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Developing Knowledge Absorptive Capacity of SMEs in China

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ABSTRACT

Small and medium-sized enterprises (SMEs) are a crucial driver of the fast growing Chinese economy. This study aims to investigate how the external structures influence SMEs' knowledge absorptive capacity for competence enhancement and performance improvement. Taking the "structure-conduct-performance" paradigm as an overarching framework, this research extends and enriches this framework by integrating social networking theory and absorptive capacity theory into it. More specific, we partition the "structure" into environmental structure and social network structure outside of a focal firm, and specify the "conduct" as knowledge absorptive capacity development including knowledge acquisition and transformation. To verify our research model, a survey method is employed involving 77 SMEs from China. The results show the distinct roles of environmental hostility, customer network ties, and knowledge absorptive capacities on SMEs' performance. Theoretical contributions and managerial implications are also discussed.

Keywords

Absorptive capacity, Environmental hostility, Social network, Performance, SMEs

INTRODUCTION

The fascination of fast growing of Chinese economy leads to a proliferation of concern on China that is experiencing the transition from a centrally planned economy to a market economy. This provides an exciting context for understanding the transformation of organizations along with associated management challenges in an emerging and transitional economy (Tsui, Schoonhoven, Meyer, Lau and Milkovich, 2004). Previous research on China focuses on the sector of International Joint Ventures (e.g., Lane, Salk and Lyles, 2001; Tsang, Nguyen and Erramilli, 2004), however, research on the small and medium-sized enterprises (SMEs) is absent in the extant literature. SMEs constitute an important sector in China, accounting for 99% of the total number of enterprises. Obviously, SMEs are a key driver of Chinese economical growth. The transitional status generates radical industry changes, regulation uncertainties, and fierce rivalry among business competitors. In China, the environment is more competitive and unpredictable for smaller firms because of the immature legal system and the yearly increasing inflow of foreign direct investment. SMEs must not only compete with a huge number of domestic competitors but also fight with the increasing sophisticated foreign entrants. Given the hardship of SMEs but often outright failure, a better understanding of the influential factors and appropriate mechanisms for high performance is desirable.

According to the knowledge-based view, knowledge is the principal productive resource of a firm (Grant, 1996). SMEs have resource constrains, therefore the accumulateness of knowledge and experience to deal with new situations is weak. In a hostile environment with intense competitions, a poor knowledge base cannot allow them to sustain defendable positions in a long run. In front of the two-fold pressures, SMEs are urged to absorb external knowledge for competence enhancement and performance improvement. Intuitively acquiring external knowledge is less costly than in-house knowledge exploration for SMEs. Previous studies that focus on the attributes inside of a firm as antecedents of organizational learning, e.g., prior

knowledge, internal formal structures, strategic intent, etc. (Jansen, Van den Bosch and Volberda, 2005; Lyles and Salk, 1996), may not be adequate to explain why there is a necessity of developing knowledge absorptive capacity for SMEs in China.

The paradigm of “structure-conduct-performance” suggests the industrial structure determines how the situated firms response to the environment and to what extent they can achieve the business goals (Porter, 1985). External structures indeed play an important role on firms’ actions. The turbulent and hostile environment requires firms to respond and adjust quickly (Peng, 2003). The timely responsiveness and appropriate adaptation to the environment demand the development of knowledge absorptive capacity through acquiring new knowledge and transform them into the firm’s specific needs. However, industrial structure cannot fully represent the external structures outside of a firm, as social networking of SMEs is salient in emerging economies. In China, small firms intend to construct networking ties with other organizations, especially their customers. From social network perspective, external customer network ties enable the focal firm to learn from other firms (Hansen, 1999). To address these gaps, this study argues that both environmental hostility and customer network ties constitute the external structures and investigate their distinct effect on SMEs’ development of knowledge absorptive capacity for superior performance.

