Innovation processes in complex network relations

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The purpose of the thesis is to study the complex network relationships with elements of both cooperation and competition and the strategic tensions and rigidities in form of role-conflicts that may arise among actors in the interplay between cooperation and competition and how tensions can facilitate or impede innovation processes in network.

The thesis has an industrial network approach departing from research of the IMP group, in business-to-business relations as an analytic tool to study the change and dynamics appearing in network-relations, more specific how firms navigating their network positions and takes on different roles in business relations, where a firm can be a supplier, cooperation partner as well as competitor in the same dyadic relation but in different activities.

Introduction

The research literature on alliances, networks, supply chains and cluster initiatives has a clear view of cooperation, trust and harmony. Companies and organizations that use networks improve its level of innovation are encouraged to collaborate, create a strategic agenda and an alliance, network, or cluster identity to be successful (Håkansson & Snehota, 1995; Ford, 1998: Christopher 2000; Read, Carroll & Smith, 2007). At the same time, many of the initiatives for interaction has been difficult to get started and show modest innovative results (cf. Burfitt, MacNeill & Gibney, 2007) and that element of competition is likely (as in so many other areas) to stimulate business to work more vigilant and dedicated to innovation and renewal. The study takes a critical stand to what appears to be a superstition to trust and to the view of harmony underlying the descriptions of the various network solutions business.

Within the scientific literature there have only been a limited number of publications contributed to discuss the competitive element of the network where companies cooperate (see e.g. Bengtsson & Kock, 2000; Lemmens, 2004; Oliver, 2004, Gnyawali & Madhavan, 2007). In today's economy many companies are in situations where competition and cooperation are mixed or overlap each other (Herz & Mattsson, 2004) or even the relationship between the two companies can both contain competition and cooperation (Bengtsson & Kock 2000). This does not necessarily need to be harmful. We therefore believe that a more diverse perspective on networks and relations are important to better understand how both competition and cooperation simultaneously, but in different ways, can stimulate the innovative processes for networking companies. The

thesis therefore contributes to the development of a more detailed perspective of how tensions and role-conflicts in inter-organizational networking may improve innovative acting and innovations.

The research questions within the thesis is generated from a pre-study of a network within the ICT industry, more precisely the multimedia segment. Multimedia segment is characterized by an ongoing convergence of the IT, media and telecommunication industry, which to a large extent affect the companies and their strategic actions to position themselves within the networks and on the market. All actors within the networks are forwarding their positions towards the customer ie operators. In this competitive game new positions and roles are created in the networks (Nyström 2008) and firms cooperate and compete intensively and simultaneously.

The competition is on network-to-network basis rather than firm-to-firm basis (cf Normann and Ramirez 1993, Stabell and Fjeldstad 1998, Hertz and Mattsson 2004). The business networks often of a temprorary basis and structured around specific customer projects ie system integration such as IPTV or revenue management. In these cases the value-add is also very close to the customer and the influence of the customer on the final product is high. The positions and the roles of actors may therefore vary depending on the customer project and form of activities and resources needed from the customer project perspective. This is a usual business case for the IT firms but not so common within the telecommunication, which traditionally has long-term relationships with its customers as well as suppliers.

Co-opetitive relations also appears in situations of mergers and acquisition where a competitor acquire a cooperation partner or a preferred supplier in the offer of system integration where a former supplier can forward its position and offer a total solution to a customer standing next to or in front of the focal firm instead of behind.

The effects are that positions changes and the roles of the firms become more blurred or vague where actors takes on multiple roles ie supplier, customer, cooperation partner or competitor depending on customer case and where expectation of the different roles can create tensions and conflicts.

A way to interpret this interplay is to departure from the roles different actors have when they interact (Bengtsson et al 2009) and roles they are assigned due to their position.

