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SME International innovation and strategic adaptiveness: The role of domestic network density, centrality and informality

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Abstract

Purpose - *The purpose of this paper is to examine the role of small and medium sized enterprises' (SMEs) domestic network structural attributes on their ex-post internationalisation strategic innovation and adaptiveness in the host country.*

Design/methodology/approach - *The model fit of SME domestic network structural attributes and their ex-post international performance was examined using structural equation modelling on data gathered from a sample of 263 SMEs from Croatia, a transition and emerging economy. Hierarchical regression analysis was further performed to test both the direct and moderating effects.*

Findings - *The study revealed that domestic network informality moderates the link between SME domestic network centrality and their international innovation. Similarly, the findings show that domestic network informality strengthens the negative association between domestic network density and SME international innovation and strategic adaptiveness. Moreover, the study did not find any direct impact of these domestic networks' structural attributes (density and centrality) on SME international innovation and strategic adaptiveness.*

Originality/value – *Scholars have emphasised the importance and urgency for further research attention on the role of networks on SMEs' internationalisation activities from emerging economies. This study responds to this call, and to the knowledge of the authors, is the first to examine the role of domestic network attributes on SME international performance in emerging economies. The findings provide new insightful contributions to the social network perspective and the international entrepreneurship literatures.*

Key words: Domestic network density, network centrality, network informality, international strategic innovation and adaptiveness, SMEs, Croatia.

1. Introduction

A surging scholarship in the relationship and entrepreneurial marketing literature based on the social network theory have examined and acknowledged the positive role of networks and networking on Small and Medium Enterprises (SMEs) performance (Andersson *et al.*, 2013; Boso *et al.*, 2013; Musteen *et al.*, 2014; Peng and Luo, 2000). Networks have been defined as

patterned relationships that link individuals, groups, and business organisations (Hoang and Antoncic, 2003; Scott *et al.*, 2012; Zhou *et al.*, 2007). Diverse networks have been examined in this body of scholarship (Zhang and Li, 2010) but generally broadly categorised into business (customer, competitor, supplier) networks and social/political (government officials, institutions) networks (Boso *et al.*, 2013; Sheng *et al.*, 2011; Peng and Luo, 2000). According to this stream of research, SMEs heavily rely on both business and political networks as an important competitive strategy in order to overcome their limitations and succeed in the intensively competitive and increasingly turbulent business environment (Sheng *et al.*, 2011).

Recent stream of international entrepreneurship scholarship have also began to exam the role of networks in the internationalisation efforts of SMEs, entrepreneurial firms (Harris and Wheeler, 2005; Musteen *et al.*, 2014; Zahra, 2005). These studies have suggested that networks assist SMEs in identifying new opportunities in foreign markets, and in overcoming issues relating to liabilities of foreignness, smallness, and newness (Ellis, 2011; Zahra, 2005). Moreover, networks are seen as providing SMEs with better access to relevant resources required for early internationalisation (Lindstrand *et al.*, 2011). In the context of born global small and medium enterprises, the international business literature has also acknowledged the pivotal role of networks in their internationalisation and performance (Freeman *et al.*, 2006; Mort and Weerawardena, 2006; Zhou *et al.*, 2007). As such, the widely acknowledged logic in this discourse is that networks have a significant influence on the successful internationalisation of SMEs (Musteen *et al.*, 2014; Zhou *et al.*, 2007).

Both streams of relationship marketing and international entrepreneurship literature suggests that SME networks may be formal (Björkman and Knock, 1995), informal (Sorenson, 2003), local and/or international (Andersson *et al.*, 2013; Zhou *et al.*, 2007). On the one hand, some scholars argue that SME networks are more localised as geographical proximity and co-location engender frequent, trustful and face-to-face interaction, communication and

cooperation (Dubois, 2015; Kingsley and Malecki 2004). On the other hand, many studies have highlighted the critical importance of international networks in capturing relevant foreign market knowledge, gaining access to strategic resources, and reducing liabilities of foreignness and newness (Amal and Filho, 2010; Evers *et al.*, 2012; Johanson and Vahlne 2003). Some scholars have empirically explored the role of both local and international networks on SME internationalisation process and found direct positive influence (Andersson *et al.*, 2013). Specifically, local networks were found to be important in the initial internationalisation of SMEs, while the international networks served a more important role in the re-launching of internationalisation or further expansion of the SME into the global market (Andersson *et al.*, 2013). Home-based networks have also been empirically found to play a positive mediating role in the relationship between inward and outward internationalization and firm performance in the context of born-global SMEs (Zhou *et al.*, 2007).

Notwithstanding the support for the positive impact of networks on SMEs internationalisation efforts, scholars have bemoaned the lack of research on the role of network attributes or structure on firm internationalisation outcomes (Musteen *et al.*, 2014). Additionally, the extant literature has not empirically examined the interaction effect of network structural attributes on SMEs internationalisation. The dearth of research on these issues is surprising and leaves us less knowledgeable about the role of networks attributes on SMEs internationalisation efforts. Moreover, scholars have noted that much of the network-related international entrepreneurship literatures are based in developed economies or focused on firms in developed economies with scant attention on the issue in developing and transition economies (Yamakawa *et al.*, 2008). These scholars have therefore emphasised the urgency of further research attention on the internationalisation activities of SMEs from emerging economies (Musteen *et al.*, 2014; Yamakawa *et al.*, 2008).

These gaps offer an opportunity for impactful and relevant contribution to both the network and the international entrepreneurship literatures, as well as in enhancing our understanding on this important issue. As such, we take a step towards addressing these gaps in the literature by drawing on the social network perspective and international entrepreneurship literature to empirically investigate the role of SMEs domestic network attributes on their international performance, namely ex-post internationalisation innovation and internationalisation strategic ‘adaptiveness’. Specifically, we explore (1) the impact of SME domestic network density on their ex-post internationalisation innovation and strategic ‘adaptiveness’, (2) the impact of domestic network centrality on SME ex-post internationalisation innovation and strategic ‘adaptiveness’, and (3) the moderating role of SME domestic network informality on the domestic network attributes – SME ex-post internationalisation performance relationship, in the under-researched context of a transition and emerging economy of Croatia.

[Insert Figure 1 here]

Using a sample of 263 SMEs in Croatia, we find that domestic network informality has a significant moderating influence on the relationships between domestic network density and both ex-post international innovations and strategic adaptiveness. Similarly, domestic network informality is found to positively moderate the link between domestic network centrality and SME ex-post international innovation but not strategic adaptiveness. However, SME domestic network attributes (density and centrality) have no direct effect on SME ex-post international innovation and strategic adaptiveness. These findings are instructive and provide further explanation of the role of network attributes on SME post internationalisation performance in

the host country. In the next section, we draw on the social network theory to explore the networks and international entrepreneurship literature. This process leads to the development of testable hypotheses. The research methodology is next discussed, followed by the results and discussion sections. Finally, the implications, limitations and recommendation for future research directions conclude the paper.

