

NETWORK OPERATION AND INTERNATIONAL PERFORMANCE OF HIGH TECH SMES

ABSTRACT

This study identifies and examines the relationship between network operation and international performance of High Tech SMEs (HTSME) in the telecommunications industry in Ireland. The network operation construct for this paper comprises three dimensions: network initiation, network coordination and network learning. Empirical research was carried out using a mail survey in which 154 firms completed and returned the questionnaire. Three hypotheses were analysed using structural equations modelling using LISREL. The study's main finding suggests a positive relationship between a firm's network coordination and international performance. However, no support was found for the relationship between network initiation, network learning and international performance. This study is cross sectional, confined to a single industry and focused on the role of networks in the HTSME context only. Results from this study provide policy makers and practitioners with additional insights into specific network operation based factors that are associated with international performance for HTSMEs. This study offers a multiple dimensionality to the network resource concept by measuring the direct effect of the network operation capabilities in terms of network coordination, network learning and network initiation on international performance of HTSMEs in the telecommunications industry. These findings advance network research by highlighting the trade-offs that networks impose on firms that seek to manage and leverage their network operating resources.

Keywords: Network Operation, High Tech SMEs, International Performance

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INTRODUCTION

Research on business networks to date has focused on antecedents of network formation and relationships or relational content among firms rather than outcomes or consequences of such relationships and networks (Werner 2002; Kapasuwan 2006). Several researchers have thus suggested that there is an increasing need for business research to shift a focus from traditional dyadic relationships to a larger business context of network relationships in order to understand firms' behaviour and performance (Achrol 1997; Rowley 1997; Gulati 1998). Research specifically in strategic management has addressed the issues of why firms form networks and alliances (Gulati 1999; Gulati & Gargiulo 1999; Ahuja 2000), and has explored relational concepts such as mutual dependence, trust and commitment (Ganesan 1994; Morgan & Hunt 1994; Dyer & Chu 2000; Griffith et al. 2000). Yet, there is still an urgent need for academic research to systematically investigate the effect of networks on firm performance (Gulati et al. 2000).

Although the arguments in favour of networking appear compelling and most of the existing literature is premised on the belief that networking is beneficial (Havnes & Senneseth 2001), there has been little empirical evidence to date of an association between firm performance and the owner's capabilities in terms of network operation. Zhao and Aram (1995) argued that there is a cost to networking (in terms of the owner's time and possibly also financial) and, therefore, entrepreneurs need to be strategic in their use of networks by balancing the potential benefits of networking against the costs.

On the relationship between internationalisation and performance, Bausch and Krist (2007) argue that this is context dependent and as a consequence investigators should not be searching for internationalisation-performance generalisations or principles, but rather focusing on the identification of moderators or drivers that produce differential internationalisation-performance effects. Internationalising SMEs overcome their resource constraints through network relationships. However, networking activity has not been conceptualised and measured as a competitive capability that contributes to SME internationalisation (Loxton & Weerawardena 2006). Still, to date, detailed studies of what actually constitutes a networking capability are almost non-existent (Kale et al. 2002; Walter et al. 2006).

To address these questions, we conceptualize and measure the concept of network management capability as reflected by a set of key network operating routines. Recent work on dynamic capabilities suggests that inter-organisational management can be regarded as a distinct dynamic capability (Eisenhardt and Martin, 2000; Zollo and Winter, 2002), alluding to a set of organizational routines that are the building blocks of dynamic capabilities (Zahra et al., 2006; Helfat et al., 2007; Teece, 2007). In conceptualizing network operating capability, we build on this research that addresses the routines that underlie dynamic capabilities, and we apply these ideas to the context of network operations. This approach enables us to develop a theory-based, multidimensional model of our focal construct network operating capability.

Network operation refers to the capability to effectively manage a portfolio of relationships or a network as a whole. Three dimensions of network operation are proposed here and

include network initiation, network coordination and network learning. Initiation deals with the specific investments by a firm to begin network relations and involves network sensing. Network sensing is defined as the degree to which a firm actively seeks information on new alliance partnership opportunities (Bonner et al., 2005), which includes organised and structured information about a firm's upstream and downstream partners (Loxton and Weerawardena, 2006). Coordination capabilities involve synchronizing and integrating the activities of the partners within the network. Partner integration refers to the degree to which the firm actively engages in coordinating activities and strategies across alliance partners. Conflict management is also included as the management and coordination of such conflict in inter-firm collaborations is important. Network learning can speed capability development by acquiring and exploiting knowledge developed by others. Network learning therefore, refers to the degree to which the organization engages in alliance learning activities, including the dissemination of lessons within the firm (Sinkula et al., 1997) and thus enables a firm to use this information to select valuable partners.

