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**How to achieve the long-term survival of firms – A network position perspective**

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**Abstract**

Maintaining network position in changing environments has been a strategic issue that concerns a firm's competitive advantage and long-term survival. Despite knowing the importance of interfirm relationships in determining a firm's network position, little knowledge is gained towards how relationship dynamics (establishment, maintenance, strengthening, ending and reactivation of relationships) are handled by the firm so as to maintain its network position. The research enquiry is addressed using a processual analysis and taking from a focal net perspective. Based on the empirical data that covers a time period from 1998 to 2008 in the optical recording media industry where technological change has taken place for three times, we propose that achieving "positional fit" and "positional flexibility" is the key that determines the successful handling of relationship dynamics and that can be seen a form of dynamic capabilities, allowing a firm's momentum to be sustained.

**Keywords**

Network position; Interfirm relationship; Competitive Advantage

# **How to achieve the long-term survival of firms – A network position perspective**

## **1. Introduction**

Firms operate in a business environment in which their respective resources are used or combined in relation to other resources through developing interfirm relationships, so as to achieve firm growth and jointly create economic value (Achrol & Kotler, 1999; Araujo *et al.*, 2003; Normann & Ramirez, 1993; Powell *et al.*, 1996). A network of interfirm relationships represents an organizational structure which differs from a hybrid form consisting of markets and hierarchies (Williamson, 1975) and which emphasizes the complementarity, interdependence, reciprocity and cooperation between firms (Ford & Håkansson, 2006; Powell *et al.*, 1996; Wilkinson & Young, 2002). A firm embedded in such an interorganizational structure occupies a network position that determines the firm's accessibility to information and resources closely related to its competitive advantage (Johanson & Mattsson, 1992; Tsai, 2001; Zaheer & Bell, 2005). As demonstrated by Zaheer and Bell (2005), a firm's innovativeness results from occupying a superior network position that facilitates the bridging of structural holes to enhance internal firm capabilities.

Networks evolve in a dynamic fashion. From a lifecycle point of view, interfirm relationships that constitute a network may experience a number of stages from their birth to dissolution (Dwyer *et al.*, 1987). Recently an increasing attention is devoted to the research of relationship dissolution or ending, in terms of its antecedents and process, such as Hibbard *et al.* (2001), Ping (1999) and Tähtinen & Halinen (2002). The ending of a relationship may arise from the dark-side of relationship (Anderson &

Jap, 2005) or relationship burden (Håkansson & Snehota, 1998), which makes a firm at a certain point in time perceive too much cost to continue the cooperation with its counterpart and see a new relationship attractive. Additionally, relationship energy, an accumulation of positive interaction between two parties, may allow an ended relationship to be reactivated (Havila & Wilkinson, 2002), although how to reactivate an ended relationship is poorly understood. In this sense, relationship dynamics, which comprise the establishment, maintenance, dissolution or even reactivation of interfirm relationships, not only mark the evolution of a network but also change a firm's network position.

A firm's altered network position signifies its changed competitive stance which is affected by the reconfiguration of the pool of resources across firm boundaries. From a strategy perspective, interfirm relationships are strategic resources that a firm can exploit to enhance firm performance, such as through technological innovation (Gulati *et al.*, 2000; Harryson *et al.*, 2008; Powell *et al.*, 1996). Moreover, a firm's performance may be affected by its counterparts' capabilities and their respective interfirm relationships because of characteristics of embeddedness and connectedness that enable, and simultaneously, constrain actions or reactions of economic actors in networks (Afuah, 2000; Anderson *et al.*, 1994; Håkansson & Ford, 2002; Uzzi, 1997). Following this vein, being able to handle relationship dynamics, namely, to handle, use, exploit or explore interfirm relationships is important for a firm to adjust the ways of using its resources in relation to others, so as to improve its competitive position in a network (Ritter & Gemünden, 2003; Wilkinson & Young, 2002; Zolkiewski & Turnbull, 2002). Thus, the key of maintaining network position lies in a firm's ability to handle relationship dynamics.

A firm's ability to maintain its network position in the evolution of a network, of which it is part and in which relationship dynamics take place, is crucial to its long-term survival. However, an interaction perspective suggests that firms embedded in networks are empowered with limited freedom to use, combine and develop their resources through relational linkages (Ford & Håkansson, 2006; Normann & Ramirez, 1993; Uzzi, 1997). In other words, this limited freedom restricts a firm's ability to handle relationship dynamics. Moreover, firms may develop different interpretations, due to their respective experience and learning capabilities, towards the utilization of interfirm relationships to act in line with changing conditions, which consequently make relationship dynamics difficult to foresee and handle.

