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Bititci, Umit and Mokadam, M (2010) *Investigating the role of innovation over collaborative relation intensity in supply chains.* In: 17th International Conference of the European Operations Management Association, 2009-06-06 - 2009-06-09. (Unpublished)

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# Investigating the role of innovation over collaborative relation intensity in supply chains

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# **Abstract**

This research aims to discuss collaborative relations and the factors that determine the degree of partners' interaction within supply chain dyads. It is argued that power, innovation and market dynamics plays significant role in determining the degree of partners' interaction within collaborative relations. This study proposes a model that illustrates the interrelations between these factors and their effect over collaborative relations intensity. It is argued that innovation, in particular, play significant role in shaping power relations and market dynamics in collaborative ventures.

**Keywords:** Collaboration intensity, Supply Chain, Innovation

# Introduction

Supply chain is defined as a system of interactions between suppliers, manufacturers, distributors, retailers and customers in which material, financial and information flows connect participants in both directions (Fiala, 2004). Valsamakis and Groves (1996) highlighted that the supply chain management concept emphasizes the need to coordinate and synchronize all the activities that create value for customers and are performed across the supply chain, in order to achieve high levels of customer service in a cost-effective way. The development of partnerships along the supply chain is becoming an increasingly important concept in the supply chain literature and in industrial practices (Valsamakis and Groves, 1996). It is highlighted by Zailani and Rajagopal (2005) that the most successful manufacturers have carefully linked their processes to external partners in the supply chain. The dominant logic in supply chain relationships paints a picture of tightly-linked, two-way interacting collaborative firms in long-term relationships (Hausman and Johnston, 2009).

Whipple et al (2009) identified that collaborative initiatives between supply chain partners offer the potential for better business results through inter-firm integration. It involves the strategic process of coordination between firms within the supply chain to competitively deliver a product or service to the ultimate customer (Benton and Maloni, 2004). Collaborative supply chain allows pooling partner's resources (Nummela, 2003) hence acting as a medium for creating and sustaining a competitive advantage (Fawcett et al. 2008).

Previous studies highlighted that there are different levels of interactions and intensities to collaborative relations (Valsamakis and Groves, 1996 and Whipple et al, 2009). In the same vein, Golicic et al (2003) introduced the concept of relationship

magnitude, as a distinct element, in which they highlighted the presence of different levels of intimacy or closeness in business relations.

Most previous studies highlighted the positive association between performance and the degree of interaction between supply chain members (Yih Wu et al, 2004; Mouritsen et al, 2003). Several authors argued that the greater degree of supply chain collaboration leads to higher levels of performance (Duffy, 2008; Spekman et al, 1998). Although, there seems to be much debate among previous studies regarding the factors that may affect collaborative relations intensity, several publications identified power, market dynamics and innovation as important factors in determining collaborative relations intensity.

Larsen (2006), Wu and Cavusgil (2006) and Morgan and Hunt (1994) highlighted the role of market dynamics over collaborative relations intensity. Some other studies identified power differences and innovation as effective players in determining the degree of partners' interactions in collaborative ventures (Larsen, 2006; Bagchi and Larsen, 2002; Bititci and El Mokadem, 2009). In addition, Bititci and El Mokadem (2009) highlighted the interrelations between these factors. In turn, this research contends that power, innovation and market dynamics are highly interrelated and these interrelations affect degree of partners' interaction in collaborative relations. In addition, the research argues that innovation, in particular, play significant role in shaping power relation and market dynamics in collaborative ventures. Hence, the typical research questions will be:

RQ1: How can the interrelations between power, innovation and market dynamics affect collaborative relations intensity?

RQ2: What is the relation between innovation, from one side, and power and market dynamics from the other side?

# **Research Methodology**

This research is of an exploratory nature. The research started with in-depth review of supply chain collaboration literature to explore the role of power, innovation and market dynamics over collaborative relations. The research adopts the concept of systematic literature review while reviewing the extant literature. This was done through preparing a scoping study (Tranfield et al, 2003). The aim was to identify high quality relevant literature to clearly understand the different factors that affect collaborative relations intensity and their interrelations. In addition, the literature review aimed at exploring the effect of innovation over power and market dynamics in collaborating dyads. Specific management databases, such as Web of Knowledge, Emerald Insight, ABI Inform and Science Direct, were investigated.

