



## Organizational embeddedness and its effect on performance: An exploratory analysis for Malaysian business managers

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### Abstract

In advancing the Malaysian industrial and business cause Malaysian business managers may have to reflect properly on the 'myth of downsizing' in inter-organization context. Firms' network structural positions exert different effects upon the firms' level of relational capital outcomes in an upstream supply network. Previous researches had largely focused on the context of decentralized network structure. However, the supply network is a centralized network because of the existence of the focal firm the existence of which may influence the impact of relational capital outcomes. Hence, the objective of this study was to determine the type of network structural positions required to obtain reasonable relational capital outcome in upstream supply network through an exploratory analysis of a small material-intensive maritime industry. The study found that network structural positions, i.e. degree centrality, did contribute to firms' level of relational capital trust. In conclusion, firms embedded in upstream supply network benefit differently in terms of relational capital through different degrees of embeddedness. Firms' resources should be re-aligned to match the benefits of different network structural positions.

**Keywords:** inter-organizational relationship, logistic network, network studies, social capital, social network analysis, supply chain management

### Introduction

The last decades had seen an increase in managerial concern regarding the complexity of supply chain, more specifically the upstream supply network. The upstream supply network refers to firms residing in the upstream flow of the supply network. The upstream supply network has become more complex due to increased interactions and interrelations among the suppliers' firms as well as the number of the firms. These firms which are the suppliers of materials and services to the focal firms are connected or involved with each other directly or indirectly through the supply of materials to the focal firms or manufacturers.

One of the main strategies of managing these inherent complexities often adopted by supply chain managers includes the reductionist approach. The traditional reductionist arguments state that firms opted for the removal from the complex upstream supply chain of partners who do not meet the performance requirements of the supply chain in an attempt to manage the complexity arising from extensive inter-firm relationships (Choi & Kim, 2008). These strategies may prove to be effective in the short term, but may negatively impact the focal firms in the long run. These negative effects may emerge as firms' involvement in a network of inter-firm relationship creates an important element of intangible capital, which is the relational social capital. The involvement among the firms in the upstream supply network is essentially the firms' embeddedness in the upstream supply network structure. However, recent arguments suggest that to simply remove these underperforming firms may not be the best way, as firms may remove partners who are resourceful or more influential. Nonetheless, these characteristics are not visible through good accounting measures. In this vein, Cockburn and Henderson (1998) in addition to

Putnam (1993; 2000) posited that approaches which value and appreciate these complex inter-firm relationships may have better alternatives. This is because firms have been found to benefit through embeddedness with other firms in a network structure.

Network embeddedness constitutes an important element that Putnam (1992) identifies as being the relational capital or social capital (Cousins et al., 2001; Geraldine 2015). Cousins et al. (2006) stated that relational capital is the configuration of relationships within the network structure, as well as with the broader network structure of the firm. It has been documented that the level of embeddedness increases relational capital such as trust and motivation from the interactions (Cousins et al., 2006). More specifically, organizational researchers have confirmed that organizational involvement in a decentralized network structure impacts organizational relational capital outcomes such as the level of trust (Gulati & Gargiulo, 1999; Podolny & Page, 1998). Thus, a firm's embeddedness in the network structure may produce relational capital such as trust that may then have the potential to generate other benefits such as reduced costs and greater flexibility (Reagans, Zuckerman & McEvily, 2004). Nevertheless, decentralized and horizontal communication structure of networks caused opportunistic acts to become an imminent threat. Opportunism may emerge when parties in the network relationship have issues of goal incongruence. In addition, connectivity may have its costs too, as a firm may lose some control of its operations and administrations. Naturally, in a supply network context, to guard against the instability of the network structure and threat of opportunism, while at the same time acquiring high level of integration among firms in the supply network structure, stakeholders in the network structure often introduce a focal or central firm to administer and manage the activities in the network structure (Huang, 2007). This is the case that we are investigating.

