

The impact of customer knowledge and marketing dynamic capability on innovation performance: an empirical analysis

Mauro Falasca

Department of Marketing and Supply Chain Management, East Carolina University, Greenville, North Carolina, USA

Jiemei Zhang

Business Management Institute, School of Business, Henan University, Kaifeng, China

Margy Conchar

Department of Marketing and Supply Chain Management, East Carolina University, Greenville, North Carolina, USA, and

Like Li

School of Business, Henan University, Kaifeng, China

Abstract

Purpose – This paper aims to explore the intermediary role of marketing dynamic capability (MDC) in the relationship between customer knowledge management (CKM) and product innovation performance (PIP).

Design/methodology – A conceptual model is proposed and a survey instrument is developed. The model is tested empirically in an organizational buyer/seller setting using a survey among middle and top management of firms engaged in business-to-business relationships within high-tech industries in China.

Findings – Results show that MDC fully mediates the relationship between CKM and PIP. Empirical findings thus demonstrate that CKM is related to improved firm PIP through the deployment of firm-specific MDCs.

Research implications/limitations – The study provides clarification for a unique distinction between organizational learning and dynamic capabilities. Findings suggest that knowledge creation occurs within the scope of CKM, while the analytical and perceptual processes that lead to insights and redeployment of firm resources fall under the umbrella of MDCs.

Practical implications – Dynamic capabilities play an essential role in transforming the firm's knowledge resources to create new configurations in response to market needs. Hence, this study reinforces the role of marketing decision-makers with appropriate decision-making power who, in an ongoing cooperation with other functional areas, are able to adapt and redeploy resources to reflect environmental changes and implement marketing strategy decisions.

Originality/value – This study contributes to the literature by addressing simultaneously the relationship between CKM, MDC and PIP. Specifically, the study demonstrates the mediating influence of MDCs on the relationship between CKM and firm PIP. The study also clarifies a key distinction between organizational learning and dynamic capabilities, demonstrating that knowledge serves an antecedent role to the deployment of dynamic capabilities.

Keywords Customer knowledge management, Dynamic capabilities, Empirical studies, Marketing dynamic capability, Organizational markets, Product innovation performance.

Paper type Research paper

Introduction

Customer knowledge represents an important firm resource for identifying marketplace opportunities, enhancing competitive advantage, pursuing innovation and managing dynamic marketing environments (Mowery *et al.*, 1996; Wang, 2006; Zhang and Lu, 2012; Korhonen-Sande and Sande, 2016). However, firms have realized that paying attention to customers' needs and building customer

relationships is insufficient for success (Hunt, 2004; Rigby *et al.*, 2002); firms must strengthen customer knowledge resources at the management level (Baskerville and Dulipovici, 2006). Empirical evidence from the literature on the resource-based view of the firm (Barney, 1986, 1991; Peteraf, 1993) supports the view that a firm with knowledge management capability will use resources more efficiently and, ultimately, will be more innovative and perform better (Belkahl and Triki, 2011; Darroch, 2005).

While the relationship between knowledge management and improved firm performance is well established, the effects of additional firm resources and/or capabilities on firm innovation performance deserve attention to improve

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
32/7 (2017) 901–912
© Emerald Publishing Limited [ISSN 0885-8624]
[DOI 10.1108/JBIM-12-2016-0289]

Received 16 December 2016

Accepted 2 March 2017

understanding of and develop a robust model for effective firm performance (Teece *et al.*, 1997; Zahra *et al.*, 2006). O’Cass *et al.* (2015) indicated that the role of marketing resources and the firms’ capability to deploy them to improve performance represents a topic that has received modest attention in the literature. A number of previous studies (e.g. Chien and Tsai, 2012; Fang and Zou, 2009; Helfat and Peteraf, 2015; Stadler *et al.*, 2013; Teece, 2007, 2014; Teece *et al.*, 1997; Wang and Ahmed, 2007) have argued that dynamic capabilities lead to high performance. However, empirical evidence has been inconsistent (Barreto, 2010; Peteraf *et al.*, 2013). Calls have appeared in the literature for an effort to initiate paradigmatic development on firm resources and capabilities so that the literature can be advanced in a more structured and focused way (Barreto, 2010; Cavusgil *et al.*, 2007). The question of how to enhance the ability of firms to achieve a more efficient coupling of customer knowledge and other resources to respond to market changes and create customer value through innovation needs to be examined in a systematic way.

The purpose of this paper is to investigate the nature of the relationship between customer knowledge management (CKM), marketing dynamic capability (MDC) (a subcategory of the broad range of firm dynamic capabilities) and product innovation performance (PIP). This research study makes an important contribution to the literature, as no previous studies have analyzed those relationships simultaneously. To accomplish the stated research objective, a conceptual model is proposed that posits the mediating influence of MDC on the relationship between CKM and firm PIP. A survey instrument is developed to empirically test the proposed relationships, and findings are presented from a study among middle and top management of firms engaged in business-to-business relationships within high-tech industries. The study findings demonstrate that CKM is related to improved firm PIP through the deployment of firm-specific MDC.

The rest of the paper is organized as follows: First, an overview of the CKM, MDC and PIP literature works, which provide theoretical support for the current study, is provided. Next, the authors discuss the development of the research hypotheses and conceptual model before presenting the methods used and results obtained. Conclusions, implications and directions for future research are also discussed.

Theoretical framework and research hypotheses

Customer knowledge management

Customer knowledge is a key asset in the process of innovation (Rowley, 2002), and one of the most important sources of customer value improvement (Frauendorf, 2006). Customer knowledge has been conceptualized fairly consistently in recent scholarly articles. Li and Calantone (1998) conceptualize market knowledge competence as the set of firm processes that generate and integrate market knowledge. The authors propose that customer knowledge is derived through systematic collation, verification and analysis of data accumulated, organized and structured in the process of communications and transactions with customers.

Similarly, Gibbert *et al.* (2002) describe customer knowledge as a dynamic combination of experience, situation information and expert insight realized in the course of interactive processes between companies and their customers,

and of the absorption and evaluation of new experiences and information gained during those interactions. Those authors suggest that CKM is about how companies acquire and share tacit knowledge with the customer, and characterize CKM as a strategic process that serves to enhance customer value and create competitive advantage through the use of knowledge resources. Smith and McKeen (2005) propose that CKM involves the management of knowledge about customers and their needs as well as knowledge co-creation with customers. CKM can be used to reshape corporate value offerings and, hence, offers potential positive effects on the performance level of products (Wang, 2006). Customer knowledge, therefore, represents a resource or building block for the development of capabilities (Amit and Schoemaker, 1993; Barney, 1991; Makadok, 2001). In this respect, Teece *et al.* (1997) suggested that resources must be translated into dynamic capabilities to realize competitive advantage and superior financial performance.

The effective management of customer knowledge plays an important strategic role in firms serving customers in business-to-business environments. Knowledge resources needed for ongoing strategic development purposes include the following: knowledge of customers and the customers’ customers, knowledge about customer needs/wants and satisfaction with vendor products, processes and services, as well as knowledge about vendor differential advantage to customers (Gordon *et al.*, 1993; Griffith *et al.*, 2006). Shang and Wang (2015) propose a three-dimensional conceptual framework for customer knowledge, namely, product/technical-level, system-level and strategic-level customer knowledge. According to this framework, product-level customer knowledge denotes knowledge about customer perceptions of supplier firm current technology, products and services, a clear understanding of customer preferences about product innovation and service, and knowledge about customer new product/service development requirements. This knowledge can enable improved understanding of customers’ needs and value expectations, enhance product improvement and innovation capability and result in better customer value creation.

