The asymmetric effects of local and global network ties on firms' innovation performance

Lei Wang
Glorious Sun School of Business and Management Donghua University, Shanghai, China
Jun Li
College of Forestry and Landscape Architecture, South China Agricultural University, China and
School of Management, Curtin University, Australia, and
Shaoqing Huang
Antai College of Economics and Management Shanghai Jiao Tong University, Shanghai, China

Abstract

Purpose – The purpose of this paper is to develop and empirically test a theoretical framework examining how local network ties and global network ties affect firms' innovation performance via their absorptive capacities.

Design/methodology/approach – The conceptual framework is empirically tested in a field study with multi-source data collected from a sample of 297 manufacturing firms located in four. Manufacturing clusters in the south-eastern Yangtze River Delta of China. Hypotheses were tested with the use of path analysis with maximum likelihood robust estimates through the structural equation modelling approach.

Findings – The asymmetry between local network ties (LNT) and global network ties (GNT) in terms of influences on firms' innovation performance is confirmed by empirical tests. LNT not only significantly and positively contribute to firms' innovation performance directly but also enhance it indirectly via absorptive capability, whereas GNT exhibit only marginal influence on innovation performance. GNT are shown to boost innovation performance (IP) only indirectly via firms' absorptive capacities. Knowledge heterogeneity and the difference between domestic and multinational firms' institutional environment are considered to be the main causes of the asymmetric effects.

Originality/value – While the previous literature either focused on the mediating role of firms' knowledge absorptive capacities or investigated the effects of social networks separately, this study incorporates both mechanisms into a single analytical framework to better account for the interactions between network effects and absorptive capacities. The results challenge some previous studies positing that GNT are stronger determinants than LNT in shaping a local firm's innovation capacity in emerging economies, and the findings emphasize the importance of absorptive capacity in helping local enterprises to leverage external linkages to enhance firm's innovation performance.

Keywords Asymmetry, Absorptive capacity, Innovation performance, Global network ties, Local network ties

Paper type Research paper

Introduction

International business and marking analysts have routinely observed that local firms in developing economies often struggle to upgrade their performance in product innovation, mainly due to lack of efficient learning capacity and an enabling environment allowing them to effectively absorb, exploit and digest external knowledge acquired from global buyers. However, realizing product innovation is crucial for enhancing a firm's long-term competitiveness and achieving the ultimate goal of gaining market share. Innovation performance is also a prerequisite for firms looking to climb the global value chain. Thus, understanding the underlying mechanisms that enhance a firm's innovation capacity is of critical importance from corporate governance and marketing strategy perspectives, especially for business organizations involved in global supply chain in the context of fast-growing international business. Previous studies have extensively addressed such issues as learning capability, knowledge acquisition and exploitation and innovation performance of firms involved in buyer-supplier relationships in both the international business and marketing literature. It is generally accepted that the acquisition, assimilation and exploitation of external knowledge make a critical contribution to a firm's learning and innovation capability. Attaining external resources often depends on social network ties, which help firms gain access to complex, uncodified, valuable knowledge, whereas firms with arm's length relationships can obtain only codified, explicit information from exchange parties. The existing literature has identified two main categories of network ties:

1 local network ties (LNT), which are rooted in the social relationships that bind co-located firms; and

The current issue and full text archive of this journal is available on Emerald Insight at: **www.emeraldinsight.com/0885-8624.htm**

Journal of Business & Industrial Marketing
33/3 (2018) 377–389

[DOI 10.1108/JBIM-10-2016-0252]

We acknowledge the funding support by National Natural Science Foundation of China (No. 71572032), and Donghua University Distinguished Young Professor Program (B201315).

Received 27 October 2016
Revised 3 July 2017
28 September 2017
Accepted 10 October 2017

2 global network ties (GNT), which are embodied in various informal external linkages embedded in globalized production networks that are established by leading foreign firms or buyers.

Whilst both LNT and GNT are considered to help provide the knowledge base for firms' innovation, prior theoretical and empirical studies have not reached a consensus with regard to which of them are primarily responsible for determining their innovation performance. From the local social web perspective, LNT provide an interactive and open learning mechanism through various inter-firm interactions, such as labour circulation, informal communication and R&D cooperation, which give firms more opportunities to access diverse and valuable information from local peers. By contrast, the global network literature asserts that GNT with leading firms, represented by multinational enterprises (MNEs) in developed countries, are likely to present a wide range of new products, know-how and international market information, thereby presenting a greater potential for local firms to improve their innovation capabilities. Therefore, identifying how LNT and GNT influence firms' innovation performance represents an important research agenda.

Recent studies suggest that firms must possess the ability to "recognize the value of new, external information, assimilate it, and apply it to commercial ends" to improve their innovation performance, which in turn may also depend on external knowledge derived from LNT and GNT. In this regard, innovation performance demands certain societal and institutional competencies that have been termed *absorptive capacity*, as well as access to external knowledge.

Moreover, most prior studies have focused on high-technology hotspots in developed countries, such as Silicon Valley and Route 128, highlighting the flow of extremely new technical knowledge through social circles. The institutional environment in developed countries consists of well-developed and relatively stable political, social and economic systems. By contrast, the institutional framework in emerging economies is generally considered underdeveloped, which is characterized by less-developed resources, technologies and managerial skills. When there are stark differences in resources and knowledge in the institutional environments in which external linkages are created, such linkages – whether international or local – are likely to have different degrees of impact on firms' levels of innovation.

By bringing together these convergent strands of evidence from management, marketing and international business, our study incorporates firms' absorptive capability and innovation performance in an analytical framework of social network by examining different effects of LNT and GNT on firms' innovation performance, including the different effects of LNT and GNT on firms' innovation performance and the mediating effect of absorptive capacity. In doing so, this study contributes to the international business and marketing literature from three perspectives. First, whilst prior research focused on a single perspective of LNT or GNT and emphasized how LNT and GNT benefit the acquisition of specific, complex knowledge, we find asymmetric effects of LNT and GNT on firms' innovation performance. Second, we assess the mediating effect of absorptive capacity on the relationship between LNT/GNT and firms' innovation performance by extending the literature on absorptive capacity theory. Third, with our sample being drawn from the largest emerging economy – China – this study's findings may also improve our understanding of the relevance of the theoretical framework in the context of developing countries. The interpretation of the theoretical model and empirical results involves standard forms of firms' local and global networks based on the social capital theory, and thus allows a completely "classical" reading of the paper.

Conceptual foundation

Theoretical framework

Over the past two decades, increasing attention has been paid to regions that are designated as sites of innovation in the globalizing economy. The popularity of this trend can be traced back to various studies of regional success stories, such as the rapid economic growth of networked small and medium-sized enterprises in the "Third Italy", the exemplary industrial system of Silicon Valley and other examples of successful regional clusters in most developed and developing economies. These studies draw on the common rationale that territorial agglomeration provides the best context for an innovation-based globalizing economy because of "sticky" knowledge grounded in social interaction, and therefore the key advantages of clustering are to be found in the processes of knowledge creation and learning by LNT.

On the other hand, some scholars document that local firms can rarely innovate independently and that the introduction of new products and processes into the global market largely depends on the ability of local firms to build strong links with MNEs. As the globalized network diminishes the economic relevance of regional clusters, GNT are considered to be a useful means through which local firms can obtain external resources for gradient upgrading, especially when less-developed countries are considered the recipient economies.

Absorptive capacity is considered a crucial dynamic capacity pertaining to knowledge creation and utilization, which involves a collection of routines to manage knowledge and the cumulative influences of continuous learning in the firm. By effectively redefining and deploying knowledge-based assets, firms with high absorptive capacity would be amenable to change, and thus reshaping their operational capabilities to improve performance. Based on these arguments, we developed a theoretical framework to explain how LNT and GNT affect firms' innovation performance via their absorptive capacities.