The rest of the paper is organised as follows: First, a discussion on internationalization and the HTSME is presented. Second, the derivation of the hypotheses is provided. Third, the research method and the empirical results are outlined. The final section provides a discussion of these findings along with limitations and future research directions.

INTERNATIONALIZATION AND THE HIGH TECH SME

Although there is no single agreed definition of HTSMEs, these are generally characterized by small and medium-sized firms with advanced knowledge and capabilities in technology, an educated workforce, and the ability to adapt quickly to fast changing environments (Crick and Spence, 2005). These characteristics facilitate the internationalization of HTSMEs which have been known to act quickly when windows of opportunity in foreign markets present themselves (Lindell and Karagozolu, 1997; Baldwin and Gellatly, 1998). SMEs within the high tech sector frequently operate within a narrowly defined market niche. Firms operating in, e.g. wireless data security cannot afford to target only a single (home) market. If the company is to take full advantage of the market potential this means simultaneous penetration to all markets (Saarenketo et al., 2004).

The internationalization process of small and specialized high technology firms is often different from that of more mature industries (Saarenketo et al., 2004). In dynamic high tech markets, one of the factors influencing high performance appears to be speed of internationalization. Recent reports (Fan and Phan, 2007) show that these firms are growing and expanding their operations to other countries at a relatively faster pace than others. Consequently, HTSMEs may not necessarily have the time to integrate prior knowledge and fully develop their international strategies before implementing them as suggested by Johanson and Vahlne (1977). Instead, these companies need to react rapidly, develop mechanisms to assess opportunities quickly and allocate resources to take advantage of them. The results of these actions, some being previously labelled 'reactive strategies' have become the basis for survival in dynamic environments (Eisenhardt and Martin, 2000). Interpersonal and inter-organizational relationships are viewed as the media through which these firms can gain access to a variety of resources (Hoang and Antoncic, 2003). Furthermore, firms that pursue opportunities in foreign markets enabled by network resources may experience greater international growth than those that do not. Spence and Crick (2006) substantiate this argument by claiming that the internationalization of HTSMEs is, in fact an inherently entrepreneurial act in itself, whereby firms seek out new potential resources and resource combinations in networks to exploit in foreign markets.

HYPOTHESES

Network Initiation

Initiation is based on the premise that inter-organizational relationships do not start on their own (Ritter and Gemünden, 2003). They are the result of specific investments. Typical activities to identify potential partners are visits to trade shows, monitoring industry-related journals, and exploiting hints from existing partners. Company visits and the distribution of information about the firm to potential partners are also initiation activities. Network initiation involves a degree of network sensing. Network sensing is defined as the degree to which a firm actively seeks information on new alliance partnership opportunities (Bonner et al., 2005). Because opportunities for competitive advantage can be found through network relationships (Burt, 1992; Anderson et al., 1994; Achrol and Kotler, 1999), firms are constantly in search of new network partners, especially those that can provide unique and complementary resources. In the context of the currency trading banking network, Zaheer and Zaheer (1997) found a strong positive relationship between a bank's alertness, or the number of contacts it makes, and the frequency with which other banks contact it.

According to these findings, firms seek other firms that actively monitor the market for alliance partnering opportunities. Through active sensing of the marketplace, a firm establishes contacts and becomes well informed about partnering opportunities. As a result, an active network sensing firm can be valuable to others seeking new partners by providing them access to valuable opportunities and reducing their search costs.

Many studies have highlighted the importance of market knowledge – defined as “organized and structured information about the market” (Li and Calantone 1998, p.15). In the context of this study, the focus is on network partners, therefore, similar to Walter et al (2006), partner knowledge is organized and structured information about a firm's upstream and downstream partners (suppliers and customers) , and competitors. Loxton and Weerawerdena (2006) stressed, that partner knowledge allows for the initial selection of possible collaborations, joint ventures and research partners. Hence, the initiation aspect of network relationship management comprises of a range of initiation activities as outlined above, as well as partner knowledge and network sensing capabilities. Therefore it can be argued that if a firm is actively engaged in seeking out partners, information and resources within the network, and initiates appropriate relationship development, they will have a greater chance of opening up opportunities that will lead to enhanced performance outcomes in international markets. Hence;

Hypothesis 1: The more effective the level of network initiation capability a firm has, the greater the effect on its international performance.

Coordination

Coordination implies that organizations involved in a network need to synchronize their activities so that the activities of organizations are in tune with each other (Mohr and Nevin, 1990). Such coordination includes the establishment and use of formal roles and procedures and the utilization of constructive conflict resolution mechanisms (Helfert and Vith, 1999).