2. Theory and Hypotheses

The entrepreneurship and international entrepreneurship literature emphasize that the founding, early acquisition of resources, further development and internationalisation of SMEs can all be explained by the entrepreneur's networks (Johannisson, 1986; Mort and Weerawardena, 2006; O'Gorman and Evers, 2011). The international entrepreneurship literature in general and SME ex-post internationalisation performance is rooted in the SMEs social networks. The social network perspective suggests that firms cultivate and nurture strong domestic network ties in order to facilitate beneficial effects on themselves (Boso et al., 2013; Li and Zhou 2010). Accordingly, social networks influence the pattern of resources and information available to a firm as a result of its position within the network structure (Boso, Story, & Cadogan, 2013; Adler and Kwon, 2002).

The social network perspective has therefore become a dominant and useful lens within this stream of scholarship (Musteen *et al.*, 2014; O'Gorman and Evers, 2011; Zahra, 2005). The basic tenet of the social network theory is that networks serve as channels for exchange relationships and resource flow which contribute to positive performance outcomes of the firm (Musteen *et al.*, 2014; O'Gorman and Evers, 2011). Accordingly, SME's approach to developing networks tends to be intentional, calculative and a managed process involving the exploration, screening and selective use of networks in a manner that aligns well with its

business definition (Larson and Starr, 1993; O’Gorman and Evers, 2011). In this respect networks do not only serve as channels for acquiring resources, but are by themselves important and valuable resources (Andersson *et al.*, 2013; Coviello and Cox, 2006). Moreover, firms and SMEs for that matter are suggested to operate under bounded rationality which affects their ability to achieve optimum performance (Simon, 1982). Accordingly, these firms operate under the constraints of limited and often unreliable information, limited capacity to process the available information, and limited timeframe to make the right decisions (Simon, 1982). As a result, SMEs tend to orient towards the achievement of satisfactory results instead of optimum performance (Simon, 1982). Networks are therefore suggested to enable SMEs overcome or bypass some serious limitations such as lack of critical resources, information, and legitimacy in their performance and internationalisation efforts (Ellis, 2011; Loane and Bell, 2006).

The international entrepreneurship literature has emphasised the vital facilitating role of networks in SMEs’ international opportunity recognition and exploitation (Andersson *et al.*, 2013; Ellis, 2011; Musteen *et al.*, 2014). According to this body of literature, networks provide relatively small and resource-constrained firms with important foreign market knowledge that help mitigate perceived uncertainties associated with internationalisation (Zhou *et al.*, 2007). Moreover, the foreign market knowledge acquired through networks help in reducing SMEs liabilities of foreignness, newness and smallness (Amal and Filho, 2010; Evers *et al.*, 2012). This stream of research has further evidenced empirically the critical role of different types of networks in SMEs internationalisation (O’Gorman and Evers, 2011; Zhou *et al.*, 2007). Some of the networks types examined include both local and international networks (Andersson *et al.*, 2013; Vasilchenko and Morrish, 2011), organisational and personal networks (Eberhard and Craig, 2013), Business and social networks (Boso *et al.*, 2013; Evers and O’Gorman 2011; Chandra *et al.*, 2009), institutional networks (Evers and Knight, 2008; O’Gorman and Evers, 2011), as well as weak and strong networks (Sharma and Blomstermo, 2003). The main logic

highlighted in these studies is that both the initial entry into a foreign market and the subsequent penetration into other foreign markets are a function of networks (Johanson and Vahlne, 2009; Lamb and Leiesch, 2002).

In the context of transition economies, a relatively limited number of studies have examined the role of networks and found them to be helpful in SMEs' survival and growth (Batjargal, 2003; Zhou *et al.*, 2007), innovation (Boso *et al.*, 2013), internationalisation (Zhou *et al.*, 2010), and in overcoming institutional voids (Khanna and Palepu, 2000). This body of literature stresses that these contexts are characterised by institutional voids, relatively low level of trust, as well as political, economic and regulatory uncertainties (Musteen *et al.*, 2014; Zhou *et al.*, 2007). As such SMEs rely heavily on developing and sustaining more informal networks in these contexts in order to acquire relevant international market knowledge at a relatively minimal transaction cost than via formal networks (Musteen *et al.*, 2014). Thus, while relevant, developing and sustaining formal networks may rather cost more and inhibit the new firm's opportunity recognition and exploitation potential in the globalised and complexed business environment than informal networks. Moreover, formal local sources of knowledge may feed and limit SME information search processes, and accentuating the issue of bounded rationality for these firms (Simon, 1982).

Some of the structural dimensions of networks discussed in the literature include network size, formality, diversity, density, stability, and flexibility (Hoang and Antoncic, 2003; Rocks *et al.*, 2005). Notwithstanding, very little research has examined the role of network attributes on SMEs internationalisation or post internationalisation performance except the study of Musteen *et al.* (2014). Musteen *et al.* (2014) examined the role of network density, network diversity, and network strength in the extent of foreign knowledge acquired at the time of internationalisation among Czech SMEs and found positive impact. We move this body of knowledge forward by examining the role of SME domestic network structural attributes

specifically network density and network centrality on their post internationalisation performance (innovation and international strategic adaptation). We further examine the moderating role of domestic network informality on these associations.

2.1 Firm strategic adaptiveness and innovativeness

Strategic adaptiveness refers to the ability of firms to strategically respond to challenges or crises caused by environmental turbulence (Miles and Arnold, 1991). It is perceived as a strategic asset as well as a performance measure for firms in the contemporary dynamic and globalized business environment (Krohmer *et al*, 2002; Miles and Arnold, 1991). The issue of strategic adaptiveness has therefore become extremely relevant to firms particularly SMEs operating in the current business environment characterised by technological sophistication, increasingly demanding consumers and more intense competition (Coviello *et al.*, 2000). Firms are therefore facing increasing turbulent, complex, and threatening environments and all of which underscore the importance of a firm's ability to strategically adapt to the changing business environment (Miles and Arnold, 1991).

Firm innovativeness as a concept has been defined and operationalised variously (Story *et al.*, 2015). On the one hand, firm innovativeness has been conceptualised as an organisational culture that reflects the firm's receptivity to new ideas and willingness to pursue novel ways of doing things (Kyrgidou and Spyropoulou, 2013). This behavioural perspective further emphasises that firms with higher innovativeness are more willing to change and adopt new ways of doing things (Calantone *et al.*, 2002; Menguc and Auh, 2006). On the other hand, others posit that firm innovativeness refers to the propensity of the firm to develop new products or services (Garcia and Calantone, 2002). The diverse definitions however focus on

the degree of newness, creativity, novelty, experimentation in new product development activities and/or the number of new products/services (Story *et al.*, 2015).

In this study, we therefore refer to firm international innovativeness as the propensity of the firm to launch innovative new products or services intensively and relentlessly relative to competitors in the host country (Story *et al.*, 2015). In the context of SMEs operating in foreign markets, innovativeness is essential for them to manage or overcome the liability of newness, foreignness and smallness in order to survive in the international market. Accordingly, greater innovativeness in such new, complex and uncertain environments produces greater performance benefits than may be the case in the home market that tends to be more predictable (Russell and Russell, 1992). Firms need greater innovativeness efforts to better satisfy consumers under highly competitive conditions (Boso *et al.*, 2013).