System-level customer knowledge refers to knowledge of customers’ purchasing decision-making processes, selection criteria, and associated functional areas and management structures. Acquisition of this kind of customer knowledge requires long-term communication and understanding between the marketing staff and product development team of the supplier firm so as to achieve the win-win goal of smooth sales and customer satisfaction (Gordon *et al.*, 1993). System-level customer knowledge tends to be tacit in nature, involving long-term communication and exchange between supplier firm marketing personnel and customer firm buyers and decision-makers in key functional departments (such as manufacturing, finance and others) to design sales programs that meet customer needs, and to assure positive customer response to sales support and after-sales service.

Strategic-level customer knowledge involves knowledge about customers’ long-term vision, marketing strategy, market positioning, customers’ competitors’ differentiation strategies and the relationships between customers and other suppliers. Shang and Wang (2015) point out that, while strategic-level

CKM is very important for supplier firms, customer knowledge about customers' and competitors' differentiation strategies, market positioning, long-term vision and marketing strategies can be extremely difficult to obtain. Strategic-level customer knowledge requires supplier companies to be keenly market-conscious and to incorporate the customer firms' strategic-level needs into the company's strategic planning and design process to enhance the company's MDC.

Marketing dynamic capability

A capability is a patterned activity that emerges over time and can then be used in a consistent manner to generate responses to changes in the firm's competitive environment (Helfat and Peteraf, 2003; Winter, 2012). *Ad hoc* problem-solving or any kind of disjointed entrepreneurial improvisation is not a capability unless it initiates the emergence of some pattern over time and is based on prior outcomes (Moliterno and Wiersema, 2007). Helfat *et al.* (2007) note that such capability is in place when firms (or their constituent parts) have the capacity to perform certain specific activities in a reliable and satisfactory manner.

The distinguishing feature that makes capabilities "dynamic" is their ability to alter the way an organization makes its living by restructuring the resource base and/or by initiating change in the organization's external environment (Helfat and Winter, 2011; Teece, 2007). In recent years, much attention has been devoted to the concept of dynamic capability (Schweizer *et al.*, 2015). An array of definitions has emerged, attempting to clarify this concept (Ambrosini and Bowman, 2009; Di Stefano *et al.*, 2010; Helfat *et al.*, 2007; Peteraf *et al.*, 2013; Wang and Ahmed, 2007). However, the definition offered by Teece *et al.* (1997) prevails in the majority of scholarly articles. Those authors define a dynamic capability as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (Teece *et al.*, 1997, p. 516).

MDC can be thought of as a specific form of dynamic capability that captures capabilities related to firm marketing functions. In recent years, a stream of scholarly research on MDC has emerged against the background of dynamic capabilities theory (Fang and Zou, 2009; Marcus and Anderson, 2006; Menguc and Auh, 2006) seeking to explain heterogeneity in firm performance and competitive advantage (Teece, 2014). MDCs have been conceptualized under the process view as those high-reactivity and high-efficiency organizational processes that enable dynamic integration and configuration of marketing-related assets and knowledge within a firm to create customer value and achieve competitive advantage (Xu *et al.*, 2011). From a constitutive dimension perspective, Li (2015) defines MDC as integrated organizational processes that establish, link and configure market resources so as to identify, create and deliver customer value. These processes encompass market perception (including environmental scanning and knowledge absorption), interface interoperability (e.g. flexible decision-making and coordination functions) and customer responsiveness (including marketing communication and channel integration).

One expression of MDCs is the speed with which an organization's cross-functional, marketing-led processes of

creating and delivering customer value respond to market changes (Fang and Zou, 2009; Hult *et al.*, 2005; Nguyen and Nguyen, 2011). This position is congruent with the proposition that firms with dynamic capability "demonstrate timely responsiveness and rapid and flexible product innovation, coupled with the management capability to effectively coordinate and redeploy market positions and expansion paths" (Teece *et al.*, 1997, p. 515).

In the present study, MDC is conceptualized as the organization's cross-functional and marketing-led processes that enable dynamic integration and reconfiguration of resources to create and deliver customer value in response to market changes. As such, MDC captures allocation and integration of market-related resources, as well as adaptation to the evolution of the competitive environment through market perception, interface coordination and customer responsiveness to create and deliver customer value.

Product innovation performance

One of the most important resources of a firm is its capacity to generate innovations (Charterina *et al.*, 2016). PIP represents the degree of success of an innovation (Alegre *et al.*, 2006). PIP refers to market reception and profits following the introduction to the market of products and/or service innovations (Atuahene-Gima *et al.*, 2005). Customarily, PIP has been measured as the degree of product innovation and the proportion of innovations to achieve commercialization.

Different PIP metrics have been proposed in the literature. Studies have included financial and non-financial indicators (Hsu, 2016). Baker and Sinkula (1999) and Zhang and Duan (2010), for example, use new product introduction and success rates relative to competitors, degree of product differentiation, first to market with new applications and new product cycle time relative to the competition to measure PIP. Metrics categorized by Fainshmidt (2014) as profitability performance measures include return on assets, profit margin and operational efficiency, while market performance indicators include market-share, stock returns, innovation and growth.

In the present study, we analyze the relationship between CKM, MDC and firm performance. Specifically, this study considers PIP as a metric to investigate performance outcomes of deployment of MDC. Following Lin and Chen (2006), we examine increased firm profits, relative success compared with competitors' products, good fit with market demands and expanded firm market share to assess PIP.

Customer knowledge management and product innovation performance

Firms increasingly apply customer knowledge to innovation activities, especially in the process of new product development (Eslami and Lakemond, 2016). Gibbert *et al.* (2002) point out that customers who fully share with supplier firms their knowledge and experiences, and who actively participate in the product innovation process, can achieve win-win outcomes for both themselves and their supplier firms. Joshi and Sharma (2004) investigate empirically the role of customer knowledge development in the new product development process, and conclude that customer knowledge development can significantly improve new product development performance. Similarly, Ryzhkova (2015)

empirically demonstrates that knowledge acquired from customers can significantly impact a firm's innovation performance. Weiss *et al.* (2004) cite internet giants Google, eBay and Amazon.com as examples of improved innovation performance as a result of effective CKM.

Murschetz (2013) points out that when customers become the supplier company's knowledge partner and fully participate in every aspect of the product innovation value chain, they can help significantly improve the company's innovation and quality processes. Zhang and Lu (2012) find that customer participation in CKM has a significant effect on innovation capability. Similarly, Taherparvar *et al.* (2014) found that CKM can have a positive effect on innovation speed and innovation quality, and positively impact different operational and financial performance measures. In general, previous research supports the relationship between CKM and improved PIP. Hence, our conceptual model proposes this direct effect as our first study hypothesis:

H1. CKM is positively related to PIP.

Customer knowledge management and marketing dynamic capability

Resources, including all knowledge acquired, absorbed and assimilated by firms, have an impact on dynamic capabilities (Liao *et al.*, 2009). Kogut and Zander (1992) suggest a close relationship between knowledge acquisition and dynamic capabilities. The empirical findings of Chien and Tsai (2012) indicate that knowledge resources have a positive direct effect on dynamic capability. Using data from Taiwanese high-tech firms, the empirical study by Wu (2007) demonstrates that the more abundant the knowledge resources, the greater the firms' dynamic capabilities.