Local network ties and innovation performance

LNT, which are characterised by strong compliance with social norms and a high level of mutual trust, have long been considered a key factor for knowledge generation and diffusion amongst localized network partners. First, firms with dense business ties have more opportunities to access diverse and valuable information from local peers (suppliers, buyers and competitors), research organizations and public organizations, and are thus likely to engage in more innovative activities than those with fewer ties.

Second, LNT are helpful for transferring tacit and complex knowledge. Because these types of knowledge are always embedded in the functioning of the human resources process, they are difficult to obtain through a simple market transaction. LNT provide an interactive and open learning mechanism through various inter-firm interactions, such as labour circulation, informal communication and R&D cooperation. Hence, firms with LNT have greater access to diverse and valuable channels to obtain tacit and complex knowledge.

Furthermore, LNT expose firms' mutual dependence and obligations, which will lead them to resist opportunistic behaviour. Therefore, firms can put more resources into new product development without worrying about loss caused by imitation. Hence, we hypothesize the following:

H1. LNT have a positive effect on firms' innovation performance.

Global network ties and innovation performance

Despite its innovation advantages, LNT also have some shortcomings, for that over-dependence on LNT may reinforce firms' existing behaviours and rigidities, which will lead to a relatively narrow field of knowledge. By contrast, GNT with leading firms, represented by MNEs in developed countries, are likely to present a wide range of new products, know-how and international market information, thereby presenting a greater potential for firms to improve their innovation capabilities. It is documented in the previous literature that the social capital embedded in GNT offers a context for firms to interact with multinational companies to access required knowledge resources, and important knowledge assets are, thus, transferred voluntarily when global buyers provide technological assistance to help local suppliers increase their supply quality and efficiency. In addition, firms must actively learn and imitate the advanced technology of MNEs using a *learning by doing* approach or they will be eliminated from the global supply chain by MNEs, which in turn force them to take effective measures to incorporate transformed knowledge into operations. Under these circumstances, GNT not only provide firms more opportunities to acquire advanced knowledge but also contribute to enhancing their capability of doing so.

Furthermore, GNT also permit local suppliers to generate a desirable amount of redundancy amongst global buyers, which motivates firms to better reflect on the nature of their existing products and to digest and absorb newly acquired knowledge. From this perspective, GNT enable firms to revisit the ways of effectively integrating existing and new knowledge to mobilize mutual commitment and facilitate the usage of external knowledge. In such conditions, the opportunities for firms to explore and transfer the new knowledge are often increased with improved knowledge absorptive capacity. These discussions and arguments lead to our next hypothesis, formally stated below:

H2. GNT have a positive effect on firms' innovation performance.

Network ties and absorptive capacity

Absorptive capability, like many other dynamic capabilities, develops through an organization's experience-based learning, and thus tends to build up cumulatively by external network relationships. Therefore, interaction with local knowledge sources (e.g. local suppliers, competitors and research institutes with similar cognitive structures, common skills and shared languages) helps in the accumulation of absorptive capacity. Ahuja and Katila (2001) find, for instance, that the knowledge identification and assimilation process is much simpler when the internal and external knowledge bases contain similar elements. Obviously, the common values, culture, history and tradition between firms that characterize LNT are helpful for them to analyze, process, interpret and understand the knowledge embedded in LNT, therefore helping the accumulation of absorptive capability.

In GNT, MNEs will give firms technical assistance on product design, quality control and inventory management, which help firms derive new insights from the combination of existing and newly acquired knowledge. GNT also allow MNEs to better assess firms' capabilities, making their communication more frank and sincere, which transparently increases trust and reliability between them. This can then further increase firms' capacity to transform and exploit external knowledge in GNT. Therefore, formal cooperation and informal interaction with MNEs will help firms learn how to assimilate, transform and exploit external knowledge embedded in GNT, which is conducive for absorptive capacities.

Notably, a context of network ties (GNT and LNT) embedded in an emerging economy is quite different from that of network ties within a developed country. China, noted for the short period of time in which it transitioned from a planned economy to a free-market system, has experienced considerable political and economic uncertainty and is still refining its institutional environment. In recent years, many formal institutions such as laws and regulations have already been established, but their enforcement is still problematic. In such situations, the transaction cost would be very high if people rely only on the formal institutional framework. As a result, network ties are likely to facilitate reciprocal interaction and unobserved knowledge flow, and by lowering transaction costs, to complement the inefficiency of the formal framework in facilitating economic exchanges. By freeing-up precious resources, such institutional support would likely facilitate firms' absorptive capacities. Thus, we propose the following:

H3. LNT have a positive effect on firms' absorptive capacity.

H4. GNT have a positive effect on firms' absorptive capacity.

Absorptive capacity and innovation performance

Absorptive capacity has long been considered one of the most important determinants of a firm's ability to utilize external knowledge to increase its internal innovation capacity. According to Zahra and George (2002), firms focusing on the acquisition and assimilation of new external knowledge are able to continually renew their knowledge stock, whilst firms focusing on transforming and exploiting new external knowledge can obtain profits through exploitation. Previous studies considered absorptive capacity to be a crucial dynamic

Journal of Business & Industrial Marketing
Volume 33 · Number 3 · 2018 · 377–389

capacity pertaining to knowledge creation and utilization in knowledge-based competition and emphasized its importance in firms' organizational learning process.

Cepeda-Carrión *et al.* (2012) document that firms with high absorptive capacity would find it appropriate to reshape their operational capabilities to improve performance by effectively redefining and deploying knowledge-based assets. Absorptive capacity also plays an important role in integrating different types of knowledge from different sources by helping firms identify and assimilate valuable knowledge effectively. For example, absorptive capacity can enable firms to improve innovation performance by building on and replicating both the firms' prior technological knowledge and knowledge acquisition from global buyers. It also provides local firms with greater opportunities to combine new patterns for resource and capability by which new insights will emerge. Furthermore, absorptive capacity helps improve firms' capability in selecting knowledge recombination and capitalizing on innovation opportunities that are potentially more successful for commercializing feasible options from a broad set of potential innovation alternatives. These arguments have been supported by some empirical research in the recent literature. For example, empirical studies by both Chen (2009) and Liao and Yu (2013) on the high-technology firms in Taiwan, as well as the investigation of Parra-Requena *et al.* (2013) into manufacturing firms in Spain, corroborated the positive effects of absorptive capacities on firms' innovation. Thus, we propose the following hypothesis:

H5. Absorptive capability has a positive effect on firms' innovation performance.

To improve innovation performance by external knowledge acquisition through LNT and GNT, firms must have the capabilities to acquire, assimilate and transform valuable external knowledge and combine it with their knowledge base. Absorptive capacity involves recognizing the value of new, external information, assimilating it and applying it to commercial ends. It also helps preserve and utilize newly created knowledge maintained within the organization, thus enhancing its future exploitation. The consideration of all the statements above suggests that firms, to improve their innovation performance, will not only depend on LNT and GNT to acquire valuable knowledge and information but also need absorptive capability to integrate the new knowledge and information with their existing resources for implementation and exploitation. Following our earlier discussions and arguments supporting *H3*, *H4* and *H5*, we predict that firms' innovation performance is indirectly and positively associated with LNT and GNT via its absorptive capacity. Consequently, we proceed to the final two hypotheses:

H6. Absorptive capability mediates the relationship between LNT and innovation performance.

H7. Absorptive capability mediates the relationship between GNT and innovation performance.