Networks of firms also require strategic and co-ordinative planning. McNaughton and Bell (2001) stress that exchanges in a network are not organised by market forces, rather they are structured by patterns of trust and opportunity. The same considerations that inhibit network formation militate against the development of mechanisms for co-ordination within networks. The benefits of co-ordination are difficult for an individual firm to appropriate, and to achieve benefits collectively, firms must give up some autonomy and call on uncommon managerial skills (managing between firms rather than managing within them). Coordination

within a network therefore, lends itself to partner integration. Partner integration refers to the degree to which the firm actively engages in coordinating activities and strategies and in the sharing of knowledge across alliance partners (Bonner et al., 2005). Effective integration across partners is critical for the productive use of a partner's resources through knowledge transfer. In the marketing channels literature, the quality of communication and coordination, knowledge sharing, and joint participation between manufacturers and dealers has been linked to relationship performance (Mohr and Spekman, 1994). Mohr and Spekman (1994, p.138) state that without a high level of coordination, just-in-time processes fail, production stops, and any planned mutual advantage cannot be achieved. A critical aspect of any relationship is the potential for conflict between the alliance partners and how they deal with them (Kale et al., 2000). Conflict often exists in any alliance relationship on account of the inherent dependencies involved in such interactions. Given that a certain amount of conflict is expected, how such conflict is managed and coordinated is important (Boroy and Jemison 1989), as the impact of conflict resolution on the relationship can be productive or destructive (Deutsch, 1969).

Accordingly, it is reasonable to argue that a firm that actively coordinates activities across its partners is likely to have access to valuable resources and therefore becomes desired by other partners (Bonner et al., 2005), which in turn may lead to enhanced performance outcomes. Thus:

Hypothesis 2: The greater the firm's network coordination capability, the greater the effect on international performance.

Learning

Competition is increasingly knowledge based as firms strive to learn and develop capabilities faster than their rivals (Prahalad and Hamel, 1990; D'Aveni, 1994; Teece and Pisano, 1994). However, the time between the identification of a problem and its arrival may not allow the firm to internally develop the knowledge and capabilities needed to respond effectively (Dierickx and Cool, 1989). Furthermore, by learning through inter-firm networks, firms can reduce the perceived uncertainties of foreign markets without having to wait until their own market knowledge has reached the required level (Forsgren, 2002). This has led to a shift from traditional resource or risk sharing alliances to alliances with learning from partners as a primary goal (Hamel, 1991). Through 'learning alliances' firms can speed capability development and minimize their exposure to technological uncertainties by acquiring and exploiting knowledge developed by others (Grant and Baden-Fuller, 1995). This construct is similar to the notion of absorptive capacity, which refers to a firm's fundamental learning processes: its ability to identify, assimilate and exploit knowledge from the environment (Cohen and Levinthal, 1989; Lane and Koka, 2006). Lane and Lubatkin (1998) argue that the understanding of learning alliances has been limited to *how* they should be structured and managed, and that far less is known about *with whom* a learning alliance should be formed. Kale and Singh (2007) see the alliance learning process as a process that is directed toward helping a firm and its managers, learn, accumulate and leverage alliance management know-how and best practices. Kale and Singh (2007) draw on research from the dynamic capabilities perspective (Zollo and Winter, 2002) and the knowledge based view of the firm (Nonaka, 1994; Grant, 1996) and suggested that such a process involves deliberate efforts to articulate, codify, share and internalize alliance management know-how in firms.

Network learning therefore, refers to the degree to which the organization engages in alliance learning activities, including the dissemination of lessons within the firm (Sinkula et al., 1997). It helps firms interpret and internalize the information and knowledge that it transfers and adapts (Sinkula et al., 1997). A firm that exhibits a strong network learning capability

processes information and knowledge about past relationships, which can be effectively transferred to others for use in future relationships (Anderson et al., 1994; Mohr and Spekman, 1994; Sinkula et al., 1997). Potential partners would value this information and knowledge accumulated by network-learned firms (Anderson et al., 1994; Mohr and Spekman, 1994; Sinkula et al., 1997). In addition, firms that emphasize network learning practices should be in a good position to effectively use this information to select valuable partners and to manage effective linkages with those partners (Powell et al., 1996; Gulati, 1999). Accordingly, it can be argued that a firm that effectively learns from its network encounters will be more efficient in selecting and managing network activities that ultimately leads to performance outcomes in international trade. Hence:

Hypothesis 3: The more effective a firm is in network learning, the greater the effect on international performance.

MEASURES

The scales used in this study were sourced from the literature, and in some cases were modified for the current research context.

Initiation

Initiation activities, partner knowledge and network sensing are the three dimensions of the eight item initiation scale, four items on initiation activities are taken from Walter et al's (2006) scale and one item from Ritter and Gemünden's (2003) relationship specific scale. Partner knowledge draws on the work of Loxton and Weerawardena (2006) and includes two items from their partner knowledge scale. Network sensing, which is the degree to which a firm actively seeks information on new alliance partnership opportunities, draws one item from Bonner et al's (2005) scale.