Both strategic adaptiveness and innovativeness are therefore performance measures examined in the extant scholarship. Scholars have examined the role of network ties on firm performance with some studies confirming that network ties do improve firm performance including internationalization, innovativeness and strategic adaptiveness (Havnes and Senneseth, 2001; Sheng *et al.*, 2011). Accordingly, network ties facilitate beneficial effects of firm innovativeness and strategic adaptiveness (Boso *et al.*, 2013; Li and Zhou, 2010). We therefore examine the role of network structural attributes on SME ex-post internationalisation performance measures of innovativeness and strategic adaptiveness.

2.2 Network Density

Network density refers to the extent to which actors in an individual's networks know one another, are interconnected and are cohesive (Tichy and Fombrun, 1979). Others further defined network density as the proportion of existing relationship among network members to

the possible total number of relationships (Marsden, 1990). Accordingly, network density also reflects the degree of structural holes present in the network (Burt, 1992, Musteen *et al.*, 2014). Network density is thus measured in terms of the connectedness, that is, the extent that network members are linked to each other (Tichy and Fombrun, 1979), or the interconnectedness (Cromie and Birley, 1992) that exists between members of the network. In a low network density, direct connections between network members are relatively sparse while in a high network density, most network actors are directly linked to each other (Musteen *et al.*, 2014; Zhou *et al.*, 2007). Moreover, the density of ties in a network, (particularly density overlap) tends to increase over time (Soda *et al.*, 2004).

Some scholars have highlighted that high density networks provide useful social support and facilitate the transmission of complicated information (Nahapiet and Ghoshal 1998). Notwithstanding, others suggest that in highly dense networks, there is significant redundant knowledge possessed by network members due to the presence of few structural holes (Musteen *et al.*, 2014). The more dense one's direct network of contacts, the less likely that new resources will enter, as more resources will simply re-circulate within the group (McEvily and Zaheer, 1999). Such networks are therefore considered as being less efficient in accessing valuable and non-redundant knowledge (Musteen *et al.*, 2014). Low dense networks on the other hand are suggested to augment new and substantial information gathering in a timely manner for strategic actions (Burt, 2009). Studies that empirically examined the impact of network density revealed that low density networks tend to generate greater information diversity and greater number of new venture ideas (Koka and Prescott, 2002; Zhou *et al.*, 2007).

The above theoretical arguments and empirical findings taken together, we posit that SMEs' domestic networks characterised by low density would accentuate their internationalisation and international strategic performance outcomes. The structural holes in low domestic density networks will enable SMEs gather relevant, diverse and new information

necessary for their ex-post internationalisation innovation and effective strategic adaptation in the host country. This logic leads us to hypothesise that:

Hypothesis 1a. *SME domestic network density has a relationship with their ex-post internationalisation strategic adaptiveness in the host country.*

Hypothesis 1b. *SME domestic network density has a relationship with their ex-post internationalisation innovation in the host country.*

2.3 Network Centrality

Network centrality is another structural attribute expected to influence SMEs' performance outcomes (Madhavan *et al.*, 1998). It refers to a firm's position in the entire pattern of ties comprising a network and indicates the firm structural proximity to all other firms in the network (Ibarra, 1993). Previous researchers suggest that firms with central network positions enjoy several advantages that contribute to higher performance (Brass *et al.*, 2004). Centrality strongly resonates with high position in the network status hierarchy, social power, structural influence and a high degree of access to and control over valued resources (Ibarra, 1993; Marsden, 2002; Chiu, 2008). Network centrality explicitly includes the ability to access (or control) resources through indirect as well as direct links (Madhavan *et al.*, 1998). Degree of centrality taps the ability of actors to "reach" other actors in their network through intermediaries. Moreover, centrality is further suggested to be helpful in developing and maintaining high level of trust among networks (Partanen *et al.*, 2008).

Researchers have therefore characterised varying degrees of access to resources by measuring network centrality at the interpersonal (Brajkovich, 1994) and inter-organizational levels (Johannisson *et al.*, 1994; Powell *et al.*, 1996). This stream of research describes network centrality as a power position that renders strategic advantages to the firm occupying such positions (Madhavan *et al.*, 1998). We argue that the centrality of the SME within its networks

will occasion positive ex-post internationalisation performance outcomes. Being at the core of domestic networks accentuates the SMEs' ability to capture current trends and relevant information which together facilitate their innovativeness in the foreign market. Moreover, such a position of power and privileged access to strategic resources will enable SMEs proactively and creatively posture and adapt to complex competitive dynamics in the foreign market. Following this logic, we hypothesise that:

Hypothesis 2a. *SME domestic network centrality positively relates to its ex-post internationalisation strategic adaptiveness in the host country.*

Hypothesis 2b. *SME domestic network centrality positively relates to its ex-post internationalisation innovation in the host country.*

2.4 Network Informality

It has been highlighted that SMEs networks are broadly formal and informal (Björkman and Knock, 1995; Sorenson, 2003; Zhou *et al.*, 2007). Formal networks are relationships embedded in a formal structure of business links, such as strategic alliances, collaborative relationships or buyer-supplier relationships (Björkman and Knock, 1995; Freeman *et al.*, 2006). In contrast, informal networks consist of personal relations built upon goodwill, and bounded in social, geographical and institutional space (Sorenson, 2003; Zhou *et al.*, 2007). Domestic networks are perceived broadly as informal since such networks are less governed by formal structure of business relationships, but rather by social and spacial closeness (Sorenson, 2003; Zhou *et al.*, 2007). Informal networks are suggested to assist SMEs mitigate the effects of their lack of resources at a minimal transaction cost (Musteen *et al.*, 2014). As some empirical studies have provided support for the positive impact of network ties on SME internationalisation outcomes (Musteen *et al.*, 2014; Zhou *et al.*, 2010), we expect network informality to moderate the domestic network attributes and SME ex-post internationalisation

performance relationship. Specifically, we posit that the negative effects of domestic network density on SMEs post internationalisation innovation and strategic adaptiveness to increase with more informal networks. This is because; highly dense informal networks would erode SME essential time resource, as they will spend their limited time and resources in communicating with many networks on repetitious issues. Such dense domestic networks may not even know the dynamics of the SME host international environment, and would be unable to offer any added value information to the SME's performance efforts in the host environment. Thus, such dense informal interactions with home country networks may focus more on resolving operational issues but rather limit the sharing of new and innovative ideas relevant for innovation and strategic adaptiveness in the host country environment.

Notwithstanding, informality of the domestic network ties may rather facilitate central domestic ties in the timely acquisition of new information and opportunity identification necessary for their ex-post innovation and strategic adaptiveness in the host market. This is based on the logic that central networks in resource power position will be able to pick and choose relevant and value added information from their domestic networks for their ex-post internationalisation performance in the host country. Along the same line of reasoning, we expect network informality to positively moderate the association between network centrality and both ex-post internalisation innovation and strategic adaptiveness. Hence, we hypothesise that:

Hypothesis 3a. *Network informality negatively moderates the relationship between domestic network density and SME ex-post internationalisation strategic adaptiveness in the host country.*

Hypothesis 3b. *Network informality negatively moderates the relationship between domestic network density and SME ex-post internationalisation innovation in the host country.*

Hypothesis 3c. *Network informality positively moderates the relationship between domestic network centrality and SME ex-post internationalisation strategic adaptiveness in the host country.*

Hypothesis 3d. *Network informality positively moderates the relationship between domestic network centrality and SME ex-post internationalisation innovation in the host country.*

3.0 Methodology

3.1 Sample

The sample was randomly drawn from a population of Croatia SME companies. SMEs are pervasive and constitute the principal engines of growth in most economies particularly in transition and emerging economies (Acquaah and Agyapong, 2015). In Croatia, it is estimated that about 99.7% of all registered enterprises are SMEs and they are critical to the performance of the economy (CEPOR, 2014). In 2013 for instance, SMEs in Croatia contributed about 52.1% of gross domestic product (GDP), 68% of employment, and 48.2% of Croatian exports to the international markets (CEPOR, 2014). Croatia recently joined the European Union (EU) which afforded its domestic SMEs both willing and unwilling to deal with the new regulations and heightened international competition within the European Union. This situation has further triggered the need for SMEs to internationalise. Examining the role of domestic network attributes in the post internationalisation performance is therefore relevant.