Methods

To focus on the effects of LNT and GNT on local firms' innovation performance, especially in the context of an emerging economy, we chose manufacturing industry clusters located in China's Yangtze River Delta (YRD) region as our research subject. China has long been thought as a "world factory" since joining the WTO in 2001 (Li *et al.*, 2010). Manufacturing industry clusters such as the information and communication technology (ICT), as well as personal computer, textile and clothing industry clusters play a very important role in the global manufacturing network because of their outstanding cost advantage, flexible manufacturing mode and perfect matching capacity. The YRD region is widely considered a central hub of highly concentrated OEMs as most of the exporting manufacturing industries in China are located in this region because of its obvious geographical superiority, outstanding industrial base and flexible manufacturing mode (Zhou and Li, 2012; Jiang and Stening, 2013). These manufacturing industry clusters in YRD not only have a mature local network but also remain tightly connected with their international customers. For that reason, it is appropriate to choose the industry clusters in YRD in constituting the sample frame for our study.

Data collection and sampling

A random sample of firms was drawn from four manufacturing industry clusters in YRD, namely, the Shanghai ICT cluster, Suzhou laptop computer cluster, Shaoxing textile cluster and Pinghu clothing cluster. These manufacturing clusters were chosen because they reflect the different characteristics of Chinese local suppliers in global buyer-local supplier relationships. The Shanghai ICT industry cluster is China's fastest growing manufacturing industrial hub of exporting production activities. The Suzhou IT cluster is the world's largest laptop computer production base, accounting for about one-fourth of the world's production of laptop computers. Shaoxing is the largest city in China in terms of textile production and export, and Pinghu is the home of the largest clothing export base in China, especially in terms of offshore production.

We drew our sample from the Economic Commerce Committee of these four cities, which included 1,200 firms across the four cities. Firms were then selected from the lists based on the following criteria:

- having no fewer than two years of experience in global and local cooperation relationships, as long-term agreements encourage firms to invest more resources into cooperation relationships, which will enhance the organizational learning and then improve their performance (Li *et al.*, 2014); and
- being a firm operating in the manufacturing sector because inter-firm cooperation relationship in the manufacturing sector is the most common form in China (Xie *et al.*, 2010).

Based on these criteria, 803 firms were shortlisted.

Mature scales that have been used in domestic and foreign research are adopted to ensure the reliability and validity of the questionnaire. Prior to conducting the actual questionnaire survey, we selected 30 firms in the Shanghai ICT cluster and Shaoxing textile industry cluster to take a pre-test (excluded from the final sample). The questionnaires were then adjusted based on the feedback from the preliminary survey and the

opinions of experts. Because top administrators can provide reliable information regarding the basic environmental and organizational characteristics of their firms, senior managers or firm presidents represent the most appropriate sources of information for this study. The respondents were assured of the anonymity and confidentiality of their responses, that there are no right or wrong answers, and they should answer as honestly as possible.

Totally, 803 questionnaires were delivered through postal mail or online, of which 309 were completed and returned after telephone call follow-ups over a period of three months. A screening of the returned questionnaires found that 297 were usable, constituting a response rate of 37 per cent. The informants come from firms spanning diverse industries, including ICT (29.7 per cent), notebook PCs (23.4 per cent), textiles (31.3 per cent) and clothing (15.7 per cent). Diverse industries ensure the variance of the independent variables in the research model. Respondents holding a technology and management position in their respective companies accounted for nearly 80 per cent of the whole sample, of which 90 per cent had worked more than five years in the firm. Therefore, the authenticity and reliability of the questionnaires are guaranteed (see Table I).

Measures

The measurements of constructs were based on published literature on international business knowledge transfer and innovation. We followed stringent procedures in designing the questionnaire. First, an English-language version of the questionnaire was prepared based on previous studies and was then translated into Chinese by two bilinguals. Second, we used back-translation to check conceptual equivalence. Any conflict was discussed carefully until there were no substantial differences in the meaning of the items.

Local network ties and global network ties

The measures for LNT are adapted from Boehe (2007). The measures capture linkages between firms and local customers, suppliers, research institutes, peers and industry associations. Table II depicts this scale. The measures for GNT are adopted from Chen (2009) and Yli-Renko *et al.* (2001). The measures capture the requirements for product quality and delivery time from international customers, cooperation between local firms and international customers and the information obtained by the firms in clusters from international exhibitions. Table II depicts this scale.

Absorptive capability

Most studies use a quantitative approach towards measuring absorptive capacity, i.e. R&D expenditures, the number of technical employees, R&D investment, etc. (Cohen and Levinthal, 1990; Tsai, 2001; Grimpe and Sofka, 2009). In this study, we follow earlier empirical studies which have adopted this process-based approach (Jansen *et al.*, 2005; Lichtenthaler, 2013) and measure absorptive capacity on the process of external knowledge acquisition, assimilation, transformation and exploitation as indicators for absorptive capacity (Zahra and George, 2002). The measures of absorptive capacity are adapted from Jansen *et al.* (2005) and Flatten *et al.* (2011), which capture firms' ability to identify, acquire, assimilate and apply the external new knowledge. Table II depicts this scale.

Innovation performance

Hsu and Fang (2009) synthesized criteria for the development of innovation performance constructs from previous empirical

Table I Characteristics of the sample (N = 297)

Characteristic	Item description	Number	Proportion (%)
Age of alliance	Under 2 years	108	36.3
	3-5 years	101	33.9
	6-10 years	61	20.6
	Over 10 years	27	9.0
Number of employees	Under 100	116	39.1
	100-500	110	37.0
	500-1,000	40	13.5
	Over 1,000	31	10.1
Industry type	Textile	93	31.3
	Clothing	47	15.7
	Notebook PC	69	23.4
	ICT	88	29.7
Respondent position	Management	104	25.0
	Market	45	15.2
	Technology	122	41.1
	Other	26	8.8
Respondent tenure	Under 5 years	36	16.9
	3-5 years	96	27.9
	5-10 years	102	31.6
	Over 10 years	63	23.4
Firm ownership structure	State-owned	104	35.0
	Joint venture	45	15.2
	Private firm	148	49.8

Journal of Business & Industrial Marketing
Volume 33 · Number 3 · 2018 · 377–389

Table II Variables indicators and sources

Constructs	Variable indicators	Variable sources
Please circle the number which accurately reflects your company's present relationship with peers, customers, geographically proximate suppliers and international customers		
LNT	LNT 1. We are closed linked with local customers	Boehe (2007)
	LNT 2. We have comprehensive linkages with many suppliers in the same area	Boehe (2007)
	LNT 3. We often collocated with local research institutes and universities	Boehe (2007)
	LNT 4. We and many peers are located geographically close to one another in the area	Knoben (2009)
	LNT 5. We are closely linked with local industry associations	Sobrero and Roberts (2001)
GNT	GNT 1. We are closely linked with international customers	Chen (2009)
	GNT 2. We have comprehensive linkages with many international customers	Chen (2009)
	GNT 3. Our international customers provide us with new market and trend information	Yli-Renko *et al.* (2001)
	GNT 4. Our international customers made strict product quality requirements	Yli-Renko *et al.* (2001)
	GNT 5. We frequently attend international trade exhibitions to acquire valuable market information	Chen (2009)
When responding to the following items, please evaluate your company's absorptive capacity for each item in relation to the average for direct competitors on a scale of 1 to 5		
AC	AC 1. Capacity to capture relevant, continuous and up-to-date information and knowledge	Flatten *et al.* (2011)
	AC 2. Capacity to assimilate new technologies and innovations that are useful or have proven potential	Jansen *et al.* (2005)
	AC 3. Capacity to applicate technologies designed by other to the firm's particular needs	Jansen *et al.* (2005)
	AC 4. Capacity to use and exploit new knowledge in the workplace to respond quickly to market changes	Jansen *et al.* (2005)
How much do you agree with the following statement about your company?		
Innovation performance	IP1: New product development generates a high investment return	Hsu and Fang (2009)
	IP2: New product development contributes significantly to market leadership	Hsu and Fang (2009)
	IP3: New product development generates high customer acceptance	Hsu and Fang (2009)
	IP4: Patent growth rate in the past three years	Alegre and Chiva (2008)
	IP5: New product growth rate in the past three years	Alegre and Chiva (2008)

Notes: Local network ties (LNT); Global network ties (GNT); Absorptive Capability (AC)

studies on innovation. Further to our previous discussion on the justification of the hypotheses, we used three items from the Hsu and Fang (2009) criteria that we considered to be closely aligned with the product innovation construct. We were also guided by Alegre and Chiva (2008), who proposed and tested a measurement scale for product innovation performance with two different dimensions of constructs based on previous research (OECD, 1997). We adapted one item from the Alegre and Chiva (2008) construct for our research. Table II depicts this scale.

