Supply Chain Management Competence and Performance: An Entrepreneurial Approach in Iranian IT SMEs

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Abstract
Nowadays, SMEs concentrate on Supply Chain Management (SCM) in order to gain competitiveness. The philosophy behind this is to integrate value creating activities across the boundaries of any firm. This integrity helps managers in achieving the competitive edge which they are looking for. In this paper, the concepts of entrepreneurship and SCM are put together in order to measure firm performance. Then, in-depth interviews with managers and executives of the SMEs and also with experts in IT industries were conducted. Moreover, the researchers undertook an exploratory study, and conducted a survey in Iranian SMEs. The results show that to succeed in this competitive environment, SMEs should develop unique competences that are inimitable to maximize their utility in the supply chain, and accordingly to improve their performance. Finally, limitations of the research are discussed, and the authors then conclude the paper with a discussion of some directions for future research.

Keywords: SME, SCM, Entrepreneurship, Competence, Performance

Introduction
In this increasingly volatile competitive environment, Supply Chain Management (SCM) has become an inevitable strategic competence to gain competitive advantage for almost any SME. Although large companies are thinking about getting more profitable, SMEs are struggling to use their competencies in the most optimized manner (Williams, 2006). SCM concentrates on integrating value creating activities across organizational activities. The success of any form of SCM depends upon many criteria, such as the level of integrity, performance, boundary spanning strategies etc (Morash and Clinton, 1998).

Prior research has shown that firms that participate in SCM activities reveal different levels of performance (Hsu et al. 2009). Indeed, the level of performance is a function of many variables. However, the research in this domain is limited; many research projects concentrate the role of tangible resources that a firm could mobilize to gain success in SCM (Hafeez et al. 2010), and a limited number of studies consider intangible resources (Williams, 2006). Moreover, the focus of most of the existing theories is primarily on large companies, and the literature has less to do with the theories at the SME level (Bayraktar et al. 2010). In fact, SMEs has less accessibility to many resources,
and do not have enough resources to successfully engage in a SCM (Ren et al. 2010). Instead, they rely on their advantages and competences to overcome their constraints (Bayraktar et al. 2010). This is why we need to make a distinction between SMEs and large companies.

In this study, we focus on the SMEs in IT industries of Iran, in order to measure their performance, based on the application of SCM and their approach toward entrepreneurship. In other words, we consider the limitations of SMEs and their competences which were gained through their entrepreneurial approach, to measure their performance. In addition, as mentioned earlier, SMEs mostly rely on their intangible resources; IT companies are also more prone to gain such competences and resources. Therefore, the present study focuses on the SMEs in IT industries of Iran.

In sum, we first introduce a framework based on the literature review and our qualitative study. Then, we test the proposed model in a quantitative phase. Finally, we will discuss the results and the paper concludes with some directions for future research, and the limitations of our study. It goes without saying that the main contribution of the present study is to present and test a model for measuring the performance of SMEs based on their level of engagement in SCM. As mentioned earlier, the entrepreneurial approach of the companies is taken into account simultaneously.

**Literature review**

Large firms and SMEs are different in nature. The difference is due to many characteristics and there is a gapping insight in this field. In fact, tangible and intangible resources that belong to SMEs are quite far from each other. For instance, SMEs are more prone to fail if they just rely on their tangible resources, while large firms have the competitive advantage to lead the market. In this respect, SMEs should take advantage of their intangible resources to become able to compete. Such resources include competences internal to the manufacturing or servicing firms, the expertise in the company, etc. Indeed, SMEs and large firms have different stories in managing their supply chains, however, we have to keep in mind that although the stories differ, the competitive advantage still remains as an integral part of their survival strategies (Bayraktar et al. 2010).

In the last decade, internationalization and globalization led to fall of trade barriers, global supply chain management and competencies advanced with a galloping rate. At the same time, global markets faced two facts: uncertainty and complexity. These facts affected the performance of SMEs around the world through creating greater supply chain risk such as the risks associated with perceptions, cultural differences, organizational learning, e-business, information security, supplier opportunism, and dependence (Bunn and Liu, 1996).