Using the official Croatian Finance agency database of businesses (Poslovna Hrvatska 2009 - Business Croatia) as our sample frame, a total population of 11,989 listed SMEs were identified. The researchers made the decision to include only those SMEs with international operations as well as those exporting their products and services to international markets. This reduced the final population from which we would sample to 1570 SMEs. All these 1570 constituted the sample based on the logic that a very conservative response rate of 13 percent would produce an acceptable sample of 200 replies (Coviello *et al.*, 2000; Peng and Luo 2000; Sheng *et al.*, 2011). This logic was informed by the reluctance of respondents in such contexts

(transition economies) to volunteer information on their business activities born out of mistrusts of institutions and fear of how the data might be used (Musteen *et al.*, 2014). Key informants consisted of top management team members that were knowledgeable about the company activities to be able to complete the questionnaire in a thoughtful manner.

Before the actual survey, the questionnaire was first pre-tested with a convenience sample of five academics that are knowledgeable in the topic area and had experience in questionnaire design. Their remit was mainly to provide comments regarding the appropriateness, relevance and wording of the questionnaire items; the survey length, and the time taken to complete the questionnaire. Following the pre-test stage, a pilot study was launched involving ten (10) SME managers. Based on the pre-test and pilot study, some of the questionnaire items were dropped and the wording of some questions changed to improve clarity. In April 2009 the questionnaire (with a self-addressed envelope) was posted to the 1,570 companies and after a number of telephone follow ups 291 completed questionnaires were returned in the self-addressed envelope provided. The self-addressed envelopes were provided to ensure confidentiality and encourage participants to be candid in their responses. After eliminating questionnaires returned with missing data, we ended up with usable information from 263 geographically dispersed SMEs and constituting a 16.75 percent response rate.

Thirty-one (31) percent of the respondents were directors of SMEs, 24 percent owners of SMEs, 10 percent were sales managers, and 35 percent reported their position as “other.” Moreover, 7 percent of the firms were micro businesses with no more than 10 employees, 28 percent were small sized firms employing a maximum of 49 employees, and 65 percent were medium firms with more than 50 employees. Additionally, these firms covered several industries including construction (21 percent), tourism (15 percent), manufacturing industry (15 percent), wholesale (9 percent) and miscellaneous (40) percent. To test for non-response

bias, we compared the demographic data of those that did not return a completed questionnaire with those we received and found useful. Those with missing data and excluded from our analysis were considered as not responded and included in the group in the non-response bias test (Luo *et al.*, 2006). Moreover, we statistically compared the questionnaires we received at the beginning of the data collection with those received at the end. In both cases, we found no significant difference in location, industry, firm size, and ownership.

3.2 Measures

This study relies heavily on previous research for items to measure key constructs examined. Specifically, items were adapted from previous studies by making changes to words and sentences to enhance understanding in both the SME international markets and Croatian contexts. The items were pre-tested before the actual survey to ensure face validity (Hair *et al.*, 2010). Moreover, we are not looking at nodes and edges in real network data to determine the network measures in this study, but rather using quasi-network measures derived from survey data as in other studies (Antia and Frazier, 2001; Boso *et al.*, 2013; Sorenson, 2003; Zhou *et al.*, 2007). Table 1 displays specific items used to measure the constructs and their respective factor loadings.

Domestic Network Density (DND): In creating our domestic network density measure, we adapted four items from Antia and Frazier's (2001) original scale with 6 items (Cronbach alpha = 0.729). The seven items adapted focus on communication frequency, interaction level, and the extent of cohesive relationship. Some of the adjusted items for network density consisted of the following: *domestic networks of our company share information amongst themselves; there is very little reciprocity among our domestic networks; relations among our*

domestic networks are very cohesive. The responses to these items were anchored on a 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree.

Domestic Network Centrality (DNC): Domestic network centralization was measured by using three items from Antia and Frazier's (2001) scale (Cronbach alpha = 0.799). These items were adjusted for the purpose of this study: *Networking with our domestic stakeholders (customers, suppliers, competitors, and politicians) is a crucial cog in our internationalisation efforts; we are very active among our domestic network of stakeholders; We are central within our domestic network system; we have extensive links with our domestic stakeholders.* We elicited valued responses to each network question using a 7-point scale, anchored by 1 = strongly disagree and 7 = strongly agree.

Domestic Network Informality (DNF): Network informality was measured with a four-item scale, anchored by a 7-point scale (Cronbach alpha = 0.747). Respondents were asked to specify whether their domestic networks with stakeholders (customers, suppliers, competitors and governments) were informal, formal, unstable and inflexible. These items were developed based on ideas from the network informality literature (Sorenson, 2003; Zhou *et al.*, 2007).

Ex-post International Strategic Adaptiveness (ISA): This international performance construct was measured using an adapted four-item scale developed by Krohmer *et al.* (2002) (Cronbach alpha = 0.793). The scale was adapted specifically to measure the strategic adaptiveness of SMEs to the host and international business environment after the internationalisation. Respondents indicated on a seven-point scale (1 = strongly disagree to 7 = strongly agree) how accurately each statement described the international adaptive ability of the firm. See Table 1 for the items of the construct.

Ex-post International Strategic Innovation (ISI): Four items developed based on ideas gleaned from the extant literature were used (Cummins *et al.*, 2000; Gilmore *et al.*, 2006).

These items measured the extent to which SMEs innovate their products/services ex-post internationalisation to meet the changing needs of their customers in host international markets, identify unarticulated international market needs and develop solutions for them, and the extent to which they invent new products and services even at the risk of making their own products obsolete in the international markets (Cronbach alpha = 0.832).

Control variables (CVs): Following other studies, we controlled for *Ownership Status (OS)* and *Firm Size (FS)* of the SMEs since the extant literature suggests they may influence networking ability (Coviello *et al.*, 2000; Peng and Luo 2000; Zhou *et al.*, 2007). In transition economies with the legacy of centrally planned economic systems dominated by state-owned enterprises (SOEs), non-SOEs tend to have unique challenges and lack formal institutional support (Musteen *et al.*, 2014). Managers in these firms may thus be strongly motivated to developing and sustaining ties in order to compensate for such lack of support and improve performance (Xin and Pearce 1996). Also, following Peng and Luo (2000) firm size in this study was equated with the total number of employees in a firm.