Data analysis and results

In this section, we first present the procedure for constructs scale reliability and measurement validity test, and then we proceed to modelling results analysis.

Scale reliability and measurement validity

Analysis of reliability of the latent variables was conducted by calculating the constructs' alpha and the composite reliabilities (CRs). Table III shows that all factor constructs' alpha and the composite reliabilities (CRs) exceed the threshold value of 0.7, providing evidence of measure scale reliability (Hulland, 1999).

Convergent validity was assessed by confirmatory factor analysis. Fornell and Larcker (1981) suggest that a loading of 0.7 or higher is enough on established scales. As shown in Table III, all factor loadings exceed this threshold (except one item). Furthermore, the average variance extracted (AVE) for all constructs was larger than 0.50 (see Table III), indicating that the measurement items capture sufficient variance in the underlying construct than that attributable to measurement error (Fornell and Larcker, 1981).

The discriminant validity of the research scales was tested in three different ways. First, we ran an exploratory factor analysis by using principal component analysis with varimax rotation (see Table IV) for LNT, GNT, absorptive capacities and innovation performance. The analysis generated four factors, as expected, and there are no substantial cross-loadings (all below 0.4, see Table V). Then, we performed pair-wise chi-square difference tests for all constructs using both a constrained and an unconstrained model. In each test, the constrained model fit is significantly worse than that of the unconstrained model, thus satisfying Anderson and Gerbing's (1988) criterion for discriminant validity. Moreover, the square root of AVE value for each scale was higher than the construct's respective correlation with all other constructs (See Table V), providing

Table III Reliability and validity of the measures

Variables	Measurement items	λ	Cronbach's α	CR	AVE
LNT	LNT 1	0.797***	0.852	0.880	0.595
	LNT 2	0.798***			
	LNT 3	0.694***			
	LNT 4	0.810***			
	LNT 5	0.752***			
GNT	GNT 1	0.742***	0.850	0.884	0.606
	GNT 2	0.846***			
	GNT 3	0.704***			
	GNT 4	0.770***			
	GNT 5	0.781***			
Absorptive capacity	AC 1	0.781***	0.850	0.851	0.589
	AC 2	0.801***			
	AC 3	0.736***			
	AC 4	0.752***			
Innovation performance	IP 1	0.765***	0.871	0.880	0.594
	IP 2	0.781***			
	IP 3	0.772***			
	IP 4	0.778***			
	IP 5	0.775***			

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; CMIN/DF = 1.482; RMSEA = 0.040; RMR = 0.026; NFI = 0.927; GFI = 0.933; IFI = 0.975; TLI = 0.971; RFI = 0.915

Table IV Exploratory factor analysis

Variables	Measurement items	Factor1	Factor2	Factor3	Factor4
LNT	LNT 1		0.814		
	LNT 2		0.846		
	LNT 3		0.743		
	LNT 4		0.815		
	LNT 5		0.755		
GNT	GNT 1	0.792			
	GNT 2	0.877			
	GNT 3	0.764			
	GNT 4	0.816			
	GNT 5	0.816			
Absorptive capability	AC1				0.821
	AC2				0.842
	AC3				0.764
	AC4				0.796
Innovation performance	IP1			0.789	
	IP2			0.762	
	IP3			0.811	
	IP4			0.801	
	IP5			0.766	

Notes: Innovation performance (IP); The KMO value is 0.876, significant at the 0.001 level, and the total variance explained amounted to 69.941%

Table V Means, SD and correlations of variables

Variables	Mean	SD	1	2	3	4
1. LNT	3.08	0.64	*0.771*			
2. GNT	2.31	0.68	0.050	*0.778*		
3. Absorb capacity	3.01	0.64	0.387***	0.211**	*0.767*	
4. Innovation performance	2.84	0.69	0.339***	0.126*	0.351***	*0.771*

Notes: Italic values represent square root of AVE values; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

further support for discriminant validity (Fornell and Larcker, 1981).

Common method bias

To test common method bias, we used the Harman's one-factor test for all variables to check for common method bias (Harman, 1967). The first factor with an eigenvalue of 4.234 accounted for only 23 per cent of the variance. The results indicate that there is no such general factor which can accounts for most of the variance. Furthermore, we put all the variables in a single factor CFA model, and the fit was poor (χ^2/df = 12.4, NFI = 0.379, CFI = 0.395, RFI = 0.316, GFI = 0.502, RMSEA = 0.175), which means no single factor explains the majority of the variance (Podsakoff *et al.*, 2003). Based on these results, we can reasonably conclude that CMV does not significantly affect the results in the analysis.

Empirical results

Hypotheses were tested with the use of path analysis, a subset of structural equation modelling (SEM) in which only single indicators (i.e. observed variables) are used, with maximum likelihood robust estimates in AMOS 6.0 SEM programme. The results of the first test are described in Table VI (direct model). This model is designed to test *H1* and *H2*, positing that LNT and GNT have positive effects on firms' innovation performance. The chi-square value for this model was satisfactory. The direct effect model shows that LNT is positively correlated with firms' innovation performance (β = 0.410***, $p < 0.001$). Hence, *H1* is supported. However, the effect of GNT on firms' innovation performance is marginally significantly positive (β = 0.106, $p < 0.1$). Hence, *H2* received marginal support.

The second test was implemented by the theoretical (indirect) model, which is designed to test *H3*, *H4* and *H5*. Overall, the theoretical model fits the data well. The chi-square value is 234 with a df of 149, GFI of 0.927, NFI of 0.921, GFI of 0.927, IFI of 0.970, RFI of 0.910 and RMSEA of 0.044. *H3* and *H4* proposed that LNT and GNT have positive effects on firms' absorptive capacities. The results of the indirect effect model show that both LNT (β = 0.465***, $p < 0.001$) and GNT (β = 0.196***, $p < 0.001$) are positively correlated with firms' absorptive capacities. Hence, both *H3* and *H4* are supported. *H5* proposed that absorptive capacities have a positive effect on firms' innovation performance. The results show a significant and positive relationship between absorptive capacities and firms' innovation performance (β = 0.437***, $p < 0.001$). Therefore, *H5* is also validated.

H6 and *H7* posit that absorptive capability mediates the effects of LNT and GNT on firms' innovation performance. To provide empirical evidence for mediation, this study follows previous research to examine direct, indirect and saturated models in terms of their fit indices and path coefficients (Osmonbekov *et al.*, 2016). As shown in Table VI, the chi-square difference between the direct and indirect models is 80 with 61 df, which is significant ($p < 0.05$).