Since entrepreneurial firms are more willing to bear some level of uncertainty and take some risk, and SMEs have the ability to operate in complex supply chains, this becomes a prominent advantage of these companies against large ones (Handfield et al. 2009; Cousins et al. 2006). Then, a unique entrepreneurial approach toward SCM is needed which could be designed based on competencies. Aligning entrepreneurial approaches and SCM practices is critical in achieving improving corporate outcomes. Moreover, entrepreneurial activities might also complement SCM practices and make competency a reality for a typical SME (Giunipero et al. 2005).
In this paper, we define entrepreneurship as an opportunity based process, which starts from recognizing an opportunity and ends in exploiting it. This process leads to some kind of value creation. Opportunistic activities include value creation and risk taking, which means it is firmly associated with innovation (Sexton and Bowman-Upton, 1991). However, entrepreneurship theories and practices are mostly applicable in nascent and newly established firms; established firms also could take advantage of its benefits (Pinchott and Pellman, 1999).

In the same way, the well-defined concept of corporate entrepreneurship refers to the development of new business ideas and opportunities within corporations (Miller, 1983). This broadly investigated definition encompasses at least four schools of thoughts, which are as follows:

- "corporate venturing" which pertains to the organizational provisions that new ventures require and the processes associated with aligning them with the firm’s existing activities (Chesbrough, 2003),
- "intrapreneurship" which investigates the often revolutionary tactics these corporate entrepreneurs adopt, as well as the actions managers take to make their lives. It also considers the personalities and styles of individuals who make good corporate entrepreneurs (Birkinshaw, 1997),
- "entrepreneurial transformation" which presumes that firms can adapt to a volatile environment and suggests that such adaptation would best be achieved through manipulating the firm’s culture and organization systems in a more entrepreneurial manner (Ghoshal and Bartlett, 1997), and
- "bringing the market inside" which concentrates on structural changes in order to encourage entrepreneurial behavior, using the image of the marketplace to propose how firms ought to manage their resource allocations. It proposes the better use of these market techniques and approaches as spin-offs and corporate venture capital operations (Birkinshaw, 1997).

Entrepreneurial competences provide substantial advantages for firms that facilitate SCM activities and provide a fertile ground for enjoying a continuous rivalry instead of a onetime leap. As resources, they lead to superior performance, predominantly in highly competitive or challenging environments in which there are a large number of SMEs.

In this sense, the most valuable competences are those that are rare, valuable and uniquesince they are key determinants of the performance of any SME (Teece et al. 1997). The Resource based view (RBV) identifies inimitability and immobility as the other characteristics that support competitiveness, and intangible resources are central for gaining competitive edge in both national and international settings (Barney, 1991). As a bundle of business culture and processes, the competency of SMEs with an entrepreneurial approach toward SCM should provide a source of competitive edge because it is not easy for competitors to imitate. It is embedded in organizational processes and as a resultis complicated for outsiders to observe (Barney, 1995).

Additionally, this competence is less likely to be perfectly mobile across firms. It develops over time within the firm and is not straightforwardly transferred. According to RBV, one might expect entrepreneurial SCM competence to offer the firm a key resource for reaching competitive edge. For manufacturing SMEs with resource constrains, the entrepreneurial competence in SCM is particularly important because it allows them to compete successful against large ones.
Theoretical Framework

As discussed earlier, entrepreneurial competency in SCM is a critical determinant of the firm's performance. In this sense, at the first step we would like to elaborate the elements of this concept. In order to do so, we utilized an exploratory research approach in which we reviewed the relevant literature and interviewed several SME executives, experts and academics in this field. Moreover, we tried to consider the complexities of SCM. Based on our findings, the following elements stand among the most important determinants of entrepreneurial competencies in SCM of investigated SMEs (Figure 1). It should be noted that the literature review supports that these attributes are vital to the performance of SMEs.