Despite knowing the importance of relationship dynamics to a firm's competitive advantage and long-term survival, how relationship dynamics are handled to maintain the firm's network position in the evolution of a network remains under-explored and thus forms our research enquiry. This research contributes to the existing knowledge of relationship dynamics in a network context, such as the establishment or ending of an interfirm relationship that positively or negatively impacts on other connected relationships. The research also contributes to the building of a linkage between relationship dynamics and network position, which enhances the knowledge of gaining competitive advantage in networks. In order to address our research enquiry, we adopted a focal net perspective as the research boundary and chose the optical recording media industry as the empirical setting, in which three net reconfigurations driven by technological change facilitates our employment of a processual design to investigate relationship dynamics.

The rest of the paper is structured as follows. Firstly, we provide a theoretical

elaboration on network position which directs our attention in the empirical investigation. Secondly, we rationalize our adoption of a case-based, processual study, delimitation of research boundary and analysis of empirical data. Then, we present a longitudinal case based on processual analysis. Lastly, we offer a discussion on our result followed by a conclusion.

## **2. Network position: An overview**

This research centers on network position as the theoretical foundation. A firm's network position is seen as a location of the firm within a complex set of interacting relations in which it is embedded (Wilkinson & Young, 2002). Network position can also be seen in four ways: 1) the function performed by the firm for the other firm; 2) the relative importance of the firm in the network; 3) the strength of the relationships with other firms and 4) the identity of the firms with which the firm has direct relationships (Mattsson, 1987). Because of the characteristics of connectedness and embeddedness, network position describes a firm's access to knowledge and information but also spells out the firm's opportunities and limitations in establishing, maintaining, and terminating business relationships (Low, 1997; Tsai, 2001; Zaheer & Bell, 2005). The importance of network position to a firm's operational performance comprises the following three issues:

### *2.1 Role as the dynamic aspect of network position*

The network position of an actor involves accessing, using and combining resources via transferring and transforming activities, attempting to solve problems from its daily operation and to attain participating parties' separate and collective goals in an

effective and efficient way (Ford & Håkansson, 2006; Johanson & Mattsson, 1992). However, it is difficult to examine network dynamics without relating the position concept to the role aspect. Anderson *et al.* (1998) argue that the role, acting on a change-process dimension, is an actor's intended and created behaviour which is expected by its counterparts. They have pointed out that an actor is said "to occupy or have a position, but to perform the role or roles that come with the position" (Anderson *et al.*, 1998, p. 170). In this sense, relationship dynamics are considered as a social process, in which network positions act as the stability dimension while roles act as the change dimension.

Firms in networks benefit from the aggregation of resources, interfirm cooperation and adaptation which define their roles in the routines and in the pattern of interaction (Uzzi, 1997; Wilkinson & Young, 2002). That is to say, a firm's change of its role(s) will impact on resource utilization and affect its network identity and the nature of involved relationships. This role change may strengthen or endanger the firm's relationships, and subsequently, affect its competitiveness in the network. In this sense, the role change produces not only relationship dynamics but also strategic influences. Andersen (2008) argues that a firm can improve its position and stay competitive by continually defining and redefining its role(s) in interaction with others. He puts forth four types of rivalry strategies which can be differentiated by the changes in role sets in relation to others and in which successful practice entails a scanning of the surroundings and a consideration of possible countervailing responses followed by the firm's strategic move. These strategies are role replacement, role enhancement, role redefinition and role alteration.

## *2.2 Network position as value-creating unit*

An interactive view suggests that firms occupying distinctive network positions in an intricate web of interfirm relationships pool their resources and perform coordinated activities to jointly create value for their counterparts and end-users (Normann & Ramirez, 1993; Parolini, 1999). Here “network position” is different from “market position”, in which the former focuses on a firm’s location in the interdependency structure while the latter concentrates on rivalry activities to position a firm’s products in relation to competing offers in the minds of potential customers (Baraldi *et al.*, 2007; Wilkinson & Young, 2002). Johanson and Mattsson (1992) divide the concept of network position into the micro-level position and the macro-level position. A micro-level position refers to an actor’s relationships with individual organizations while a macro-level position takes into account the roles performed by the actor and its counterparts in a value-generating network and thus it reflects the nature of resource interdependence and industry logic and emphasizes each individual actor’s role in a relational structure of value co-creation (Normann & Ramirez, 1993; Pfeffer & Salancik, 1978).

While the position of a firm is embedded in a network, its role in the division of labor becomes more distinct and its dependence on others increases as its interaction with these parties continues. One way to understand this embeddedness of a value-creating, relational structure is to employ the concept of technology bundles (Ford & Saren, 2001). A value-creating structure can be seen as bundles of *product, process and marketing* technologies, in which each respectively refers to a firm’s knowledge and ability to “design”, “manufacture or produce” and “market and deliver” a product or service valued by other firms. The concept of technology bundles provides the explanation of how a firm utilizes its cooperative relationships in a variety of resource

combinations to pursue efficiency and effectiveness through an array of productive activities where its network position is seen as a value-creating unit.