This study entails several contributions to the literature. First, consistent with knowledge-based view, our study also acknowledges the importance of external new knowledge that directly reinforces SMEs’ competence and promotes their performance in China context. Second, this study extends and enriches Porter’s “structure-conduct-performance” framework by integrating the theory of social network and absorptive capacity into it. Besides the effect of environmental structure on a firm’s action, we further argue that a focal firm’s social networking structure substantially influences its action, especially in China. Also our research enrich this framework by specifying the development of absorptive capacity as an appropriate conduct that is able to translate the external structures and resources into superior performance achievement for SMEs. Finally, our empirically validated framework in China provides cumulated knowledge of understanding the management, especially SMEs’ management, in transformational, emerging economies. Practically, our results have significant implications for owners and managers in SMEs to achieve superior performance as well as for the economies to foster SMEs’ growth which in turn contributes to the economies better.

THEORETICAL DEVELOPMENT

Michael Porter (1985) articulates a paradigm of “structure-conduct-performance” that can serve as the overarching framework of this research. It is postulated that the industrial structure influences to what extent a firm can achieve its goals. Accordingly, we argue that the turbulent and hostile environment can be as a trigger of a firm’s proactive actions. However, the traditional approach only sheds light on the environmental structure that firms operate in while underestimates another type of structure outside of the firms, i.e., social networking structure with other organizations. In fact, in a transitional economy where the business competition is hostile while the legal system is still unfledged, SMEs are more enthusiastic about cultivating ties with other organizations compared with larger firms (Peng and Luo, 2000; Xin and Pearce, 1996). Thus, this study conceptualizes the external structures of a focal SME into two parts: one is the environmental structure and the other is the firm’s inter-organizational networking structure. The environmental variable that is exogenous to a firm determines its strategic choice and drive it to learn from others, whereas the social networking of a focal firm, an inherent capital to be mobilized, provides opportunities for this firm to acquire external knowledge and resources.

According to absorptive capacity theory, a firm’s learning activities provide interfaces to the external environment. It is reasonable to argue that immediate “conduct” for SMEs is the development of a firm’s absorptive capacity including knowledge acquisition, knowledge assimilation/transformation, and exploitation (Todorova and Durisin, 2007; Zahra and George, 2002). Evaluating and acquiring external knowledge provides a firm with a knowledge base for further adaptation to the turbulent environment. When knowledge has been acquired from external sources, it will be either assimilated or transformed into a new form, which are alternative processes to accommodate the new knowledge (Todorova and Durisin, 2007). Cognitively, the difference between knowledge assimilation and transformation exists in the fit of the external knowledge and the recipient’s prior knowledge. When the new knowledge fits the existing knowledge structures well, it is slightly altered to improve the fit with no change of the existing knowledge structure, then knowledge is assimilated. When the new knowledge cannot be altered to the recipient’s knowledge structure, the recipient must transform its structure to adapt to this idea or situation. With regard to the specific situation with radical changes, the acquired new knowledge may not fit to the existing structures and cultures of SMEs. Instead of assimilating knowledge, knowledge transformation is more likely to occur in SMEs for adaptation. In addition, the results of knowledge exploitation are often shaped by the achieved performance (Yli-Renko, Autio and Sapienza, 2001), and the process of knowledge exploitation is not our focus in this study.

Hence, our research concentrates on the knowledge acquisition and transformation that function as the intermediate conducts that lead SMEs to achieve competence-based performance including market share growth, product quality improvement, and operational efficiency.

As we mentioned before, SMEs in China are facing two-fold pressures: hostile environment and scarcity of knowledge. Small firms are urged to acquire the so-called external business knowledge, including knowledge of products, markets, business operations and technologies (Dhanaraj, Lyles, Steensma and Tihanyi, 2004; Tsang et al., 2004; Yli-Renko et al., 2001). We distinguish the tacit knowledge from explicit knowledge in respect of the content of acquired knowledge. Tacit knowledge is abstract and can be communicated through active involvement of the parties, whereas explicit knowledge is highly codified and is transmittable in formal, systematic language (Polanyi, 1966). General speaking, knowledge of technologies and production processes are more standardized and explicit, whereas management, marketing and business operation skills are context-specific and more tacit (Dhanaraj et al., 2004). Tacit knowledge is more important than explicit knowledge because of its embeddedness in the firm-specific assets.

Integrating social network theory and absorptive capacity theory into the “structure-conduct-performance” paradigm, we propose a research model as shown in Figure 1. In addition, our focus of external knowledge is on those acquired through the firm-customer relationship.

