

Technological Capability and Relationship Performance: The Roles of Power

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Abstract

The purpose of this paper is to explore the impact of technological capability on power, trust and inter-firm relationships performance within the supply chain. This study proposes to utilise quantitative design as a main approach to answer the research question. The data will be collected by using survey questionnaires. The sample of this study will consist of manufacturing companies which are listed in the Federation of Malaysian Manufacturers (FMM) Directory. The structural equation modelling (SEM) approach will be employed in order to test the proposed hypotheses in this study. Evidence from previous research has supported the advantages of keeping long lasting inter-firm relationships. Scholars suggest that inter-firm relationships will enable both parties to enjoy overall business performance and new product development opportunity. The literature findings confirmed the notion that technological capability can create competitive advantage for members of the supply chain. However, possessing such capability may create power imbalance which leads to deterioration of the inter-firm relationship. The manufacturing companies can benefits from this study by understanding the potential impact of technological capability on power, and how this association affect the inter-firm relationships. It may furnish useful information on the advantages and disadvantages of possessing such capability which can be the basis of making future investment decision related to the technological capability expansion.

Keywords: Technological capability, power, relationship performance, mediator, supply chain management

1 Introduction

Recent factors in today's world such as globalisation, maturing markets and rapid technological change, and intensified and swift change within marketplace competition have fostered manufacturers to seek new ways of establishing and maintaining sustainable competitive advantage (Santoro & Chakrabarti, 2002). There are two major competitive advantages in business that have been widely documented in the literature. First, technological capability is one of the foundations of a firm's competitive capability.

It helps firms to increase their ability to apply technical knowledge in creating and delivering innovative products that consumers may value; and thus affect the overall business performance and new product development performance of a firm (Latip, Salleh, Omar, & Yaakub, 2013; Wang, Lo, Zhang, & Xue, 2006).

Second, firms develop closer inter-firm relationships within the supply chain as part of sustaining competitive advantage. Evidence shows that, increasingly, firms realise the importance of engaging in strategic collaborations to survive in the current dynamic business environment and, therefore, engage in developing inter-firm relationships, especially within the supply chain, to create more effective links with their trading partners (Corsten & Felde, 2005; Gyau & Spiller, 2008; Ryssel, Ritter, & Gemunden, 2004; Sengun & Wasti, 2009; Thakkar, Kanda, & Deshmukh, 2008).

At first glance, these evidences may suggest that technological capability promotes closer relationships between manufacturers and their suppliers. Nevertheless, this initial perception fails to take into account the existence of power in business relationships. For example, Boeck and Wamba (2008) argue that the adoption of technology may lead to potential conflict rather than benefit to inter-organisational relationships. They contend that there is the possibility that firms may initially encourage other members in the partnership to adopt the same technology. Subsequently, any disagreement on this matter will result in the exercise of power to generate pressure on members - which may create conflict in the relationship.

Therefore, the purpose of this research is to investigate the mediation impact of power in the relationship between technological capability and relationship performance within the context of Malaysia's manufacturing supply chain. This study is expected to contribute to the literature by providing linkages between Resource Based View theory and power-dependency theory. Most of prior technology-related studies only looked at power as dependent variable (Abdullah, 2009; Ryssel et al., 2004). Based on theoretical grounds, it is found that power exist in firm interrelationships and thus, incorporating this variables in a single study as a mediator may provide a broader understanding of the relationship between Resource Base View and power-dependency theories.

2 Research question

The proposed main research question will be addressed below:

What impact does technology capability have on power and relationships performance?

The sub-questions derived from the above research question are as follows:

- What impact does technological capability have on relationships performance?
- Does power mediates the association between technological capability and relationships performance?

3 Literature review

Buyer and supplier relationships begin when human learn to trade goods and services. Since then, this relationship has developed naturally over time and become an integral component of business operating strategies (Wilson, 1995). As nature of doing business evolved, firms have shifted their attention from continuously choosing the right business counterparts over the firm's life-cycle, to the continuance of the existing favourable relationships (Zerbini & Castaldo, 2007).

As noted by Rahman and Bennett (2009), the need for closer relationship is inevitable due to recent factors such as globalisation and stiff competition in the market which focus on cost, quality, delivery, and technology. Subsequently these will create a greater need for inter-firm relationship especially with the firm's major supplier.