3.3 Analyses

Due to the adaptation of some of these scales already validated in previous studies, exploratory factor analysis (EFA) was performed to gauge the measurement of these constructs. This process further enabled us to examine the potential presence of common method variance (CMV) in the data set. Harman's single factor test was employed as the first criteria in examining CMV (Podsakoff and Organ 1986). All the items were included in the EFA analysis which resulted in a five-factor solution that accounted for over 58% of the variance in the model. Item loadings were all greater than 0.520. **Table 1** contains the factor loadings of all variables.

When all the items were constrained to a single factor, only 16.23% of the variance was explained by the resulting single factor extracted.

Moreover, we estimated three competing models using structural equation modelling (AMOS) to further check the potential presence of CMV in our data. In the first model, we loaded all indicators on a single latent factor which yielded the following results: $\chi^2/DF = 1438.244/189 = 7.610$; GFI= 0.628; IFI = 0.284; and CFI = .275; RMSEA = 0.159; PCLOSE=0.000. In the second model, each indicator was loaded on its respective latent factor with the following results: $\chi^2/DF = 293.68/171 = 1.72$; GFI= 0.91; IFI = .930; and CFI = 0.93; RMSEA = .05; PCLOSE=0.342. The results of the second model are far superior to that of model 1. In the final third stage (model 3), we followed Carson (2007) to estimate a combined congeneric measurement model by estimating a CFA model for all multi-item scales together with a common method factor linking all the indicators/items: $\chi^2/DF = 293.099/170 = 1.724$; GFI= 0.908; IFI = .930; and CFI = .929; RMSEA = .05; PCLOSE=0.328. The indices of model 3 are not substantially better than that of model 2. These together confirm that CMV is not a potential problem in this study.

[Insert Table 1 here]

We examined the reliability levels of the scales using Cronbach's alpha (α) and the resulting values from this analysis satisfy the level of acceptable reliability (Hair *et al.*, 2010; Nunally 1978). Moreover, to assess the discriminant validity of the measures, we conducted confirmatory factor analysis (CFA) using structural equation modelling (AMOS) on the five measures to examine the chi-square statistics, chi-square to degrees of freedom ratio, and other indices. Accordingly, levels of 0.90 and above for comparative fit index (CFI), goodness-of-fit index *GFI*; incremental fit index *IFI*, Tucker-Lewis index (TLI), levels of 0.80 and above for AGFI, and levels of 0.06 or lower for root-mean square error of approximation (RMSEA) reveals an appropriate fit of the model to the data (Bentler and Bonnet, 1980; Hu and Bentler,

1999, Kim *et al.*, 2013). The result show an acceptable fit of the five-factor model to our data: χ^2 (171) =293.68 ($p < 0.01$), $CMIN/DF = 1.72$, $GFI = 0.91$, $AGFI = 0.88$, $IFI = 0.93$, $TLI = 0.92$, $CFI = 0.93$, $RMSEA = 0.05$ and $PCLOSE = 0.342$. Specifically, all these measures of the fit indexes exceeded the critical levels suggested by Bentler and Bonnet (1980).

Additionally, we investigated the potential presence of multicollinearity in our dataset, which is considered to exist when correlation coefficients of variables are 0.9 or above and are highly correlated (Pallant, 2007). The correlation coefficient values of the variables in **Table 2** are below +/- .40 and are not strongly correlated, suggesting that multicollinearity is not an issue in this study. Notwithstanding, we further inspected the variance inflation factors (VIFs) of the hierarchical regression output and found the highest VIF value to be 1.084. The low VIFs scores of between 1 and 2, which are well below the rule-of-thumb level of 10 (Cryer and Miller, 1994) further eased any concerns of multicollinearity among our variables (Nakos and Brouthers, 2002). Besides, we mean-centred the variables before forming the interaction terms in our regression analysis to inspect if the inclusion of the interaction term resulted in multicollinearity problems (Jaccard *et al.*, 1990). Table 3 reports the results which are not materially different from the earlier results not reported here. These together showed no indication of multicollinearity among our variables.

4. Results

The descriptive statistics, reliability coefficients, and correlations among the variables appear in Table 2. The hierarchical regression analysis results are presented in Table 3. Models 1 and 4 are the baseline models and contain only the control and dependent variables. Noticeably in model 1, firm ownership (OS) has a positive impact on SME international strategic adaptiveness (ISA), while firm size (FS) has a positive but insignificant coefficient. In model

4, both OS and FS do not have a significant influence on SME ex-post international strategic innovation (ISI). Hypotheses **1a** suggested that domestic network density (DND) will relate to SME ex-post ISA in the host country. Model 2 of Table 3 presents the regression output of this relationship. The association between network density and ex-post ISA ($\beta = 0.046, p \leq 0.46$) is positive and not significant. H1a is therefore not supported. Similarly H1b predicted that DND has an association with SME ex-post ISI in the host country. As depicted by model 5, the association between DND and SME ex-post ISI ($\beta = -0.003, p \leq 0.96$) is not significant. Thus our H1b is also rejected.

[Insert Table 2 here]

[Insert Table 3 here]

H2a posited that domestic network centrality (DNC) relates positively to SME ex-post ISA in the host country. Model 2 of Table 4 depicts a positive but insignificant association ($\beta = 0.027, p \leq 0.68$) between DNC and SME ex-post ISA in the host country. This rejects hypothesis H2a. H2b also suggested a positive association between DNC centrality and SME ex-post ISI. In model 5, the estimate coefficient of DNC is not statistically significant ($\beta = 0.007, p \leq 0.92$) and also has a negative sign. This result rejects our H2b.

Hypothesis 3a predicted that domestic network informality (DNF) moderates the relationship between DND and SME ex-post ISA, such that the negative impact is strengthened at higher level than at low level of networks informality. Model 3 of Table 3 revealed a negative and significant ($\beta = -0.122, p < 0.01$) moderating effect of DNF on DND and SME ex-post ISA. A plot of this moderation effect in Figure **2(a)** confirms that the negative relationship between DND and SME ex-post ISA was stronger at higher levels of informal networks than at lower levels of informal networks. In H3b, we suggested that DNF moderates the relationship between DND and SME ex-post ISI, such that the negative relationship is stronger under a

more informal rather than formal network ties. As shown in model 3 of Table 4, we found that DNF significantly moderates the impact of DND on SME ex-post ISI ($\beta = -0.162, p < 0.01$). We plotted the results graphically (Figure 2b) to explore the form and nature of the interaction significant interaction (Aiken and West, 1991; Aryee *et al.*, 2012). Figure 2(b) confirms that DNF strengthens the negatively significant influence on the association between DND and SME ex-post ISI. These findings are significant and support our H3a and H3b.

Hypothesis 3c posited that DNF moderates the DNC and SME ex-post ISA relationship. As the interaction effect of DNF on the DNC and SME ex-post ISA relationship is not significant ($\beta = -0.047, p \leq 0.45$), H3d does not receive statistical support. Similarly, H3d predicted a moderating effect of DNF on the association between DNC and SME ex-post ISI. Model 6 of Table 3 shows a significant and positive moderating effect ($\beta = 0.145, p < 0.05$) of DNF on DNC - SME ex-post ISI relationship. Figure 2(d) which plots this interaction, confirms that high level of domestic network informality strengthens the positive impact of domestic network centrality on SME ex-post international strategic innovation. Our H3c is thus also supported.