Coordination

Coordination includes the establishment and use of formal roles and procedures and the utilisation of constructive conflict resolution mechanisms (Helfert and Vith, 1999). Accordingly, network coordination is measured on a six item scale with three items on coordination activities taken from Walter et al's (2006), two items on partner integration and conflict resolution from Kale et al's (2000) and one item from Loxton and Weerawardena (2006) on formalising network relationships.

Learning

Kale and Singh (2007) suggested that network learning involves deliberate efforts to articulate, codify, share and internalise alliance management know-how in firms. Three items were taken from Kale and Singh's (2007) scale on alliance learning, three items are taken from Bonner et al's (2005) network learning scale and deals with issues such as conducting reviews of network learning and how that learning modifies subsequent behaviour. Two items are taken from Loxton and Weerawardena's (2006) learning scale and deals with feedback and decision making around network activities.

International market performance

Three dimensions have been identified to capture the firm's level of international market performance. These dimensions are based on the company's marketplace performance (Jaworski and Kohli, 1993), financial performance (Narver and Slater, 1995), and levels of customer satisfaction (Walter et al., 2006). The first two dimensions relate to a more objective analysis of performance and are based on marketplace indicators (i.e. sales growth

over the past three years and the market share of the firm's number one product) and financial indicators (i.e. average return of investment, revenue and pre-tax profitability). For customer satisfaction, respondents were asked to consider the extent to which they felt their firm had varying levels of customer satisfaction and retention.

METHOD

This study adopted Dillman's (2007) Tailored Design Method (TDM), which asserts that survey response can be explained in terms of the theory of social exchange. According to Fahy (2001) the appeal of TDM is that it provides the researcher with a comprehensive set of theoretically based and empirically tested guidelines for survey design, questionnaire construction and questionnaire implementation.

SMEs are the focus of this study as they are a key economic sector in Ireland, where they constitute 97% of enterprises and contribute to the flexibility and resilience of the economy as well being active in international markets (SBA, 2008). This study draws on research from HTSMEs, in the telecommunications and internet services sectors in Ireland. This industry was selected as it is considered a global industry with a complex value chain. It is also an industry with high levels of inter-firm network and export activity.

For the current study, the population comprised of all companies in the telecommunications, internet and related industries. In order to compile a relevant sampling frame, data from the Irish Central Statistics Office (CSO) and The Commission for Communications Regulation of Ireland (ComReg), Business and Finance and Dunn and Bradstreet were used. The focus was on a single industry in one country to control for industry- and country-specific factors affecting international performance. This study was based on a mail survey of 458 SMEs (with more than 3 and less than 250 employees) drawn from this population. The questionnaire underwent multiple pre-tests. Whenever possible, multiple-item measures were used to minimize measurement error and to enhance the content coverage for constructs. Statement-style items were measured on seven-point Likert-scales.

The overall response rate for this study was 40.39% with a useable response rate of 33.64%. The specific activities carried out by respondent firms include the following: computer consultancy, computer services, computing and bureau services, data communications, Internet services and Web design, telecommunications and telephone cost management.

A missing data process in accordance with Hair et al. (2006) is not deemed an issue in this study as only one questionnaire was returned incomplete. However, further analysis of missing data was performed using Preliis 2.80 to impute individual missing values using the estimated means algorithm following Du Toit and Du Toit (2001).

Using a t-test, early and late respondents were compared on several key characteristics such as importance of relationships, percentage of revenue derived from international markets, importance of international markets to overall performance and number of years exporting. No significant difference was found at the 0.05 level. Thus, based on these results and considering that the response rate was relatively high, it was concluded that non-response bias is not a significant problem. Furthermore, size and location differences between respondents and non-respondents revealed no significant differences between the sample and the population under investigation.

Harman's single factor test was performed to test for the presence of common method variance bias (Harman, 1967; Podsakoff et al., 2003; Chang et al., 2010). All variables were entered into an unrotated principal components analysis. The results of the analysis indicated nineteen items with eigenvalues greater than 1 and no single factor accounted for more than 33.7% of the covariation. Only one variable accounted for 18% of the variance. The results indicate that common method variance, though probably present to some degree, does not affect the results in this study.

SCALE VALIDATION

Table 1 provides the descriptive statistics and correlations for the composite variables used in this study. The measures of network initiation, network coordination and network learning were positively correlated with the measures of international performance with correlations ranging from 0.172 to 0.832.

Table 2 displays the results obtained from the estimation of the CFA model. An inspection of these results shows that all items loaded on their specified constructs. Convergent validity is evidenced by the large and significant ($t < 1.96$, $p < .05$) loadings on the items on respective constructs (Shoham, 1999). As far as the reliability is concerned, table 2 presents the results of the composite reliability (CR) and the average variance extracted (AVE). The values for the CR ranged from 0.82 to 0.87, which exceeds Bagozzi and Yi's (1988) recommended minimum level of 0.60. In terms of AVE, all four constructs are under the 0.50 guideline and range from 0.40 to 0.47. Ping (2009) argues that if AVE of the resulting measure is within a few points of 'acceptable' (0.50), this may not always be 'fatal' to publishing a model test.