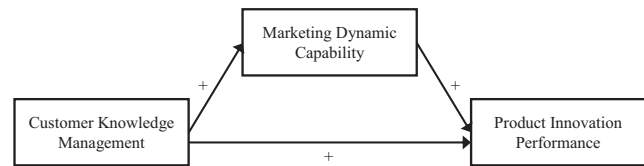
Based on an empirical study of Chinese equipment manufacturing firms, Zhang *et al.* (2008) show that firms' CKM positively affects their marketing ability. The study suggests that firms with adequate product-level customer knowledge can perceive market changes more rapidly, identify the direction of product improvement or innovation, explore new market opportunities and customer demands and, ultimately, improve their MDC. Similarly, Griffith *et al.* (2006) establish that, through the accumulation of customer knowledge resources, firms are better able to develop marketing capabilities. Based on these ideas, the second study hypothesis is derived:

H2. CKM is positively related to MDC.

Marketing dynamic capability and product innovation performance

Organizational capability theory points out that variation in performance among firms can be explained by differences in capabilities. Dynamic capabilities help increase firm performance (Chien and Tsai, 2012; Griffith *et al.*, 2006; Wu, 2007). More specifically, dynamic capabilities contribute to firm profitability, efficiency and market performance (e.g. market share, growth and customer satisfaction) (Fainshmidt, 2014). Eisenhardt and Martin (2000) point out that the ability to adapt resource configurations to changes in the environment can help companies gain and retain sustainable competitive advantage. Marsh and Stock (2003) establish that

Figure 1 Conceptual model



the dynamic integration of marketing capabilities can increase both new product development success and long-term competitive advantage, while Morgan *et al.* (2009) find that marketing capabilities directly impact both return on assets as well as firm performance.

As previously explained, MDCs represent a specific form of the broader set of dynamic capabilities that focus on the allocation and integration of market-related resources. As such, MDCs enable firms to adapt more efficiently and effectively to the evolution of the marketplace environment through market perception, interface coordination and customer response to create and deliver customer value. Innovative products reflect customer value maximization, which can help enhance the innovation performance of a firm. The expected relationship between MDC and firm PIP results in the following hypothesis:

H3. MDC is positively related to PIP.

The intermediary role of marketing dynamic capability

Organizational knowledge is an important and rich reserve of knowledge which includes both the firm's own internal knowledge system as well as external knowledge involving customers, partners, competitors, etc. that serves as the foundation of product innovation activities. Mowery *et al.* (1996) note that it is important for the innovation process that companies obtain relevant knowledge by interacting with external parties (such as customers, competitors and suppliers). Customer knowledge gained by a firm becomes part of the organization's knowledge system, and can serve as a resource for business management.

Firms that build highly efficient marketing processes are in a better position to develop and smoothly transform customer knowledge into commercially valuable product output. A firm's MDC can also improve the ability of the company to adapt to changes in the environment, and to satisfy target customer demand by creating customer value through pricing, integrated marketing communications and supply chain management. The purpose of building MDC is to achieve more efficient coupling and allocation of resources, especially through the management of customer knowledge resources, and enhance the ability of companies to respond to market changes to create customer value through innovation (Fang and Zou, 2009; Menguc and Auh, 2006; Xu *et al.*, 2011). The proposed relationship between CKM, MDC and PIP is captured in the following hypothesis:

H4. MDC mediates the relationship between CKM and PIP.

The proposed conceptual model is presented in Figure 1.

Table I Survey measurement items

Scale	Measurement item	Source
Customer knowledge management		
CKM1	Our company has great knowledge about our customer firms' evaluation of our products and services	Shang and Wang (2015)
CKM2	Our company has great knowledge about our customer firms' requirements in terms of how to improve our existing products and services	
CKM3	Our company has great knowledge about our customer firms' requirements in terms of new product/service development	
CKM4	Our company has great knowledge about our customer firms' procurement decision process	
CKM5	Our company has great knowledge about which departments at our customer firms are involved with procurement decisions	
CKM6	Our company has great knowledge about the procurement selection criteria of our customer firms	
CKM7	Our company has great knowledge about our customer firms' development goals and strategies	
CKM8	Our company has great knowledge about our customer firms' target customers	
CKM9	Our company has great knowledge about our customer firms' assessment of our competitors' products and services	
Marketing dynamic capability		
MDC1	Our company regularly conducts systematic assessments on the status of customers and competitors	Li (2015)
MDC2	Key market information can be effectively distributed and shared among different departments within our company	
MDC3	Important market information can be quickly shared with top executives within our company	
MDC4	Managers at different levels within our company have appropriate marketing decision making power	
MDC5	Important marketing decisions can be adapted to reflect environmental changes	
MDC6	The marketing department in our company can coordinate effectively with other functional areas	
MDC7	Our company has the ability to distribute marketing information (such as product information) accurately to target customers	
MDC8	Our company has the ability to use different communication methods in marketing activities	
MDC9	Lead times from R&D to market at our company is shorter when compared to other companies in our industry	
Product innovation performance		
	Product innovation has led to:	Lin and Chen (2006)
PIP1	Increased profit	
PIP2	Relative success compared with competitors' products	
PIP3	Good fit with market demands	
PIP4	Expanded market share	

Methods

The conceptual model was tested empirically in an organizational buyer/seller setting, using the survey method for data collection. In the following subsections, instrument development, data collection and analysis, content, face, convergent and discriminant validity, scale reliability, non-response and common method bias (CMB), as well as a series of model assumptions are discussed.

Instrument development

Following the literature review, a survey instrument was developed to investigate the variables of interest. The survey included 22 measurement items to capture data relating to the three core research variables, as well as six questions assessing demographic and firm characteristics. The measurement items in our model are perceptual measures of manager's opinions, which have been shown to satisfy reliability and validity requirements (Ketokivi and Schroeder, 2004). Five-point Likert-type scales anchored at 1 = strongly disagree, 3 = neutral and 5 = strongly agree were used for all items in the survey.

Table I presents the measurement items used in this study. CKM was operationalized using a nine-item scale designed and validated by Shang and Wang (2015). The first three items include questions related to customer knowledge at the product or technical level. The next three items are related to knowledge about customer firms' procurement processes, while the last three items measure different aspects of CKM at the strategic level. Responses for each of the nine items were added together to compute a score for the CKM scale. As previously explained, each individual item was measured on a five-point Likert-type scale. Thus, overall CKM scores could range from 9 to 45.

The scale for MDC was operationalized using nine items adapted from the instrument originally developed and validated by Li (2015). The first three items are related to the market sensing ability of a firm. The next three measurement items include questions related to resource coordination (or interface operability), while the last three questions are related to customer responsiveness. Responses for each of the nine measurement items were added together to generate a total

score for the scale. The scores for the MDC scale could, therefore, range from 9 to 45.

The last scale, PIP, was operationalized using four items drawn from Lin and Chen (2006). The PIP scale included questions related to profit performance, relative success, market demand fit and market share performance of new products. The scale score was calculated by adding together the responses from each of the four items. Scores for the PIP scale could, therefore, range between 4 and 20.

Demographic measures included gender, educational background, work experience and position within the firm of the participants. One of the classification questions included in the survey captured firms' type of ownership. In the case of China, companies tend to have a single dominant stakeholder (Chen *et al.*, 2009). Previous empirical work established that state-owned enterprises (SOEs) in China tend to outperform non-state-owned firms in terms of both quantity and quality of new products developed (Zhao and Lan, 2015). As a result, state ownership (coded 1 if a firm was an SOE and 0 otherwise) was captured as a dummy control variable in this study.