Abstract and citation search was carried out according to some inclusion and exclusion criteria. Because this research has a particular interest in collaboration between manufacturing companies, empirical studies focused on service sector companies are excluded. This research utilized around 30 usable relevant articles.

After the literature review phase, the researchers proposed a theoretical framework drawing the relations between power, innovation and market dynamics and their interrelations and their effect over collaborative relations intensity.

A case study approach was chosen to investigate the relation between power, innovation and market dynamics and collaborative relations intensity. Case study research provides in-depth investigation and allows the researcher to fully understand the different factors within its organizational context and to draw conclusions based on real world data. The data was collected through a series of in depth semi structured face

to face interviews with key managers that are in a direct contact with the other partner within the case study companies.

The authors prepared a case study review protocol. The protocol provides guidelines to ensure that the data can be collected, presented and analyzed in a repeatable and reliable manner by a number of different researchers and ensuring that the data is appropriately triangulated. A final preparation for data collection is to conduct a pilot case study to try out the protocol and identify its suitability. Respondents were asked to review the primary reports prepared and identify whether they represent a fair reflection to the situation and the discussion undertaken during the interviews.

The research unit of analysis is the dyadic relationship between business partners in supply chains. Each case study represents a dyadic relation between two business partners. This means that the relation was assessed from both view sides of business partners. It is contended that this dyadic relationship should be understood in far more details. This dyadic relationship is considered as a major indicator to the relation between various supply chain partners (supply chains comprises various dyadic relations between partners).

Anonymity was guaranteed for participants as all interviewees asked that anonymity had to be guaranteed as the subject is delicate and can have negative impacts on their relation with their partners.

Since the extant literature does not provide clear-cut answers to the research questions, this case study research is designed as an exploratory and theory building study. Two case studies, each case represents a collaborating dyad, helped to gain insights into the role of innovation, power and market dynamics over collaboration. Following Yin (2003) replication strategy, this research deployed a theoretical replication strategy. This means that two collaborating dyads were selected to produce contrasting results for a predictable reason (one dyad with no innovation while the other comprises two companies with joint innovation). The theoretical model, developed from the literature, needs to be verified and modified empirically till it reaches its final form. The model was tested against the two dyadic relations with the aim of identifying its suitability and modifying it in accordance to the real world data.

# Literature and model development

During the past two decades, supply chain management has developed as a management concept that offers promises for organizations to strengthen their competitive advantage (Larsen, 2006). Golicic et al (2003) identified that a large part of managing supply chains consists of managing multiple relationships among the member organizations. They acknowledged that connection among organizations range from single transactions to complex independent relationships.

In general, previous research identified that inter-organizational relationships are positioned in-between continuum anchors of market transactions and vertical integration (Duffy, 2008 and Kanter, 1994) with collaborative relations in-between (Golicic and Mentzer, 2005). It should be noted that collaborative relations, itself, may be of varying intensity (Whipple and Russell, 2007). In the same vein, Golicic et al (2003) highlighted that in the collaborative relations category; relations may include different levels of relations intensity.

Previous studies discussed the factors that may affect the degree of interaction between firms in collaborative ventures. It could be identified that several studies discussed the effect of market dynamics over collaborative relations depth. Some other studies identified power and innovation as major players in determining partners' level of interaction in collaborative ventures.

Bititci and El Mokadem (2009) demonstrated empirically the role of power, innovation and market dynamics over collaborative relations degree of interactions. Golicic and Mentzer (2006) highlighted the effect of power differences and market dynamics on determining collaborative relations degree of interaction. In addition, Bagchi and Larsen (2002) and Larsen (2006) highlighted the role that power and innovation play in determining the degree of interaction in collaborative ventures

# Market dynamics

The market dynamics is considered an important factor in determining the desire of each party to undertake close relations. Firms need to consider the complexity of the market in order to identify the appropriate focus for a partnering relationship (Whipple et al, 2009). It is contended by Wu and Cavusgil (2006) that high market uncertainty and dynamics can noticeably affect the extent of collaboration between firms. It could be argued that the presence of multiple sources of supply (or multiple customers) would be associated with the increase, at one side of a dyad, desire to intensify interactions. This will be associated with diminished desire from the other side of the dyad to intensify the relation (Yih Wu, et al, 2004).