Table 1 Means, Standard deviations and correlations

Variable	Mean	St. Dev.	1	2	3	4	5	6	7	8	9	10	11
Initiation 1	4.570	2.077											
Initiation 2	6.427	2.738	0.812										
Initiation 3	5.545	2.241	0.680	0.672									
Coordination 1	7.349	3.068	0.508	0.383	0.389								
Coordination 2	9.973	4.162	0.535	0.519	0.502	0.656							
Learning 1	6.285	2.245	0.428	0.364	0.376	0.396	0.388						
Learning 2	12.882	4.357	0.317	0.215	0.302	0.311	0.288	0.703					
Learning 3	6.311	2.720	0.410	0.401	0.405	0.464	0.515	0.607	0.488				
International Performance 1	8.184	2.753	0.251	0.257	0.319	0.184	0.371	0.223	0.317	0.204			
International Performance 2	12.187	4.413	0.237	0.262	0.235	0.285	0.387	0.216	0.231	0.256	0.769		
International Performance 3	8.405	2.622	0.224	0.227	0.274	0.224	0.350	0.232	0.289	0.251	0.832	0.813	
International Performance 4	8.433	3.633	0.310	0.330	0.265	0.357	0.455	0.197	0.172	0.227	0.667	0.807	0.647

N = 149. Correlations greater than or equal to 0.07 are significant at $p < 0.05$. Correlations greater than or equal to 0.10 are significant at $P < 0.01$.

Table 2: CFA and Constructs Reliability

Construct Item	Standardized Loadings	Regression Weights	T Values
Initiation (CR =0.87, AVE =0.47)			
Inform ourselves of their respective markets	0.70	0.49	9.30
Inform ourselves of their products/services	0.52	0.39	8.02
Determine their strengths and weaknesses	0.79	0.62	11.10
Inform ourselves of their strategies and potentials	0.82	0.68	11.81
Judge in advance which possible partners we can pursue projects with	0.73	0.53	9.87
Seek opportunities to complement our capabilities and resources	0.57	0.47	8.61
Routinely gather information about prospective partners from various forums	0.52	0.27	5.46
Coordination (CR =0.82, AVE =0.44)			
We analyze what we would like and desire to achieve with which partner	0.55	0.31	5.35
We appoint coordinators who are responsible for the relationships with our partners	0.6	0.36	7.53
We discuss regularly with our partners how we can support each other in our success	0.78	0.60	10.54
We try to formalise our network relationships	0.78	0.61	10.74
The partners engage in joint problem solving while resolving conflicts	0.57	0.45	8.66
Great emphasis is placed on dealing with cultural obstacles while resolving conflicts	0.54	0.30	5.71
Learning (CR =0.83, AVE=0.40)			
We ensure that strategic decisions within our firm are informed by our networking activities	0.58	0.34	7.24
We value employee feedback for strengthening networking relations	0.56	0.31	6.86
We conduct periodic reviews to understand what we are doing	0.74	0.54	9.84
We periodically collect and analyze field experiences from our networks	0.71	0.50	9.29
We modify our network related procedures as we learn from experience	0.72	0.52	9.58
Resources such as network manuals are developed	0.53	0.40	8.06
Company managers attend training programmes on network management	0.47	0.22	5.57
The company provides opportunities for on-the-job network training	0.51	0.26	5.20
Performance (CR =0.87, AVE =0.47)			
The International Market Share of your number 1 product/service	0.59	0.47	9.42
Your International Sales Growth over the last 3 years	0.91	0.83	14.3
Your Average Return on Investment	0.33	0.11	4.01
Your total Turnover	0.3	0.088	3.51
Your International Turnover	0.95	0.9	15.38
Your Total Pre-Tax Profitability	0.27	0.072	3.25
Your International Pre-Tax Profitability	0.9	0.8	13.92
Customer satisfaction in international markets	0.7	0.49	9.55
Customer retention in international markets	0.74	0.55	10.41

Construct reliability (CR) was calculated as follows: $(\text{square of summation of factor loadings}) / (\text{square of summation of factor loadings} + \text{summation of error variances})$ (Fornell and Larcker, 1981).

Average variance extracted (AVE) was calculated using the following formula: $(\text{summation of squared factor loadings}) / (\text{summation of squared factor loadings} + \text{summation of error variances})$ (Fornell and Larcker, 1981).