### *2.3 Network position as power-exercising, strategizing location*

The interdependency structure of a network reveals that the division of labor equips each network position with a domain (in terms of product offered, clientele served or functions performed) that it has to be systematically connected to other domains in a coordinated way, so as to minimize uncertainty and maximize self and collective interests (Pfeffer & Salancik, 1978; Thorelli, 1986). The interdependence also suggests that firms in networks have a certain degree of “power” to influence the actions of others, which makes interfirm relationships at some points in time with less stability and more conflict. That is to say, interfirm relationships exhibit a co-existence of conflict and cooperation. The exercise of power is driven by actors’ profit-seeking behaviors. However, power is not solely a negative force. As indicated by Hingley (2005, p. 856), “Weaker organizations in asymmetric relationships have a certain degree of tolerance to imbalance of power and asymmetric relationships are not necessarily unstable or short lasting.”

Seeing network position as location of power implies that a firm can “strategize” to improve its operational performance in a network by relating its resources and activities to other firms (Gadde *et al.*, 2003; Thorelli, 1986). It has to be noted that firms’ power exercise or strategizing is constrained by their existing accessibility to information and knowledge and by their respective interaction histories (Ford & Håkansson, 2006; Tsai, 2001; Uzzi, 1997). Owing to the connectedness of interfirm relationships, the consequence of exercising positional power may not only result in

relationship dynamics but also bring a firm changes in its co-opetitive stance in a value-creating network (Bengtsson & Kock, 2000), such as such as co-working with competitors to create market demands or strengthening a cooperative relationship by weakening or even ending another one.

Firms embedded in networks have to confront the paradox of interaction: it strives for control over the counterparts and simultaneously it is influenced by the latter (Håkansson & Ford, 2002). The attempt to control through power-exercising or strategizing could be the source of interfirm conflicts in which one party tries to improve its position at the expense of the other who perceives this as hindering it from achieving its goals (Andersen, 2008). These conflicts may then lead to a state of turmoil in the relationship. The turmoil could be mitigated if adaptive efforts of involved parties have been made to eliminate the mismatches (Hallén *et al.*, 1991); otherwise the radical changes of relationship, such as relationship ending, cannot be avoidable. These radical changes of relationships result in reconfiguration of the resource structure across firm boundaries, in which some firms' capabilities are reinforced while some others' capabilities are rendered obsolete, see Afuah (2000) for example.

### **3. Research methods**

The enquiry into how a firm maintains its network position via handling relationship dynamics in the evolution of a network requires a longitudinal, case-based approach which centers on a processual analysis. In a process analysis, “time” and “events” are central elements that allow relationship dynamics as well as changes in network positions to be captured. Pettigrew (1997, p. 338) sees a process as “a sequence of

individual and collective events, actions, and activities unfolding over time in context.” Rather than merely focusing on “input” (the starting conditions) and “output” (the outcome), a particular attention of this processual study is focused on the developmental process which comprises the influences of time and temporality (Van de Ven & Huber, 1990). A case-based approach is especially suitable for this processual study because it not only facilitates the investigation of network complexity framed by how or why questions but also permits a detailed description of how actors engage each other, in which relationship dynamics are produced (Halinen & Törnroos, 2005; Patton, 2002; Yin, 2009).

Delimiting the boundary is crucial to processual network research (Halinen & Törnroos, 2005). We used a focal net perspective to draw an artificial and purposeful boundary for this research. This perspective not only centers on the focal actor’s important relationships (both directly and indirectly connected) but also takes into account the characteristics of connectedness and embeddedness (Alajoutsijärvi *et al.*, 1999; Anderson *et al.*, 1994; Uzzi, 1997). In addition to the capturing of relationship dynamics, a focal net perspective facilitates the investigation of changes in actors’ positions and roles along a dimension of time when the concepts of technology bundles and value co-creation are considered (Ford & Saren, 2001; Parolini, 1999). Using the focal net perspective as criteria, we selected company F, three of its business customers (C1, C2 and C3), three of its suppliers (S1, S2 and S3) and one of its complementor (D1) from the optical recording media industry to form a technology-bundled and value-creating net for empirical investigation, see Table 1 for the description of the empirical setting and the focal net.