To conclude, several previous studies identified market dynamics as an important determinant for business relations degree of interaction.

#### Power relation

Supply chains are complex power structures (Watson, 2001), in which at many times, one party has more power than the other, because one party is more dependent on the other (Gelderman et al, 2008). Kumar (2005) identified that business relations are characterized by interdependence power structure. Cox et al (2004) highlighted that power plays an important role in determining the nature and level of supply chain integration. In general, Cox (2004 A) emphasized that the appropriate sourcing strategy for a buyer depends on the power and leverage circumstances that they find themselves in

Hausman and Johnston (2009) identified that managing collaborative relations requires employing influence tactics that deepen interdependence and do not damage the relation in the future. Hingely (2005 B) highlighted that the smooth adoption of power differences in supply chains could result in deeper collaborative relations between collaborating firms. In their study of relationships magnitude, Golicic and Mentzer (2006) referred to power differences as essential factor in determining relations depth. They identified that the use of power advantage would not only hurt the relation depth but also may lead to ending the relationship. It is contended that exploiting power differences non-coercively produces positive outcomes (Hausman and Johnston, 2009), hence leading to better opportunity for increasing the levels of partners' interaction. Caniels and Roeleveld (2009) identified that a high level of interdependence leads to partners to disregard power differences and allows for deepening cooperative relationship. In the same vein, El Ansary and Stren (1972) put forward by Hausman and Johnston (2009) identified the importance of exercising power in a way that provides better opportunity to achieve superior inter-organizational collaboration.

From the previous discussion, it could be identified that power and dependence relation contributes significantly in determining the level of interaction between collaborating partners.

#### Innovation

Collaboration requires the co-ordination between different functions among different partners. It involves the disclosure of crucial information between business partners. It may involve the sharing of design, new product development and production data among the collaborating partners (Larsen, 2006). Bititei and El Mokadem (2009) highlighted the role that innovation plays in determining the degree of partners' interaction in collaborative relations. Larsen (2006) classified products into two main categories; primarily innovative and primarily functional. He identified that each category requires a distinctively different type of supply chain integration. Bagchi and Larsen (2002) highlighted that firms competing with innovative products and technology have less incentive to share sensitive product or business information with supply chain partners. Generally, it is expected that firms with much innovation in their process tend to have a relatively low degree of integration with their supply chain partners than those with low levels of innovation in their operations (Larsen, 2006 and Bagchi and Larsen, 2002).

From the preceding literature exploration, it could be identified that previous research highlighted the role that market dynamics, power and innovation plays in determining the degree of interaction in collaborative ventures. However, this research contends that these factors are highly interrelated and their interrelation is the major determinant of collaborative relations intensity.

# Interrelation between innovation, power and market dynamics

Through reviewing the relevant literature, the relation between power, innovation and market dynamics became apparent. Bititci and El Mokadem (2009) contended that these factors are highly interrelated. Johnsen and Ford (2008) identified that technical prowess plays a significant role in alleviating power differences between collaborating firms. In the same vein, Larsen (2006) identified the positive association between proprietary technology and increasing power differences. He identified that innovation puts organizations in a better position in terms of power.

Bagchi and Larsen (2002) identified that the absence of innovation heightens competition facing organizations. They identified that innovative products allows organizations to manipulate market dynamics effect through the specialized knowledge owned by them. Similarly, Johnsen and Ford (2008) identified that specialist technical knowledge and innovation can alleviate competition facing firms in the market.

In addition, the relation between market and power was evident. Lai (2008) and Ogbonna and Wilkinson (1998) highlighted that the nature of the market, seller/buyer market plays a significant role in determining the suitable level of power influence that can be exerted in collaborative relation.

From the preceding discussion, it could be identified that power, market and innovation are highly interrelated. It is argued that these factors can either strengthen or manipulate the effect of each other, hence affecting the intensity of collaborative relations. In addition, it could be seen that innovation considerably affect power relation and market dynamics between collaborating firms. Hence, this research is proposing a conceptual model (as shown in figure 1) that draws the interrelations between power, innovation and market dynamics and their effect over collaborative relations intensity.