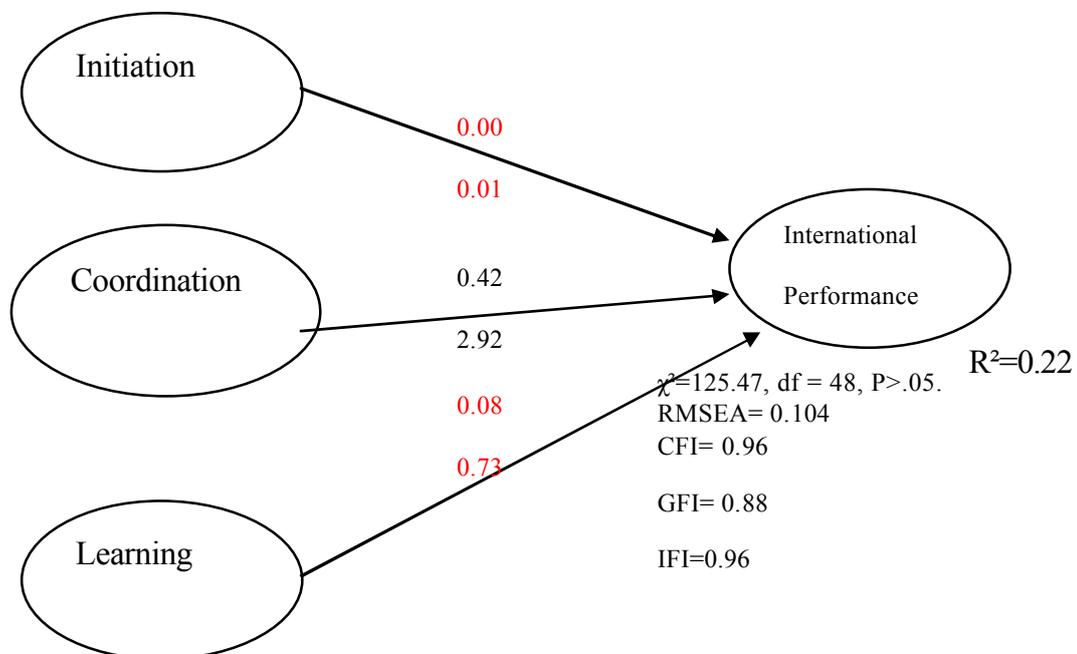
The measurement model tested (Network Operations) was one in which each item loaded on only 1 of 3 factors corresponding to its composite subscale. This hypothesized 3 factor model did not fit the data well from a statistical perspective ($\chi^2=509.28, df=201, P<.05$). If the model

is to provide a satisfactory representation of the data, it is important for the chi-square value to be non-significant ($p > 0.05$). However, when taking the other fit indices into account (GFI=.75, AGFI=.68, CFI=.92, NNFI.92 RMSEA=.11, and RMR=.23), the CFI and NNFI indicates a good fit.

RESULTS

As outlined above, the proposed measurement model was consistent with the data, the hypothesized structural model was estimated using LISREL 8.80. Before estimating the structural model, composite variables were created to deal with the issue of small sample size. The Single Factor Method was used for this study, as according to Landis et al. (2000), it is the most frequently reported method in the literature and its purpose is to distil original set of items to a reduced number of indicators that are empirically balanced measures of the constructs. Figure 1 shows the parameter estimates, t -values and the fit statistics for this structural model.

Figure 1 Final Model



Note: standardized parameter estimates above the line and t -values below the line

DISCUSSION OF THE FINDINGS

Initiation

A positive but non-significant relationship was found between network initiation and international performance, thereby not supporting hypothesis 1. Drawing on the growth stages theory of network development, the initiation construct could be seen as being as part of the ‘*searching process*’ as described by Batonda and Perry (2003, p. 1460). The activities in this initial stage of the network development process are seen as phase one by a range of authors (Dwyer et al., 1987; Ford, 1980; Larson 1992; Heide, 1994). Looking through this lens, might lend some explanation to the lack of support for the relationship between network initiation and international performance. If network initiation is seen as a stage in the process

as distinct from an element of overall networking capability, then subsequent factors or variables will have a bearing on the international performance relationship. Also, Batonda and Perry (2003) point out that the outcome of the stages model (including phase one) seem to be influenced by the interaction between economic actors and individuals in the network as well as external persons such as the network broker. It is also evident that sometimes foreign market opportunities are discovered completely by chance, with no clear initiating role attributable to the buyer, seller, or third party (Ellis 2000). Furthermore, Ellis (2000) contends that it is appropriate to treat the trade fair (which is referred to in this construct in this study) as a special kind of initiation scenario. Empirical support for this assertion is provided by Reid (1983, p. 154) who, based on his study of information search strategies used by exporters, found participation in international trade-fairs to be 'more likely than any other information search activity to be of use to the export decision-maker.'