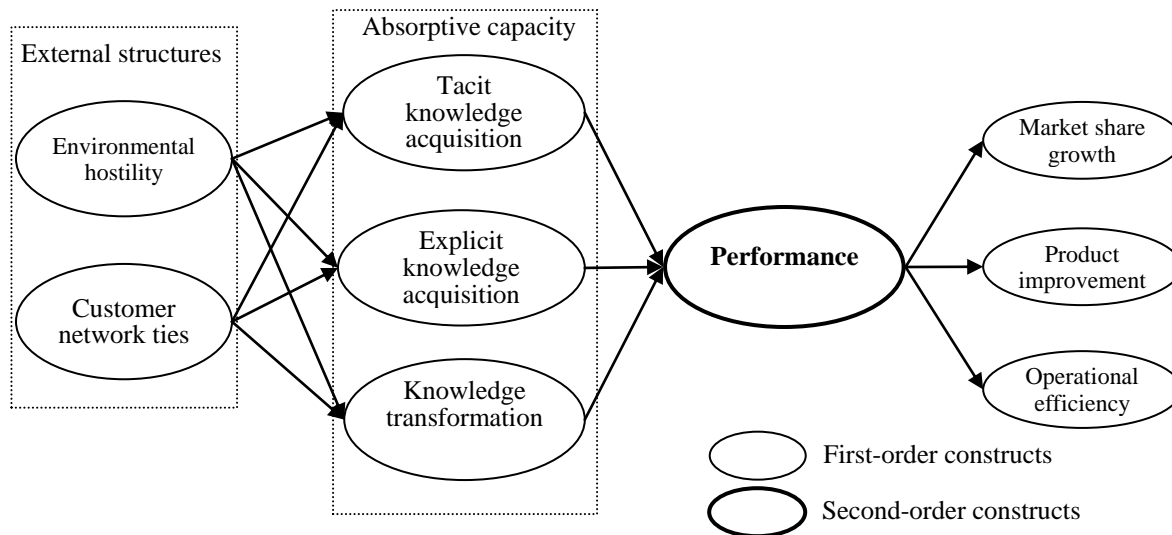


Figure 1. Research model

Environmental hostility, knowledge acquisition and transformation

Environmental hostility indicates a general unfavorable business climate such as the intense competition for resources or market opportunities and competitive dynamism. The intense competition creates incentives for SMEs to learn from those skilled firms by conducting knowledge activities. As Kohli and Jwaorski (1993) demonstrate that in the absence of competition, customers are stuck with the organization's products and services, by contrast, under conditions of high competition, customers have many alternative options to satisfy their needs and wants. Specifically in a high hostile environment, SMEs prefer to differentiate their products and/or services to cater to customers’ preferences and center on building on the skills to imbue the distinct qualities. Regarding the constrained resources and capacity, SMEs would take a proactive position in the intense competition (Wolff and Pett, 2006). Consequently they tend to acquire external knowledge from their customers who possess critical knowledge.

The hostile environment also triggers firms to transform their knowledge structure to adapt to the new ideas or situations. A firm’s knowledge acquisition activities do not guarantee the immediate transformation of new knowledge into its internal structure, process and culture. Thus, the external trigger is still important to push SMEs to transform knowledge by combining the new knowledge and the existing knowledge to arrive at a new schema. In this way, SMEs may achieve superior performance and grow more rapidly. Thus, we hypothesize that,

Hypothesis 1a: The environmental hostility has a positive impact on SMEs' tacit knowledge acquisition.

Hypothesis 1b: The environmental hostility has a positive impact on SMEs' explicit knowledge acquisition.

Hypothesis 1c: The environmental hostility has a positive impact on SMEs' knowledge transformation.

Customer network ties, knowledge acquisition and transformation

Nahapiet and Ghoshal (1998) argue that social networking with other firms facilitates knowledge acquisition and transformation by affecting the conditions necessary for the creation of value through the exchange and combination of intellectual resources. According to the theory of weak tie, the organization is more likely to capture new knowledge from those distant ties that imply a low level of redundancy (Hansen, 1999). The relations with customers serve as channels through which useful knowledge and information flow in, therefore they are important sources for the focal firms.

