION ADOPTION AND DIFFUSION APPROACH

Process stages (commitment development process)
knowledge, persuasion, adoption

Environment
competitive pressures, change agents

Social system
opinion leaders, network connectedness

Adopter
size, structure, innovativeness, strategic posture

Innovation
relative advantage, compatibility, complexity, trialability, observability, uncertainty

THE NETWORK AND INTERACTION APPROACH

Temporary interaction episode
coordination, resource exchange, social exchange, and adaptation activities, within established relationship / initiation of a new relationship
norms and rules: power dependence, co-operation, closeness and expectations
social bonds (attraction, trust, and commitment) and resource ties between the actors

Supplier and adopter characteristics
individual characteristics:
preferred interaction style, perceived importance, relative familiarity, and risk aversion
company characteristics:
relative size, preferred interaction style, relative familiarity, and centralization of purchasing
industry characteristics:
concentration, number of alternative partners, intensity of competition, rate of technical change, and traditions and norms

Product characteristics
simplicity/complexity, innovativeness, importance, substitutability, switching costs, exchange frequency

Network
relationships, direct/indirect influences, references, reputation, network position, roles, other actors related to the process directly and indirectly

Environment
market structure, dynamism, internationalization, actors' social systems

APPENDIX 3 The chronological list of interviews

First interviewing phase, 15 interviews
FOODCONCERN1 CASE, CEO of the supplier, 27th September 2005
FOODMEDIUM CASE, Production manager, 8th December 2005
FOODMEDIUM CASE, Product development & quality assurance manager, 12th Jan 2006
FOODMEDIUM CASE, Maintenance manager, 8th February 2006
FOODCONCERN1 CASE, Production manager (quality & development manager in the beginning of the process) & Laboratory assistant, 14th February 2006
FOODMEDIUM CASE, Maintenance manager, 15th February 2006
FOODCONCERN1 CASE, Quality & development manager, 2nd March 2006
FOODSMALL1 CASE, The two owners of the company, 3rd March 2006
FOODCONCERN1 CASE, Microbiologist (she), 3rd March 2006
FOODMEDIUM CASE, CEO-owner of the supplier, 7th March 2006
FOODCONCERN1 CASE, Microbiologist (he), 7th March 2006
FOODCONCERN1 CASE, CEO of the supplier 8th March 2006
FOODCONCERN1 CASE, Microbiologist (she), 16th March 2006
FOODCONCERN1 CASE, Microbiologist (he) 17th March 2006
FOODMEDIUM CASE, Production manager, 17th March 2006

Second interviewing phase, 25 interviews
FOODSMALL2 CASE, Former production manager-owner, 8th December 2006
FOODSMALL2 CASE, Maintenance manager (electricity), 8th December 2006
FOODCONCERN2 CASE, Head of project and development organization, 17th January 2007
FOODMEDIUM CASE, CEO-owner, 29th January 2007
FOODCONCERN2 CASE, Project manager, 7th February 2007
FOODCONCERN2 CASE, Production manager, 7th February 2007
FOODSMALL1 CASE, The two owners of the company, 1st March 2007
FOODMEDIUM CASE, Product development & quality assurance manager, 12th April 2007
FOODMEDIUM CASE, CEO-owner of the consultancy, 12th April 2007
FOODMEDIUM CASE, Board member, 12th April 2007
FOODSMALL1 CASE, The CEO-owner of the supplier, 12th April 2007
FOODCONCERN1 CASE, Head of production, 13th April 2007
FOODCONCERN1 CASE, Factory manager, 18th April 2007
FOODCONCERN2 CASE, Head of IT subproject, 31st May 2007

FOODCONCERN2 CASE, Head of hygiene subproject, 31st May 2007
FOODCONCERN2 CASE, Head of facilities construction subproject, 31st May 2007
FOODCONCERN2 CASE, Head of implementation subproject, 6th June 2007
FOODSMALL2 CASE, CEO-owner, 20th June 2007
FOODSMALL2 CASE, Production manager, 20th June 2007
FOODSMALL2 CASE, CEO-owner of the supplier, 21st June 2007
FOODSMALL2 CASE, CEO-owner of the cleaning company, 21st June 2007
FOODSMALL2 CASE, Microbiologist (consultancy), 21st June 2007
FOODSMALL2 CASE, Former production assistant, 25th June 2007
FOODSMALL2 CASE, Method developer professor, 26th June 2007
FOODCONCERN2 CASE, Automation engineer (consultancy), 26th June 2007

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