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Table 1 here

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The optical recording media industry was chosen as the empirical setting because the industry has experienced several technological changes that drove the evolution of the focal net where relationship dynamics were produced. In order to reconstruct the net evolution, we focused our data collection on significant events between focal net members using interviews (72 in total) and archival materials. Based on Van de Ven and Huber (1990, p. 214), “events represent changes in variables and these changes are the building blocks of process in an input-process-output model.” Schurr *et al.* (2008) also indicate that significant events may have positive or negative valence that occasions relationship change. The data collection was carried out in three stages, covering a period from the end of 2007 to mid 2009. The first stage, consisting of 10 interviews, aimed at identifying radical changes of relationships. The purpose of the second stage, consisting of 50 interviews, was to relate these radical changes to the reconfiguration of the focal net driven by technological change, in which changes in network positions were observed. The third stage (a follow-up stage), consisting of 12 interviews, aimed at clarifying ambiguity or contradiction in the empirical data and confirming key findings with the informants. Between each stage, relevant literature was reviewed that permitted us to develop the understanding towards research phenomena (Dubois & Gadde, 2002).

Our analysis of empirical data pays a great attention on great amount of attention to the episodic dimensions of events. However, the focus is not merely on temporal succession but also on causal postulates within chronological sequence (Yin, 2009). We began the analysis with organizing and reading interview transcripts,

field notes and archival materials, searching for codes and themes related to relationship dynamics that marked the evolution of the focal net. While analyzing the empirical data, we also kept research memos. These memos were treated as corroborative information that assisted to build the linkages between notes and themes. Apart from memos, triangulation between a variety of data source and a follow-up stage of data collection were important ways that we used to enhance the trustworthiness of our empirical data.

We have noticed two limitations of this research. First, although this single-case is built on extensive interviews with managers from the focal company and its supplier and customer and complementor companies and archival materials, the picture presented is still subjective and industry-specific. Generalising the findings of this research would be difficult. Second, network research suggests that a network can extend boundless and the influences of change forces initiated by actors may flow among interconnected relationships. Although a focal net perspective is used in this research, the capturing of relationship dynamics and our understanding of them remains constrained.

#### **4. Relationship dynamics resulted from three arrivals of technological change at the focal net**

The case description covers a time-span of more than 10 years from 1998 to 2008, in which major technological change has taken place three times, from CD-R to 1) DVD+R and DVD-R, 2) DVD+/-R DL and 3) HD DVD-R and BD-R technologies. As shown by Figure 1, each arrival of technological change at the focal net brought about the reconfiguration of the net in which relationship

dynamics as well as changes in network positions took place. Additionally, changes in actors' roles were observed in the net which was characterized by bundles of technology, see Figure 2.

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Figure 1 here

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Figure 2 here

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#### *4.1. The first net reconfiguration in early 2004*

Relationship dynamics that caused the reconfiguration of the focal net was as the outcome of the interplay between change forces generated from a series of significant events. In comparison between Phase I and Phase II in Figure 1, F dissolved its relationships with customers C1 and C3 but indirectly connected them through its relationship with another customer C2. The causes of F's ending relationship with C1 included F new vice president's reluctance to purchase C1's used CD-R production in mid 2001 and the new VP's strategic maneuvering in setting up a new marketing team in March 2002, in which the team focused on the establishment of F's branding business and developed new policies for its OEM business, such as CD-R markup and new criteria of selecting OEM customers. C1 thought that having F to take over their CD-R lines released from the closure of their US-based production factory in January 2001 to expand more CD-R production capacity while retaining the production of

DVD-Rs in their Japan-based factory was the best way to tide over technological change from CD-R and DVD-R. However, F's new VP viewed that used CD-R lines and the expansion of CD-R capacity created little value but burdens. In addition, the resignation of F's Sales Head and a Sales Manager who had built strong interpersonal relationships with C1 contributed the dissolution of the F-C1 relationship in early 2004. Perceiving little chance to restore their relationship with F, C1 gradually transferred their production orders to R2, who was F's primary competitor based in Taiwan and who purchased C1's used CD-R lines in November 2001 without asking for a favor.

Customer C3, who had a relationship with R1 (F's rival), became a victim of F's new criterion of selecting OEM customers because their orders were instable and not large. The F-C3 relationship discontinued from mid 2003. Unlike customers C1 and C3, F strengthened its relationship with customer C2 who was a technology leader in the DVD+RW Alliance. This strengthening relationship was built on a new form of partnership as an OEM entity, in which F used C2's proprietary dye materials and process control in its DVD+R volume production while C2 was responsible for approaching OEM customers, including C1 and C3. The combination of C2's product technology with F's manufacturing technology not only enabled C2 to release good quality and price-competitive DVD+R media in a timely manner but also permitted F's to enhance its branding business by introducing new products. This was an important consideration for F not to expand CD-R production capacity but transferred some of its CD-R lines to DVD manufacturing, which consequently made F to markup its CD-Rs for OEM business. Facing the shortage of CD-R supply, F carried out an outsourcing project in early 2003, which aimed at acquiring some CD-R capacity from

second- or third-tier media makers. This project resulted in F's building a trading relationship with R3, who was a Taiwan-based media maker and who competed with F in some sales territories.