- Innovativeness

Based on the interviews, most of the interviewees mentioned that the existence of an aggressive innovative approach is inevitable. According to the literature, SMEs with a strong innovative orientation tend to possess distinctive competences (Quintana-Garcia and Benavides-Velasco, 2005). These SMEs are characterized by a managerial vision and innovative culture that looks for achieving the firm’s goals through a sound SCM (Gonzalez-Padron, 2008). The interviewees revealed that an innovation orientation implies active exploration of new businesses through the supply chain. Moreover, an innovation orientation is supposed to give rise to processes, practices, and decision-making activities associated with supply chain management and as a result possibly will contribute to firm's performance (Shin, 2000). In particular, Kaminski et al. (2008) show that collaboration with suppliers can contribute to innovativeness of SMEs and improve their performance.

- Risk taking

Another element is risk taking. The significant role of risk taking characteristics appears in almost all parts of the literature associated with SMEs. Risk taking activities stimulate organizational performance for SMEs with entrepreneurial approach. Firms in compound supplychains require seamless coordinated flows of goods, services, information, and cash; or else, they face considerable supply risk (Harland, 2004). Moreover, SMEs with risk taking entrepreneurial characteristics are likely to seek strategies to maximize their profit in which they leverage SCM applications. Indeed, taking more risk would lead in more outcomes. Therefore, SMEs are more prone to take advantage of their flexibility in order to gain more profit. In sum, modern business incorporates risk taking (Smallman, 1996), however, there is a perspective that traditional perceptions of risk management view risk taking as the root cause of accidents (Adams, 1995). Here, risk taking is considered as a critical element in our model.

- Pro-activeness

According to our investigation, most SMEs in our interviews were highly proactive with respect to their industry, product category, and how they compete in the supply chain. In this research pro-activeness orientation is define as the firms’ propensity to originate proactive innovations that challenge competitors (Miller, 1983). In other words, pro-activeness entails a firm’s capability to amalgamate supply chain information and form its environment by introducing new products, technologies, and administrative techniques (Miller and Friesen, 1978). A typical proactive firm seizes and exploits new opportunities (Lumpkin and Dess, 1996). When boundary spanners offer transparency to decision makers, which influence entrepreneurial and learning actions within the supply chain,
proactive behavior occurs (Ireland and Webb, 2007). Consequently, a pro-activeness orientation drives entrepreneurial competency in SCM. In fact, proactiveness helps SME managers plan their entry and to allocate managerial and financial resources (Patel and D’Souza, 2009).

- **Relational capital**

Based on our interviews, interviewees frequently highlighted the significance of being socially connected to customers and suppliers, which the literature refers to as relational capital skill (Dwyer, 1987). In this sense, networking activity is a strategy for maximizing their self-interests through mutual relationships. The benefit of information flows in such activities has been widely emphasized in the literature (Burt, 1992). In our context, a relational capital skill symbolizes an ability to connect with supply chain players who control necessary inputs, particularly those whom the entrepreneurs know well enough to foresee their behavior (Sarkar, 2001). Through formal and informal communication channels, relational capital skill aids information sharing among supply chain players (Lee, 2010). Therefore, in this research we consider this element as a determinant of entrepreneurial competency in SCM. In sum, SMEs should learn how to use human and relational capital to develop their own capacities in order to perform more efficiently (Mertins et al, 2006).

- **Coordination capacity**

The literature includes examinations of information sharing as an enabler of coordination capability within the supply chain (Carr and Smeltzer, 2002). This competence refers to the capacity to incorporate key business processes amongst supply chain players to provide the proper products, services, and information (Kim et al. 2006). Moreover, a relationship might arise between the use of coordination capability and the richness of shared information. Coordination capability among supply chain members has a direct positive effect on both internal and external collaborations, and information sharing is considered as a key element of collaboration. Coordination capability relates positively to systems integration, or the ability to use information sharing for collaborative purposes (Walton and Gupta, 1999). In fact, coordination capability simplifies processes to augment cost efficiency, increases the productivity of employees, etc. Hence, it goes without saying that coordination capability is a factor that supports entrepreneurial competence in SCM.