In considering the reality of SMEs' external relationship establishment, it has been observed that they often first rely on some key customers, then extend their network through those key customers to a broad marketplace (Yli-Renko et al., 2001). The variety of customers is critical for SMEs to acquire a variety of external knowledge that is essential to business development in a hostile environment. Recent studies demonstrate that the customer ties have substantial contribution for young firms to acquire external knowledge (e.g., Presutti, Boari and Fratocchi, 2007; Tsang et al., 2004; Yli-Renko et al., 2001). The customer network ties of a focal firm, implying the availability of different knowledge sources, facilitate the tacit and explicit knowledge acquisition.

Fostering extensive social networks enable a firm to identify relevant external knowledge. The complementarity of the new knowledge and the firm's strategic priorities promote its willingness to transform the outdated knowledge structure for adaptation. Knowledge transformation occurs through bisociation (Zahra and George, 2002). The social interactions with various customers, even though may not be frequent, still help the focal firm have a deep understanding of market trends thereby lead to a successful transformation. Extensive customer ties enable the incremental knowledge base that improves the efficacy of new knowledge transformation and adaptation. Thus, we hypothesize that,

Hypothesis 2a: The customer network ties provided by the key customers have a positive impact on SMEs' tacit knowledge acquisition from that relationship.

Hypothesis 2b: The customer network ties provided by the key customers have a positive impact on SMEs' explicit knowledge acquisition from that relationship.

Hypothesis 2c: The customer network ties provided by the key customers have a positive impact on SMEs' knowledge transformation.

Knowledge acquisition and performance

Knowledge acquisition means that a firm identifies and acquires externally generated knowledge that is critical its operations (Zahra and George, 2002). It plays an important role in renewing a firm's knowledge base and the skills necessary to compete in a turbulent environment. Without importing renewed knowledge, firms probably fall into competence trap and may not be able to response to intensified competitions (Jansen et al., 2005). The outcomes of knowledge acquisition can enhance superior organizational performance, as knowledge acquisition facilitates accumulation of diverse knowledge. The accumulation of knowledge through learning from customers opens new productive opportunities for SMEs and contributes to their competence enhancement. With the survival analysis and logit model, Vermeulen and Barkema's (2001) research strongly supports the contribution of knowledge acquisition in enhancing a firm's viability through broadening the knowledge base and decreasing inertia. Increments to a firm's knowledge base can enhance its business performance in that it can profit from the newly acquired knowledge. Thus, we hypothesize that,

Hypothesis 3: The tacit knowledge acquisition of SMEs is positively related to their competence-based performance.

Hypothesis 4: The explicit knowledge acquisition of SMEs is positively related to their competence-based performance.

Knowledge transformation and performance

Organizational performance is not only influenced by the organization's direct interface with the external environment, but also is affected by the extent to which the firm can transform the knowledge into their specific needs, structures and cultures. Firms can possess a strong capability to identify new knowledge while a weaker transformation capability, which causes them to fail to translate new knowledge into new products and processes (Baker, Miner and Eesley, 2003). Knowledge transformation enables organizations to perceive new knowledge to some extent incompatible with their existing knowledge

(Todorova and Durisin, 2007) as well as to derive new insights and consequences from combining new knowledge with existing knowledge (Zahra and George, 2002). Through transformation, the firm builds new knowledge structures to cope with path dependency and creates opportunities for performance improvement. Thus, we hypothesize that,

Hypothesis 5: The knowledge transformation of SMEs is positively related to their competence-based performance.

RESEARCH METHOD

Data collection

To test our research model, we conducted a survey study involving SMEs in China. According to the national criteria of classifying an enterprise as a large enterprise or a small medium-sized enterprise claimed by the Chinese government¹, we reviewed the number of employees, sale, and total assets in each response firm and finally collected 77 valid observations. These SMEs from multiple industries processed different ownerships, with a mean number of employees of 434.9, mean sale of 257.4 million of RMB, and mean total asset of 159 million of RMB. The average firm age is 16.7 years.

We adopted the key informant method, inviting CEO/CIOs or senior managers, who were assumed knowledgeable with their firms, to participate in our survey. Meanwhile we were aware of the conceivable common method variance that could be a threat for the internal validity. We relied on Harman's single-factor, a widely used method, to detect and assess the common method variance which is present if a single factor accounts for the majority of the covariance in the dependent and independent variables (Podsakoff and Organ, 1986). The result of our factor analysis demonstrated that the exact 8 factors were extracted, cumulatively accounting for 78.3% of the total variance, and the initial first factor only accounted for 23% of the variance, indicating that common-method variance was not a serious problem.