Content and face validity

To ensure the content and face validity of the survey items, a panel of four subject-matter experts evaluated the measurement instrument. The group reviewed the questionnaire for readability, clarity and completeness (Dillman, 2000). Feedback received from the panel was used to revise the questionnaire and improve the instrument's readability as well as its ability to capture relevant information.

Data collection

Surveys were administered via email among a sample of middle- and top-level management at Chinese high-tech industry firms. A total of 328 questionnaires were distributed, of which 235 questionnaires were returned. The investigators had to discard 53 questionnaires because of incomplete information. The 182 usable questionnaires yielded a 55.49 per cent effective response rate.

Data analysis

A basic descriptive analysis of the 182 usable responses was conducted first to evaluate the integrity of the data. The data set was also examined to identify any potential outliers. In this respect, an analysis of standard residuals indicated that one survey response (participant number 94) needed to be removed. As a result, 181 survey responses were used to test the research model. The means and standard deviations for the different scales and survey items used in this study are displayed in Table II.

Non-response bias and common method bias

Non-response bias was assessed by comparing responses from early versus late respondents (Armstrong and Overton, 1977). The responses submitted by the first and fourth quartiles of respondents were used to test for differences in each of the scale means. The *p*-values for the different tests ranged between 0.147 and 0.820. The test results indicated that there were no significant differences between mean scale responses obtained from the two groups, suggesting that non-response bias was not an issue in the current study.

Table II Survey items descriptive statistics

Measurement item	Mean	SD
Customer knowledge management (Cronbach's alpha = 0.859)	35.254	4.281
CKM1	3.823	0.660
CKM2	3.917	0.752
CKM3	3.994	0.687
CKM4	3.829	0.721
CKM5	3.934	0.750
CKM6	4.033	0.657
CKM7	3.785	0.709
CKM8	4.044	0.721
CKM9	3.895	0.573
Marketing dynamic capability (Cronbach's alpha = 0.813)	35.122	4.079
MDC1	3.884	0.652
MDC2	4.006	0.749
MDC3	4.039	0.763
MDC4	3.851	0.734
MDC5	3.994	0.610
MDC6	3.978	0.722
MDC7	3.950	0.717
MDC8	3.950	0.725
MDC9	3.470	0.757
Product innovation performance (Cronbach's alpha = 0.742)	15.790	2.173
PIP1	3.906	0.697
PIP2	3.994	0.742
PIP3	3.956	0.729
PIP4	3.934	0.727

The potential for CMB was assessed using a Harman's single factor test (Harman, 1976; Podsakoff *et al.*, 2003). All measurement items in the study were included in a factor analysis to determine whether the majority of the variance in the model was accounted for by a single factor. The unrotated solution was examined and results indicated that CMB was not an issue, as the maximum percentage of variance explained by one general factor (39.02 per cent) was within the acceptable range (Podsakoff *et al.*, 2003).

Scale reliability, convergent and discriminant validity

Internal consistency was evaluated by calculating a series of Cronbach's alpha coefficients. The Cronbach's alpha estimate for the CKM scale was 0.859, while the estimate for the MDC scale was 0.813. These estimates exceeded the 0.70 standard suggested by Hair *et al.* (2010), indicating good internal consistency among the scale items. With respect to the PIP scale, the Cronbach's alpha coefficient of 0.742 exceeded the abovementioned threshold, suggesting acceptable internal consistency among the items included in that scale.

Item-scale correlations were analyzed to evaluate the scales' convergent and discriminant validity. Convergent validity was supported for all three scales, with all survey items correlating with their hypothesized scales at a level above the $r = 0.50$ criterion suggested by Steenkamp and van Trijp (1991) (refer

to Table III). The item-scale correlations also provided support for discriminant validity, with all measurements items correlating at a higher level with the scale they were hypothesized to belong to than with the other scales (Chin, 1998; Fayers and Machin, 2000).

Inter-scale correlations were analyzed next to further determine whether the scales in the instrument diverged. In this respect, correlations should differ significantly from one to establish discriminant validity (Bagozzi *et al.*, 1991; Edwards and Berry, 2010). A total of 5,000 bootstrapped samples were used to construct 95 per cent confidence intervals for the inter-scale correlations (Wood, 2004). The resulting estimates are presented in Table IV. None of the bootstrap confidence intervals for the correlation coefficients included the value one, providing additional support for the discriminant validity of the three scales (Torkzadeh *et al.*, 2003; Rahim and Magner, 1995).

Evaluation of model assumptions

The assumptions of no collinearity, independent and normally distributed errors, homogeneity of variance and linearity were evaluated next. Variance inflation factors (VIFs) were examined to determine whether collinearity was an issue. VIF

Table III Item-scale correlations

Measurement item	Scale		
	CKM	MDC	PIP
CKM1	0.748	0.553	0.443
CKM2	0.663	0.583	0.455
CKM3	0.701	0.537	0.423
CKM4	0.709	0.500	0.409
CKM5	0.656	0.460	0.353
CKM6	0.706	0.576	0.542
CKM7	0.695	0.552	0.504
CKM8	0.664	0.512	0.460
CKM9	0.643	0.560	0.518
MDC1	0.600	0.621	0.512
MDC2	0.483	0.643	0.509
MDC3	0.468	0.664	0.511
MDC4	0.348	0.620	0.482
MDC5	0.569	0.659	0.502
MDC6	0.541	0.655	0.539
MDC7	0.547	0.657	0.492
MDC8	0.532	0.675	0.572
MDC9	0.375	0.521	0.418
PIP1	0.548	0.627	0.743
PIP2	0.489	0.566	0.761
PIP3	0.447	0.574	0.738
PIP4	0.502	0.619	0.761

Table IV Bootstrap estimates for inter-scale correlations

Correlation	Coefficient	Standard error	95% confidence interval	
			Lower	Upper
CKM ↔ MDC	0.780	0.036	0.703	0.843
CKM ↔ PIP	0.660	0.052	0.550	0.751
MDC ↔ PIP	0.794	0.033	0.720	0.851

values above 10 are regarded by practitioners as a sign of severe multicollinearity (Belsley *et al.*, 2004; Myers, 2000; Stevens, 2012). VIF scores of 2.575 for CKM, 2.629 for MDC and 1.034 for state ownership were below the abovementioned threshold, indicating that collinearity was not a problem with the survey data.

Next, the authors determined that the survey data met the assumption of independent error components (Durbin–Watson statistic = 1.804). The histogram of standardized residuals and the normal *P-P* plot of regression standardized residuals showed that the data contained approximately normally distributed errors. A Shapiro–Wilk test was performed to examine the residuals for normality. Based on the test results ($W = 0.985$, $p = 0.054$), the authors were not able to reject the hypothesis that the residuals were an independent and identically distributed random sample from a normal distribution at the 0.05 level of significance. Finally, an analysis of the scatterplot of standardized predicted residuals suggested that the survey data met the assumptions of homogeneity of variance and linearity.

Results

A series of regression analyses were conducted to assess each component of the proposed mediation model. A list of the different regression models used to test the proposed hypotheses is presented in Table V.