In addition, the non-significant chi-square difference of 16 with 2 df between the indirect and saturated models suggests that the more complicated saturated model could not improve the fit over the indirect model. All paths in the indirect models are significant. In the saturated model, the relationship between GNT/LNT and absorptive capability and the relationship between absorptive capability and firms' innovation performance remained significant ($p < 0.01$), whilst the direct effect of LNT on firms' innovation performance is significant but lowered from 0.410 to 0.317, the direct paths from GNT to firms' innovation performance is insignificant (β = 0.053, $p > 0.1$). These results indicate that the relationship between LNT and firms' innovation performance is partially mediated by absorptive capability and that the relationship between GNT and firms' innovation performance is fully mediated by absorptive capability, consistent with Danner *et al.* (2015)'s theoretical framework of full mediation. Thus, *H6* and *H7* are confirmed. Figure 1 summarizes the path analysis results of the overall model.

Discussion

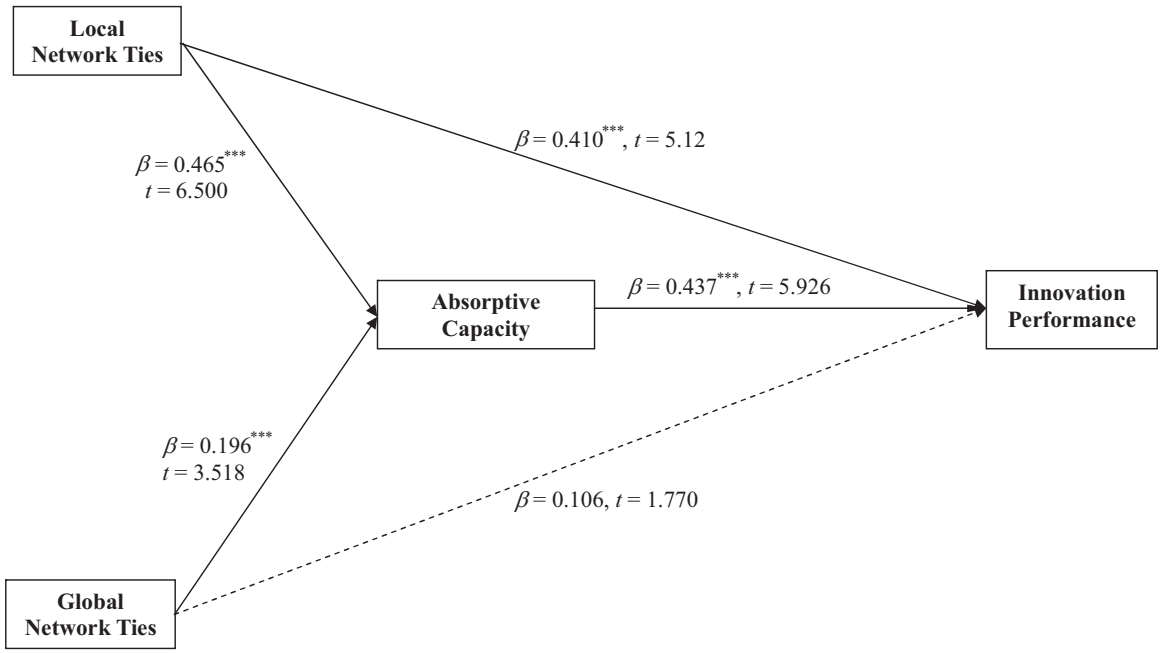
This study developed a contingency framework linking LNT, GNT and innovation performance, using Chinese clusters in the YRD region as subjects to examine the effects of GNT and LNT on cluster firms' innovation performance. Our findings contribute to the literature in a number of ways. First, we

Table VI Statistics and standardized path coefficients of structural models

Measure	Direct	Indirect	Saturated
LNT → Innovation performance	0.410***		0.317***
GNT → Innovation performance	0.106****		0.053
LNT → Absorptive capability		0.465***	0.268***
GNT → Absorptive capability		0.196***	0.195***
Absorptive capability → Innovation performance		0.437***	0.387***
Model fit			
Chi-square	154	234	218
df	88	149	147
RMSEA: root mean square error of approximation (<0.08)	0.050	0.044	0.041
GFI: goodness of fit index (>0.90)	0.934	0.921	0.932
NFI: normed fit index (>0.90)	0.939	0.927	0.927
IFI: incremental fit index (>0.90)	0.971	0.970	0.975
RFI: relative fit index (>0.90)	0.922	0.910	0.915

Notes: ****$p < 0.1$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Figure 1 Path analysis results of the overall model



Notes: Dotted linerepresent marginally significant effect and solid lines represent significant effects; the effects of LNT/GNT on absorptive capability and the effect of absorptive capability come from the indirect model; the effects of LNT/GNT on innovation performance come from the direct model.*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

contribute to the debate on the effects of LNT and GNT on firms' innovation performance. This is one of few empirical undertakings to test the different effects of LNT and GNT on firms' innovation performance in an emerging economy based on both domestic and cross-national settings, whereas previous work was mainly focused on the single effect of either LNT or GNT, e.g. Murovec and Prodan (2009); Eisingerich *et al.* (2010); Herstad *et al.* (2014); Ozer and Zhang (2015); and Gebreeyesus and Mohnen (2013). With our sample being drawn from the largest emerging economy, i.e. China, we are able to document that the influences of LNT and GNT on firms' innovation performance are asymmetric. Whilst LNT positively influence firms' innovation performance, the direct impact of GNT on firms' innovation performance is rather negligible. This may be because LNT and GNT are two distinct network ties, which give firms to access different kinds of knowledge. LNT, building on the interaction with local peers that have similar cognitive structures and common skills, are good at transferring homogenous knowledge, whereas GNT, connected with global buyers who have different technology base and organizational culture, are conducive to transferring heterogeneous knowledge.

Because firms not only tend to exploit the knowledge with which they have prior experience but also are good at transforming and exploiting it, the homogenous knowledge embedded in LNT is easy to analyze and utilize, thereby increasing firms' innovation performance directly. Conversely, heterogeneous knowledge acquired from GNT is difficult to realize directly, but rather must be assimilated and transformed before application. Furthermore, all the studied subjects in our sample data are Chinese domestic firms, and China has been noted for the short period in which it has transitioned from a planned economy to a free-market system. In contrast, the institutional environment in developed countries consists of well-developed and relatively stable political, social and economic systems. Thus, the differences in common goals, organizational culture and institutional environment between local suppliers and global buyers tend to increase the difficulty for local suppliers to learn advanced knowledge from global buyers, which, in turn, hinder the influence of GNT on innovation performance. As a consequence, GNT have only a marginal effect on local firms' innovation performance; however, GNT can affect local suppliers' innovation via absorptive capacities.

The findings reveal that the effect of GNT on cluster firms' innovation performance is fully mediated via the RAC, implying a contradiction to some of recent studies revealing that GNT play a crucial role in access to knowledge and enhanced learning and innovation for local firms in high-technology industries. This asymmetry between local and global networks motivates us to further investigate the endogenous heterogeneity of social capital in terms of local firms' GNT exploitation capability for IP improvement purposes in future research.

On the other hand, given that the samples were drawn from industries in an emerging economy, our findings corroborate the argument made by Saliola and Zanfei (2009) that it is misleading to expect that all types of firms in any country are equally conducive to knowledge transfer from GNT; learning mechanisms and innovation performance may vary widely

Journal of Business & Industrial Marketing
Volume 33 · Number 3 · 2018 · 377–389

according to the nature and intensity of the multinational presence and the competencies of the local firms. In this respect, our study provides new empirical evidence that is useful for challenging some assumptions about GNT that have been taken for granted.