Measures

We developed the items in the questionnaire by adapting measures that had been proven valid and reliable in several previous studies. All the items were in a 5-likert scale with 1 representing strongly disagree and 5 representing strongly agree. More particular, the organizational performance was a second-order construct decomposed into three components, i.e., market share growth, product improvement, and operational efficiency. The measures for each performance were adapted from Tsang et al. (2004).

All the independent variables and mediating variables were first-order constructs using reflective measures. Specifically, the items for customer network ties were adapted from Presutti et al's (2007) study. Similar instruments were also used to measure a firm's network ties with its key customers by Yli-Renko and colleagues (2001). The informants were asked to indicate to which extent the firm contact new customers, suppliers, and other organizations and institutions through its key customers. Environmental hostility was measured by three items that were selected from Jaworske and Kohli (1993). We used three items to measure a firm's tacit and explicit knowledge acquisitions from its customers respectively, which had been validated by Dhanaraj et al. (2004) and Tsang et al. (2004). The tacit knowledge acquisition included acquiring marketing expertise, managerial techniques, and business operational experience, while the explicit knowledge acquisition included acquiring written technological knowledge, written procedural/process knowledge, and written product development knowledge from the key customers. We adapted three items from Jansen et al's (2005) study to measure a firm's knowledge transformation.

RESULTS AND DISCUSSION

Measurement model test

We adopted the Partial Least Squares procedure (PLS) with the bootstrap re-sampling procedure (Cottelman and Senn, 1992) in a holistic manner, which includes a confirmatory factor analysis (CFA) and path coefficients testing. Following the recommended two-stage analytical procedure (Anderson and Gerbing, 1988), we tested the structural relationships after

¹ The criteria can be enquired on http://www.stats.gov.cn/tjbz/t20061018_402369829.htm

assessing the measurement model. Since organizational performance is a second-order construct, the factor scores of its three components, i.e., market performance, product performance, and operation performance, were computed and used to measure organizational performance (Chin, Marcolin and Newsted, 2003). According to the causal priority (Diamantopoulos and Winklhofer, 2001) and the direction of change of one item compared with others (Chin, 1998), the transformed indicators of organizational performance were treated as reflective. Although the three components were different types of performance, a large overlap appears among them in the reality. Additionally, formative indicators for dependent variables were not recommended, for they might lead to an unidentified model (Jarvis, MacKenzie and Podsakoff, 2003).

To validate our measurement model, reliability, convergent validity and discriminant validity were assessed (Hulland, 1999). The composite reliability scores (ρ) of reflective constructs were calculated to assess the construct reliability and convergent validity. The recommended threshold value is 0.70 (Nunnally, 1978). As shown in Table 1, the composite reliability scores ranged from 0.757 to 0.941, indicating the scale reliability and convergent validity. The average variance extracted (AVE) from the measures was also assessed to examine the convergent validity. The AVE values ranged from 0.512 to 0.842, above the cutoff of 0.5 (Fornell and Larcker, 1981).

Discriminant validity was verified by looking at the square root of the AVE in PLS procedure. As shown in Table 2, the square roots of the AVE value of each construct (diagonal elements) were all higher than the correlations correlation of the respective construct and other constructs (off-diagonal elements), demonstrating adequate discriminant validity (Fornell and Larcker, 1981). Furthermore, all items loaded higher on their respective constructs than on others, providing strong support for discriminant validity of our instrument (Chin, 1998).