Table VI displays the results of the different regression analyses. Model 0 included only the control variable of

Table V Summary of regression models

Model	Dependent variable	Independent variable(s)	Control variable	Hypothesis
0	PIP	–	State-owned	–
1	PIP	CKM	State-owned	H1
2	MDC	CKM	State-owned	H2
3	PIP	MDC	State-owned	H3
4	PIP	CKM, MDC	State-owned	H4

Table VI Results of the regression models

Model	R ² _{Adjusted}	F	Variables	B	Standard error	t
0	0.025	5.591*				
1	0.447	73.775***	State-owned	0.893	0.378	2.365*
			CKM	0.331	0.028	11.734***
2	0.615	144.977***	State-owned	0.675	0.285	2.366*
			CKM	0.737	0.044	16.685***
3	0.628	153.237***	State-owned	1.029	0.446	2.305*
			MDC	0.419	0.025	17.082***
4	0.631	103.805***	State-owned	0.259	0.236	1.096
			CKM	0.058	0.037	1.565
			MDC	0.371	0.039	9.489***
			State-owned	0.293	0.236	1.241

Notes: $n = 181$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

state-ownership. The results suggested there was a statistically significant ($p = 0.019$) relationship between state-ownership and PIP.

The Baron and Kenny (1986) approach was used to investigate the mediation relationship. Model 1 was evaluated to test the relationship between CKM and PIP while controlling for state-ownership. The results of this portion of the analysis suggest a statistically significant positive relationship between CKM and the outcome variable ($p < 0.001$). $H1$ is therefore supported. In Model 2, CKM was regressed on MDC. The model results indicate that there exists a statistically significant relationship between CKM and the proposed mediator ($p < 0.001$) while controlling for state-ownership. Therefore, $H2$ is also supported. Next, Model 3 tested the relationship between MDC and the outcome variable while controlling for state-ownership. The regression model results suggest that there is a statistically significant positive relationship between MDC and PIP ($p < 0.001$). $H3$ is therefore supported.

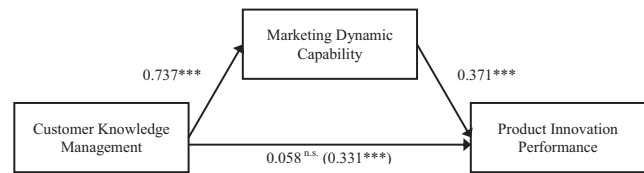
In the final step, both MDC and CKM were regressed simultaneously on PIP while controlling for state-ownership (Model 4). The model results indicate that the overall regression model explained a significant amount of variance in PIP ($p < 0.001$, $R^2_{Adjusted} = 0.631$). The regression results also provide support for the relationship between MDC and PIP ($p < 0.001$). While the link between the proposed mediator and PIP was determined to be statistically significant, the previously significant direct path between CKM and PIP in Model 1 was found to be not significant at the 0.05 level in Model 4 when MDC was introduced ($p = 0.119$). In this respect, the ratio of the indirect effect to the total effect (Preacher and Kelley, 2011) shows that the proposed mediator accounted for over 80 per cent of the total effect ($P_M = 0.826$).

A Sobel (1982) test corroborated these findings. The Sobel test result indicated that MDC did indeed mediate the relationship between CKM and PIP ($z = 8.237$, $p < 0.001$). The mediation relationship was further evaluated using the bootstrapping method (MacKinnon *et al.*, 2004; Preacher and Hayes, 2004); 5,000 bootstrapped samples were used to construct a bias-corrected confidence interval for the indirect effect of CKM on PIP (Preacher and Hayes, 2008). The resulting 95 per cent confidence interval did not include the value of zero (the confidence interval ranged from 0.204 to 0.351), leading to the conclusion that the indirect effect was significantly different from zero at the 0.05 level of significance. The bootstrapped point estimates thus confirm CKM has a statistically significant indirect effect – through MDC – on PIP. The mediational hypothesis ($H4$) is, therefore, supported. More specifically, as the direct effect of CKM on PIP became non-significant when controlling for MDC, the results indicate that MDC fully mediates the relationship between CKM and PIP. Figure 2 summarizes the study results.

Discussion and implications for research and practice

This paper explores the intermediary role of MDC in the relationship between CKM and PIP. Findings from a survey among middle and top management of firms engaged in

Figure 2 Conceptual model results



Notes: *** $p < 0.001$; n.s. indicates a non-significant result

business-to-business relationships within high-tech industries in China demonstrate that CKM is related to improved firm PIP through the deployment of firm-specific MDC.

The findings presented in this study have important implications from both an academic and a managerial perspective. From an academic perspective, little attention has been paid to the relationship between learning and the firm's marketing capability (Weerawardena *et al.*, 2015). In particular, this study answers calls for exploration of the antecedents of MDCs (Tan and Sousa, 2015). The current study treats customer knowledge as an antecedent to MDC, and demonstrates that firm learning in the form of customer knowledge resources must be integrated, interpreted and insights drawn for these knowledge resources to play a part in improving firm performance through innovation. Results from the survey conducted in this study show that the "market perception" dimension of MDCs is brought to bear on customer knowledge resources when a firm regularly conducts systematic assessments on the status of customers and competitors, and timeously distributes and shares those assessments among different departments and with top management within the firm. This process (or sets of processes) directly links customer knowledge to MDC. Hence, strategic MDC processes help firms manipulate knowledge resources to create new value offerings.

This study addresses additional questions about dynamic capabilities raised by Cavusgil *et al.* (2007). First, those authors ask the following: "Are knowledge creation and integration synonymous with dynamic capabilities?" (Cavusgil *et al.*, 2007, p. 164). The findings from the current study suggest that there is a reasonable basis for separate identification of these two concepts; knowledge creation occurs within the scope of CKM, while the analytical and perceptual processes that lead to insights and redeployment of firm resources fall under the umbrella of MDCs.

Cavusgil *et al.* (2007) go on to call for further understanding of the nature of the relationship between capabilities and competitive advantage. Specifically, they question whether "knowledge (is) a mediator to the relationship between capabilities and competitive advantage" (Cavusgil *et al.*, 2007, pp. 164-165). The findings presented in this study indicate that knowledge is an antecedent to the processes that constitute dynamic capabilities which, in turn, enable the reconfiguration of firm resources to create competitive advantage in the form of product innovation.

In addition, dynamic capabilities themselves can be regarded as a source of sustainable competitive advantage because they are firm-specific, difficult to imitate (owing to their tacit nature) and time-sensitive processes that are available to the firm to compete in the competitive

environment (Eisenhardt and Martin, 2000; Itami and Roehl, 1987; Teece *et al.*, 1997). However, dynamic capabilities are not sufficient for achieving competitive advantage (Collis, 1994). Even though the processes and decision-making capabilities can be a source of competitive advantage, they draw from the firm's customer knowledge resource base to create customer-responsive solutions. Dynamic capabilities play a quintessential role in transforming the firm's knowledge resources to redeploy resources, and in creating new configurations in response to market needs.

Findings from this study also have implications for managers. First, firms with MDC are configured to ensure "interface interoperability". That is, managers (at different levels within the firm) have appropriate marketing decision-making power, and are able to adapt resource deployment to reflect environmental changes in ongoing cooperation with other functional areas to coordinate effectively implementation of marketing strategy decisions. MDCs differentiate firms that are responsive to customer needs, by ensuring efficiency in implementing redeployment of resources (e.g. speedy introduction of innovations to market) and by communicating appropriately and effectively with target customers. As suggested by Breznik and Lahovnik (2016) (cf. also discussions in Teece *et al.*, 1997 and Weerawardena *et al.*, 2015), adoption of a dynamic capabilities view, therefore, assigns a prominent role to key decision-makers in building/maintaining differential advantage.

