Competences and capabilities for innovation in supply chain relationships

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Abstract: There is little empirical research on the relational capabilities and competences in supply chain relationships, and the important links that exist between relational capabilities, competences and supply chain innovation. This study addresses some of that knowledge gap gained through a case study of the Australian freight services sector. Findings suggest that different competences developed by supply chain participants support different ways to enable operational effectiveness. Road freight businesses should acquire knowledge of how to select and manage inter-firm relationships that provide the greatest benefit, acquiring competences that either improve their current capabilities or assist them to explore strategies that ensure incremental innovation and supply chain performance objectives are met.
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Keywords: supply chain relationships; competences; capabilities; innovation capacity.


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Maree Storer is a PhD candidate at the School of Business, Faculty of Business Economics and Law within the University of Queensland and recipient of a 2007 Cooperative Research Centre scholarship for higher degree research. She is also the Principal Project Manager of the R&D branch of the Queensland Government Department of Employment, Economic Development and Innovation. Her main research focus is exploring and investigating the importance of supply chain innovation capacity. Specifically, the level of importance supply chain organisations place on taking a strategic approach to developing supply chain relationships, and maximising the potential of supply chain dynamic capability and supply chain competence to grow supply chain innovation capacity as a competitive advantage.

Paul Hyland is a Professor in Management at Queensland University of Technology. His research focuses predominantly on innovation management and business development. He is internationally recognised for his research and has been invited to review funding applications for the European Science Foundation and the Italian government. His work is widely published in the area of innovation management with over 50 journal articles, 100 conference papers and five book chapters published in the last 15 years. He is currently working with the Cooperative Research for Integrated Engineering Asset Management.
1 Introduction

The competitiveness of a firm basically hinges on technological, human and organisational capabilities. This can also be applied to supply chains which are groups of organisations that collectively process raw materials into finished goods (Forrester, 1958; Hult et al., 2002). In managing supply chains, supply chain relationships are seen as an important facet in reducing costs, improving quality and enhancing innovation opportunities to the focal firm. Wagner and Boutellier (2002) note the growing emphasis on planning and justifying strategies for both short-term, non-cooperative relationships and long-term, cooperative relationships across supply chains. In most supply chains, managing buyer-supplier relationships for inter-organisational competence development is a critical element of supply chain management (Moller et al., 2003). Relevant supply chain competences include: understanding product life cycles, management of upstream and downstream relationships with suppliers and customers, creating and identifying value-adding or innovation opportunities and understanding total supply chain costs. Flexible and responsive supply chains able to remodel the nature and form of their business engagements based on demand can improve or value add to the overall performance of the entire chain (Wagner and Boutellier, 2002). It has been identified that demand chain alignment competence enables an integrated, information-driven approach to product lifecycles, from concept to design, manufacturing, maintenance and removal from market. There has also been a paradigm shift in supply chain theory suggesting supply chain firms should take a more strategic view toward developing their relational capabilities and not just follow the predominant operational approach of arms length transactional relationships and informal cooperation. This trend is often seen in supply chain sectors such as freight service and logistics providers. Thus, this paper seeks to answer the question, does achieving breakthrough improvements in supply chains require innovation and supply chain relationships that support supply chain capabilities to maximise value adding opportunities?

2 Supply chain relationships

Supply chain relationships vary in degree, type and nature, and it is clear in the literature that there is not a one-size fits all solution. Market dynamics require flexibility in the nature of these relationships, from arms length to informal cooperation to formal partnerships and collaboration. (Peteraf and Bergen, 2003) Coordination, cooperation, partnerships, collaboration and coopetition on the other hand, give rise to varying levels of interdependence amongst supply chain firms. In most relationships there is the pursuit of convergent interests deriving mutual benefits (Contractor and Lorange, 1988) over short, medium and longer terms.