Constructs	Items	Standard loadings	Standard errors	T-statistics
Customers network ties ($\rho=0.843$; AVE=0.643)	CNT1	0.7003	0.1120	6.2507
	CNT2	0.8821	0.0341	25.8713
	CNT3	0.8123	0.0757	10.7350
Environmental competition ($\rho=0.882$; AVE=0.714)	EC1	0.8794	0.0759	11.5847
	EC2	0.8200	0.0741	11.0593
	EC3	0.8339	0.1036	8.0455
Tacit knowledge acquisition ($\rho=0.875$; AVE=0.701)	TKC1	0.8449	0.0814	10.3772
	TKC2	0.7797	0.1128	6.9133
	TKC3	0.8831	0.0860	10.2629
Explicit knowledge acquisition ($\rho=0.941$; AVE=0.842)	EKC1	0.8886	0.0384	25.1585
	EKC2	0.9315	0.0254	36.6868
	EKC3	0.9322	0.0225	41.4875
Knowledge transformation ($\rho=0.768$; AVE=0.531)	KT1	0.6513	0.1528	4.2637
	KT2	0.6385	0.1733	3.6266
	KT3	0.8798	0.1155	7.6178
Performance ($\rho=0.757$; AVE=0.512)	MPER	0.7883	0.1194	6.6004
	PPER	0.6411	0.1447	4.4308
	OPER	0.7088	0.1658	4.2748

Table 1. Reliability and convergent validity assessment

	CNT	EC	TKC	EKC	KT	PER
Customers network ties	0.802					
Environmental competition	0.129	0.845				
Tacit knowledge acquisition	0.238	0.265	0.837			
Explicit knowledge acquisition	0.274	0.196	0.525	0.918		
Knowledge transformation	0.317	0.209	0.064	0.169	0.729	
Performance	0.264	0.188	0.383	0.347	0.417	0.716
Remark: The diagonal elements are square roots of AVE values						

Table 2. Correlations between constructs

Structural model test

Figure 2 presents the results of PLS analysis including the explanation power (R^2) and all the path coefficients. As hypothesized, environmental hostility has significant positive impacts on a firm's knowledge acquisition from its customers (H1a&1b supported). The intense competition has a much larger magnitude of effect on the acquisition of tacit knowledge than that of explicit knowledge. Indeed, the managerial and marketing knowledge are urgent to SMEs in China in the transitional stage, for their prior management experience are not sufficient to cope with the new situations. But the hostile environment is not found with significant impact on SMEs' knowledge transformation (H1c not supported). It may imply an alternative proposition, the occurrence of knowledge transformation more depend on the internal resources, while not induced by the external trigger. Customer network ties are found with significant impacts on both tacit and explicit knowledge acquisition (H2a&2b supported). Such result is consistent with Yli-Renko et al.'s (2001) finding that the customer network ties have the largest effect on knowledge acquisition, consolidating the importance of social network during a firm's growing or business expanding stage. Contrary to the environmental influence, a focal firm's network ties with customers have a higher magnitude of effect on its explicit knowledge acquisition than that on tacit knowledge acquisition. One possible reason is the availability and transferability of tacit knowledge from customers. In a hostile environment, the management and marketing skills have strategic importance for any firms while the written technological and procedural knowledge are not so sensitive. Therefore the customers might be reluctant to provide those managerial and marketing knowledge with respect to the strategic safety concern. Moreover, the stickiness of tacit knowledge requires close interactions between the two parties. The significant relationship between customer network ties and the knowledge transformation further confirm the importance of social network for SMEs (H2c supported).