Conclusion, study limitations and research agenda

The purpose of this study was to empirically investigate the intermediary role of MDC in the relationship between CKM and firm PIP. To accomplish the stated research objective, a survey instrument was developed, data were collected from over 180 Chinese managers, a theoretical model was proposed and a series of regression models were used to test the research hypotheses. The empirical results demonstrated that MDC fully mediates the relationship between CKM and PIP.

A number of potential limitations of this research must be discussed. The first limitation is the fact that all the survey respondents were from China. This issue may limit the generalizability of the study's findings to other countries or regions. Empirical research on how CKM and MDC impact the performance of product innovation should, therefore, be pursued in different geographic regions.

In terms of the survey instrument, all the measurement items used in the study represent managerial perceptions of CKM, MDC and firm PIP. While perceptual measures of manager's opinions have been shown to satisfy reliability and validity requirements, the use of more objective estimates (such as actual profit or market share metrics) in future empirical research studies would be preferable.

An additional limitation is related to the "snapshot" nature of the study. In this respect, a longitudinal approach would be preferred. A longitudinal study would allow researchers to investigate over time different issues and factors related to the development of dynamic capabilities and their impact on product innovation. More specifically, such a study could not only assist with generalizing the findings to a broader group of

subjects but also help address the potential for innovation-related biases, as additional attitudes toward the performance of new products continue to emerge over time.

A further limitation of this study is the examination of the impact of only one type of firm capability on innovation performance. Dynamic capabilities are interdependent and interwoven (Breznik and Lahovnik, 2016). Other firm capabilities, such as supply chain management dynamic capabilities (Chang, 2011; Eltantawy, 2016), can significantly affect both MDC and PIP. Future research should, therefore, explore the interaction between different types of capabilities as well as their effect on innovation performance.

These limitations notwithstanding, this study contributes to both managerial and academic fronts, has relevant research implications and provides a relevant starting point for further empirical research on a current business topic.

References

- Alegre, J., Lapiedra, R. and Chiva, R. (2006), "A measurement scale for product innovation performance", *European Journal of Innovation Management*, Vol. 9 No. 4, pp. 333-346.
- Ambrosini, V. and Bowman, C. (2009), "What are dynamic capabilities and are they a useful construct in strategic management?", *International Journal of Management Reviews*, Vol. 11 No. 1, pp. 29-49.
- Amit, R. and Schoemaker, P.J.H. (1993), "Strategic assets and organizational rent", *Strategic Management Journal*, Vol. 14 No. 1, pp. 33-46.
- Armstrong, J.S. and Overton, T.S. (1977), "Estimating nonresponse bias in mail surveys", *Journal of Marketing Research*, Vol. 14 No. 3, pp. 396-402.
- Atuahene-Gima, K., Slater, S.F. and Olson, E.M. (2005), "The contingent value of responsive and proactive market orientations for new product program performance", *Journal of Product Innovation Management*, Vol. 22 No. 6, pp. 464-482.
- Bagozzi, R.P., Yi, Y. and Phillips, L.W. (1991), "Assessing construct validity in organizational research", *Administrative science quarterly*, Vol. 36 No. 3, pp. 421-458.
- Baker, W.E. and Sinkula, J.M. (1999), "The synergistic effect of market orientation and learning orientation on organizational performance", *Journal of the Academy of Marketing Science*, Vol. 27 No. 4, pp. 411-427.
- Barney, J.B. (1986), "Strategic factor markets: expectations, luck, and business strategy", *Management Science*, Vol. 32 No. 10, pp. 1231-1241.
- Barney, J.B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Baron, R.M. and Kenny, D.A. (1986), "The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations", *Journal of Personality and Social Psychology*, Vol. 51 No. 6, pp. 1173-1182.
- Barreto, I. (2010), "Dynamic capabilities: a review of past research and an agenda for the future", *Journal of Management*, Vol. 36 No. 1, pp. 256-280.

- Baskerville, R. and Dulipovici, A. (2006), "The theoretical foundations of knowledge management", *Knowledge Management Research & Practice*, Vol. 4 No. 2, pp. 83-105.
- Belkahl, W. and Triki, A. (2011), "Customer knowledge enabled innovation capability: proposing a measurement scale", *Journal of Knowledge Management*, Vol. 15 No. 4, pp. 648-674.
- Belsley, D.A., Kuh, E. and Welsch, R.E. (2004), *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*, John Wiley & Sons, Hoboken, NJ.
- Breznik, L. and Lahovnik, M. (2016), "Dynamic capabilities and competitive advantage: findings from case studies", *Management: Journal of Contemporary Management Issues*, Vol. 21, pp. 167-185.
- Cavusgil, E., Seggie, S.H. and Talay, M.B. (2007), "Dynamic capabilities view: foundations and research agenda", *Journal of Marketing Theory and Practice*, Vol. 15 No. 2, pp. 159-166.
- Chang, H.-L. (2011), "Developing supply chain dynamic capability to realise the value of inter-organizational systems", *International Journal of Internet and Enterprise Management*, Vol. 7 No. 2, pp. 153-171.
- Charterina, J., Basterretxea, I. and Landeta, J. (2016), "Types of embedded ties in buyer-supplier relationships and their combined effects on innovation performance", *Journal of Business & Industrial Marketing*, Vol. 31 No. 2, pp. 152-163.
- Chen, G., Firth, M. and Xu, L. (2009), "Does the type of ownership control matter? Evidence from China's listed companies", *Journal of Banking & Finance*, Vol. 33 No. 1, pp. 171-181.
- Chien, S.-Y. and Tsai, C.-H. (2012), "Dynamic capability, knowledge, learning, and firm performance", *Journal of Organizational Change Management*, Vol. 25 No. 3, pp. 434-444.
- Chin, W.W. (1998), "The partial least squares approach to structural equation modeling", in Marcoulides, G.A. (Ed.), *Modern Methods for Business Research*, Lawrence Erlbaum Associates, London, pp. 295-336.
- Collis, D.J. (1994), "Research note: how valuable are organizational capabilities?", *Strategic Management Journal*, Vol. 15 No. S1, pp. 143-152.
- Darroch, J. (2005), "Knowledge management, innovation and firm performance", *Journal of Knowledge Management*, Vol. 9 No. 3, pp. 101-115.
- Di Stefano, G., Peteraf, M. and Verona, G. (2010), "Dynamic capabilities deconstructed: a bibliographic investigation into the origins, development, and future directions of the research domain", *Industrial and Corporate Change*, Vol. 19 No. 4, pp. 1187-1204.
- Dillman, D.A. (2000), *Mail and Internet Surveys: The Tailored Design Method*, John Wiley & Sons, New York, NY.
- Edwards, J.R. and Berry, J.W. (2010), "The presence of something or the absence of nothing: increasing theoretical precision in management research", *Organizational Research Methods*, Vol. 13 No. 4, pp. 668-689.
- Eisenhardt, K.M. and Martin, J.A. (2000), "Dynamic capabilities: what are they?", *Strategic Management Journal*, Vol. 21 Nos 10/11, pp. 1105-1121.
- Eltantawy, R.A. (2016), "The role of supply management resilience in attaining ambidexterity: a dynamic capabilities approach", *Journal of Business & Industrial Marketing*, Vol. 31 No. 1, pp. 123-134.
- Eslami, M.H. and Lakemond, N. (2016), "Knowledge integration with customers in collaborative product development projects", *Journal of Business & Industrial Marketing*, Vol. 31 No. 7, pp. 889-900.
- Fainshmidt, S. (2014), *Dynamic Capabilities and Resilient Organizations Amid Environmental Jolts*, ProQuest LLC, Ann Arbor, MI.
- Fang, E.E. and Zou, S. (2009), "Antecedents and consequences of marketing dynamic capabilities in international joint ventures", *Journal of International Business Studies*, Vol. 40 No. 5, pp. 742-761.
- Fayers, P.M. and Machin, D. (2000), *Quality of Life: Assessment, Analysis and Interpretation*, John Wiley & Sons, Chichester.
- Frauendorf, J. (2006), *Customer Processes in Business-to-Business Service Transactions*, Deutscher Universitäts-Verlag | GWV Fachverlage GmbH, Wiesbaden.
- Gibbert, M., Leibold, M. and Probst, G. (2002), "Five styles of customer knowledge management, and how smart companies use them to create value", *European Management Journal*, Vol. 20 No. 5, pp. 459-469.
- Gordon, G.L., Calantone, R.J., Di Benedetto, C.A. and Kaminski, P.F. (1993), "Customer knowledge acquisition in the business products market", *Journal of Product & Brand Management*, Vol. 2 No. 3, pp. 23-25.
- Griffith, D.A., Noble, S.M. and Chen, Q. (2006), "The performance implications of entrepreneurial proclivity: a dynamic capabilities approach", *Journal of Retailing*, Vol. 82 No. 1, pp. 51-62.
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010), *Multivariate Data Analysis*, Prentice-Hall, Upper Saddle River, NJ.
- Harman, H.H. (1976), *Modern Factor Analysis*, University of Chicago Press, Chicago, IL.
- Helfat, C.E. and Peteraf, M.A. (2003), "The dynamic resource-based view: capability lifecycles", *Strategic Management Journal*, Vol. 24 No. 10, pp. 997-1010.
- Helfat, C.E. and Peteraf, M.A. (2015), "Managerial cognitive capabilities and the microfoundations of dynamic capabilities", *Strategic Management Journal*, Vol. 36 No. 6, pp. 831-850.
- Helfat, C.E. and Winter, S.G. (2011), "Untangling dynamic and operational capabilities: strategy for the (N) ever-changing world", *Strategic Management Journal*, Vol. 32 No. 11, pp. 1243-1250.
- Helfat, C.E., Finkelstein, S., Mitchell, W., Peteraf, M., Singh, H., Teece, D. and Winter, S.G. (2007), *Dynamic Capabilities: Understanding Strategic Change in Organizations*, Blackwell Publishing, London.
- Hsu, Y. (2016), "A value cocreation strategy model for improving product development performance", *Journal of Business & Industrial Marketing*, Vol. 31 No. 5, pp. 695-715.
- Hult, G.T.M., Ketchen, D.J. and Slater, S.F. (2005), "Market orientation and performance: an integration of disparate approaches", *Strategic Management Journal*, Vol. 26 No. 12, pp. 1173-1181.