Theoretically there are a number of scientific studies of how competition and cooperation in networking affect innovative processes, but the understanding of the interaction between competition and cooperation and its importance for the innovative processes are limited. Different types and combinations of competition and cooperation can both stimulate and frustrate networking companies to experiment with new solutions and to exploit existing knowledge.

Theoretical Framework

The theoretical framework departures from the conceptual framework of the IMP group and the industrial network approach (cf Cook & Emerson 1978, Håkansson & Snehota 1995). Within this perspective actors are assumed to be mutually interdependent to coordinate their resources and activities and hence the relations affect the nature and the outcome of a firm's action. Within the networks a firm's action is dependent on its network position (Henders 1992) where a firm's strategic action is defined as "efforts of a firm to influence its position in the network of which it is part" (Gadde et al 2003:358).

Within the perspective networks consist of loosely connected relations and are dynamic over time where firms both cooperate and compete and try to control and influence each other (Wilkinson and Young 2002). The perspective differ from the strategic management theories with traditionally a clear focus on competition, the industrial network view provides a more balanced approach to cooperation and competition (Gadde et al 2003).

Bengtsson et al (2003) emphasizes the activity and resource level of analysis over the actor level since activities and related resources affects both cooperative and competitive interactions among actors. The activity dimension captures this interplay between cooperation and competition since the same actor (firms) can compete in one activity and cooperate in another activity simultaneously taking on different roles (Bengtsson & Kock 2000).

From a strategic point of view the possibility to influence others in a network is a function of a firm's network position. Thorelli (1986) defines an actor's network position as a location of power and influence within the network.

Network position

Firms network position and related strategies within industrial network approach departure much from the work by Mattsson & Johanson (1987; 1992). (see also: Henders, 1992; Axelsson and Easton, 1992; Ford 1998; Ford et al., 2003). From this perspective the aim of a firm's strategic action is to change or preserve the firm's network position through directing actions and influencing efforts at its relationships (Johanson and Mattsson, 1992).

Networks are dynamic due to action and reaction of the actors within the business relationships and thus network position is constantly changing as firm tries to position itself better within the network (Henders 1992). These strategies influence in turn the positions of suppliers, cooperation partners as well as competitors within and between networks. For example suppliers are forwarding their position towards the customer and a supplier can be a supplier, cooperation partner, customer and competitor in the deal of system integrations such as IP TV solutions towards the customers (operators).

From an industrial network perspective an actor cannot get in position, an actor (firm or individual) has a constantly changing position and tries to positioning itself better through cooperative and competitive actions. An important aspect is that a firms network position is a relative concept and the unique position is dependent on how it's relates as well as are perceived by other actors (Håkansson & Snehota 1995, Gadde et al 2003). Firms are expected to behave according to the norms associated with the position and tensions can appear when for instance a smaller supplier show up as a competitor or the influential partner in a customized system integration due to direct contacts with the customer.

A firm's position in a network is closely connected to the role the firm has within and outside a network for example a manufacturer or a software supplier. Some argue that it is difficult to separate an actor's position and its role (Anderson et al 1998). An actor's role guides the behavior and is a result to the expectation the surrounding has on the particular role. In this way roles can be seen as predictive, if we know the role-expectations of a specific position, customer, supplier, competitor etc. the behavior and actions taken by the specific actor can be predicted (Biddle 1986). Here it is also important to acknowledge that different roles interact (i.e. buyer and supplier).

Bengtsson & Kock (1999, 2000) claims that actors can play different roles depending on the activities and resources available but emphasize that it is not the firm itself who acts, it is individuals, units and/or teams within the organization that act and perform different roles, the authors therefore suggest that the role of an actor is more multifaceted (Bengtsson et al 2003).

Network position and role-theory

The concept of roles has been covered within the industrial network approach but in a wide and general meaning (Andersson et al 1998). The link and interaction between network position and role-theory has not been covered within the industrial network approach to a larger extent (Nyström 2008). Roles can be interpreted as the dynamic aspect of the position where the actors perform the roles that comes with a position (Andersson et al 1998).