[Insert Figures 2a, 2b, 2c & 2d here]

5. Discussion

Based on social network theory and the international entrepreneurship literature, we formulated and tested a model to explain how SME domestic network structural attributes affect their international product/service innovation and strategic adaptiveness. The model further examined the moderating role of domestic network informality on these associations. Several important findings emerged. First, the results provided no support for the direct effect of domestic network structural attributes (density and centrality) on SME ex-post

internationalisation innovation and strategic adaptiveness in the host country. These findings are quite surprising since the extant literature has suggested the pivotal role of network ties in general and network structural attributes on firm initial successful internationalisation (Ellis, 2011; Lindstrand *et al.*, 2011; Musteen *et al.*, 2014).

Extending this strand of research, the study underscores that domestic network attributes per se are not valuable resources that deliver value for SME ex-post internationalisation performance (Madhavan *et al.*, 1998). Moreover, the findings demonstrate that SMEs relying on domestic network attributes will not enable them access the type of resources that can help them create and deliver value in terms of international innovation and adaptiveness (Brass *et al.*, 2004). Arguably, SMEs relying mainly on domestic network density and centrality suffer a liability of localness and a competitive disadvantage in their ex-post internationalisation performance. This liability and competitive disadvantage is arguably driven by the inability of SMEs relying on domestic networks to understand the host country context and the implications of certain events on firms' activities that can positively affect their innovativeness and adaptation efforts. Additionally, due to bounded rationality (Simon, 1982), SMEs relying on domestic network attributes may overlook other relevant information sources both in the home and host markets because they suffer resource limitations.

Second, the findings however validate Andersson *et al.* (2013) finding that international networks augment firms' ex-post internationalisation performance and further expansion into the global market, while local networks contribute more positively to the initial internationalisation process of SMEs. Thus, while domestic networks may contribute to the initial successful internationalisation of SMEs, ex-post internationalisation success in the host country may depend more on developing and sustaining new and different network ties in the host country. Together, these findings provide important and novel aspect of the social network

theory and the context under which certain network ties and attributes will create and deliver value (Musteen et al., 2014; O’Gorman and Evers, 2011).

Third, the study established that network informality significantly strengthens the negative impact of dense domestic networks on SME international innovation and strategic adaptiveness. This finding underscores the view that very informal dense domestic networks are unable to provide relevant resources and information for SMEs’ success in the host country, and may rather take away crucial time from the SME by constantly seeking to learn how to also succeed in the internationalisation process. Finally, we expected the central and informal domestic networks to be valuable in SME international product/service innovation and strategic adaptiveness. Our findings confirm the significant positive role of central and informal domestic networks on SME international product/service innovation. However, the findings failed to provide support for the significant role of central and informal networks on SME international strategic adaptiveness. These findings have important research and practical implications.

6. Theoretical and practical implications

The study makes at least two significant contributions towards moving the literature forward. First, although many studies in the international entrepreneurship literature have examined the role of networks in SME successful internationalisation process (Harris and Wheeler, 2005; Zahra, 2005), research on domestic network structural attributes in SME internationalisation process is limited with mixed and inconclusive findings (Al-Laham and Souitaris, 2008; Anderson *et al.*, 2013; Giblin and Ryan, 2012). Moreover, researchers have failed to examine the role of local networks in SME ex-post international performance. Given the extensive literature on the role of international networks in firms’ post internationalisation

performance in the host country; it is long overdue that a study examined the impact of domestic networks on SME ex-post internationalisation performance. By examining the direct effect of domestic networks attributes on SME ex-post internationalisation performance, this study has enhanced our understanding of the potential impact and limitations of domestic network structural attributes on SME ex-post internationalisation performance.

Second, the finding that only domestic network informality enhances domestic network centrality on SME ex-post internationalisation innovation is instructive and novel in the international entrepreneurship literature. It thus highlights the view that SMEs that are central within their home country networks, use their position power accorded them by their centrality to capture and sieve relevant ideas and resources that are positively impactful in their product/service innovation efforts in the host country. The negative moderating role of network informality on dense domestic networks and SME international strategic adaptiveness is equally fruitful. Beside informality, the findings together are suggestive that the impact of domestic co-located networks density and centrality recede after the SME initial successful internationalisation. This implies that domestic network ties and attributes are unable to assist the SME subsidiaries in the host countries to overcome the liabilities of foreignness and newness in order to innovate or strategically adapt (Amal and Filho, 2010; Evers *et al.*, 2012; Johanson and Vahlne, 2003). The findings together add new dimensions to the international entrepreneurship literature.

Third, scholars have acknowledged the lack of research in transition and emerging economies focusing on the role of networks and network attributes on firms' internationalisation process and ex-post internationalisation performance (Musteen *et al.*, 2014; Yamakawa *et al.*, 2008). This is one of the few studies in the international entrepreneurship literature that has examined the role of transition economies' SME network attributes on their international performance (Yamakawa *et al.*, 2008). The findings provide a new perspective to

the predominantly developed countries centred scholarship in the network-related international entrepreneurship literatures. Moreover, it fills the research gap identified in this body of literature and adds to the limited studies done in similar context (Musteen *et al.*, 2014; Yamakawa *et al.*, 2008).

Practically, SME owners and managers need to understand the limits of domestic networks and network attributes in host countries. It implies that, managers need to refocus their limited subsidiary resources and time to developing new geographically co-located network ties and attributes in the host country. Instead of relying on their domestic networks that helped in their initial successful internationalisation, developing new international networks would enable them to speedily overcome their liabilities of foreignness, newness and smallness in the host country (Evers *et al.*, 2012; Johanson and Vahlne 2003). Through such international networks they will access critical information and resource needed for their international strategic adaptation, innovation and overall performance in the host country. Moreover, the positive moderating role of domestic network informality on the relationship between network centrality and international innovation suggests that SMEs can still derive some positive benefits from their informal domestic network ties only when they are central within their domestic network system.

7. Limitations and future research directions

Notwithstanding the important contributions this study makes to literature and practice, there are a number of limitations and the findings should be interpreted in the context of these limitations. First, the study only examined four domestic network structural attributes and their impact on SME ex-post internationalisation performance. It is possible that different types of networks such as customer ties, supplier ties, competitor ties, or government ties in the home

country may influence SMEs' international performance. Future studies could look to examining the impact of different types of network ties on SME ex-post internationalisation performance in the host country. Moreover, we did not examine nodes and edges in real network data but rather used "quasi-" network measures derived from survey data as in other studies. Future studies could also focus on exploring real network data and their impact on SMEs' post internationalisation performance. Such approaches would further enhance our understanding of domestic networks contributions to SMEs international performance.

Secondly, performance is a multidimensional concept for which researchers have used different measures. In this study, we used SME ex-post internationalisation strategic adaptiveness and innovation as the international performance measure. Different performance measures such as international sales growth, market share, service delivery, return on investment (ROI), return on assets (ROA), or return on equity (ROE), could be adopted in future research to examine the impact of networks or networks structural attributes. Despite the above limitations, the findings in this study have filled a research gap in the international entrepreneurship literature.