- Hunt, S.D. (2004), "On the services-centered dominant logic for marketing", *Journal of Marketing Research*, Vol. 68 No. 1, pp. 21-22.
- Itami, H. and Roehl, T.W. (1987), *Mobilizing Invisible Assets*, Harvard University Press, Cambridge, MA.
- Joshi, A.W. and Sharma, S. (2004), "Customer knowledge development: antecedents and impact on new product performance", *Journal of Marketing*, Vol. 68 No. 4, pp. 47-59.
- Ketokivi, M.A. and Schroeder, R.G. (2004), "Perceptual measures of performance: fact or fiction?", *Journal of Operations Management*, Vol. 22 No. 3, pp. 247-264.
- Kogut, B. and Zander, U. (1992), "Knowledge of the firm, combinative capabilities, and the replication of technology", *Organization science*, Vol. 3 No. 3, pp. 383-397.
- Korhonen-Sande, S. and Sande, J.B. (2016), "Improving customer knowledge transfer in industrial firms: how does previous work experience influence the effect of reward systems?", *Journal of Business & Industrial Marketing*, Vol. 31 No. 2, pp. 232-246.
- Li, T. and Calantone, R.J. (1998), "The impact of market knowledge competence on new product advantage: conceptualization and empirical examination", *Journal of Marketing*, Vol. 62 No. 4, pp. 13-29.
- Li, W. (2015), "The concept and scale development of the marketing dynamic capabilities", *Journal of Business Economics*, Vol. 280 No. 2, pp. 68-77.
- Liao, J., Kickul, J.R. and Ma, H. (2009), "Organizational dynamic capability and innovation: an empirical examination of internet firms", *Journal of Small Business Management*, Vol. 47 No. 3, pp. 263-286.
- Lin, B.-W. and Chen, C.-J. (2006), "Fostering product innovation in industry networks: the mediating role of knowledge integration", *The International Journal of Human Resource Management*, Vol. 17 No. 1, pp. 155-173.
- MacKinnon, D.P., Lockwood, C.M. and Williams, J. (2004), "Confidence limits for the indirect effect: distribution of the product and resampling methods", *Multivariate Behavioral Research*, Vol. 39 No. 1, pp. 99-128.
- Makadok, R. (2001), "Toward a synthesis of the resource-based and dynamic-capability views of rent creation", *Strategic Management Journal*, Vol. 22 No. 5, pp. 387-401.
- Marcus, A.A. and Anderson, M.H. (2006), "A general dynamic capability: does it propagate business and social competencies in the retail food industry?", *Journal of Management Studies*, Vol. 43 No. 1, pp. 19-46.
- Marsh, S.J. and Stock, G.N. (2003), "Building dynamic capabilities in new product development through intertemporal integration", *Journal of Product Innovation Management*, Vol. 20 No. 2, pp. 136-148.
- Menguc, B. and Auh, S. (2006), "Creating a firm-level dynamic capability through capitalizing on market orientation and innovativeness", *Journal of the Academy of Marketing Science*, Vol. 34 No. 1, pp. 63-73.
- Moliterno, T.P. and Wiersema, M.F. (2007), "Firm performance, rent appropriation, and the strategic resource divestment capability", *Strategic Management Journal*, Vol. 28 No. 11, pp. 1065-1087.
- Morgan, N.A., Vorhies, D.W. and Mason, C.H. (2009), "Market orientation, marketing capabilities, and firm performance", *Strategic Management Journal*, Vol. 30 No. 8, pp. 909-920.
- Mowery, D.C., Oxley, J.E. and Silverman, B.S. (1996), "Strategic alliances and interfirm knowledge transfer", *Strategic Management Journal*, Vol. 17 No. S2, pp. 77-91.
- Murschetz, P. (2013), "Customer integration and web interactivity: a literature review and analysis of the role of transaction costs in building value webs", in Friedrichsen, M. and Mühl-Benninghaus, W. (Eds), *Handbook of Social Media Management: Value Chain and Business Models in Changing Media Markets*, Springer-Verlag Berlin Heidelberg, pp. 775-794.
- Myers, R.H. (2000), *Classical and Modern Regression with Applications*, Duxbury Press, Pacific Grove, CA.
- Nguyen, T.D. and Nguyen, T.T.M. (2011), "The WTO, marketing and innovativeness capabilities of Vietnamese firms", *Management Research Review*, Vol. 34 No. 6, pp. 712-726.
- O'Cass, A., Ngo, L.V. and Siahtiri, V. (2015), "Marketing resource-capability complementarity and firm performance in B2B firms", *Journal of Business & Industrial Marketing*, Vol. 30 No. 2, pp. 194-207.
- Peteraf, M.A. (1993), "The cornerstones of competitive advantage: a resource-based view", *Strategic Management Journal*, Vol. 14 No. 3, pp. 179-191.
- Peteraf, M., Di Stefano, G. and Verona, G. (2013), "The elephant in the room of dynamic capabilities: bringing two diverging conversations together", *Strategic Management Journal*, Vol. 34 No. 12, pp. 1389-1410.
- 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.
- Preacher, K.J. and Hayes, A.F. (2004), "SPSS and SAS procedures for estimating indirect effects in simple mediation models", *Behavior Research Methods, Instruments, & Computers*, Vol. 36 No. 4, pp. 717-731.
- Preacher, K.J. and Hayes, A.F. (2008), "Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models", *Behavior Research Methods*, Vol. 40 No. 3, pp. 879-891.
- Preacher, K.J. and Kelley, K. (2011), "effect size measures for mediation models: quantitative strategies for communicating indirect effects", *Psychological Methods*, Vol. 16 No. 2, pp. 93-115.
- Rahim, M.A. and Magner, N.R. (1995), "Confirmatory factor analysis of the styles of handling interpersonal conflict: first-order factor model and its invariance across groups", *Journal of Applied Psychology*, Vol. 80 No. 1, pp. 122-132.
- Rigby, D.K., Reichheld, F.F. and Scheffer, P. (2002), "Avoid the four perils of CRM", *Harvard Business Review*, Vol. 80 No. 2, pp. 101-109.
- Rowley, J.E. (2002), "Reflections on customer knowledge management in e-business", *Qualitative Market Research: An International Journal*, Vol. 5 No. 4, pp. 268-280.