Apart from the radical changes in F's interfirm relationships, F's remained stable relationships with its suppliers S2 and S3 and its complementor D1 because the arrival of DVD+/-R technologies did not bring about significant changes in F's usage of or combination with the resources of these actors. Although the F-S1 relationship continued, their business remained in CD-Rs due to that S1's dye materials for DVD manufacturing failed to be certified by the DVD Forum and the DVD+R Alliance for political issues rather than technical concerns. The relationship dynamics driven by technological change also contained changes in roles of focal net members. As exhibited by Figure 2, these changes in roles occurred through both existing and new relationships, such as C2's new role as an OEM by strengthening its relationship F and F's new role as a branding company which required F to establish relationships with distributors and channels.

#### *4.2 The second net reconfiguration towards the end of 2005*

Another reconfiguration of the focal net towards the end of 2005 was observed, as the outcome of relationship dynamics driven by the arrival of DVD+/-R DL technologies. The relationship dynamics were characterized by F's reactivation of its relationship with customer C3 from late 2004 and customer C2's exit from its OEM business towards the end of 2005. Unlike the adoption of customer C2's dye material for its DVD+R manufacturing, F produced DVD-Rs for other customers and its branding business using in-house solutions. However, F's encountered a technical barrier to

upgrade its DVD-R media to a higher recording speed in mid 2004 that made its sales momentum suspended. In order to get rid of this disadvantageous situation, F turned to external solutions. Initially F approached customer C4 who was a Japan-based brand marketer and who also operated materials business, but the approach did not generate a successful outcome because of F's partnership with C2 (C4's competitor in the DVD+R area) and F's previous decision not to adopt C4's dye solution in 2002. Without other choices, F approached C3 who just established its business of dye materials for DVD manufacturing as a strategic move to enhance its competitiveness in the industry. C3 was happy to provide F with their materials because F's huge production capacity could be a boost to their sales. The reactivation of the F-C3 relationship later permitted F to re-gain orders from customer C1 due to that F's DVD-Rs using C3's material was able to diversify their product lines. Meanwhile, F produced DVD+R media for C1 and C3 through its partnership with C2.

Although the partnership allowed F and C2 to release new DVD+R products ahead competition, their advantage was gradually neutralized by their competitors, such as the R2-C4 collaboration. Particularly after C2 introduced their DVD+R DL, which relied on OEM and technology agreements with F, C2 could hardly operate their OEM business. The release of DVD+R DL made C2 suffer from decreased profit margins in their existing DVD+R products, to the extent that they were unable to sustain their partnership with F. Finally, C2 exited from their OEM business but still retained their materials and branding businesses. Consequently, C2's OEM customers, including C1 and C3, were taken over by F. C2's relationship ending with C1 and C3 and C3's relationship reactivation with F resulted from the changes in their roles, as shown by Figure 2.

While F's relationships with its business customers evolved in a dynamic fashion, its relationships with suppliers S2 and S3 and the complementor D1 remained relatively stable. Meanwhile, F also maintained its relationships with S1 and R3 so as to meet its customers' needs for CD-R (see Figure 1).

#### *4.3 The third net reconfiguration in mid 2008*

The evolution of the optical recording media industry was marked not only by the rapid technological change but also by format rivalry. A similar format rivalry, to that between DVD+R and DVD-R, also occurred with high definition of optical recording media: the rivalry between HD DVD-R and BD-R. The arrival of high definition of optical recording technologies brought about radical changes in F's relationships, which consequently rendered the reconfiguration of focal net in mid 2008.

Relying on its in-house development, F was able to volume produce HD DVD-Rs and BD-Rs from early 2006 and 2007 respectively. The ability to launch industry-leading and cost-competitive HD DVD-Rs using existing production system provided F with a great opportunity to enhance its competitive advantage. However, F did not take advantage of R&D achievements to promote their HD DVD-Rs because their marketing team's attitude of sitting on the fence towards the format rivalry. F's marketing strategy remained passive until customer C5, who was a Japan-based format leader in the HD DVD camp, approached their top management for cooperation in mid 2007. Both parties then initiated a series of co-promotional programs, including bundle sales (F's branded media with C5's). However, F's relationship with C5 was short-lived. Their cooperation discontinued when C5

announced in February 2008 that they were leaving the HD DVD business. This decision mainly arose from that C5's supporters, such as major channels and studios, turned to the rival camp, the Blu-ray Disc Association.