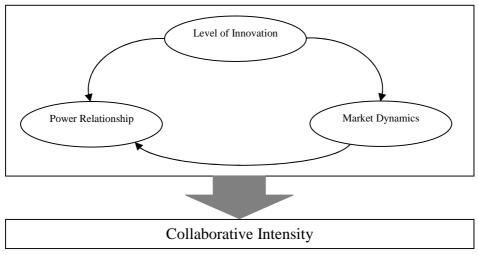


Figure 1 – Proposed model

# **Case studies and findings:**

Two case studies, representing two collaborating firms, were deeply investigated against the proposed model. The first case study represents a dyad operating in the FMCG market in Egypt. The second case study comprises two companies serving the pharmaceutical market.

# First case study

The first case dyad comprises two companies, partner 1 and partner 2. Partner 1, a multinational company operating in Egypt with its mother company in UK, and is supplying Egypt, Lebanon, Palestine, Jordan, Iraq, Sudan, and Syria with home, personal care and food products. Partner 1 is considered a low-tech company since its expenditure on research and development is weak. All researches and new innovations are developed and managed from the mother company in UK. Partner 2, an SME operating in Egypt, is providing packaging materials to partner 1. Partner 2 is also considered a low-tech company as it has no expenditure on research and development.

The business relation between both sides is close and extends over a period of more than 15 years. Partner 2 is supplying 70% of partner 1 needs from flexible packaging. This percentage represents around 30-40% from the total sales of partner 2. Both companies started their collaborative venture when Partner 1 announced a supplier development program that develop collaborative relations with strategic suppliers, develop their processes and identify cost-saving opportunities for the mutual benefit of partner 1 and its suppliers. Generally, partner 1 determines the degree of interaction with its suppliers according to the degree of dependency with that supplier and the market dynamics facing their suppliers.

The power relation between the two companies is clearly skewed towards partner 1. The financial capabilities, the high volume of purchases, the ability to provide its suppliers with development programs and being a principle customer to partner 2 (40 % from partner 2 total annual sales) puts partner 1 in a better power position.

The market competition facing partner 2 is quite severe and could be identified as major contributor in shaping their business relation. The reason for this is that the market of packaging is full of several small and large players that compete severely based on cost, reliability and quality. The willingness of several suppliers to be part of partner 1 supplier's network further amplifies the market competition facing partner 2.

The interrelation between power and market dynamics was clear. It could be identified that the market dynamics played a significant role in amplifying the power difference between them. The high market competition facing partner 2 increased the power difference between the two companies and provides partner 1 with a better opportunity to get better prices and to choose from among a variety of suppliers.

Although there is absence of any form of innovation in both sides operations, the effect of this absence over power and market dynamics could be substantiated. It could be identified that the absence of any form of innovation in partner 2 operations further amplified power differences between the two companies. Besides, the absence of any form of innovation in partner 2 operations allows for the ease of switching from one supplier to another and in turn amplifies the market competition facing partner 2. Thus, it significantly heightened the market competition facing partner 2.

It could be identified that the market dynamics and the absence of innovation in partner 2 operations strengthened the power differences between the two partners. In turn, the depth of the relation and the amount of undertaken joint activities was a direct result to the effect of the interrelations between power, market dynamics, and innovation.

Under their partnership, both companies undertake several joint activities and abandon others. The joint activities between them are centred on the regular meetings, cost model (a predetermined formula that comprises the commodity price, conversion cost, logistics cost and partner 2 profit margins), reciprocal technical teams' visits and gap analysis program. The cost model proves the ability of partner 1, the powerful side, to influence partner 2 decisions to accept disclosing all of its pricing structure for partner 1. Besides, partner 1 developed some performance measures that partner 2 should use and follow to assess the performance of the relation.

In conclusion, it could be identified that the current degree of interaction (depth of the relation) between the two companies was affected by the interrelations between power, market dynamics and innovation. The absence of innovation in partner 2 operations amplified both the market competition facing partner 2 and the power differences between them. This in turn led to the current intensity of the relation.