In supply chain, coordinating transactional relationships usually exist through contractual arrangements often negotiated at arm’s length and subject to performance agreements. Cooperative relationships in supply chains form when firms agree to share capabilities, resources and information through either informal or formal conditions, or a mixture of both. These relationship types have also been used to develop capabilities such as agility and flexibility in supply chains (Sanchez and Perez, 2005). These focus on elimination of waste and the provision of flexibility for faster response. Responsive supply chains alternatively often focus on speed, cost and quality (Ferdowset al., 2006).
Another form of cooperation is between competitors, referred to as coopetition, originally based on game theory (Bengtsson and Kock, 2000; Dagnino and Padula, 2002). Several options can be found in coopetition frameworks (Garcia and Velasco, 2002) including; competition-dominated relationships, equal relationships (coopetition), cooperation-dominated relationships and strategic collaborative relationships through strategic coopetitor alliances. Competitors align and share resources to cooperate and collaborate on specific activities that create a competitive advantage and deliver profitability to the relevant competing partners. Although researchers such as Bengtsson and Kock (2000) have tended to view competition and cooperation as opposite ends of a single continuum, coopetition recognises a middle ground that allows competitive relationships to cooperate in activities such as new product development or developing economies of cost and scale.

Supply chain relationships need to be formed according to specific circumstances and market driven competitive priorities. The benefits of relationships include the need to deliver a value adding product or service of exceptional quality, on time, at a reasonably competitive price (Hill, 2000; Slack et al., 2004). Thus, organisations attempting to meet these objectives need to pay attention to their operational effectiveness as this is a primary driver of business performance and central to continuous innovation management. Operational effectiveness involves improving processes performance by leading and controlling the processes within the firm and across the firms as well as measuring and improving the processes. Bessant and Boer (2002) argue that organisations need to engage in continuous innovation to be both operationally effective in exploitation and strategically flexible in exploration. Similarly, a culture of continuous innovation requires organisations to focus on renewing managerial competencies congruent with the changing business environment (Teece et al., 1997). According to Hyland and Boer (2006), organisations need to develop inter-firm arrangement to align operational effectiveness and innovation activities. These capabilities are developed by bundling (Hyland and Boer, 2006) behaviours such as: information sharing, asset utilisation and organisational change projects, continuous improvement and business process reengineering.

3 Innovation in supply chain relationships

Companies see innovation as one of the most important factors in gaining a competitive advantage (Tidd et al., 2005). Other authors argue that being innovative has become a necessity for companies (Bessant, 2003). Schumpeter (1947, p.66) defined innovation as the creation of new combinations, which can be “a new product, a new technology for an existing application, a new application of technology, the development or opening of new markets, or the introduction of new organisational forms or strategies to improve results”. Boer and Gertsen (2003) discussed continuous innovation as the ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, exploitation and exploration.

Bessant and Boer (2002) argue that organisations need to engage in continuous innovation to be both operationally effective in exploitation and strategically flexible in exploration. The recent developments in society, markets, technology and industry
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suggest that leading organisations need to find configurations of processes, procedures, people technologies and organisational arrangements that allow them to become continuously innovative. A culture of continuous innovation requires organisations to focus on renewing managerial competencies congruent with the changing business environment (Teece et al., 1997). There is a need for learning processes to build the flexible capability to reconfigure and transform their assets. In dynamic and unstable environments, firms have to constantly scan their environment, assess government policies and develop agile behaviours to rapidly accomplish changes (Teece et al., 1997). Therefore, supply chain managers need to identify specific sets of organisational capabilities to transform and reconfigure competencies for more flexible and time-based operations. These capabilities are developed by bundling behaviours such as: information sharing, building trust, balancing power and creating interdependencies. All reconfigurations and transformations continuously affect operational processes by the accumulation, selection and change of patterns of routines (March and Simon, 1993).

Innovation demands an investment of resources and these resources are usually obtained through developing links with supply chain members. Developing more strategic supply chain inter-organisational alignments requires a more strategic perspective which should exhibit collaboration (Kaltof, 2006), capabilities such as responsiveness (Ferdowset al., 2006) and flexibility (Sanchez and Perez, 2005) and a sharing of competences. It is also argued that there is a need to focus on leveraging inter-organisational relationships into more cooperative and collaborative outcomes, to pursue a continual value adding and create supply chain innovation capacity (Malhotra et al., 2005).