Not long prior to the dissolution of the F-C5 relationship, F also discontinued its relationships with customers C1 and C2 towards the end of 2007, in which C1 repositioned them as an OEM while C2 exited from the optical recording media industry. As a patent member in the Blu-ray Disc Association, C1 thought that they were able to produce more competitive BD-Rs and earn more margins than existing media makers because they did not have to include royalty fees in the cost of each disc they produced. C1 further sold their brand business in order to consolidate their resources that permitted them to reposition as an OEM. This strategic move not only disconnected C1's relationship with F but also turned both parties against each other. On the other hand, C2's competitiveness was gradually eroded by their failure to retain their position in the DVD+R DL business. The situation became worse after the arrival of HD DVD-R and BD-R technologies because of their possession of few influential technical resources. Finally, they were forced to exit from the industry. The radical changes in F's relationships with customers C1, C2 and C5, that rendered the reconfiguration of the focal net (see Figure 1), were associated with these customers' changes in their roles (see Figure 2). In the face of these changes, F relies more on its brand business to promote its BD-R products.

## **5. Discussion**

The empirical result enables us to argue that handling relationship dynamics is an embodiment of maintaining network positions that concerns long-term survival of

firms in networks. The importance of relationship dynamics to survival of firms lies in that they allow resources to be exploited, mobilized, recombined, explored, or released across firm boundaries for a variety of economic goals through establishing, maintaining, strengthening, ending or reactivating interfirm relationships. This can be demonstrated by F's relationship ending with customers C1 and C3 to release some of its CD-R production capacity and transfer them into DVD-R and DVD+R production, in which some of them were combined with customer C2's technical resources. In this vein, we are able to make two senses here. One is that interfirm relationships are said to be sources of innovation and can be seen as a firm's indirect capabilities that permit the maximization of the value of its resources used through relational linkages (Araujo *et al.*, 2003; Harryson *et al.*, 2008; Powell *et al.*, 1996). The other is that handling relationship dynamics enables a firm to adjust its network position, in which its dependence on the connected dyads is altered, so as to be in line with the changing environment.

Although a firm's ability to handle relationship dynamics is crucial to gaining competitive advantage in a network, our empirical data reveals that using this ability is problematic. As shown by C1's used production lines being purchased by R2, F's failure to acquire C4's dye material and F's short-lived cooperation with C5, a firm's intention to handle relationship dynamics, such as through strengthening an existing relationship, sometimes may backfire. This is because an interfirm relationship not only connects dissimilar capabilities of two interacting parties but also holds the parties' respective histories of interaction in networks that produce constraining forces at some points in time, hindering the continuation of the relationship or establishment of another relationship (Ford & Håkansson, 2006; Gulati *et al.*, 2000). We are permitted to argue here that following a rational planning to exploit, use and handle

interfirm relationships or to design relationship portfolios does not guarantee the creation of an appropriate structure of interdependence that benefits the firm's network position. Thus, in the process of handling relationship dynamics a firm needs to develop an emergent mechanism that allows the firm to dynamically respond to actions of counterparts.

The above discussion permits us to propose that successful handling of relationship dynamics that leads to a firm's long-term survival hinges on achieving "positional fit" and "positional flexibility". Drawing on Nadler and Tushman (1980, p. 40), the concept of fit can be defined as "the degree to which the needs, goals, objectives, and/or structure of one component are consistent with the needs, demands, goals, objectives, and/or structure of another component". Achieving positional fit is to create strategic, time, functional and organizational fits between the domains of different firms through developing interfirm relationships. Handling relationship dynamics to create or maintain fits between domains has to go beyond a dyadic-level. Our empirical findings suggest that employing a concept of value-creating and technology-bundled net is beneficial to forming relationship strategy (Alajoutsijärvi *et al.*, 1999; Ford & Saren, 2001; Parolini, 1999). This can be exemplified by C5's discontinuation of their HD DVD business. From a technical point of view, HD-DVD media can be much cheaply produced than Blu-ray Disc media based on the existing product and process technologies without a great effort of modification. However, the inability of the HD DVD camp to tightly link product and process technologies to marketing technologies (which are possessed mainly by channels and studios) leads to their failure. Such a network-level analysis also provides an alternative explanation to why technological prowess is not enough to bring an innovation to markets.

Another crucial aspect of successful handling of relationship dynamics is achieving position flexibility. Based on Sanchez (1995, p. 138), the concept of flexibility can be seen as a firm's "abilities to respond to various demands from dynamic competitive environments". Achieving positional flexibility requires a firm to be able to respond to counterparts' actions that affect its attainment of desired portfolio of relationships through handling relationship dynamics. We find from our data that flexibility resides in the mobilization of necessary resources between firms through relational linkages that may accompany changes in roles of firms. An example of this is C2's ability in mobilizing F's production capacity and C1's and C3's marketing resources to support C2's new role as an OEM in their DVD+R business. Another example is F's ability to acquire external dye materials through a reactivation of relationship with C3 to solve its technical problem, although C3 was not F's priority. The importance of interfirm resource mobilization highlights two points. Firstly, this interfirm mobilization of resources does not necessarily to be self-initiated; it sometimes can be other-directed, in order to generate effective mobilization, such as F's production resources being mobilized by C2 to form an OEM entity. Secondly, a firm's mobilization of resources involves dealing with the co-existence of cooperation and competition, in which a firm can benefit from cooperating with competitors, such as F's cooperation with R3 and C2's OEM-customer relationships with C1 and C3.