In general, the inter-firm relationship can be manifested when two or more firms enter into business relationships for mutual benefits (Latip & Al-Hakim, 2011; Patrakosol & Lee, 2009). Dwyer, Schurr, and Oh (1987) believe that firms enter cooperative relationships with their major supplier because of the expected benefits from the collaboration and the alliance tend to continue as long as the perceived benefits exist in the relationship.

Meanwhile, one of the key components found to be essential for inter-firm relationship performance and to remain competitive in the market is technological capability (Ehigie & McAndrew, 2005; Latip et al., 2013; Sheu, Yen, & Chae, 2006; Tsai, 2004; Tyler, 2001; Wang et al., 2006). The review on the literature generally denotes that technological capability within the manufacturing perspective is corresponds to the salient and diverse range of computer-based technology that comprises the use of robotics, information technology, computer-aided manufacturing (CAD), computer-aided design (CAM), automated storage/retrieval system (AS/RS), flexible manufacturing system (FMS), computer numerically control (CNC) machinery and automated identification techniques (García-Muiña & Navas-López, 2007; Kim, 2006; Narasimhan, Swink, & Kim, 2005; Rahman & Bennett, 2009). This study applies the current definition of technological capability and extends this to include any advance hardware or software compared to the existing manufacturing technological capability.

In general, power has been defined as ‘the ability to influence another person’s or organisation’s behaviour’ (Monczka, Trent, & Handfield, 2001, p. 500). Ratnasingam (2000, p. 56) further specified it as ‘the capability of a firm to exert influence on another firm to act in a prescribed manner’. In the supply chain context, Doherty and Alexander (2006) extended this definition to how a partner could influence the behaviour of another partner within the supply chain. Researchers argue that there will be a certain degree of dependency between two partners in the buyer-supplier relationship. A partner that has the ability to provide access to scarce resources will have significant power to control inter-organisational transactions (Chong & Ooi, 2008; Jun, Cai, & Peterson, 2000). Although a number of researchers have linked power to inter-firm relationships (Chong, Ooi, Lin, & Tang, 2009; Doherty & Alexander, 2006; Ritter & Walter, 2006), none of them examine the association between technological capability and power and how it relates to inter-firm relationships performance.

4 Conceptual framework and hypotheses

Figure 1 show the proposed conceptual framework which will be investigated in this study.

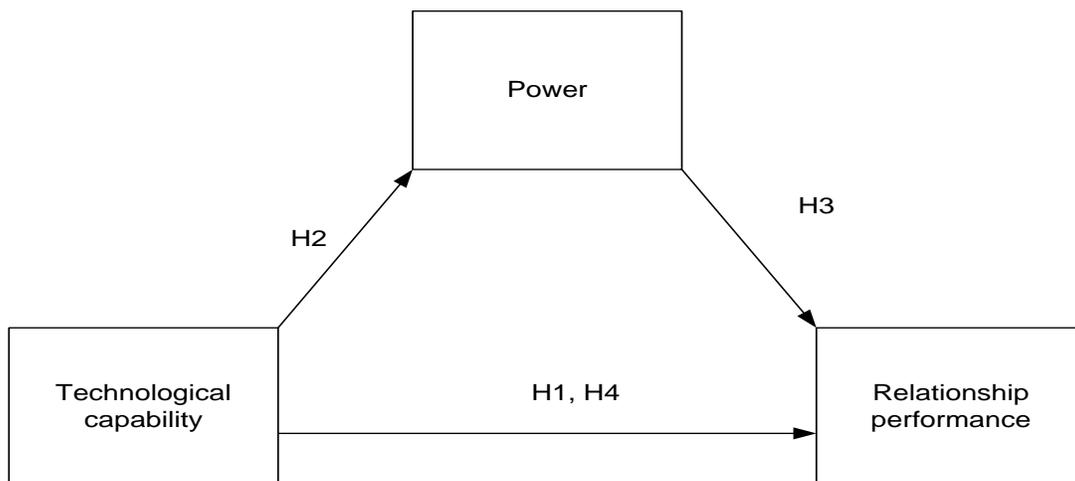


Figure 1: The proposed conceptual framework

The proposed hypotheses for this study are as follow:

H1: Technological capability has a positive impact on relationship performance.

H2: Technological capability is positively associated with power.