4 Supply chain capabilities and competences

Organisational capabilities are best described as integrated resources to which firms have access, and have been built up and improved over time (Gieskes and Langenberg, 2001). These resources include tangible and intangible assets, ranging from behaviours and skills to information systems. Teece et al. (1997) suggest that firms’ capabilities are operationalised by distinctive activities which are defined as competences.

Competences are described by Karnoe (1995, p.430) as a “repertoire of experiences, skills and beliefs”. Business inter-firm relationship competence involves the ability to find, develop and manage inter-firm working arrangements (Lambe and Spekman, 2002). The extant literature suggests that organisational competences relevant to integrate the supply chain encompasses knowledge and skills of employees (Gammelgaard and Larson, 2001), supply chain partner selection (Das and Teng, 2000; Dyer and Singh, 1998), collaboration with supply chain partners (Simatupang and Sridharan, 2002; Stank et al., 2001), accommodating resource requirements to support service provision and goods manufacturing cost effectively (Sanchez and Perez, 2005) and learning from supply chain partners (Dyer and Singh, 1998; Levison and Asahi, 1995). A business’ inter-firm relationship competence involves the ability to find, develop and manage such work arrangements (Lambe and Spekman, 2002). The resource-based theory argues that firms seek worthy, unique, and expensive inputs to copy; which account for quality resources that are rare, non-substitutable and unique, allowing for efficiencies and competitiveness (Barney, 1991; Conner and Prahalad, 1996; Rumelt, 1984). Firms can also compete by developing resources in conjunction with supply chain partners (Dyer et
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al., 1998; Dyer and Singh, 1998). These authors prescribe the benefits of complementary resource sharing through identifying the value of such a combination. The ability to select potential partners is influenced by previous partnership experiences, trust, differences in internal searching and evaluation capabilities, and differences in their ability to obtain networks-related information.

Supply chain capabilities refer to the strengths experienced through collaboration in the areas of cost capability, product quality, delivery reliability and process flexibility (Rosenzweig et al., 2003). These capabilities enable supply chain members to undertake a set range of productive tasks aimed at improving their ability to collaborate and be competitive in specific markets. When supply chain members attempt to achieve their own quality goals at the expense of their partners, the supply chain may work at suboptimal levels. By contrast, when supply chain members work towards common quality goals over time, transaction-specific know-how accumulates. For example, in developing new dedicated logistics solutions, third-party logistics providers and manufacturing that have collaborated closely are less likely to misinterpret information when implementing tailored solutions designs or changes. Other capabilities relevant to integrating the supply chain include supply chain partner selection (Das and Teng, 2000; Dyer and Singh, 1998; Fang et al., 2004), collaboration with supply chain partners (Simatupang and Sridharan, 2002; Stank et al., 2001), responsiveness (Dyer and Singh, 1998; Fang et al., 2004; Levison and Asahi, 1995) and agility (Narain et al., 2000). A supply chain must possess these capabilities to enable it to anticipate and minimise the impact of disruptions or adapt with new, more efficient processes and better quality goods (Shoemaker and Amit, 1994; Teece et al., 1997).

4.1 Responsiveness

Supply chain responsiveness relates to the extent to which supply chain participants respond cooperatively to environmental changes. It is considered as a functional component of a more holistic approach to responsiveness defined as agility (Power et al., 2001). Responsiveness draws the dynamic nature of a firm’s supply chain capabilities, which allows a business to develop and renew firm-specific competences and to better respond to shifts in the environment (Teece et al., 1997). The faster the supply chain, the better its participants can respond to changing market situations and the less it needs inventory – resulting in higher return on capital employed. As speed is increasingly becoming a firm’s key performance objective, lead time reduction has emerged as a dominant issue in manufacturing and supply chain strategy. Firms realise that faster delivery times enable them to charge a price premium. For instance, a road freight company could charge 30% more for a guaranteed next day 7:00 am delivery. Similarly, lead time has an impact on customer demand such that in many cases a 24% drop in purchases by the existing customer base is the negative result of a 5% increase in delivery time. The ability to quickly respond to short and medium term market changes can be used to offer customers added value. It is asserted that the changes can be due to variation in the product mix (mix responsiveness), the volumes required (volume responsiveness), or the delivery sequence or timing (delivery responsiveness). This can be achieved through sharing access to information, sharing resources to increase an individual firm’s resource bases or to utilise information to improve on-time delivery. Firms may also bundle these competences with other competences to be responsive and flexible.
4.2 Flexibility