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Figure 1: Moderating Effect of DNF on DND and DNC – SME IMP Relationship Model

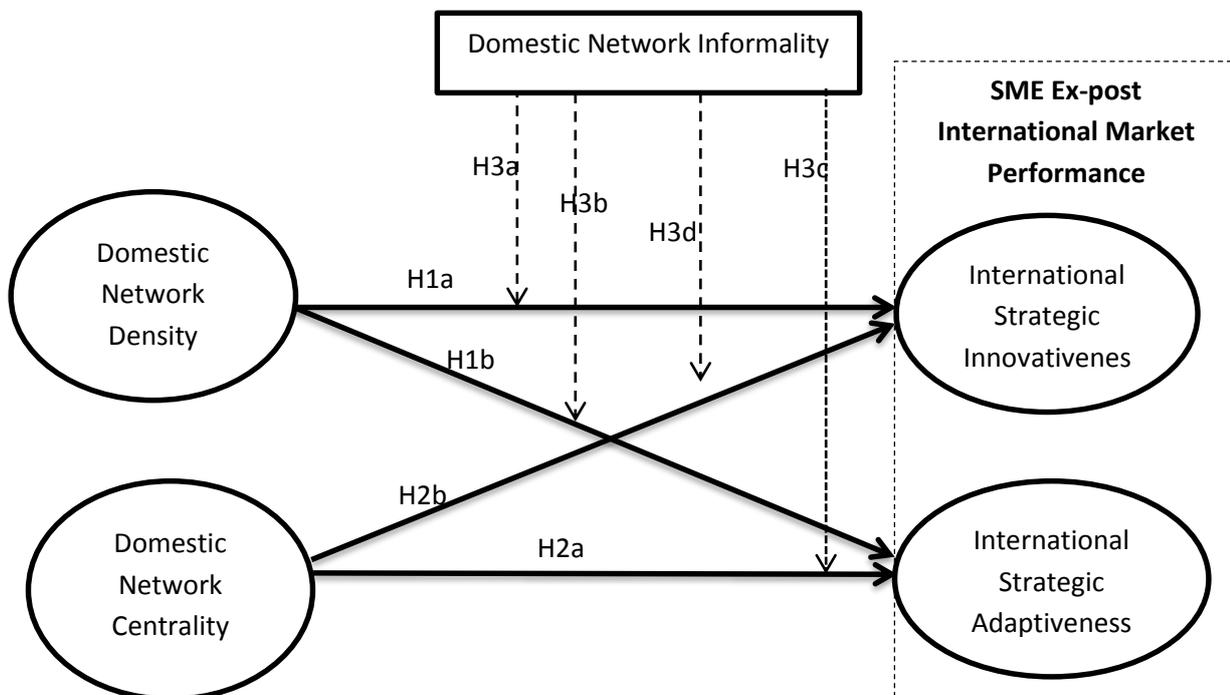


Figure 2a: Domestic Network Formality as a moderator for Domestic Network Density and International Strategic Adaptiveness.

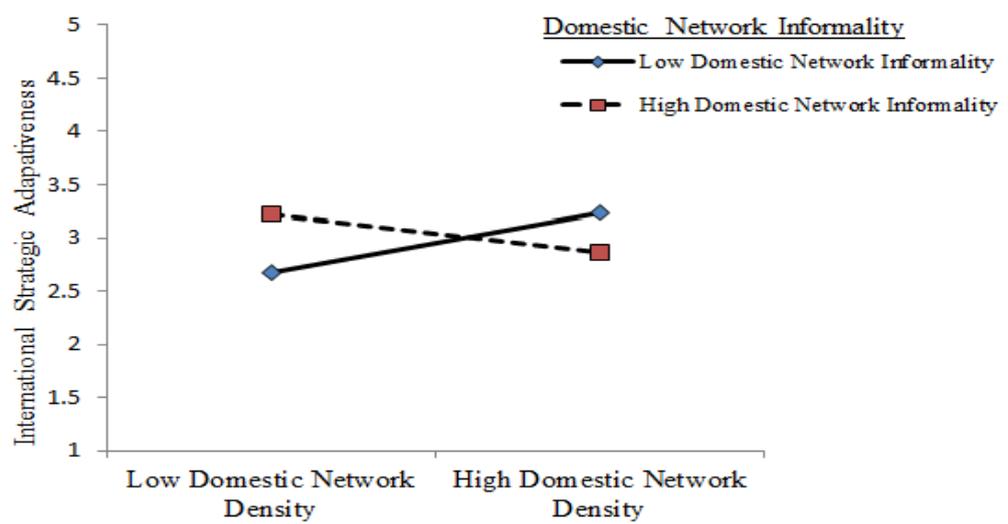


Figure 2b: Domestic Network Formality as a moderator for Domestic Network Density and International Innovation.

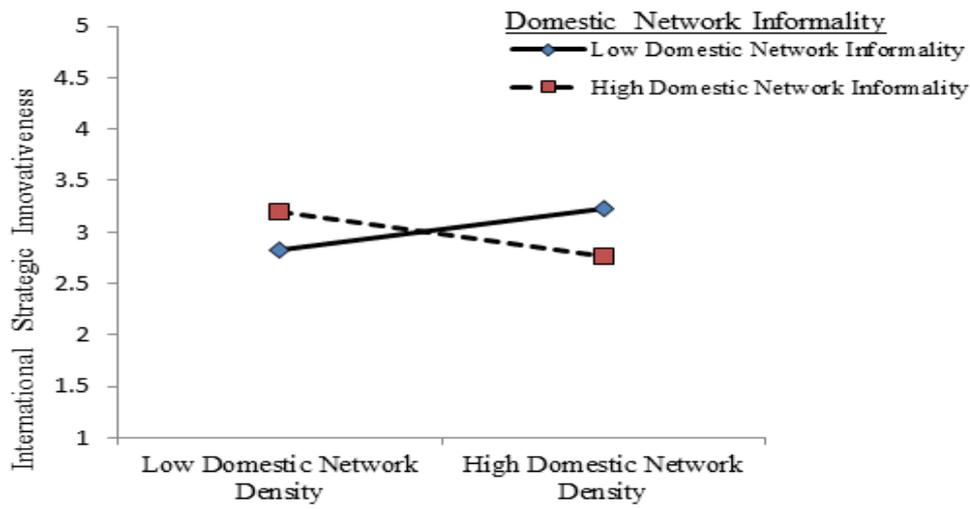


Figure 2c: Domestic Network Formality as a moderator for Domestic Network Centrality and International Strategic Adaptiveness.