Second, this study adds to our understanding of how absorptive capacity relates LNT/GNT and firms' innovation performance. The absorptive capacity literature suggests that, to increase firms' innovation performance, firms must have the capabilities to identify, assimilate and transform the external knowledge and combine it with existing resources and competencies. This study supports that view but qualifies it by finding that absorptive capacities account for the influence of LNT and GNT on firms' innovation performance. Our results underscore the need for absorptive capacity to unearth the process by which external ties (i.e. LNT and GNT) influences local firms' innovation performance.

Third, our findings also cast light on the external antecedents of absorptive capacity in both domestic and international settings and address the knowledge gap in this research field. Following Zahra and George (2002) and Ozer and Zhang (2015), we invoke the social network theory to build a model to investigate the impact of LNT and GNT on firms' absorptive capacities with a conformable framework. By conducting an empirical study in China, we found that LNT and GNT significantly facilitate firms' absorptive capacities. In doing so, we integrated the social network literature with the absorptive capacity theory that suggests absorptive capacity as one of the most salient antecedents of firms' innovation performance.

Managerial implications

Our results have two important implications for practicing managers. First, our results suggest local managers of firms implement classified management strategies according to different types of network ties. Our findings show that LNT and GNT have different characteristics and incur different effects on firms' innovation performance. Specifically, LNT not only significantly and positively contribute to firms' innovation performance directly but also enhance it indirectly via absorptive capability, whereas GNT mainly accelerate it indirectly via firm's absorptive capacities; its main effect appears to be marginally significant. Thus, managers of firms should be cautious about the building of GNT, and LNT are encouraged to enhance firms' innovation performance if they want to gain quick gains in the short run. However, managers should know that LNT alone may be insufficient to support their sustained technological progress for competing in the global market. Over-reliance on LNT will cause short-sighted learning and trap firms into learning ability rigidity, meaning that they will lose development opportunities in the future (Boschma *et al.*, 2009). To stimulate further technological development and advances, Chinese firms shall recognize that GNT can bring about more opportunities for firms to develop new products or new markets, thus ensuring their long-term gains, whereas LNT mainly improve their current period incomes. Therefore, firms should maintain a sound balance of investment in building LNT and GNT to avoid any innovation lock-in risks caused by the sole reliance on one type of external network tie.

Second, managers of local firms in emerging economies should understand the importance of absorptive capacity in terms of learning from LNT and GNT. The findings suggest that absorptive capacity acts as an important mediator between LNT/GNT and firms' innovation performance. Managers should acknowledge that, to better absorb, digest, synthesize and transform the external knowledge originated from GNT, local firms need to improve and upgrade their absorptive capacities and try to manage them effectively.

Conclusion and perspectives

Focusing on the domestic and international settings in China, we examined the effect of LNT and GNT on firms' innovation performance and the mediating effects of absorptive capacity on the relationships between them. Using a large sample of 297 Chinese cluster firms in the YRD region, our results suggest that both GNT and LNT are conducive to enhancing firms' innovation performance, but their effecting mechanism is asymmetric. More specifically, we found:

- LNT not only have a significant and positive impact on innovation performance but also improve it via absorptive capacities; and
- the effect of GNT on innovation performance is fully mediated by absorptive capacities and its direct effect on innovation performance is marginally significant.

These findings challenge some previous studies positing that GNT are more determining than LNT in shaping local firms' innovation capacity in emerging economies, as the modelling results suggest that LNT were the primary factor affecting cluster firms' innovation performance. Some scholars argued that the impact on innovation is higher for GNTs than that of LNT for cluster firms operating in an emerging economy, as LNTs may restrict innovation resources in the local network, which will result in problems such as core competency rigidity and local knowledge redundancy.

However, there are still many complications for GNT, including the existence of significant technology gaps between the cluster firms in an emerging economy and the MNEs of developed countries, especially the differences in enterprise systems, management style and organizational cultures and the social cultural environments in which the firms operate. The cluster firms in emerging economies are often characterised by unevenly developed workforces, technological backwardness and non-standardized corporate systems. In such situations, technology gaps and institutional differences will hinder knowledge absorptive capacity building, especially the capacity for absorbing and transferring tacit knowledge. This will constrain the knowledge spillover from MNEs to cluster firms and constrain their innovation performance. In contrast, common technology bases and similar culture and institutions between cluster firms are conducive for the transfer, absorption and exploitation of knowledge and technology. As a result, knowledge from LNT can be quickly transformed into cluster firms' innovation performance. Therefore, the impact on innovation performance is found to be higher with LNT than with GNT for cluster firms in our study sample in an emerging economy context.

Although our study reveals a significant and positive effect of LNT on cluster firms' innovation performance, LNT alone

may be insufficient to support their sustained technological progress. Whilst LNT help strengthen firms' knowledge accumulation and technology base and quickly improve their innovation performance, GNT can create more opportunities for firms to develop new products or open new markets, thus ensuring their long-term gains. Therefore, cluster firms should maintain a relative balance of LNT and GNT to avoid the innovation lock-in risk caused by the sole reliance on one type of external network tie. In addition, to fully realize the benefits of being a member of the GNT and LNT, cluster firms should try their best to develop and sustain their absorptive capacity.

Certainly, this study also has some limitations that open some of perspectives for future research. First, it is believed that focusing on domestic firms can reflect the real network ties from inside and outside the cluster without inference from foreign firms. Therefore, we chose only indigenous firms in the YRD region of China for our sample. However, this might potentially give rise to concerns about the generalizability of our findings to other contexts. Thus, evidence from other cultural and institutional environments would add to the strength of our study's findings. Second, there are two different types of innovation – incremental and radical innovation – that operate under different logics and adapt to different kinds of network ties. This study did not discriminate the effects of network ties, i.e. GNT versus LNT, between incremental and radical innovation. In our future research, we will seek to examine how different types of network ties influence incremental and radical innovation differently. Third, our research findings were based on cross-sectional data. Given that the effects of network ties on innovation capacity of firms may release their full potential only over the long run, longitudinal studies could help further test and substantiate some of the cross-sectional findings reported in the present study. We expect to address these issues in our follow-up studies.

References

Ahuja, G. and Katila, R. (2001), "Technological acquisitions and the innovation performance of acquiring firms: a longitudinal study", *Strategic Management Journal*, Vol. 22 No. 3, pp. 197-220.

Alegre, J. and Chiva, R. (2008), "Assessing the impact of organizational learning capability on product innovation performance: an empirical test", *Technovation*, Vol. 28 No. 6, pp. 315-326.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review of recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, pp. 411-423. No

Boehe, D.M. (2007), "Product development in MNC subsidiaries, local linkages and global interdependencies", *Journal of International Management*, Vol. 13 No. 4, pp. 488-512.

Boschma, R., Eriksson, R. and Lindgren, U. (2009), "How does labour mobility affect the performance of plants the importance of relatedness and geographical proximity", *Journal of Economic Geography*, Vol. 9 No. 2, pp. 169-190.

Cepeda-Carrión, G., Cegarra-Navarro, J.G. and Jimenez-Jimenez, D. (2012), "The effect of absorptive capacity on innovativeness: context and information systems capability as catalysts", *British Journal of Management*, Vol. 23 No. 1, pp. 110-129.

Chen, L.C. (2009), "Learning through informal local and global linkages: the case of Taiwan's machine tool industry", *Research Policy*, Vol. 38 No. 3, pp. 527-535.

Cohen, W.M. and Levinthal, D.A. (1990), "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35 No. 1, pp. 128-152.