The upstream supply network is essentially a centralized network structure. It is a centralized structure through the existence of a focal firm that monitors and administers transactions in the upstream supply chain for the production of the finished goods and services. This centralized coordination often involves a focal firm or manufacturer, typically operating in the center of the transformation process (Choi & Krause, 2006). Since relational capital outcomes emerge through interactions in a free flow, decentralized, network structure (Gulati & Gargiulo, 1999; Podolny & Page, 1998), application of the integrated network to the issues of centralized upstream supply network complexity may require deeper understanding of the impact of the centralized network structure. This research raised this concern following the argument of Putnam (1992) which posited that relational capital emerged largely in a decentralized network structure. This is because a centralized coordination such as the focal firm in the upstream supply network may introduce effects that are unknown, or remove potential benefits to the firms in the upstream supply network. For example, since the central coordinator (i.e. the focal firm), is often the most powerful firm in the supply base having arm's-length control that monitors actions of the network members, it is also a profit-driven entity with the most investment in the supply network. Occasionally, albeit unintended, a Machiavellian portrayal may affect the level of relational capital among the firms in the centralized network structure. In addition, the centralized nature of network governance has been found to reduce the horizontal connection which is prominent for the creation of relational capital in a network structure (Poppo & Zenger, 2002). Since these horizontal connections are significant at generating the relational capital posited by Putnam (1992), a key question would be: will firm's involvement or embeddedness in the centralized upstream supply network produce the same relational capital outcomes?

## Literature review

*...firms are no longer structured like a medieval kingdom, walled off and protected from hostile outside forces...but...involved in an intricate lattice work of collaborative ventures with other firms, most of whom are ostensibly competitors” (Powell, 2003)*

Powell's (2003, p. 113) statement described the overall transition of organizational form over the years as follows: The adoption of network firms in the upstream supply network structure relates to the assertion of network forms of organization in an inter-organizational or inter-firm relationship as conducted by an organizational study researcher. Integrated network refers to the notable structure of the inter-firm relationship. Globalization has made the study of inter-firm relationship increasingly important, as the resources needed to undertake the task of organizational management have grown in scale. Hence, this limits the potential of independent action by any single organization (Kauffman, 1993). It is believed that a holistic understanding of the inter-firm relationship would catapult organizations into providing better service as well as cost reduction (Faems, Van Looy & Debackere, 2005; Krauss, Mueller & Luke, 2004; Lawson et al., 2009; Stuart, Hoang & Hybels, 1999). This situation arises because a network, argued Powell (1990), facilitates the exchange of efficient and reliable information. This is due to the relational capital developed through the firms' level of embeddedness in the network structure.

Granovetter (1985) advanced the concept of embeddedness as an effort by which to explain economic behaviour of an organization. According to Granovetter (1985), embeddedness refers to the level of involvement of a firm in the network of inter-relationship. A firm's level of involvement has an impact upon its actions or behaviour in the network. Granovetter (1985) posited that transactions between actors in a network are embedded in social context of economic decisions and outcomes are affected not only by the actor's isolated relationship with other individuals or firms in the network but also by the structure of the overall network of relationship within which the actor resides. Economic behaviors are embedded in the network of relationship that provide the context for economic processes (Granovetter, 1985). As every behaviour materializes through certain form of outcome, almost all economic processes are presumed to be embedded in the networks of relationship. Thus organizational performance is influenced by the pattern of embeddedness of the organization in the network. Since in the upstream supply network, firm embeddedness relates to the degree of the interaction that a firm may have with other firms in the network which is a direct reflection of the firm degree of inter connectivity with others in a network; hence, one may conclude that organizational performance in the supply network may also be influenced by the organizational embeddedness pattern such as its centrality and connection (Scott, 1998) with other organizations in the supply network (Mueller, 2000).

Although there has been an increased number of research regarding firms' embeddedness in network, the literature is silent about the relationship between organizational embeddedness and organizational social capital in a centrally governed supply network; that is a network governed by a strong focal organization which enforces and monitors the supply and demand of materials by other sub organizations in the network. In this research, although no doubt organizational social capital emerged in network forms of organizations, we argue that the presence of a central actor of or dominant power such as the focal organization in a supply network may change the pattern of inter connectivity and ties among organizations in the network; hence, impacting organizational social performance. At the minimum, the flow of information may have to go through the central actors before it can be disseminated to other actors in the network. Furthermore, the formal power of the central organization may add new perspectives to the informal, social control mechanism operating in the network.