Role-theories have mainly developed from psychological and sociological literature and focuses on the behavior of the individual and how individuals behave differently according to the social identity in different situations (Biddle 1986). Role-theory does bridge individual behavior and social structure but can also be used as a interpretation tool in a study of business to business network. Where the role-theories developed by Merton (1957), Kahn et al (1964), Sieber (1974) and Biddle (1986) etc can be used as an analytic tool to study the interplay and potential tensions that can appear when actors change positions in networks where firms cooperate and competes simultaneously (Bengtsson et al 2009).

Merton (1957) concept of role-set can be used to grasp the multiple roles an actor have, how the expectations and norms following a position are balanced and how tensions and conflicts of expectations within the relationships are managed.

In an analysis of roles and network positions the concepts of role-making and role-taking are commonly used and define roles as "the set of prescriptions describing what the behavior of a position member should be" (Biddle and Thomas 1966:29). Role-taking respective role-making can be seen as processes in the network dynamics and the capacity or capability of the actor to change its roles. This can empirically be analyzed by measuring a firm's role and position by comparing the position at time t0, t1, t3 etc., critical incidents and strategies taken by the firm or individual to re-position themselves within a network (Henders 1992, Andersson 1998, Nyström 2008).

The strategic tensions in form of role-conflicts appear when different expectations and demand competes with each other or are not properly communicated with the effects that it cannot be fulfilled (Kahn et al 1964). To act as a competitor in one situation and a cooperation partner in another in the same relation creates tensions and sometimes an ambiguity how to act between the actors (Bengtsson et al 2009). *Role-ambiguity* is described as to the extent that un-clarity of the expectation makes it difficult for the actor to respond to and fulfill expectation and demands related to the role. Role-conflicts can appear in situation irrespective of time pressure or time constrains and situations where an actor has to choose between expectation from actor A and B since these expectations competes and violate each other (Merton 1957, Sieber 1974).

The competitive game of the positions within a system integration can also be interpreted from the framework by Sieber (1974) and the concept of *role accumulation* which describe the benefits and positive outcome for an actor in having multiple roles of an actor. Multiple roles can lead to different types of privileges where the greater number of roles an actor has the more privileges the individual can benefit from. Multiplicity of roles can also guarantee a sense of overall status security when an actor can "play" between different roles, ie smaller software supplier who deliberately changes their positions in network talking directly to the customer/operator and pointing towards the OEM vendor. Role accumulation can also give benefits such as connection to third party relations and access to resources not available to the individual and where role accumulation is a strategy to enhance the influence and power in a business network.

The concept of roles, role-conflicts as well as role accumulation is used to analyze the interplay and tensions within complex relationships and the interplay between cooperation and competition and how it influence innovation in networks.

Study design and method.

Different networks will be selected that differ with respect to (1) if cooperation involving few or many players (2) the degree of intensity of competition. The roles that different actors may have could be different depending on how many actors that are involved in cooperation and also the strength of cooperation relationships is likely to vary with the number of involved. The intensity of competition will be judged by if the companies compete in many or few product, market areas and/or consumer projects. The more areas

companies competing in the more actors of the involved organizations are affected by the conflicting requirements of simultaneous competition and cooperation gives.

The planned study design is to collect data material through interviews. As previously mentioned one case study is on-going and approximately 20 interviews are conducted within a telecommunication firm and its suppliers. The conducted interviews where semi-structured with a length of 1-2 hours, with responsible persons within sourcing, system integration, product devlelopment and market units. Secondary Data (brochures, press-material and reports) is used to prepare questions, and to better understand and interpret the collected interview material. The secondary data is very rich in the empirical context of the branch convergence, with criticial incidents such as mergers and acquisitions.

The contribution of the study lies in an integrated perspective on the interplay between competition and cooperation and its importance for innovation processes in networks and the development of the understanding of how they contribute to the development of innovative processes by tensions and role conflicts**.**

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