![Figure 1. Elements of entrepreneurial competency in SCM](image-url)
The theoretical framework of the present study is illustrated in Figure 2. As mentioned earlier, in this research we believe that entrepreneurial competency in SCM affects SCM strategies and therefore, changes firm performance. Based on the following figure, we hypothesized that in SMEs in IT industries of Iran:

\( H1: \) Entrepreneurial competency in SCM positively affects SCM strategies.

\( H2: \) SCM strategies positively affect firm performance.

\( H3: \) Entrepreneurial competency in SCM positively affects firm performance.

![Figure 2. Theoretical framework](image)

Methods

The proposed theoretical framework was tested in Iranian SMEs in IT Industries. In order to do so, we followed the random sampling approach and distributed the questionnaires both online and offline. Before taking this step, we interviewed some experts. Then, nine in-depth interviews with managers and executives of the SMEs and also with experts in IT industries were conducted. Moreover, the researchers undertook an exploratory study, and conducted a survey in the population. Conducting these interviews as a prelude to our survey-based research provides grounded and qualitative evidence about the validity of the variables. According to the insights and comments in our interviews a questionnaire with five point Likert scale were used. It should be noted that the data gathering phase took place in two respective years, i.e. 2011 and 2012. A number of 23 SMEs were chosen based on some criteria, which were: (i) to have at least three years of experience in IT sector, and (ii) to have less than 100 personnel\(^9\). In sum, 223 of the questionnaires were completed and returned. The respondents were selected randomly through a random sampling approach.

In analyzing the gathered data, we used multiple indicators to measure each latent construct. In order to evaluate the quality of the measures, we measured the properties of the survey instrument with confirmatory factor analysis (CFA) using LISREL. Also, Cronbach's alpha (which is a measure of reliability based on internal consistency) is also calculated. However, for structural equation modeling (SEM), composite reliability (CR) and average variance extracted (AVE) are viable alternatives; then these constructs are also calculated.

Discussion

Table 1 shows the measurement scales of the test results. The Cronbach’s alpha statistics for the six constructs range from 0.795 and 0.912, for which the scale should be above 0.7. Moreover, CR values are calculated which range from 0.758 to 0.912 and all are above the recommended level of 0.60. At the same time, AVE values range from 0.523 to 0.745, which should be above 0.50. AVE shows the convergent validity, which is excellent based on the data. Considering these statistics suggests that all constructs are reliable.

\(^9\)Based on the definition of SMEs in Central Bank of Iran, companies with less than 100 personnel are considered as SME.
Table 1. Measurement scales

<table>
<thead>
<tr>
<th></th>
<th>Cronbach's alpha</th>
<th>CR</th>
<th>AVE</th>
<th>χ2 /df</th>
<th>RMSEA</th>
<th>NNFI</th>
<th>AGFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovativeness</td>
<td>0.823</td>
<td>0.901</td>
<td>0.621</td>
<td>1.41</td>
<td>0.055</td>
<td>0.98</td>
<td>0.95</td>
</tr>
<tr>
<td>Risk taking</td>
<td>0.811</td>
<td>0.878</td>
<td>0.745</td>
<td>1.88</td>
<td>0.072</td>
<td>0.99</td>
<td>0.94</td>
</tr>
<tr>
<td>Proactiveness</td>
<td>0.795</td>
<td>0.815</td>
<td>0.665</td>
<td>0.85</td>
<td>0.001</td>
<td>0.99</td>
<td>0.98</td>
</tr>
<tr>
<td>Relational capital</td>
<td>0.875</td>
<td>0.902</td>
<td>0.523</td>
<td>1.32</td>
<td>0.053</td>
<td>0.99</td>
<td>0.94</td>
</tr>
<tr>
<td>Coordination capacity</td>
<td>0.758</td>
<td>0.825</td>
<td>0.598</td>
<td>1.15</td>
<td>0.031</td>
<td>1.00</td>
<td>0.94</td>
</tr>
<tr>
<td>SCM strategies</td>
<td>0.901</td>
<td>0.925</td>
<td>0.668</td>
<td>1.34</td>
<td>0.046</td>
<td>0.99</td>
<td>0.93</td>
</tr>
<tr>
<td>Firm performance</td>
<td>0.912</td>
<td>0.932</td>
<td>0.725</td>
<td>2.12</td>
<td>0.085</td>
<td>0.99</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Table 2 shows the correlation matrix for the constructs. Based on the data, all the coefficients are significant and less than 0.5; therefore discriminant validity can be assumed. Putting these correlations and the other measures together suggests an adequate level of construct validity.