## Hypothesis

Extensive interaction generates trust among firms. For example, Uzzi (1997) found that in order to obtain information regarding a potential partner before collaboration activities can be carried out; firms resort to trusted firms for information. The trust between the firms, argued (Uzzi, 1997) is the result of multiple exchanges in the past. In the same vein, Gulati (1995) highlighted that years of inter-firm relationship generates trust among them. In addition to that, Gulati and Gargiulo (1999) found that negative gossip by third parties about another party's uncooperative behaviour significantly reduces the likelihood of direct relationship; whereas positive gossip strengthens the likelihood of direct relationship among firms in the network. What this literature shows is that in a network relationship, a firm will sometimes refer to its

partner's previous experience and information with potential partners before agreeing to short-term or long-term business commitments. Extensive interactions are a catalyst for trust in networks of inter-firm relationship. Similarly, Eccles (1981) found that extensive interaction among a network of homebuilding firms also create trust among network members. The authors found that exchanges of information among the contractors regarding materials' prices create stronger inter-firm relationship; and thereby facilitate the creation of trust.

Thus, the literature indicates that firms in a network having an extensive relationship with other firms in the network may be perceived as trustworthy by others. Since extensive relationship in network analysis can be pictured based on the level of firms' coreness in the network structure, this thesis hypothesizes that:

**Research hypothesis:** Firms' embeddedness following their centrality position in the upstream supply network through different inter-firm relationship impacts the level of trust that the firms may acquire from other network members.

## Methodology

Align with the objectives of this study; the design and methodology are based on the theoretical and analytical framework of the Social Network Analysis (SNA). For this study, an upstream supply network of a small maritime industry seemed to be an ideal setting. A supply network in the maritime industry is a material-intensive enterprise.

A survey instrument was used to collect majority of the information needed for this study. Surveys and questionnaire are traditional tools to help network researchers to obtain data on inter-organizational relationships (Wasserman & Faust, 1994). Leading network researchers such as Galaskiewicz and Marsden (1978), Knoke and Kuklinski (1982), Burt (2004), and Borgatti and Li (2009) established the credibility of this technique for the collection of network data on inter-organizational transactions such as information transfer, resource transfer and joint activities. Survey is suitable for this type of study because it allows the researcher to tap into the participants' subjective perceptions of interactions rather than objective measure of interactions, in which many situations are hard to get access to for confidentiality reasons (Diani, 2002).

For data analysis, the analysis was divided according to the type of analysis technique applied. First, the researcher performed exploratory social network analysis (visual analysis) of buyer-supplier organisations' network by exploring the network maps and the network structural measures. For this purpose, this research adopted a spring-embedding visualization method in the UCINET program whereby a network layout is computed using force directed algorithm. This particular layout has the advantage of detecting network centrality patterning (Polites & Watson, 2008). For these routines, this research applied the network imaging software within the UCINET (Borgatti et al., 2003) i.e. the NetDraw, which is equipped with sophisticated visualization techniques. Visual representation of supply networks can provide useful direction for researchers, and starting point to develop subsequent quantitative analyses.

Secondly, the researcher tested the research hypotheses using innovative statistical network modelling known as the Exponential Random Graph Modelling (ERGM, or  $p^*$  model; Robins et al., 2007). The authors suggested that in social network analysis, the network structure needs to be searched, not assumed from previous other related literature. In general, the exponential random graph models (ERGM) have the following form:

$$P_r(Y = y) = (1/k) \exp(\sum nA(g) A(y)) \quad (1)$$

Where:

- (i) The summation is over all configurations  $A$
- (ii)  $\eta_A$  is the parameter corresponding to the configuration  $A$  (and is nonzero only if all pairs of variables in  $A$  are assumed to be conditionally dependent)
- (iii)  $g_A(y)$  is the network statistic corresponding to configuration  $A$ ;  $g_A(y) = 1$  if the configuration is observed in the network  $y$ , and is 0 otherwise

All ERGM models are of the form of equation (1), which describes a general probability distribution of graphs on  $n$  nodes. The probability of observing any particular graph  $y$  in this distribution is given by the equation, and this probability is dependent on both the statistics  $g_A(y)$  in the network  $y$  and on the various non-zero parameters  $\eta_A$  for all configurations  $A$  in the model. Consequently, different network analysis routines were applied to explore patterns of connectivity among the buyer-supplier organizations that are embedded in the MMEA supply network, and examine the structural characteristics of these entities. These analyses were performed using the software package UCINET (Borgatti et al., 2003).