Supply chain flexibility is a proactive capability that demands that supply chain members adjust resources to respond to changing circumstances with little negative impact on time and costs (Sanchez and Perez, 2005). Supply chain research has examined collaboration and alliances and its resulting outcomes including flexibilities (Simatupang and Sridharan, 2002) which are attained through information and resources sharing competences. One of the types of flexibility, relevant to freight transport, discussed in the operations literature is delivery flexibility which is best described as the ability of the firm to modify the planned delivery schedule. The supply chain literature refers to this flexibility as access flexibility which is highly regarded and rewarded by customers as it makes goods and services extensively and easily reachable. This flexibility is enhanced by closely synchronising activities downstream in the supply chain.

4.3 Sharing competences

Organisations need to view themselves as members of supply chains that depend one on the other to be competitive and survive. Therefore, in this competitive environment, the success of businesses depends on their ability to manage and share resources such as information and costs and risk with their networks of associates (Lambert and Cooper, 2000). Sharing information concerns the degree to which proprietary information is communicated between supply chain partners. Some of the benefits encompass increased responsiveness, reduced lead-time, better forecasts, reduced bullwhip effect, lower supply chain costs and improved customer service. Organisations can share information at several levels including strategic, operational and tactical, depending on the type of relationships they are participating in (Huang et al., 2003; Mentzer et al., 2000). Strategic information is expected to be shared in more close, long-term orientated relationships – collaboration partnerships, while tactical and operational information are usually shared in cooperative arrangements and contractual relationships respectively (Hyland et al., 2005). Tactical information usually helps firms in foreseeing demand. Tactical information includes operating costs, inventory costs and aggregate demand. Sharing operational information encompasses communicating weekly production, delivery schedules and order replenishment. Furthermore, organisations enter into relationships such as collaboration and alliances to share coordination costs (Baum et al., 2000) and resources. The rationale for establishing relationships involves finding ways to make the relationship efficient, to the extent to which coordinating the costs offsets the benefits of the relationship. For instance, an organisation with a just-in-time production process can be negatively impacted by a road freight service provider that decides to cut costs by decreasing the frequency of deliveries. The organisation needs to work with the trucking company to avoid an increase in the landed costs by transferring the expertise it has developed in its journey towards just-in-time and find potential improvements such as cost coordination for the freight company.

The literature relating to capabilities, competences and supply chain relationships have been drawn together to examine the interplay between innovation and supply chain relationships. Preliminary findings from the literature suggest that a large number of businesses engaging in different types of supply chain relationships perceive sharing resources, responsiveness and flexibility as an important bundle of competences and
capabilities to support their innovation capacity. Thus, this research aims to provide insights into the following research propositions:

**Proposition 1**: sharing competences are related to different types of supply chain relationships

**Proposition 2**: sharing competences are related to a range of supply chain capabilities

**Proposition 3**: flexibility and responsiveness capabilities are related to continuous innovation capacity in supply chains.

### 4 Australian freight services industry

Globally the freight services industry is a critical component of all supply chains ensuring services and outsourcing capabilities for an efficient and effective transport system to deliver raw materials to end user consumers. The freight movement is a vital activity for both the economy and business, as facilitators of international trade and incremental economic efficiency through gains in trade and specialisation (Banister et al., 2000). In Australia as overseas, transport plays a significant role in the supply chains acting as the pivotal role in moving bulk commodities, manufactured goods, perishable and non-perishable consumption products around the country and internationally. Freight systems are concerned with the organisation and optimisation of the seamless flow of goods. The major aim of transportation systems is to move goods between two locations at minimum cost, whilst simultaneously meeting the demands of customers regarding delivery, performance and shipment information availability (Bowersox and Closs, 1996). Therefore, effective freight systems are essential to economic progress and growth but like many other members of supply chains this industry faces rising total costs with increasing pressure on oil prices and other commodities. For freight service providers as part of the broader logistics industry they represent 4.36% of any final selling price of goods to the ultimate consumer (Davis and Drumm, 2001) and 48% of logistics costs. Therefore in this industry, innovation, particularly incremental process innovation, through supply chain relationships is important. Businesses are more than ever looking for better alternatives to arm’s length and purely transactional relationships in supply chains and investigating integrating their internal activities and extending this integration to their external partners. It is evident that freight movements play a vital role in facilitating operationally efficient supply chains (Morash and Clinton, 1997). This, according to Wagner and Frankel (2000), has impacted on the way the freight industry has restructured itself. Carriers, in order to play a critical role, are expanding their scope of their operation. However, there has been little empirical research (Gattorna et al., 2004) to explain what competences and capabilities could be developed by the Australian freight participants to support their innovation capacity. Thus, the key objectives of this study are to gain further understanding of the relational capabilities and competences developed in supply chain relationships, and to investigate any links between relational capabilities, competences and supply chain innovation.
6 Methodology