Table 2. Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>Innovativeness</th>
<th>Innovativeness</th>
<th>Proactiveness</th>
<th>Relational capital</th>
<th>Coordination capability</th>
<th>SCM strategies</th>
<th>Firm performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovativeness</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk taking</td>
<td>0.395*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proactiveness</td>
<td>0.487*</td>
<td>0.423*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relational capital</td>
<td>0.375*</td>
<td>0.575*</td>
<td>0.508*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination capacity</td>
<td>0.275*</td>
<td>0.302*</td>
<td>0.315*</td>
<td>0.408*</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCM strategies</td>
<td>0.432*</td>
<td>0.384*</td>
<td>0.344*</td>
<td>0.415*</td>
<td>0.316*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Firm performance</td>
<td>0.512*</td>
<td>0.324*</td>
<td>0.301*</td>
<td>0.257*</td>
<td>0.201*</td>
<td>0.447*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*All correlations are significant at α= 5% (two-tailed, n = 223)

As it is shown in Figure 3, the direct and indirect impacts of entrepreneurial competency in SCM on firm performance are tested. In the first part, a direct impact was tested, and in the next part, its effect through SCM strategies is investigated. Figure 3 illustrates the LISREL results, and indices of the model's fitness. Based on the factor loadings, all the elements of entrepreneurial competency in SCM were significant. Results show that entrepreneurial competency in SCM affects both SCM strategies (β= 0.52, t= 8.11), and firm performance (β= 0.41, t= 2.75). These findings support H1 and H3. Moreover, based on the results, SCM strategies positively affect firm performance (β= 0.72, t= 6.12), which supports H2.
Figure 3. Structural equation model (SEM)

*Loading/ t-value  \( \chi_2 / df= 1.45; \) RMSEA= 0.51; NNFI= 0.95; CFI= 0.98; IFI= 0.98

The Root Mean Square Error of Approximation (RMSEA) should be less than .080, which is 0.51 in the model and provides a fit of the data taking into consideration the complexity of the model. For models with good fit, chi-square normalized by degrees of freedom (\( \chi_2/df \)) should be less than three, which is 1.45 in our model. Moreover, CFI, NNFI, and IFI should all exceed 0.9, which are more than 0.9 in our model.

Conclusion

Based on the findings of our research, we could conclude that in the investigated SMEs in the field of IT, innovativeness, risk taking, proactiveness, relational capital, coordination capacity affect the entrepreneurial competency of these SMEs. Moreover, these competencies could affect SCM strategies which SMEs follow to become a successful business. However, the strategies of these companies might be established based on several elements, in this study we focus on those strategies that SMEs apply for performing better in their supply chains. In sum, the significant relationships between entrepreneurial competency in SCM and SCM strategies, and then between SCM strategies and performance show that entrepreneurial competency in SCM has indirect effects on firm performance. During the study we faced a series of limitations, among which the followings were the most important issues: lack of enough access to the experts, lack of a verified database for gathering the required information, and low response rate. Authors suggest future authors to elaborate the SCM strategies, and performance measures. Also, it might be fruitful to test the model in other context, considering contextual variables.
References