We derive two managerial implications from the above discussion of our empirical findings. The first managerial implication relates to the importance of studying the structure of interdependence in which a firm is embedded. Studying such a structure, in terms of what resources are combined and how they are used in what activities through interfirm relationships, enables the firm to understand the "movability" of its network position. This understanding includes knowing the impact of establishing,

strengthening, ending or reactivating a relationship on other connected relationships, which consequently affects the fits between domains of connected firms. The second managerial implication concerns the development of an emergent mechanism that allows a firm to dynamically respond to its counterparts' actions in the process of handling relationship dynamics. This emergent mechanism needs to integrate with the firm's learning capacity which generates knowledge from past interaction in networks, allowing the firm to better use resources of others and to know the possibilities of combining resources in new ways. Thus, the mechanism permits the firm to better respond to changing conditions, such as through changing its role(s).

## **6. Conclusions**

This study explores how a firm is able to maintain its network position through handling relationship dynamics in the evolution of a network, using a processual analysis and taking from a focal net perspective. The empirical findings allow us to suggest that the decision of using radical changes of relationships (such as ending or reactivating a relationship) to enhance firm competitiveness needs to be made on a network-level analysis, in which the structure of interdependence is at the heart of investigation. In this vein, fits between domains of connected firms are a prerequisite for an ended relationship to be reactivated. Additionally, changing a firm's role within an existing relationship can be a vital means not only to strengthen the relationship but also to change structure of interdependence, of which the firm is part. Towards maintaining network position through handling relationship dynamics, our proposed way is to achieve "positional fit" and "positional flexibility", which can be seen as a form of dynamic capabilities to respond to changing conditions in networks and which allows firms' momentum to be sustained.

Despite the new insights that are developed from the processual analysis built on an input-process-output model, there are at least two avenues for future research. An obvious direction is to continue this research in the optical recording media industry. The other beneficial direction is to carry out additional processual studies within different empirical settings. Possible empirical settings include the optical recording drive industry and the mobile telephony industry in which the former has high business relevance with the optical recording media industry while the latter is characterised by several technological changes. These studies would allow us to gain more insights into similarities and differences with regard to relationship dynamics.

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**Table 1. Description of the empirical setting and the focal net**