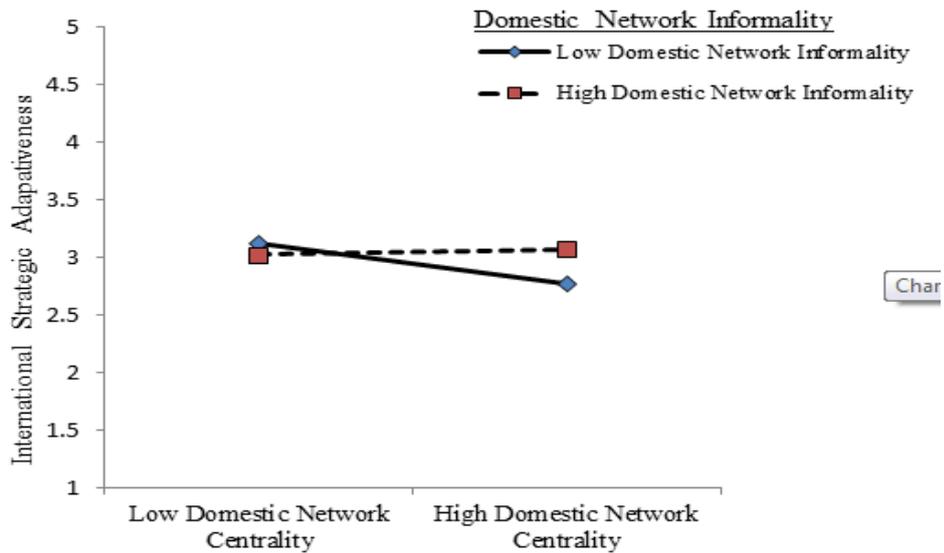


Figure 2d: Domestic Network Formality as a moderator for Domestic Network Centrality and International Innovation.

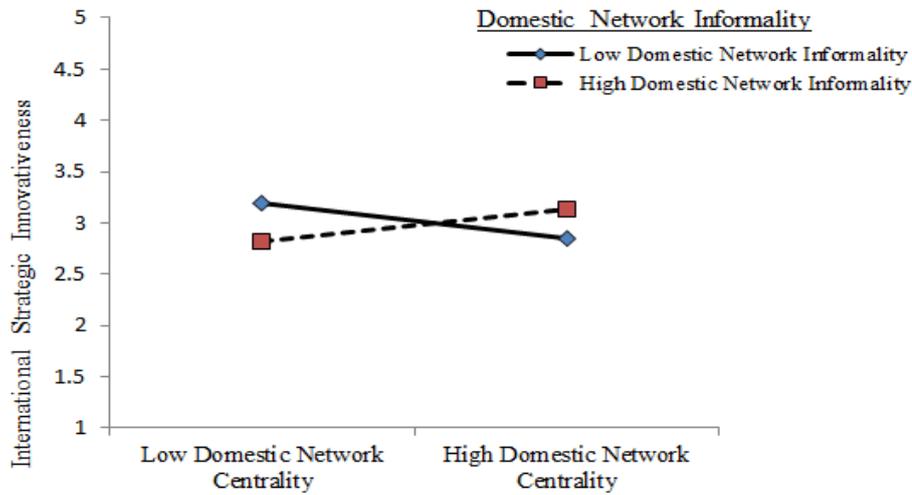


Table 1: Varimax Rotated Factor Analysis for the Six Constructs

Construct Code: factor	Ref	Measurement Variable	Factor loadings
Domestic Network Centrality (DNC) <i>Cronbach's $\alpha=0.799$</i>	DNC1	Networking with our stakeholders (customers, suppliers, competitors, and politicians) is a crucial cog in our internationalisation efforts	.834
	DNC2	We are very active in among our network of stakeholders (customers, suppliers, competitors, and politicians).	.826
	DNC3	We are central within our network system of stakeholders (customers, suppliers, competitors, and politicians).	.822
Domestic Network Density (DND) <i>Cronbach's $\alpha=0.729$</i>	DND1	Relations among members of our network system are very cohesive	.674
	DND2	Members of our company network system share information among ourselves	.646
	DND3	Members of our network system frequently discuss common problems	.621
	DND4	There is extensive interaction among members of our network system	.614
	DND5	Members of our network system share frequent communications with each other	.593
	DND6	Members of our network system share extremely close ties with each other	.574
	DND7	Members of our domestic network system are many and diverse	.564
Domestic Network Informality (DNF) <i>Cronbach's $\alpha=0.747$</i>	DNF1	Our ties with stakeholders within our network system are formal.	.843
	DNF2	Our networks with stakeholders within our network system are stable.	.823
	DNF3	Our ties with stakeholders within our network system are inflexible.	.793
	DNF4	Our ties with stakeholders within our network system are informal.	.521

SME's International Strategic Innovation (ISI) <i>Cronbach's $\alpha=0.832$</i>	ISI1	We innovate our products/services to meet the changing needs of customers in international markets.	.905
	ISI2	We continuously try to discover unarticulated market needs and develop innovative solutions for them.	.872
	ISI3	We continuously innovate and invent new products and services even at the risk of making our own products obsolete.	.747
<hr/>			
SME's International Strategic Adaptiveness (ISA) <i>Cronbach's $\alpha=0.793$</i>	ISA1	We adapt our products and services quickly to new international markets	.865
	ISA2	We adapt our products and services quickly to the changing needs of our international customers.	.795
	ISA3	We adapt our products quickly to provide real value to our international consumers	.778
	ISA4	We react quickly to threats in our international markets	.625

Table 2: Means, Standard Deviations, and Correlations

Variable	Mean	S.D	1	2	3	4	5	6	7	8
1. Firm Ownership	1.77	0.42								
2. Firm Size	2.59	0.60	-0.158*							
3. International Strategic Innovation	4.91	1.25	-0.021	0.008						
4. International Strategic Adaptiveness	4.91	0.95	0.143*	0.070	0.392**					
5. Domestic Network Informality	4.55	1.17	0.100	-0.034	-0.016	0.072				
6. Domestic Network Centrality	3.87	1.46	-0.196**	0.125*	-0.011	0.012	-0.095			
7. Domestic Network Density	4.08	0.88	-0.013	-0.143*	-0.002	0.033	0.058	0.115		
8. DND_X_DNF	0.06	0.87	0.036	0.082	-0.156*	-0.100	-0.092	0.115	0.040	
9. DNC_X_DNF	-0.09	0.94	-0.046	0.053	0.142*	-0.042	0.077	0.076	0.106	0.022

^aN=263; *p<.05; ** p<.01; *** p<.001.

Table 3: Main effects of EC, NT, AN and PLV on PSA (Standardized Coefficients)

Variables	International Strategic Adaptiveness			International Strategic Innovation			VIF
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>	
<i>Hypothesis</i>		<i>H1a & H1b</i>	<i>H3a & H3b</i>		<i>H2a & H2b</i>	<i>H3c & H3d</i>	
<i>Control variables</i>							
Firm Ownership	.158*	.164*	.172**	-.020	-.019	-.004	1.066
Firm Size	.095	.099	.112	.005	.004	.010	1.073
<i>Main effects</i>							
Domestic Network Density (DND)		.046	.056		-.003	-.012	1.053
Domestic Network Centrality (DNC)		.027	.043		.007	.018	1.084
<i>Interactions</i>							
DND x DNF			-.122**			-.162**	1.025
DNC x DNF			-.047			.145*	1.020
<i>R</i> ²	.029	.032	.049	.001	.002	.046	
<i>Adjusted R</i> ²	.022	.017	.027	-.007	-.015	.024	
<i>F Change</i>	3.898*	0.410	2.244	0.061	0.006	6.126**	
Durbin Watson	1.308	1.328	1.364	1.896	1.897	1.878	

^aN=263; * p<.05; ** p<.01; *** p<.001.