H3: Power has a positive impact on relationship performance

H4: Power mediates the positive association between technological capability and relationship performance

4.1 Technological capability and inter-firm relationship performance

Previous literature has regarded technological capability as one of the essential resources to remain competitive in the market. This is parallel to the resource-based view (RBV) theory that acknowledges that firms compete with each other on the basis of resources and capabilities (Wang et al., 2006). RBV theory assumes that sustainable competitive advantage is necessary to survive and thrive (Wang et al., 2006) and can be acquired by firms through accumulating technological capability (Tsai, 2004). Overall, in the competitive business environment, firms have no choice but to continue investing in state-of-the-art technological equipment and facilities to ensure their business survival.

Several literatures reveal that superior technological capability allows firms to apply new knowledge that will enhance a firm's competency development, thus resulting in greater business performance (Jonker, Romijn, & Szirmai, 2006; Kim, 2006). On the other hand, technological capability also enables firms to produce new innovative products. Researchers believe that superior technological capability can increase efficiency and higher differentiation through improved process and product innovations and thus improve a firm's capability in new product development (Kam, 1999; Lall, 1992; Tsai, 2004).

Meanwhile, RBV theory also governs the concept of inter-firm relationships. Ramaseshan, Yip, and Pae (2006) argue that firms engage in cooperative relationships with the objective being to achieve competitive advantage. They reveal that the main outcome of business cooperation is to permit firms to compete effectively in the marketplace. For example, maintaining healthy relationships may enable firms to enjoy uninterrupted supply of material in the long run (Jap & Ganeson, 2000). Therefore, the concept of RBV can be adopted in a dyadic channel relationship since a long term relationship between firms can be viewed as part of a firm's resources that cannot be easily imitated.

Conversely, the association between technological capabilities with the manufacturer-supplier relationship has also been recorded by many scholars in the literature. For example, a study by Angeles, Nath, and Hendon (1998) on electronic data interchange (EDI) among 128 firms in the USA found that technology EDI implementation could develop closer cooperative relationship between manufacturers and suppliers. Vlosky, Fontenot, and Blalock (2000) support the view that extranet usage leads to closer a partnership between manufacturers and suppliers. They argue that firms consistently producing superior benefits will be highly regarded by other members in the supply chain; and they tend to commit themselves to establishing, developing and maintaining this relationship.

Meanwhile, Boeck and Wamba (2008) investigated the association between the use of firm's technical resource; i.e. radio frequency identification (RFID) and manufacturer-supplier relationships in the retail supply chain. The data was collected via structured, semi-structured and non-structured interviews from 52 individuals in the retail supply chain. The findings reveal several implications of technological capability on the manufacturer-supplier relationship. First, technological capability (in this case the use of RFID) has allowed communication and information sharing both downstream and upstream in the supply chain. Second, it creates close cooperation among members in the supply chain and they look forward to the shared benefits from the system. Third, it increases relationship value since additional information is accessible to all members in the supply chain. Therefore, they conclude that technological capability leads to a positive interrelationship within members in the supply chain.

They further suggest technological capability will be able to shrink the supply chain and any new opportunities for collaboration shall further increase the relationship benefits as compared to partners who do not use the technology. Therefore, the above arguments would lead to the following hypothesis:

H1: Technological capability has a positive impact on inter-firm relationship performance.

4.2 The role of power

Power dependence theory states that the basis of power 'resides implicitly in the other's dependency' (Emerson, 1962, p. 32). This theory explains how power exists through the mutual dependency of organisations in a relationship channel. The theory assumes that firms will try to influence each other's conduct in a relationship and the power to control emerges when a firm possesses unique resources needed by the other party (Emerson, 1962).

The argument that technology deployment may create power imbalance in the inter-firm relationship can be found in several studies. Scholars caution that disruptions in a manufacturer-supplier exchange may exist in the event of acquiring technology-driven capability. One of the reasons behind this conflict is the emergence of power in the relationship. For example, Coughlan, Anderson, Stern, and El-Ansary (2001) assert that information technology has a strong impact on a firm's bargaining power in a supplier-manufacturer relationship.