To examine the opportunities for achieving breakthrough improvements in supply chains by way of innovation and supply chain relationships, the views and opinions of road freight industry participants on supply chain capabilities and competences had to be explored and analysed. Sekaran (2003) supports the exploratory approach where there is a lack of understanding of the problem which leads to an unstructured problem design. The research was carried out in two phases via a combination of a mail questionnaire and a case study of road freight service firms. The first phase of this research involved a mail survey targeting freight businesses involved in different types of relationships with the members of their supply chain such as warehouse service providers; distribution centres; and other road freight operators. The purpose of the questionnaire was primarily to gather data on issues relating to the competences and capabilities that characterise engaging in inter-firm relationships between Australian road freight businesses and their supply chain partners. Supply chain relationships such as arm’s length, cooperation, collaboration and alliances were the focus of this research. The analysis was based on 120 questionnaires derived mainly from heavy goods and chemical carriers and container and furniture carriers. The respondents ranged from operations managers, to managing directors and chief executive officers.

Respondents were asked to answer to a series of questions related to factors that promote sharing in supply chain relationships. Sharing has been conceptualised as reciprocity, or a mutual exchange between parties. This study identified two dimensions of sharing in the trucking industry: sharing information (three levels were differentiated — operational, tactical and strategic) (Huang et al., 2003; Mentzer et al., 2000), sharing resources (Baum et al., 2000; Das and Teng, 1998; Dyer et al., 1998). Statements adapted from previous studies were made in which respondents indicated the relative importance of each scale using a five-point Likert-like scale ranging from very important to not very important. For instance, road freight managers were asked if their organisations considered it important to share valuable strategic, tactical or operational information with their supply chain partners. Likewise, trucking firms’ managers rated the importance of sharing assets such as depots and warehouses that help supply chain partners to improve their service. Pearson correlation coefficients were computed to examine the three propositions examined by this study which are suggesting association between constructs. The Pearson correlation coefficient assessed the strength and direction of the relationship between scores for the variables that operationalise competences, capabilities and relationships. The second phase of this study consisted of a single case study. The operational effectiveness of business’ relationships is examined and findings of the questionnaire are clarified through the case study. Managers of the case organisations were interviewed to clarify issues emerging from the survey data and to better understand the capabilities developed engaging in relationships. Respondents were asked to respond to a series of questions related to factors that promote innovation capacity, in supply chain relationships and how competences and capabilities support this innovation capacity.
7 Findings

7.1 Survey analysis

Correlation analysis was conducted to identify relationships between sharing competences, supply chain capabilities and supply chain relationships. The results presented in Table 1 suggests that relationships at arm’s length are significantly correlated with competences such as sharing vehicle fleet (r = 0.20, p < 0.05) and warehouse space (r = 0.31, p < 0.01). Interestingly, these two sharing assets competences were not highly correlated with more close and long term orientated relationships such as collaboration and alliances as the theory suggests.