Danner, D., Hagemann, D. and Fiedler, K. (2015), "Mediation analysis with structural equation models: combining theory, design, and statistics", *European Journal of Social Psychology*, Vol. 45 No. 4, pp. 460-481.

Eisingerich, A., Bell, S.J. and Tracey, P. (2010), "How can clusters sustain performance? The role of network strength, network openness, and environmental uncertainty", *Research Policy*, Vol. 39 No. 2, pp. 239-253.

Flatten, T.C., Engelen, A., Zahra, S.A. and Brettel, M.A. (2011), "Measure of absorptive capacity: scale development and validation", *European Management Journal*, Vol. 29 No. 2, pp. 98-116.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Gebreeyesus, M. and Mohnen, P. (2013), "Innovation performance and embeddedness in networks: evidence from the Ethiopian footwear cluster", *World Development*, Vol. 41 No. 3, pp. 302-316.

Herstad, S.J., Aslesen, H.W. and Ebersberger, B. (2014), "On industrial knowledge bases, commercial opportunities and global innovation network linkages", *Research Policy*, Vol. 43 No. 3, pp. 495-504.

Hsu, Y. and Fang, W. (2009), "Intellectual Capital and new product development performance: the mediating role of organizational learning capability", *Technological Forecasting and Social Change*, Vol. 76 No. 5, pp. 664-677.

Hulland, J. (1999), "Use of partial least squares (PLS) in strategic management research: a review of four recent studies", *Strategic Management Journal*, Vol. 20 No. 2, pp. 195-204.

Jansen, J.J.P., Van den Bosch, F.A.J. and Volberda, H.W. (2005), "Managing potential and realized absorptive capacity: how do organizational antecedents matter", *Academy of Management Journal*, Vol. 48 No. 6, pp. 999-1015.

Jiang, F. and Stening, B. (2013), "Do indigenous firms incur a liability of localness when operating in their home market?", *The case of China, Journal of World Business*, Vol. 48 No. 4, pp. 478-489.

Knoben, J. (2009), "Localized inter-organizational linkages, agglomeration effects, and the innovative performance of firms", *The Annals of Regional Science*, Vol. 43 No. 3, pp. 757-779.

Li, X., Roberts, J., Yan, Y. and Tan, H. (2014), "Knowledge sharing in China–UK higher education alliances", *International Business Review*, Vol. 23 No. 2, pp. 343-355.

Li, Y., Li, P.P., Liu, Y. and Yang, D. (2010), "Learning trajectory in offshore OEM cooperation: transaction value for local suppliers in the emerging economies", *Journal of Operations Management*, Vol. 28 No. 3, pp. 269-282.

Liao, T.J. and Yu, C.M.J. (2013), "The impact of local linkages, international linkages, and absorptive capacity on innovation for foreign firms operating in an emerging economy", *The Journal of Technology Transfer*, Vol. 38 No. 6, pp. 809-827.

Lichtenthaler, U. (2013), "Absorptive capacity, environmental turbulence, and the complementarity of organizational learning processes", *Academy of Management Journal*, Vol. 56 No. 6, p. 1830.

Murovec, N. and Prodan, I. (2009), "Absorptive capacity, its determinants, and influence on innovation output: cross-cultural validation of the structural model", *Technovation*, Vol. 29 No. 12, pp. 859-872.

Osmonbekov, T., Gregory, B., Chelariu, C. and Johnston, W.J. (2016), "The impact of social and contractual enforcement on reseller performance: the mediating role of coordination and inequity during adoption of a new technology", *Journal of Business & Industrial Marketing*, Vol. 31 No. 6, pp. 808-818.

Ozer, M. and Zhang, W. (2015), "The effects of geographic and network ties on exploitative and exploratory product innovation", *Strategic Management Journal*, Vol. 36 No. 7, pp. 1105-1114.

Parra-Requena, G., Ruiz-Ortega, M.J. and Garcia-Villaverde, P.M. (2013), "Social capital and effective innovation in industrial districts: dual effect of absorptive capacity", *Industry & Innovation*, Vol. 20 No. 2, pp. 157-179.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903.

Saliola, F. and Zanfei, A. (2009), "Multinational firms, global value chains and the organization of knowledge transfer", *Research Policy*, Vol. 38 No. 2, pp. 369-381.

Sobrero, M. and Roberts, E.B. (2001), "The trade-off between efficiency and learning in interorganizational relationships for product development", *Management Science*, Vol. 47 No. 4, pp. 493-511.

Xie, E., Li, Y., Su, Z. and Teo, H.H. (2010), "The determinants of local suppliers' trust towards foreign buyers", *Management International Review*, Vol. 50 No. 5, pp. 585-611.

Yli-Renko, H., Autio, E. and Sapienza, H.J. (2001), "Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms", *Strategic Management Journal*, Vol. 22 Nos 6/7, pp. 587-613.

Zahra, S.A. and George, G. (2002), "Absorptive capacity: a review, reconceptualization, and extension", *Academy of Management Review*, Vol. 27 No. 2, pp. 185-203.

Further reading

Asheim, B. and Coenen, L. (2005), "Knowledge bases and regional innovation systems: comparing Nordic clusters", *Research Policy*, Vol. 34 No. 8, pp. 1173-1190.

Baba, Y. and Walsh, J.P. (2010), "Embeddedness, social epistemology and breakthrough innovation: the case of the development of statins", *Research Policy*, Vol. 39 No. 4, pp. 511-522.

Bagozzi, R.P. and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of Academy Market Science*, Vol. 16 No. 1, pp. 74-94.

Banerjee, S., Prabhu, J.C. and Chandy, R.K. (2015), "Indirect learning: how emerging–market firms grow in developed markets", *Journal of Marketing*, Vol. 79 No. 1, pp. 10-28.

Bertrand, O. and Mol, M.J. (2013), "The antecedents and innovation effects of domestic and offshore R&D outsourcing: the contingent impact of cognitive distance and absorptive capacity", *Strategic Management Journal*, Vol. 34 No. 6, pp. 751-760.

Camisón, C. and Forés, B. (2010), "Knowledge absorptive capacity: new insights for its conceptualization and measurement", *Journal of Business Research*, Vol. 63 No. 7, pp. 707-715.

Child, J. and Tsai, T. (2005), "The dynamic between firms' environmental strategies and institutional constraints in emerging economies: evidence from China and Taiwan", *Journal of Management Studies*, Vol. 42 No. 1, pp. 95-125.

Chiu, Y.T.H. (2008), "How network competence and network location influence innovation performance", *Journal of Business & Industrial Marketing*, Vol. 24 No. 1, pp. 46-55.

Easterby-smith, M., Lyles, M.A. and Tsang, E.W.K. (2008), "Inter-organizational knowledge transfer: current themes and future prospects", *Journal of Management Studies*, Vol. 45 No. 4, pp. 677-690.

Ebers, M. and Maurerb, I. (2014), "Connections count: how relational embeddedness and relational empowerment foster absorptive capacity", *Research Policy*, Vol. 43 No. 2, pp. 318-332.

Elola, A., Valdaliso, J.M. and López, S. (2013), "The competitive position of the basque aeroespatial cluster in global value chains: a historical analysis", *European Planning Studies*, Vol. 21 No. 7, pp. 1029-1045.

Filieri, R., McNally, R.C., O'Dwyer, M. and O'Malley, L. (2014), "Structural social capital evolution and knowledge transfer: evidence from an Irish pharmaceutical network", *Industrial Marketing Management*, Vol. 43 No. 3, pp. 429-440.

Gentile-Ludecke, S. and Giroud, A. (2012), "Knowledge transfer from TNCs and upgrading of domestic firms: the polish automotive sector", *World Development*, Vol. 40 No. 4, pp. 798-807.