Meanwhile, Vlosky et al. (2000) found that technological capability (via adoption of RFID) will result in a power imbalance and that could affect the level of inter-dependency of the other parties in the relationship. They claim that power imbalance will create an unjust balance in a relationship since powerful firms will have the advantage of dominating the relationship climate. They argue that members in the supply chain may feel technological initiatives give other parties in the chain more power and gain competitive position. In other words, possession of distinctive technological capability may affect the power-dependence relationship between parties in the supply chain. Therefore, these authors contend that continuous improvement of technological capability will tend to strain the relationship between members within the supply chain because the use of power may lead to conflict in the interrelationship.

Power dependency theory assumptions on power disparity can be applied to investigate the relationship between technological capability and power. Ryssel et al. (2004) assert that the implementation of technology will create power inequality in inter-firm relationships. As such, scholars believe that technological capability may increase dependency of one party on another and thus create a power imbalance in the relationship whereby one partner will have the ability to reshape rules in the relationship to serve their own interest (Anderson & Narus, 1990; Ke, Liu, Wei, Gu, & Chen, 2009). Consistent with this statement, Ke et al. (2009) proclaim that technology implementation will enable a trading partner to be dominant in the alliance and thus affect the level of power-dependency of the target within the relationship. Ratnasingam (2000), in her paper focussing on an investigation into the influence of power on trading partner's trust in the electronic commerce environment, concluded that electronic data interchange (EDI) capability has the potential to change organisational behaviour, technology usage and the manufacturer-supplier relationship. Besides fulfilling the objective of enhancing the effectiveness of coordination, technological capability could create a power imbalance among partners in the inter-firm relationship.

The assumption of the power-dependency theory and evidence from studies to date suggest that technological capability may generate power in the relationship channel. Nevertheless, power does not necessarily link towards a negative connotation; it also may be the driver in improving inter-firm relationships and business performance (Arend & Wisner, 2005). Additionally, a review of the literature provided in the previous chapter suggests that technological capability is closely related to the non-mediated power base. Therefore, this study contends that technological capability is related to the non-mediated power creation in the relationship.

In the interaction between non-mediated power base and the inter-firm relationship, it is perceived that the non-mediated power base enhances the attitude towards maintaining healthy relationships by fostering norms and values among supply chain members (Frazier & Summers, 1986 cited in Zhao, Huo, Flynn, & Yeung, 2008).

It is argued that a dominant firm with expert power is expected to contribute their skills, knowledge and expertise (in this case technology) with their suppliers which, in turn, will benefit them in the relationship (Zhao et al., 2008). In other words, firms that hold expert power may influence other firms' behaviour based on its superior expertise (Rosenbloom, 2004). Firms with referent power (whose goals are common with its supplier and often seen as a reference group) might influence their suppliers in a manner seen beneficial to them in the relationship (Ke et al., 2009).

Zhao et al. (2008) conducted research on the impact of power on relationship commitment within the context of the integration between manufacturers and customers in a supply chain. Their findings, based on 617 manufacturing companies in China, divulge that expert power and referent power are important in improving manufacturers' relationship commitment.

Meanwhile, Maloni and Benton (2000) argue on the impact of power on performance. They contend that the manufacturer-supplier relationship may significantly enrich performance. Given that the non-mediated power is perceived to improve inter-firm relationship, it may also positively affect the relationship performance. This argument is based on research by Brown, Lusch, and Nicholson (1995) which established that the use of non-mediated power embellishes the suppliers' opinion of the manufacturer's performance that they hold more powerful resources in the relationship. Stern and Reve (1980) also support this notion when they argue that firms with dominant power enjoy better prosperity and power - enhanced cooperation in the relationship will lead to increase overall profitability.

In summary, the above arguments uncover the theoretical and possible empirical association between technological capability, power and inter-firm relationship performance. The supply chain environment enables firms to share information, make joint decision, integrate business process and share knowledge (Jasperson et al., 2002; Kim, 2006; Latip & Al-Hakim, 2011; Latip et al., 2013). In order to realise all these benefits, a power dominant firm is expected to exercise its power; and this act may be deemed as exerting extra pressure by the target firm (Ke et al., 2009). Yet, there is no known research being conducted to determine the mediating effect of a firm's power on the association between technological capabilities and inter-firm relationship performance. This gap hinders the advancement of knowledge within this research domain, and thus it is crucial to clarify the impact of technology on a firm's power, especially within the manufacturer-supplier context. Thus, the statement above is formalised into the following hypotheses:

H2: Technological capability is positively associated with power.