Table 1 Relationships between sharing competences and supply chain relationships

<table>
<thead>
<tr>
<th>Sharing Competences</th>
<th>Type of relationships</th>
<th>ArmsLength</th>
<th>Cooperative R</th>
<th>Collaborative R</th>
<th>Alliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic information</td>
<td>Pearson Correlation</td>
<td>0.01</td>
<td>0.04</td>
<td>0.17</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.90</td>
<td>0.69</td>
<td>0.06</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Tactical information</td>
<td>Pearson Correlation</td>
<td>0.12</td>
<td>0.07</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.05</td>
<td>0.03</td>
<td>0.94</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Operational information</td>
<td>Pearson Correlation</td>
<td>0.15</td>
<td>0.27</td>
<td>-0.05</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.11</td>
<td>0.04</td>
<td>0.59</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Fleet capacity</td>
<td>Pearson Correlation</td>
<td>0.20</td>
<td>0.20</td>
<td>0.05</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.03</td>
<td>0.03</td>
<td>0.55</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td>Warehouse capacity</td>
<td>Pearson Correlation</td>
<td>0.31</td>
<td>0.00</td>
<td>0.09</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.00</td>
<td>0.99</td>
<td>0.31</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
<td>120.00</td>
</tr>
</tbody>
</table>

Notes: 
- Correlation is significant at the 0.01 level (2-tailed).
- Correlation is significant at the 0.05 level (2-tailed).
The significant positive relationships indicate that the more organisations develop sharing assets competences in the freight industry the more they are likely to engage in loose relationships. Table 1 also shows some significant positive relationships between sharing information competences and the different type of inter-firm relationships. For instance, the more the freight companies develop strategic information sharing competences the more they are likely to do it by engaging close working arrangements such as alliances. \( r = 0.21, p < 0.05 \).

A general inspection of Table 2 indicates that there is a highly significant positive correlation between competences such as sharing information and sharing assets with supply chains’ responsiveness capability. Similarly, Table 2 shows positive Pearson coefficients associating sharing information competences and warehouse capacity and supply chains’ flexibility capability so the more these competences are developed by channel participants such as the road freight firms, the greater the flexibility in the supply chain to deliver their services.

### Table 2  Interrelatedness between sharing competences and supply chain capabilities

<table>
<thead>
<tr>
<th>Sharing competences</th>
<th>Flexibility</th>
<th>Responsiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic information</strong></td>
<td>0.25</td>
<td>0.27</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td><strong>Tactical information</strong></td>
<td>0.18</td>
<td>0.39</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.04</td>
<td>0.00</td>
</tr>
<tr>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td><strong>Operational information</strong></td>
<td>0.18</td>
<td>0.44</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td><strong>Fleet capacity</strong></td>
<td>0.06</td>
<td>0.23</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.52</td>
<td>0.01</td>
</tr>
<tr>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
</tr>
<tr>
<td><strong>Warehouse capacity</strong></td>
<td>0.26</td>
<td>0.30</td>
</tr>
<tr>
<td>Pearson correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>N</td>
<td>120.00</td>
<td>120.00</td>
</tr>
</tbody>
</table>

Notes: ▲ Correlation is significant at the 0.01 level (2-tailed). ▼ Correlation is significant at the 0.05 level (2-tailed).

### 4.1 Case study analysis

The case study was designed to examine proposition three of this study. In particular the case study focuses on how the combination of responsiveness and flexibility supports operational improvement and innovation in supply chain.
4.2 Case firms

Firm A is a large leading provider of business to business integrated freight transport services, which moves over two million tonnes annually, employing more than 800 people and operating a network of more than 20 depots across Australia. Firm B is a regional family owned and operated freight transport firm with over ten years in the trucking industry, delivering services across regional Queensland. Firm C is an Australian liquor retailer that stocks a wide range of beer, pre-mixed beverages and wines and operates over 200 retail liquor outlets across Australia. Firm A and Firm C maintain a cooperative relationship while the relationship between Firm A and B is basically contractual.

4.2.1 Sharing

Sharing information competences were perceived by the participants as the regular exchange of information such as delivery schedules, cargo loading/unloading hours and delivery confirmation and the sharing of resources. The participants indicated that all firms engaged in weekly communication and monthly meetings to exchange information. Firm B and Firm A met on a monthly basis to evaluate the report of key performance indicators. In the case of the working arrangement between Firm A and Firm C, the aims of the monthly meetings were to discuss the achievement of performance indicators, solve the problems faced during the month, and follow up the logistics initiatives they were undertaking. When using technology for information sharing between Firm A and Firm B, Firm A’s regional operations manager pointed out that:

“The web based systems had enabled Firm A to schedule distribution activities based on the deliveries confirmation Firm B sent, issue invoices and track items. The same communication channel is used by Firm A to send Firm B the weekly program of consolidated and detailed deliveries and by Firm B to send Firm A reports on returned products.”