As one of the items in the initiation scale referred to third party support organizations such as government organizations, it was interesting to note a similar finding from Ellis (2000). He found that formal search activities based on objective data collected by professional or government agencies were virtually never used to identify opportunities abroad and consequently have had little bearing on the foreign market entry behaviour exhibited by the toy-makers in his study. However, more recent research on high tech firms, found that the external government networks were the most significant factor enhancing export performance, irrespective of the export destinations (Ujjal, 2009).

Market and network sensing was included in the initiation construct in this study and interestingly Berghman et al (2006) contended that traditional market sensing capability is not enough, as this simply feeds the company with information, the real value lies in how this information is assimilated and transformed within the firm. Overall their findings on a study of marketing orientation, suggested that the simultaneous and gradual development of marketing knowledge absorptive capacity, organizational competence and network competence is necessary.

Coordination

A positive and a significant relationship at the 95 % confidence level were found between network coordination and international performance, thus supporting hypothesis 2. The finding that network coordination is positively related to international performance in this study is consistent with previous research findings on the role of the alliance or coordination function. This is consistent with Katsikeas et al (2009), who recognize that international exchange is most productive when the resources and capabilities of trading partners are coordinated and fully matched to the work requirements inherent in importing products to foreign markets. Yet achieving optimal coordination is particularly difficult in international transactions, as the resources required for successful exchange are scattered across the employee-actors of the export and import firms (Zaheer et al., 1998).

Fink et al (2008) contended that international cooperation's of SMEs require this kind of behavioural coordination for their long-term and highly complex transactions. The ability of an enterprise to deal with behavioural uncertainty within cooperation and to resourcefully keep in check the danger of opportunistic behaviour on the part of the cooperation partner influences the utility it derives from the cooperation relationship. In a similar vein Schilke and Goerzen (2010) found that alliance management capability to be a crucial driver of alliance portfolio performance.

Henderson and Cockburn (1994) demonstrated the usefulness of higher-order organizing mechanisms to coordinate R & D know-how and activities within pharmaceutical firms. They refer to such mechanisms as the firm's architectural competence with respect to R & D, and

they operationalise it in terms of the extent to which research activities are coordinated as a seamless whole and managed centrally by a focal individual or team. Similarly, Clark and Fujimoto (1991) highlighted the positive impact of centrally coordinating various groups and activities during the development of new product designs in the automotive industry. Their research shows that having such a mechanism ('heavyweight teams') leads to a significant reduction in the time and cost associated with developing new product designs. Finally, Dyer and Nobeoka (2000) examined the issue of how Toyota and its suppliers learn faster (show greater productivity improvements) than competitors. They claim that one important factor in explaining Toyota's relative learning capability is that Toyota has created a separate organizational unit that has been assigned the responsibility to accumulate, store, integrate, and diffuse production knowledge. Toyota's 'Operations Management Consulting Division' represents a mechanism designed to centrally coordinate and share valuable production knowledge throughout Toyota's network. Mitchell, (2000) and Kale et al, (2002) believed that centralized coordination of this kind is becoming equally important in the alliance context.

This research suggests that one important way that organizations can capture, integrate, and disseminate alliance-management know-how is through the creation of a separate, dedicated unit charged with the responsibility to capture prior experience. Kale et al (2002) referred to this as a dedicated alliance function, for example, firms such as Hewlett Packard, Eli Lilly, and Parke- Davis have appointed a 'Vice President or Director of Strategic Alliances' with his/her own staff and resources. This dedicated function coordinates all alliance-related activity within the firm and can enhance the firm's ability to generate high returns from alliances or networks in a number of ways.

Learning

A positive and non-significant relationship was found between network learning and international performance, meaning hypothesis 3 is not supported. This finding is consistent with those of Bonner et al. (2005) and one plausible explanation for this finding might be that a firm's network learning activities go largely unnoticed by managers in other firms because they are more internal and implicit and, as a result, have little influence on its perceived position with a relationship network. To the extent that the network learning activities are internal and unnoticeable by managers, they may not be acknowledged as an antecedent of the firm's own networking capability by managers.

Furthermore, Nahapiet and Ghoshal (1998) argued that some aspects of social capital can hinder interaction and thus constrain rather than enhance learning. They argue that though social norms and identity have a positive effect on group performance, these attributes can also hinder the group's receptiveness to new information and to seek other methods of doing things.

Theory (for instance Granovetter, 1973) and practice (Floren and Tell, 2004) support the notion that trust is the major prerequisite for learning in groups. Floren and Tell (2004) focused on the emergent nature of learning in groups or networks, and in their research trust has proven to be an essential element supporting the learning process in networks. As the relationship between trust and international performance was not supported by Kenny and Fahy (2011), given this argument that trust is a prerequisite to learning, it may come as no surprise that the relationship between network learning and international performance is thus not supported.