## Results

### *Exploratory network analysis: Visual analysis of social network trust network map and degree centrality*

It can be seen immediately from Figure 1 that there are several sub-groups or cliques of trust-relationship in the network structure. In addition in the almost all sub-groups or cliques, there is one firm that has high trust attribute compared to other nodes. Furthermore, nodes that are periphery in the network are mostly low in their trust score. This network map implies that nodes that are embedded in the core position may experience high level of trust while most nodes on the periphery have low trust level. Together, the positioning of the nodes of the trust network indicates the tendency towards a degree based core-periphery structure. Borgatti et al. (1998) stated that the core periphery structures imply the existence of two distinct regions in the network, i.e. one that includes dense and cohesive subsets of nodes, and another where connections are looser and sparse. Borgatti et al. (1998) posited that these particular structure may form in two ways; i.e. one as a result of high centralization process, indicated by the presence of hubs and spokes nodes (for example, when prominent firms attract most of the other firms) and another due to high triangulation, which suggests the presence of large number of overlapping cliques.



trust relationships are built overtime and relied on other endogenous variables such as size of the participating firms and the length of the relationships (Jiang et al., 2011; Laaksonen et al., 2009; Doney & Cannon, 1997). Firms' size encompasses the firm's overall size and market share position. Firms' size provides a signal to other firms on its level of trustworthiness. Overall size and market share indicate that many other businesses trust this firm enough to do business with it. This suggests that the firms consistently deliver on their promises to others or they would not have been able to maintain their position in the industry.

**Table 1. ERGM results**

Parameter	ML Estimates	Standard Error
<i>Trust Network Pure Structural Effects</i>		
Arc	-1.101	0.082*
Reciprocity	1.478	0.401*
A-in-S	-1.350	0.429*
A-out-S	0.128	0.399
AT-T	1.096	0.259*
AT-C	-0.273	0.109*
AT-D	0.469	0.212*
AT-U	-0.089	0.131
A2P-T	-0.163	0.045*
A2P-D	-0.124	0.075
A2P-U	0.084	0.027*
<i>Trust Network Pure Attribute Effects</i>		
<u>Section 1: ONEDC in Contract tie</u>		
Sum of continuous attributes	0.071	0.026*
Difference of continuous attributes	-0.036	0.017*
<u>Section 2: ONEDC in Information sharing tie</u>		
Sum of continuous attributes	-0.064	0.017*
Difference of continuous attributes	0.028	0.014*
<u>Section 3: ONEDC in Referral Made tie</u>		
Sum of continuous attributes	0.017	0.001*
Difference of continuous attributes	-0.027	0.001*
<u>Section 4: ONEDC in Referral Received tie</u>		
Sum of continuous attributes	0.031	0.012*
Difference of continuous attributes	0.046	0.022*

(Asterisk indicate effects where absolute value of estimates exceed twice the standard error)

Secondly, there is a significant and positive effect of reciprocity for trust network model. This indicate that firms are likely to nominate each other in trust relationship; i.e. if Organizations APMHQ1 trust WILSEL4, there is also a high likelihood that WILSEL4 trusts APMHQ1 in return. Reciprocity is an important feature of many other social networks studies, and it is expected in trust relationships (Lusher, 2011; Lusher & Ackland, 2010; Lusher et al., 2010; Lusher et al., 2012; Bamber et al., 2010; Robins et al., 2009).