Important resources sharing competences were developed between Firm A and Firm B and by Firm A and Firm C. Firm B’s managing director commented that Firm A gives them the opportunity to minimise their ongoing operational costs by allowing them to buy some consumables such as petrol, tyres and engine oils at the price Firm A purchases them. This price is considerably lower than the price Firm B would be charged as Firm A has greater bargaining power, due to its size and national purchasing power. Likewise, the interviewees from Firm A and Firm B asserted that other resources were shared such as pallets, and shipping containers. Firm C also reported that warehouse and distribution centre space had been shared with Firm A to enable the picking activities, pallet and container preparation. Furthermore, it was found that in order to facilitate the loading and unloading of trucks within the time allotted, Firm C and Firm B shared the cost of a leased forklift and its driver.

4.2.2 Flexibility

Flexibility was perceived as the ability to add capacity to be able to perform while maintaining productivity and safety at the highest standards. Firm B’s managing director and Firm A’s regional operations manager highlighted that they have made the service flexible to the extent that they do the picking and packing for Firm C and used time slots
for their deliveries. Firm C’s regional distribution manager had acknowledged the flexible service offered by Firms A and B by stating that “Alternatively, if there was a time slot at the delivery centre, and we all know we won’t make it, then we can call the DC and the involved parties and rebook it for when we can all be there”. Flexibility was also shown in the cases when increases or decreases in the frequency of deliveries were needed because of the seasonal variability. Firm’s A operations manager remarked “There are some weeks when we operate three to four tailgate loaders and others five or six. If it is end of the year, we put out 10 tailgate loaders going to the DC and liquor outlets with the help of some semi-trailers.”

4.2.3 Responsiveness

Responsiveness was also a performance outcome of the relationships. A quick response to schedule changes was regarded by Firm C’s regional distribution manager as an important component of the relationship, particularly during the festive seasons when demand for liquor escalates. Firm B was rewarded on how promptly they managed to distribute urgent deliveries. The expectation on urgent deliveries ranged from two to three hours. However, there have been problems in meeting this expectation, as there was not a common understanding on what represented a real urgency, “where there is a genuine requirement for an urgent delivery we will do our utmost to accommodate their request,” Firm B’s managing director stated. Most of the special and urgent orders were fulfilled within six hours. Although the time slots at the distribution centre showed a great level of flexibility, this was not the case at liquor stores because the delivery windows are more constrained. Shops of Firm C usually open at nine in the morning and receive deliveries until three in the afternoon, as after this time the drive through areas and unloading bays are very busy with the arrival of customers. Firm C’s regional distribution manager commented that although a kind of reward system was set for urgent deliveries, penalties were not applied for not fulfilling urgent delivery orders and more importantly premium rates were not charged by Firm A to deliver outside the schedules. Firm C used to be charged higher rates by a former freight service provider to accommodate urgent deliveries.

5 Discussion

This research provides insights into the importance of developing competences through inter-firm relationships and how these competences support capabilities that are vital to improve supply chain operational effectiveness and incremental process innovation.

Therefore, in addressing proposition one which suggests that sharing competences are related to different inter-firm relationships, it is important to indicate that two types of inter-organisational relationships, that is, arm’s length and cooperation, were essential to develop sharing information and assets competences. These findings are in contrast to much of the literature that is based on exemplar industries, such as the manufacturing sector, where information sharing (Huang et al., 2003; Mentzer et al., 2000) and resources sharing competences (Baum et al., 2000; Dyer and Singh, 1998; Gulati and Singh, 1998) are the foundation of collaborative relationships and strategic alliances. This is not surprising as the price and commoditised nature of the industry as well as the characteristics of the vast geography of Australia prompts its participants to enter into
agreements that enable them to share assets so they can have a cost-effective presence. Developing sharing competences in less long-term oriented inter-firm relationships ensure provision of the service in remote areas, for the large to mid-size freight transport operators, and in capital cities for the small regional operators. As this study’s results indicate that road freight firms were keen to develop sharing competences by exchanging operational information through cooperative relationships. Freight companies viewed sharing information related to delivery schedules as critical because of its impact on operating costs. Delivery schedule issues are very important as trucks can be stopped and contractual arrangements adversely affected because of driver fatigue as significant assets are at risk.