H3: Power has a positive impact on inter-firm relationship performance

H4: Power mediates the positive association between technological capability and inter-firm relationship performance

5 Research methodology

This study will utilise quantitative approach in order to describe the impact of technological capability on power, and relationship performance. Singh (2007) view the quantitative approach as a research method that primarily aim to determine the relationship between set of independent and dependent variables to obtain answer to the research questions. As this study is descriptive in nature that try to establish the relationship between technological capability, power, and relationship performance, and not to institute causation among them, it is clear that the selection of quantitative approach is arguably appropriate and align with the above scholars viewpoint.

The statistical part in this study will be largely based on the structural equation modelling (SEM) usage. The SEM approach also seems to be appropriate since it will allow the use of confirmatory factor analysis that enables the researcher to access the contribution of each single item as well as to discover the reliability of the scale in measuring the concept (Hair, Black, Babin, & Anderson, 2009).

The target population of this study will be all manufacturing companies from diverse manufacturing subsectors listed under the Federation of Malaysian Manufacturers (FMM) Directory 2013. Since the list of companies contain in the report is segregated alphabetically by manufacturing subsectors and not by size of the firms, the researcher plans to adopt a simple random sampling technique to extract amounts of respondent as a sample to represent the manufacturing sector's population.

This study will employ a survey questionnaire technique to gain primary quantitative data. This research plans to adopt 5-point Likert scales ranging from 1 to 5 which represent the notion of 'strongly disagree' to 'strongly agree' respectively, to measure various dimensions of technological capability, power, and relationship performance within the manufacturing supply chain. Items will be evaluated using scales that consist of constant metric values to distinguish respondents' reaction towards a given statement (Kothari, 2004; Singh, 2007). In order to increase reliability and validity of the survey instruments, items for measurement of variables will be adapted and adopted from prior research. The instruments will be preliminary tested by supply chain professionals and revised accordingly to enhance the validity and reliability of the instruments.

This study will adopt a series of statistical methods to analyse the data. Initially the analysis will start with test the goodness of data by checking the reliability and validity of the measures. Next, descriptive statistics will be employed to check the normality of the data and to check for the existence of outliers. Subsequently, confirmatory factor analysis (CFA) will be exercised to explain how different measured items represent the constructs. Hair et al. (2009) state that CFA is first part of a complete test of structural model that enables researcher to confirm or reject the preconceived theory. CFA can explain how different measured items represent the constructs; which closely related to the construct validity of a proposed measured theory. This is important because the construct validity will reflect on the accuracy of the measurement items by explaining on how a set of measurement items represent the theoretical latent construct those items are design to measures. The measured theory is assumed to be supported when the analysis displays construct validity confirm the fitness of CFA models (Hair et al., 2009).

The next stage is to run a line goodness-of-fit (GOF) testing to establish a measurement model's validity and to support the evidence of construct validity. Line GOF through chi-square testing will signifies on how the model could reproduces the covariance matrix among the indicator items i.e. measuring the difference between observed and covariance matrices (Hair et al., 2009). Specifying the structural model is the next critical step which involves assigning relationships from one construct to another based on the proposed theoretical model. In this stage, the path model will represent both the measurement and structural part of SEM that shows the complete set of constructs and indicators in the model together with the structural relationships among them.

Finally, test to assess the structural model validity will be conducted to discover how constructs such as technological capability, power, and relationship performance as proposed in the theories, relates to one another really matches reality. This can be done by assessing the model GOF and significance, direction, and size of structural parameter estimates. Once, the structural model validity has been determined, substantive conclusions and recommendations can be drawn.

6 Expected contribution

The study is expected to give an explanation as to the mediation effect of power on the association between technological capability and relationships performance.

As such there are several contributions which can be expected from this study. Manufacturing companies can benefit from this study by gaining an understanding of the potential impact of technological capability on firms' power and how this association affects relationships performance. It may also furnish useful information on the advantages and disadvantages of possessing such capability which can be the basis of making future investment decisions related to technological capability expansion. This study also hopes to provide valuable information on the current status of technological capability of the manufacturing industries in Malaysia that will help the state government in planning the development of or reviewing current policy relating to the country's manufacturing sector.

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8 References

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