Third, the model shows that the A-in-S parameter is significant but negative A-in-S parameter is an indication of the presence of highly nominated firms within the trust network. What can be taken from

this parameter estimates is that in the trust network, controlling for other effects, although there is a significant parameter estimates for A-in-S, the negative MLE score indicates that it is unlikely that trust ties relationship will be forged based on the degree based structural formation. On top of the structural parameters, Table 1 also shows the effects of the continuous attributes upon the ties formation propensity between the embedded buyer-supplier organizations in the trust network in the attribute effects sections. The first section shows the results for ONEDC in contract tie.

The Sum of Continuous Attribute is significant and positive. This shows that in the trust network, firms that have high ONEDC in contract tie forge trust ties with others with similar level of high embeddedness and with low embeddedness more frequently. Because the embeddedness score is related to the number of connections that firms have in the network, we could also relate this parameters to the location of these firms in the network structure. Structurally, we would find these firms to be located in the center of the network, as there are the nodes that have the most connections or ties to other nodes in the network. The Difference of Continuous Attribute is significant and negative, suggesting that the firms with differing level of embeddedness levels are less likely to forge ties together. What can be taken from the findings of the ERGM analysis outcome is that, ONEDC in contract tie influences the propensity for trust ties to be forged between the embedded firms. Thus, firms with high ONEDC may appear more trustworthy to the other network members.

In the second section, there is a negative and significant Sum of Continuous Attribute parameter; indicating that firms with high ONEDC in the information sharing tie have low tendency to trust others with high or low ONEDC firms. A significant and positive Differences of Continuous Attribute shows that there is a strong tendency for firms in the observed network to forge ties or trust other network members when their ONEDC differences are small. When compared to the attribute effects in contract tie, the Sum of Continuous Attribute effects are non-significant but positive and significant Difference of Continuous Attribute effects. The distinctions in the attribute effects may relate to the type of ties in question. A formal tie such as the contract tie is governed by terms and regulation. Such condition may lead to focal organizations becoming dominant in the network. For example, Toyota is the focal organization in the Toyota's supply chain with few tier-one organizations also considered focal, as they function as the main supplier to Toyota production facility. The flows of supplier between upstream suppliers to the focal suppliers and subsequently to the manufacturer itself are governed by agreed rules and regulations with the contracted organizations bounded to the demands and needs of the ordering authority (i.e. focal organizations). This phenomenon may create few focal organizations that become core nodes as indicated by the positive Sum of Continuous Attribute effects in the model. On the other hand, positive and significant Difference Continuous Attribute may be attributed to the informal nature of the information sharing tie whereby in such network, communication is not based and bounded by any official regulatory. The third section of trust network model shows the results of attributes' effects for ONEDC in referral made tie. There is a significant and positive Sum of Continuous Attribute effects for the observed network, indicating that firms with high ONEDC in the referral made tie tend to forge ties with others. The negative and significant Differences of Continuous Attribute shows that when the difference in their ONEDC is small, there is low tendency for the firms of the observed network to forge trust ties with other firm.

Finally, the fourth section shows the result of attributes effects, ONEDC in referral received tie. The Sum of Continuous Attribute is found to be positive and significant. This is an indication that firms that possessed high ONEDC in referral received tie are likely to form ties with other network members. However, the positive and significant Difference of Continuous Attribute shows that trust relationship is more likely to be forged between network nodes when the difference in ONEDC in referral received tie is small.



## Discussion

The exploratory analysis and the ERGM analysis revealed that there were significant, positive effects of firms' embeddedness based on centrality network positions and trust. For example, firms that are highly embedded in the information-sharing tie network, based on their degree centrality network structural position, have a high likelihood of being perceived as trustworthy by other network members. The results are similar in the referral made ties, and the referral received ties. This also indicates that as firms are more embedded in the centralized upstream supply network based on the degree centrality network structural position, their level of trustworthiness also improves. However, the Maximum Likelihood Estimate (MLE) is significant but negative when firms are highly embedded in the contract tie. What this means is that the more embedded a firm is in the upstream supply network based on the formal contract tie, the less likely it will be perceived as trustworthy by other network members.