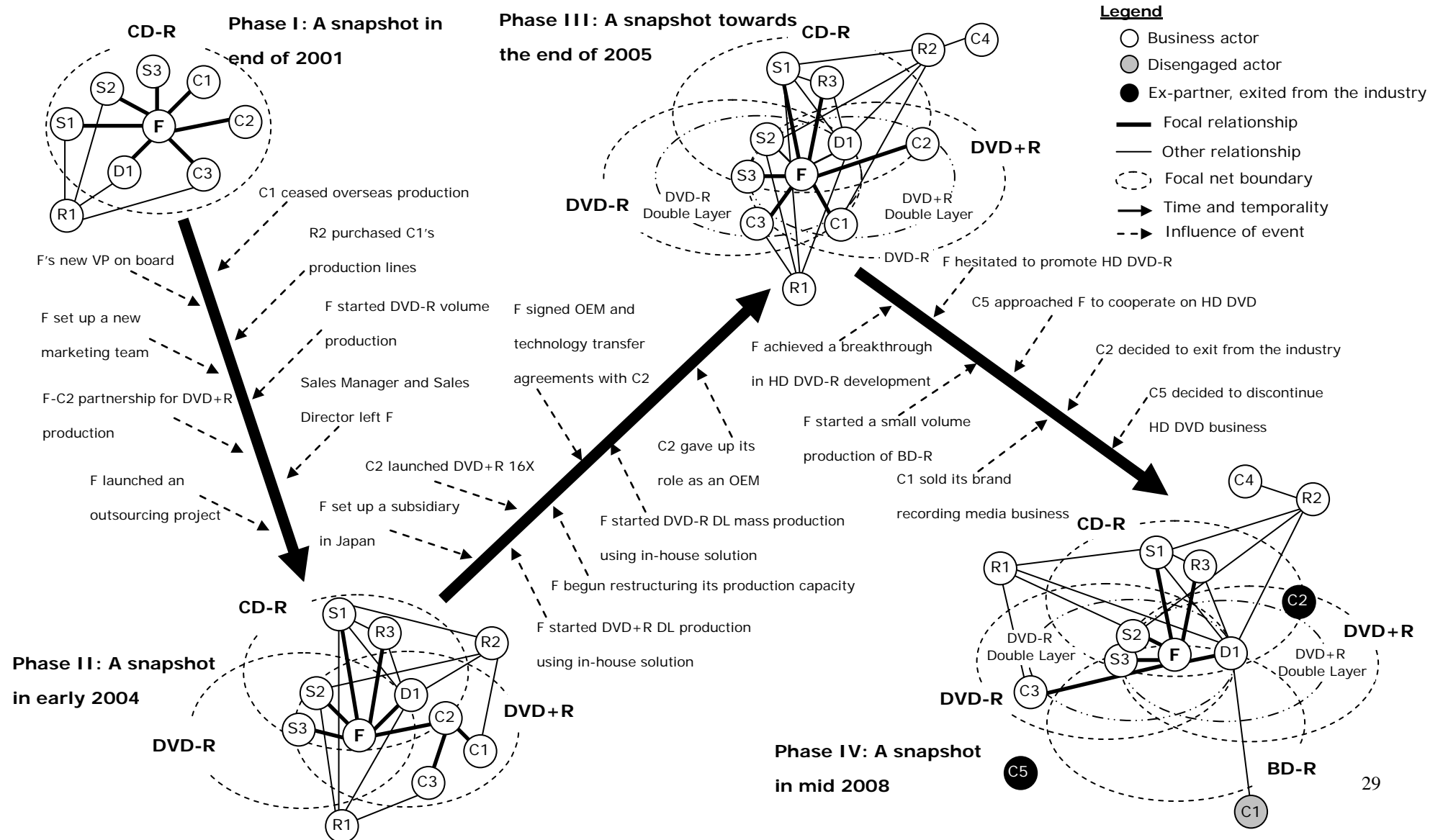
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<b>The optical recording media industry as the empirical setting</b>	<p>The finalization of CD-R (R for recordable) specification by Sony and Philips in 1990 can be seen as a starting point of the optical recording media industry. To date the industry has undergone major technological change for three times from CD-R to 1) DVD+R and DVD-R, 2) DVD+/-R DL (DL for double layer, simply meaning double recording capacity of a DVD+/-R disc) and 3) HD DVD-R and BD-R (BD stands for Blu-ray Disc). The industry is also characterized by format rivalry between “plus (+) camp” and “minus (-) camp” and between “HD” and “BD”, in which plus media was developed the DVD+RW Alliance and minus media and HD DVD were developed by the DVD Forum while BD was developed by the Blu-ray Disc Association. These standard organizations all aim at defining, disseminating and verifying their respective formats and at licensing their format logos for commercialization. Apart from “recordable” products, “rewritable” products (such as CD-RW and DVD+RW) are also available in the market. For the convenience of this study, the attention is focused on the development of recordable technologies only. In recordable technologies, dye materials (chemical compounds) are the most important materials that determine the cost and quality of products and speed in new product launch (such as boosting existing products to a higher recording speed).</p>
<b>The focal net under study</b>	<p>The study investigated the evolution of the focal net which centered on F who was a Taiwan-based OEM (Original Equipment Manufacturer) and who was capable of developing dye materials for its production of CD-Rs (see Figure 2). The focal net comprised F’s suppliers S1, S2 and S3, customers C1, C2 and C3 and a complementor D1. Following F’s relationship with S2 (a Taiwan-based supplier of silver targets which were used in the volume production) in late 1990s, F also developed its relationships with S1 (a Swiss-based supplier of dye materials) and S3 (a Taiwan-based supplier of packaging materials and packaging services) in 2000 and 2001 respectively. C1, C2 and C3 were all Japan-based brand marketers who were pioneers in the industry and who had experience of manufacturing optical recording media. F built its OEM-customer relationships with C1, C2 and C3 respectively, in late 1998, late 1999 and mid 2000, by signing business agreements and agreeing product specifications. Unlike C1’s and C2’s exclusive relationships with F, C3 also established a relationship with R1 (F’s competitor). Moreover, F used its in-house dye materials to produce CD-Rs for C1 and C3 while C2 provided F with their materials to produce CD-Rs for them. F initiated its complementor relationship with D1 (a drive maker based in Taiwan) in early 1999 for the purpose of exchanging marketing and technical intelligence, including the test of product compatibility. Then, a focal net in the end of 2001 was identified, see Figure 1. The roles of these firms in the net</p>

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were illustrated in Figure 2.

**Figure 1. The evolution of the focal net driven by technological change**





**Table 2. Roles played by members in the technology-bundled focal net**