Similarly, Kale et al (2000) hypothesised that the greater the relational capital that exists between alliance/network partners, the greater will be the degree of learning achieved. Again, Kenny and Fahy (2011) did not find support for the relationship between relational capability

and international performance. Kale et al (2002, p. 465) shed further light on the learning concept by saying that – “Many companies, including those with high alliance experience, fail to capitalize on the lessons associated with their prior experience”. However, their research would indicate that companies (large in the case of their specific study) who are strong on coordinating networking activities do in fact engage in some learning effort, which is not the case in the findings of this study focusing on SMEs.

Interestingly, Floren and Tell (2004) found that the prerequisites for learning changed with time in the networks. In the beginning of the collaborations, the networks were primarily oriented towards specified goals of the network. As time passed, trust increased between network members. In the wake of the inter-personal trust, a reciprocal and transparent milieu developed, which in turn established prerequisites for a receptive and confronting capacity between the managers, which led to higher-level learning. As this study is cross sectional in nature, the effect of changes in networking capability over time was not captured, but it is indeed a fruitful avenue for future research.

Anand and Khana (2000) on the other hand, explored differences in learning effects on contract specific alliances and found evidence of large learning effects in managing joint ventures, but no such evidence for licensing contracts. The effects of learning on value creation are strongest for research joint ventures, and weakest for marketing joint ventures. These results are consistent with the view that learning effects are more important in situations characterized by greater contractual ambiguity.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

As with any research, certain limitations must be noted. First, the external validity of this study may be limited to the type of firm under investigation. This single context is, however, considered appropriate to control for industry effects.

This study examined the network operation and international performance of HTSMEs only. This study did not capture the role of large businesses in the sector (e.g. mobile operators or flagship firms) who, in a lot of cases, are the main customers of these SMEs. In fact, Loane and Bell (2009) acknowledge that the role played by a firm’s clients in supplying resources, including knowledge, has been under investigated, particularly from an international entrepreneurship stance. The role of regulators, (e.g. ComReg), government agencies or other bodies that have control over the infrastructure, networks such as 3 G and 4G, awarding licences, contracts and spectrum allocation was also not captured. Decisions and actions taken at this level in the industry (for example, awarding of a mobile license, or privatising telecoms in some jurisdictions) could have far reaching affects for a HTSMEs’ domestic as well as international business activities.

The study measured the direct effects of network operation on international performance; future research could consider incorporating control variables such as number of partners, importance of partners or destination of exports. The final export destination exports modifies the set of determinants of export as export performance is multifaceted, and because the specific target export markets require unique range of resources and capabilities (Lefebvre et al., 1998). Ujjual (2009) found that the difference in the relative importance of network intensity on export performance facilitated a new insight on the effective network pattern influencing high-tech exports.

CONCLUSION

Additional interesting insights could be gained from the results of the three hypotheses tested in this study. First, a positive but non-significant relationship between network initiation,

network learning and international performance, a positive and a significant relationship network coordination and international performance. This range of findings could support Bonner et al's (2005) similar notion that performing, simultaneously, elements of network initiation, coordination and learning at high levels tends to strain the competencies and resources of an organization. Which is consistent with the literature on resource constrained small businesses. Therefore, managers have to carefully decide which strategic direction they should pursue. Should the firm create value for partners by being well informed about the breadth of opportunities, or should it strive to become an excellent coordinator of activities across multiple networks?

In relation to network coordination, Goerzen (2007) disconfirmed the widely discussed perspective of the value of minimizing transaction costs within alliance networks and considers some of the various explanations for this. One reason may be that the repeated ties in expanded networks act to lock out newcomers with the needed cutting-edge technologies as suggested by Gulati (1999). Thus, a management team that overemphasizes the need to reduce alliance transactions costs may be placing too high a premium on management efficiency. Further, it may be that policies of exploiting existing routines, or perhaps even complacency, may drive out the desire for new knowledge creation and absorption, especially in technologically uncertain environments. Firms, by focusing primarily on achieving improved coordination across networks, may be reducing the opportunities for novel systems, procedures, or perspectives to enter into their network (Goerzen, 2005). Taken together, this suggests that the economic factors of coordination costs and appropriation concerns must be considered together with social or behavioural patterns to improve our understanding of the impact of network characteristics and capabilities on firm performance.

In conclusion, this study contributes to and informs the emerging research on networks. Most prior research in this field of inquiry has emphasised structural properties of networks (Ahuja, 2000; Rowley et al., 2000; Shipilov, 2006) with less attention given to the operation of the network. The current study brings this topic to the foreground, suggesting that the question of what type of network operating capabilities are relevant might be as critical as the question of which network structure is desirable. The findings reveal that not all of these dimensions have a significant impact and offers empirical evidence on the link between network operation and international performance, thus providing insight into the types of network capabilities that have the potential to create value for the firm and those that do not.

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