This suggests that the study hypothesis can be accepted. As a firm becomes more embedded in the upstream supply network structure, it will experience varying levels of relational capital depending on the type of activity that the firm involved in. Thus, the more embedded a firm is in the supply network based on degree centrality network position, the more likelihood there is for the firm to be perceived as trustworthy by other firms embedded in a similar network structure. This implies that firms in an upstream supply network relationship trust the firms that occupy the central position in the supply network structure; alternatively, by definition, the firms that receive the most ties or connections from other firms.

Overall, it appears that firm embeddedness in the supply network structure contributes to the level of trust that one firm may receive from other network members. Moreover, the trustworthiness level that a firm receives from other colleagues may be helpful in the collaborative development of new-product innovation or service.

This finding is consistent with Uzzi (1997). Uzzi (1997) found that in inter-firm relationship, active relational governance such as information-sharing is associated with trust. Further, it was found that firms resort to trusted firms in the network that they have dealt multiple times in the past to obtain information regarding a potential partner before collaborative activities can be carried out. More importantly, Zaheer et al. (1998) confirmed that this leads to improved performance of inter-firm exchanges. An important implication of this is that these findings support that firm commitment into information-sharing activities enhances the perception of trust that the firm may receive from other network members. In addition, referral relationships are regarded as being a firm's high level of goodwill (Anderson, 1998). Referral relationships often involve sending human resources or participating in programs, to make certain of issues regarding clients or processes. As receiving referrals can be interpreted as receiving resources from other network members, others may regard the act of sending referrals to other firms as an act of goodwill. Consequently, firms that receive a high number of referrals will also be perceived as highly trustworthy by other firms in the network structure. Thus, the findings of ERGM analysis for the hypothesis one lend support to the argument that firms are more embedded in the centralized upstream supply network.

## Contribution

The findings of this study showed that the relationship between network involvement and relational capital is reasonably high, even in the highly centralized upstream supply network structure. The quantitative analysis results of this study may shed light on the type of relationship that may have influence upon firms' relational capital and become the knowledge needed for managers to comprehend the dynamics. In addition, the findings of this study may shed light on the 'myth of downsizing' in the context of inter-organization. Choi (2011) described the upstream supply chain complexity or supply base complexity as being a 'beast' that requires understanding in order to tame it; rather than by harsh actions such as removal of a part or elements that formed the whole network. This study attempted and

succeeded to investigate and provide others with an additional lens through which to comprehend the complexity and consequently, bring new means to tame the beast. Since it has been a known empirical fact that downsizing does not improve performance of intra-organization, the findings of this study may prove similar effects. It may also explain in part why, in the context of inter-organization, a 'reductionist' approach (based on accounting measures) to suppliers' management may not be the answer. The ill-guided reductionist may remove the influential, resourceful firms that do not appear on the firms' radar of good accounting measures (Choi et al., 2006).

As for future research opportunities, the framework of this study could also be tested in other industries, for example, to a more dynamic, fast cycle industry such as the electronics industry. The heightened degree of uncertainty and rate of innovation in the electronics industry may influence the pattern of strategic behaviour of the embedded organizations and the appropriate network configurations. Hence, to see if the findings of this study would also hold in different industry, it would be an interesting undertaking and would add to the generalizability of this study.

## Conclusion

This study presented a view of the supply network as a social system and pointed out that network embeddedness plays a prominent role. Our results suggest that embeddedness impacts the organizational level of social capital. This implies that the supply management function can, to certain extent, shape the supply network structure around particular organizations. More researches are needed to determine the extent to which embeddedness of an organization can control, or more likely influence, the development of networks and how much leverage the supply network has in this process. The results also suggest that supply network embeddedness may have significant contribution to strategy development. In conclusion, by considering all the implications of our study, we may conclude that complexity is not all bad. Managers need to consider their firms' existing embeddedness in order to exploit the competitive advantage of supply network inter-organizational relationships. Firms that fail to understand the underpinnings of these relationships stand to face more difficulties within the network itself. For this reason, managers intending to obtain competitive advantage from the network must engage with other partners more effectively. No doubt, some firms are at an adequate standing, while others are struggling in some areas. The framework of this study can be applied by managers who are committed in engaging other network members.

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