George, G., Zahra, S.A. and Wood, D. (2002), "The effects of business–university alliances on the innovative output and financial performance: a study of publicly traded biotechnology companies", *Journal of Business Venturing*, Vol. 17 No. 6, pp. 577-608.

Gereffi, G., Humphrey, J. and Sturgeon, T. (2003), "The governance of global value chains", *Review of International Political Economy*, Vol. 15 No. 4, pp. 1121-1135.

Glaister, A., Liu, Y., Sahadev, S. and Gomes, E. (2014), "Externalizing, internalizing and fostering commitment: the case of born-global firms in emerging economies", *Management International Review*, Vol. 54 No. 4, pp. 473-496.

Grimpe, C. and Sofka, W. (2009), "Search patterns and absorptive capacity: low- and high-technology sectors in European countries", *Research Policy*, Vol. 38 No. 3, pp. 495-506.

Guler, I. and Nerkar, A. (2012), "The impact of global and local cohesion on innovation in the pharmaceutical industry", *Strategic Management Journal*, Vol. 33 No. 5, pp. 535-549.

Guo, B. and Guo, J.J. (2011), "Patterns of technological learning within the knowledge systems of industrial clusters

in emerging economies: evidence from China", *Technovation*, Vol. 31 Nos 2/3, pp. 87-104.

Håkanson, L. and Dow, D. (2012), "Markets and networks in international trade: on the role of distances in globalization", *Management International Review*, Vol. 52 No. 6, pp. 761-789.

Hallin, C., Holm, U. and Sharma, D.D. (2011), "Embeddedness of innovation receivers in the multinational corporation: effects on business performance", *International Business Review*, Vol. 20 No. 3, pp. 362-373.

Hao, B. and Feng, Y. (2016), "How networks influence radical innovation: the effects of heterogeneity of network ties and crowding out", *Journal of Business & Industrial Marketing*, Vol. 31 No. 6, pp. 758-770.

Harman, H.H. (1967), *Modern Factor Analysis*, University of Chicago Press, Chicago.

Jean, R.B., Chiou, J.S. and Sinkovics, R.R. (2016), "Interpartner learning, dependence asymmetry and radical innovation in customer-supplier relationships", *Journal of Business & Industrial Marketing*, Vol. 31 No. 6, pp. 732-742.

Kenis, P. and Knoke, D. (2002), "How organizational field networks shape interorganizational tie-formation rates", *Academy of Management Review*, Vol. 22 No. 2, pp. 275-293.

Leminen, S., Nyström, A.G., Westerlund, M. and Kortelainen, M.J. (2016), "The effect of network structure on radical innovation in living labs", *Journal of Business & Industrial Marketing*, Vol. 31 No. 6, pp. 743-757.

Love, J.H. and Ganotakis, P. (2013), "Learning by exporting: lessons from high-technology SMEs", *International Business Review*, Vol. 22 No. 1, pp. 1-17.

Malhotra, A., Gosain, S. and Sawy, O.A.E. (2005), "Absorptive capacity configurations in supply chains: gearing for partner-enabled market knowledge creation", *MIS Quarterly*, Vol. 29 No. 1, pp. 145-187.

Minbaeva, D., Pedersen, T., Björkman, I., Fey, C.F. and Park, H.J. (2014), "MNC knowledge transfer, subsidiary absorptive capacity and HRM", *Journal of International Business Studies*, Vol. 45 No. 2, pp. 38-51.

Moran, P. (2005), "Structural vs relational embeddedness: social capital and managerial performance", *Strategic Management Journal*, Vol. 26 No. 12, pp. 11-29.

Nätti, S., Hurmelinna-Laukkanen, P. and Johnston, W. (2014), "Absorptive capacity and network orchestration in innovation communities promoting service innovation", *Journal of Business & Industrial Marketing*, Vol. 29 No. 2, pp. 173-184.

Nyström, A.G., Ramstrom, J. and Tornroos, J.A. (2017), "Conceptualizing mechanisms influencing strategizing in business networks", *Journal of Business & Industrial Marketing*, Vol. 32 No. 6, available at: https://doi.org/10.1108/JBIM-06-2015-0105

OECD (1997), "The measurement of scientific and technological activities", *Proposed Guidelines for Collecting and Interpreting Technological Data, Oslo Manual, OECD, Paris*.

Patel, P.C., Kohtamäki, M., Parida, V. and Wincent, J. (2015), "Entrepreneurial orientation as experimentation and firm performance: the enabling role of absorptive capacity", *Strategic Management Journal*, Vol. 36 No. 11, pp. 1739-1749.

Peng, M.W., Wang, D.Y.L. and Jiang, Y. (2008), "An institution-based view of international business strategy: a focus on emerging economies", *Journal of International Business Studies*, Vol. 39 No. 5, pp. 920-936.

Pietrobelli, C. and Rabellotti, R. (2011), "Global value chains meet innovation systems: are there learning opportunities for developing countries?", *World Development*, Vol. 39 No. 7, pp. 1261-1269.

Porter, M.E. (2000), "Location, competition, and economic development: local clusters in a global economy", *Economic Development Quarterly*, Vol. 14 No. 1, pp. 15-34.

Saleh, M.A., Ali, M.Y. and Julian, C.C. (2014), "International buyer behaviour–commitment relationship: an investigation of the empirical link in importing", *International Business Review*, Vol. 23 No. 2, pp. 329-342.

Simonin, B.L. (1999), "Ambiguity and the process of knowledge transfer in strategic alliances", *Strategic Management Journal*, Vol. 20 No. 7, pp. 595-623.

Song, M. and Chen, Y. (2014), "Organizational attributes, market growth, and product innovation", *Journal of Product Innovation Management*, Vol. 31 No. 6, pp. 1312-1329.

Steven, A.B., Dong, Y. and Corsi, T. (2014), "Global sourcing and quality recalls: an empirical study of outsourcing-supplier concentration-product recalls linkages", *Journal of Operations Management*, Vol. 32 No. 5, pp. 241-253.

Terziovski, M. (2010), "Innovation practice and its performance implications in small and medium enterprises (SMEs) in the manufacturing sector: a resource–based view", *Strategic Management Journal*, Vol. 31 No. 8, pp. 892-902.

Tsai, W.P. (2001), "Knowledge transfer in intraorganizational networks: effects of network position and absorptive capacity on business unit innovation and performance", *Academy of Management Journal*, Vol. 44 No. 5, pp. 996-1004.

Verbeke, A., Bachor, V. and Nguyen, B. (2013), "Procedural justice, not absorptive capacity, matters in multinational enterprise ICT transfers", *Management International Review*, Vol. 53 No. 4, pp. 535-554.

Zhang, S. and Li, X. (2008), "Managerial ties, firm resources, and performance of cluster firms", *Asia Pacific Journal of Management*, Vol. 25 No. 4, pp. 615-633.

Zhou, K.Z. and Xu, D. (2012), "How foreign firms curtail local supplier opportunism in China: detailed contracts, centralized control, and relational governance", *Journal of International Business Studies*, Vol. 43 No. 7, pp. 677-692.

Zhou, K.Z., Zhang, Q., Sheng, S., Xie, E. and Bao, Y. (2014), "Are relational ties always good for knowledge acquisition? Buyer–supplier exchanges in China", *Journal of Operations Management*, Vol. 32 No. 3, pp. 88-98.

Zhou, X., Li, Q., Zhao, W. and Cai, H. (2003), "Embeddedness and contractual relationships in china's transition economy", *American Sociological Review*, Vol. 68 No. 1, pp. 75-102.

Corresponding author

Jun Li can be contacted at: jun.li@curtin.edu.au