# Second case study

The second case dyad comprises two companies, partner 1 and partner 2. Partner 1 is a UK based subsidiary for a US based biopharmaceutical company that develops proprietary products for the pharmaceutical market, based on its own, unique drugdelivery systems. Partner 1 is considered a high-tech company since its expenditure in innovation represents around 20% from its total annual sales. Partner 2, a UK based company, is a part of a large Japanese company that is considered one of the world's leading designers, manufacturers and marketers of vascular prostheses and patented medical devices. Partner 2 is also considered a high-tech company as the development of patented devices is considered a crucial part of their business.

Both companies started their business relation 15 years ago when they jointly developed a usable retrieval device for partner 1 drug-delivery system. Partner 2 is considered a crucial partner to partner 1 as they are supplying 100% of their retrieval device. It could be identified that the joint development of the retrieval device and the associated agreements influenced the power relation, market dynamic and innovation (exchanging critical information) between the two partners.

The joint development of the retrieval device and the associated agreements created a special link of interdependence between the two companies. Although theoretically partner 2 is in a better position in terms of power (partner 2 are supplying 100 % of

partner 1 retrieval device and this represents around 3-4 % from their total annual sales), it should be noted that the power game has no effect over this collaborative relation.

The joint development of the retrieval device (innovation) and the associated agreements created a market of one customer and one supplier; Partner 1 product is unique and they are the only customer for partner 2 retrieval device and partner 2 is the only supplier of the retrieval device. The absence of other suppliers and customers and the signed agreements eradicated any effect for market dynamics over the relation.

The effect of the market dynamics over the power relation was evident. The presence of one customer and one supplier helped in manipulating any power difference between both sides. The joint development of the retrieval device (innovation) and the associated agreements, and the absence of other suppliers and customers (market dynamics) played a significant role in establishing an interdependence power relation between them.

From the preceding discussion, it could be identified that innovation significantly affected the power relation and the market dynamics. The joint innovation between the two partners eradicated the effect of power differences and created a market of one customer and one supplier.

In turn, the presence of one customer and one supplier allowed for smooth exchange of innovative information between the collaborating partners. This reflects the effect of market dynamics over the exchange of critical and innovative information.

In conclusion, it could be identified that the current degree of interaction (depth of the relation) between both partners was affected by several factors. The market dynamics (one customer-one supplier) created by the joint development of the retrieval device (innovation) led to a clear interdependence power relation between them; hence allowing them to intensify their interaction.

The intensity of the relation resulted also from the elimination of power differences and the high degree of openness in exchanging critical and confidential information. It should be highlighted that power, innovation and market dynamics and their interrelations contributed significantly in reaching the current levels of collaborative relation interaction.

# **Discussion**

Previous studies acknowledged the presence of different degrees of interactions between collaborating firms in supply chain. Several publications highlighted the role of power, market dynamics and innovation in determining the intensity of collaborative relations. However, the initial argument discussed herein was that the interrelations between power, market dynamics and innovation are the main contributor in determining the levels of interactions between partners in collaborative ventures. In addition, it was claimed that innovation shapes power relations and market dynamics in collaborative ventures.

The research, having developed a model for the collaborative relations intensity, verified the factors affecting the degree of interaction between collaborating firms through 2 case studies. The case studies demonstrated that the interrelations between power, market dynamics and innovation considerably affected the levels of interactions.

Power relation in both cases was affected by the market dynamics. In the first case dyad, the presence of high market competition amplified power differences between the two companies. In the second case dyad, the absence of any form of market competition eradicated power differences between the two firms.

In addition, it could be noticed that the absence of innovation in the first case dyadic relation amplified the power differences and the market dynamics. In the second case

dyadic relation, the presence of joint innovation eradicated power differences and market dynamics effect over the relation.

It was also obvious that the interrelations between innovation, power differences and market dynamics play a significant role in determining the degree of partners' interactions in the two examined cases.

#### Conclusion

It may be concluded that power, market dynamics and innovation are highly interrelated. The interrelations between the aforementioned factors play considerable role in determining the degree of interaction between collaborating firms. In addition, it could be identified that innovation affects the power differences and market dynamics in collaborative ventures. The absence of innovation amplifies power and market dynamics effect while the presence of innovation eradicates their effect.

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