- Ryzhkova, N. (2015), "Does online collaboration with customers drive innovation performance?", *Journal of Service Theory and Practice*, Vol. 25 No. 3, pp. 327-347.
- Schweizer, L., Rogbeer, S. and Michaelis, B. (2015), "The dynamic capabilities perspective: from fragments to meta-theory", *Management Research Review*, Vol. 38 No. 7, pp. 662-684.
- Shang, X. and Wang, Y. (2015), "The key dimensions of business customer knowledge and measurements: an empirical study in China", *Management Review*, Vol. 27 No. 2, pp. 67-76.
- Smith, H.A. and McKeen, J.D. (2005), "Developments in practice XVIII-customer knowledge management: adding value for our customers", *Communications of the Association for Information Systems*, Vol. 16 No. 1, pp. 744-755.
- Sobel, M.E. (1982), "Asymptotic confidence intervals for indirect effects in structural equation models", in Leinhardt, S. (Ed.), *Sociological Methodology*, Jossey-Bass, San Francisco, CA, pp. 290-312.
- Stadler, C., Helfat, C.E. and Verona, G. (2013), "The impact of dynamic capabilities on resource access and development", *Organization Science*, Vol. 24 No. 6, pp. 1782-1804.
- Steenkamp, J.-B.E.M. and van Trijp, H.C.M. (1991), "The use of LISREL in validating marketing constructs", *International Journal of Research in Marketing*, Vol. 8 No. 4, pp. 283-299.
- Stevens, J.P. (2012), *Applied Multivariate Statistics for the Social Sciences*, Routledge, Taylor & Francis Group, New York, NY.
- Taherparvar, N., Esmailpour, R. and Dostar, M. (2014), "Customer knowledge management, innovation capability and business performance: a case study of the banking industry", *Journal of Knowledge Management*, Vol. 18 No. 3, pp. 591-610.
- Tan, Q. and Sousa, C.M.P. (2015), "Leveraging marketing capabilities into competitive advantage and export performance", *International Marketing Review*, Vol. 32 No. 1, pp. 78-102.
- Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", *Strategic Management Journal*, Vol. 28 No. 13, pp. 1319-1350.
- Teece, D.J. (2014), "A dynamic capabilities-based entrepreneurial theory of the multinational enterprise", *Journal of International Business Studies*, Vol. 45 No. 1, pp. 8-37.
- Teece, D.J., Pisano, G. and Shuen, A. (1997), "Dynamic capabilities and strategic management", *Strategic Management Journal*, Vol. 18 No. 7, pp. 509-533.
- Torkzadeh, G., Koufteros, X. and Pflughoeft, K. (2003), "Confirmatory analysis of computer self-efficacy", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 10 No. 2, pp. 263-275.
- Wang, C.L. and Ahmed, P.K. (2007), "Dynamic capabilities: a review and research agenda", *International Journal of Management Reviews*, Vol. 9 No. 1, pp. 31-51.
- Wang, H. (2006), "The research of the performance impact of new products on customer knowledge management", *Science & Technology Progress and Policy*, Vol. 23 No. 8, pp. 143-145.
- Weerawardena, J., Mort, G.S., Salunke, S., Knight, G. and Liesch, P.W. (2015), "The role of the market sub-system and the socio-technical sub-system in innovation and firm performance: a dynamic capabilities approach", *Journal of the Academy of Marketing Science*, Vol. 43 No. 2, pp. 221-239.
- Weiss, L.M., Capozzi, M.M. and Prusak, L. (2004), "Learning from the internet giants", *MIT Sloan Management Review*, Vol. 45 No. 4, pp. 79-85.
- Winter, S.G. (2012), "Capabilities: their origins and ancestry", *Journal of Management Studies*, Vol. 49 No. 8, pp. 1402-1406.
- Wood, M. (2004), "Statistical inference using bootstrap confidence intervals", *Significance*, Vol. 1 No. 4, pp. 180-182.
- Wu, L.-Y. (2007), "Entrepreneurial resources, dynamic capabilities and start-up performance of Taiwan's high-tech firms", *Journal of Business Research*, Vol. 60 No. 5, pp. 549-555.
- Xu, H., Li, W. and Wang, L. (2011), "Market knowledge management and formation of marketing dynamic capabilities: a case study on Tianjin OTIS", *Chinese Journal of Management*, Vol. 8 No. 3, pp. 323-331.
- Zahra, S.A., Sapienza, H.J. and Davidsson, P. (2006), "Entrepreneurship and dynamic capabilities: a review, model and research agenda", *Journal of Management Studies*, Vol. 43 No. 4, pp. 917-955.
- Zhang, H. and Lu, R. (2012), "The empirical research of the effect of customer knowledge management on service innovation capability", *Science of Science and Management of S.&T*, Vol. 33 No. 8, pp. 66-73.
- Zhang, J. and Duan, Y. (2010), "The impact of different types of market orientation on product innovation performance", *Management Decision*, Vol. 48 No. 6, pp. 849-867.
- Zhang, R., Wang, K.-Y., Xia, L.-K. and Liu, Y.-M. (2008), "Study of relationship between market knowledge competence, marketing capability and organizational performance", *Journal of Dalian University of Technology*, Vol. 29 No. 2, pp. 19-24.
- Zhao, X. and Lan, P. (2015), "Are Chinese state-owned enterprises lagging behind in product innovation?", *International Journal of Chinese Culture and Management*, Vol. 3 No. 4, pp. 351-379.

Corresponding author

Jiemei Zhang can be contacted at: jiemei1226@163.com

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com

Reproduced with permission of copyright owner.
Further reproduction prohibited without permission.