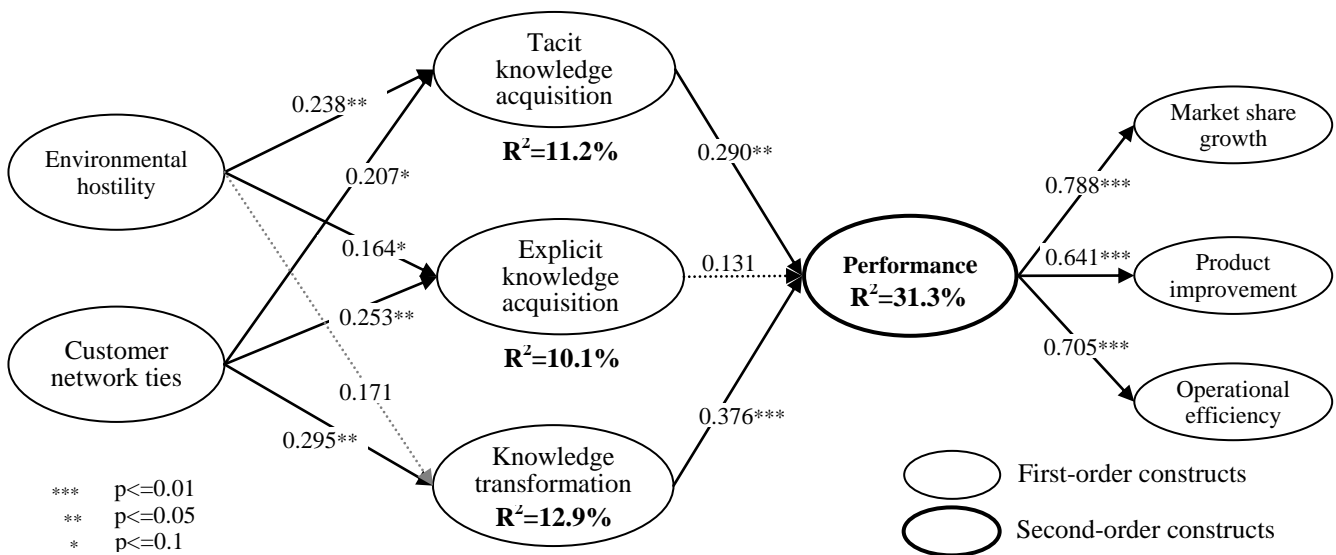


Figure 2. Results of structural model

The absorptive capacity is found important to a firm's performance, explaining 31.3% of the variance. Acquiring the tacit managerial knowledge significantly contributes to the firm's competence-based performance with a magnitude of 0.290 (H3 supported). However, the explicit technological and procedure knowledge is found with a non-significant impact on the performance (H4 not supported). A plausible explanation is that the explicit knowledge may not constitute the firm-specific asset and therefore is unable to lead the firms to achieve superior performance. Most of the sampled SMEs are not engaged in high-tech industries, therefore those easy-to-copy technologies and production process are not a major concern of these firms. Our result indicates knowledge transformation have a significant impact on the firm's performance with a magnitude of 0.376 (H5 supported). As we argued before, transforming external knowledge for organizational needs is an important component of developing the absorptive capacity and can create substantial influences on improving the organizational performance.

CONCLUSION AND IMPLICATIONS

This study depends on and enriches the paradigm of “structure-conduct-performance” by integrating social network theory and absorptive capacity theory into the respective components. Our theoretical model objects to explain the survival evolution of Chinese SMEs – how the external structures including environmental hostility and customer network ties leads the development of absorptive capacity to their competence-based performance enhancement. The empirical results demonstrate that the external structures of a firm take an important place in its internal capacity development. A hostile competition environment could trigger the firm to actively acquire knowledge from its customers while the customer network ties provide conditions for such acquisition. Consistent with previous research on absorptive capacity (Cohen and Levinthal, 1990; Lane et al., 2001; Zahra and George, 2002), our study in China context also indicates the vital role of knowledge acquisition and transformation for firms to obtain superior competence and performance. Not surprising, the external tacit knowledge are found more important for SMEs than those explicit knowledge that is easier to access.

Our findings provide important insights for SMEs’ owners or managers in China. During the specific transitional economy, managers should be vigilant to the competitive business environment. It is clear that the unfavorable effect of such turbulence and hostility can be mitigated for small firms, if they portrait as proactive learners. SMEs can greatly benefit from the external knowledge acquired from the skilled customers. Although SMEs often establish relationship with some key customers who may help improve the management skills in the early stage, they still need to expand their network towards other organizations, according to the wisdom of social network. Usually those key customers would link the small firms to a broader market. The construction of wide customer network ties must take managers’ role into account. In China, a focal firm’s networking ties with other organizations is often derived from the situated managers’ networking ties with managers at other organizations (Peng and Luo, 2000). Managers at small firms need spend more time and effort in cultivating network ties with other firms, especially with the sophisticated customers who have valuable knowledge and are willing share knowledge as well. A two-tied network structure can be mobilized and capitalized through internal absorptive capacity development.

The diversity of inter-organizational relationships provides more opportunities for small firms to capture new knowledge such as better management, marketing skills and updated technologies and production processes. Despite the importance of external knowledge acquired from various sources, managers in SMEs must recognize the readiness of knowledge transformation in order to adapt to the new situations. As the environment is turbulent with rapid changes and the knowledge from customers has a great variety, it’s important for SMEs to appropriately interpret the new knowledge and translate them to match their specific contexts.

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