The research, in addressing proposition two which states ‘sharing competences are related to supply chain capabilities’, found that the interrelatedness between sharing competences and responsive capabilities is not only strong but also statistically significant. This supports previous research findings that high levels of information sharing and resources are enablers of agility (Power et al., 2001) and speed to market. This suggests that participants in the supply chain such as trucking firms are likely to quickly reallocate the fleet to routes that needed them, reschedule distribution centre activities and customers’ activities to respond promptly to programmed, as well as urgent non-scheduled deliveries in a cost efficient manner. Similarly, the results demonstrated that sharing competences are strongly associated with flexibility. This extends previous work, e.g., Sanchez and Perez (2005) conducted in the manufacturing industry which found that flexibility capabilities are enhanced in supply chains with higher environmental uncertainty and technological complexity but lower interdependency among the participant in the supply chain. The Australian road freight transport industry is dominated by small operators who are prompted to depend on large road freight service providers as they assist them in many ways such as accessing low-priced consumables, training and web-enabled communication that represent significant operational cost reductions. Sub-contracted small operators enhance the flexibility and feasibility of services provided by large operators as the latter cannot always find it operationally feasible to dedicate a fleet to cover every remote area.

Furthermore, in addressing proposition three which states ‘flexibility and responsiveness capabilities are related to supply chain innovation capacity’, it was found that supply chain participants realised the criticality of engaging in inter-firm relationships that enable the development of competences to build innovation capacity. Organisations in this study have identified the need to maintain their competitive positions, by engaging in exploratory strategies such as cooperating with firms that possess complementary assets and were prepared to exchange information. This type of business arrangements not only enhanced the operational effectiveness of the firms via flexibility and responsiveness improvements, but also addresses the weaknesses in each firm’s innovation capacity. Supply chain partners, involved in the case study, demonstrated to be incrementally innovative by developing a dedicated web based solution which enabled sharing tactical and operational, to increase flexibility and quality of the service. Furthermore, the strategic nature of the relationships in which the freight service provider enabled them to exploit their flexibility and responsiveness as they were prepared to fit each other regardless of their size.
6 Conclusions

The results of this study were more intriguing than they first appeared. Does achieving breakthrough improvements in supply chains require innovation and supply chain relationships that support supply chain capabilities to maximise value adding opportunities? The experience of participants in the freight industry is an example of how better performance can be achieved over time with the support of bundled capabilities developed in specific types of supply chain relationships. The critical capabilities needed for significant changes were responsiveness and flexibility. Considering the type of relationship in which supply chain participants were engaged, it was particularly important that the sharing competences used were closely related to capabilities that enhance operational performance. Road freight businesses need to learn how to select and manage inter-firm relationships that benefit them most from competences that either improve their current capabilities or assist them to explore strategies that ensure they and their supply chain are attaining the performance objectives while incrementally innovating. The analysis of the case study suggests that trucking firms can think about the significant gains in improvement afforded by long-term relationships with supply chain partners but find it difficult to work cooperatively with members of their own industry, being more easily influenced by more traditional contractual relationships which would ensure their status as independent firms. Large firms need to transfer the competences, developed through cooperative interaction with supply chain partners, to their contractual arrangements with small to mid-size trucking organisations, as the latter are keys to ensuring delivery flexibility at low operational costs which the former needs. Likewise, small to mid-size trucking businesses need to better understand how to work closely with their industry participants, as not all relationships should be adversarial, to ensure they develop or participate in innovative processes that enable them to exploit their flexibility and responsiveness to changing circumstances in the market. Further research is needed to explore and confirm the direct or indirect influence of some other types of capabilities in supply chain relationships.

References


