An Empirical Investigation of the Resource-based Antecedents of Customer Value in Turbulent Environments in China*

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Abstract: With the increasingly turbulent environment and the significant role of customers in business success, creating and delivering superior customer value by deploying unique competences of a firm has been winning more attention. However, studies of customer value seem rather divergent and fragmented, and few studies, if any, have been conducted to identify the distinctive capabilities that determine the effective and efficient creation and delivery of customer value. This paper tries to bridge such gaps and explores the fundamental antecedents of customer value in turbulent environments in perspective of a resource-based theory. Based on the structural equation models developed, we find that technological competences, integrative competence and strategic flexibility are the key resource-based antecedents of customer value while no evidence is found to support the impact of marketing competences on customer value. Furthermore, only the moderating role of marketing turbulence in the relationship between customer value and strategic flexibility is detected and supported.

Key words: customer value; core competences; strategic flexibility; environmental turbulence

1. Introduction

It is well known that customer value is increasingly becoming one of the most important success factors for both manufacturers and service providers (Gale, 1994; Zeithaml, 1988; Woodruff, 1997). Many authors have suggested that business should re-orient their operations towards superior customer value (Slater, 1997). However, these studies are rather fragmented and have not yet yielded any unambiguous interpretations with respect to the nature and antecedents of customer value even though it is widely believed that creating and delivering superior customer value is the fundamental source of sustainable competitive advantage in the present customer-centered era (Zeithaml, 1988; Woodruff, 1997; Lapierre, 2000).

On the one hand, although the body of conceptual knowledge about customer value has been growing rapidly and such factors as product-related, service-related and other promotion-related factors have been identified as the antecedents of customer value (Lapierre, 2000), only a few, if any, have focused on how to create superior customer value by configuring or redeploying business activities and processes supported by firm-specific distinctive competences. In fact, the lack of managerial understanding of "how" to create and deliver superior customer value by deploying core competences of firms has become one of the most influential barriers to achieve

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dynamic competitive advantages in turbulent environments. On the other hand, with the increasingly dynamic and turbulent nature of competition, there is a strong tendency to understand firms in terms of the efficient use of unique capabilities dynamically. However, although it is widely agreed that core competences of firms contribute to superior customer value, little is known about the explanation or prediction of how and why unique core competences will result in superior customer value and thus sustainable competitive advantages. In addition, in today's turbulent environment, the capability to predict and respond to fundamental environmental changes or strategically shape the future directions of environmental changes, i.e., strategic flexibility has become increasingly critical. However, knowledge of the different role of environmental turbulence in the process for strategic flexibility to influence the superiority of customer value is very scarce, and little has been conducted on the moderating role of environmental turbulence on the relationship between strategic flexibility and customer value.

Therefore, this study aims at bridging the research gaps via an empirical investigation of the resource-based antecedents of customer value in turbulent environments. By drawing on a growing body of literature on resource-based theory and other highly related findings (Barney, 1991; Henderson and Cockburn, 1994), this paper focuses on how constituents of core competences and strategic flexibility influence customer value differently and the moderating role of environmental turbulence on the creation and delivery of superior customer value. By decomposing core competences into three constituents, i.e., marketing competences, technological competences and integrative competences, this study avoids vagueness and tautology, and achieves operational results. By taking strategic flexibility into consideration, detecting its direct impact on customer value and modeling the moderating role of environmental turbulence, it is expected to identify the significant uniqueness of various antecedents of customer value in turbulent environments. The paper is organized as follows: the next section provides the theoretical background and develops related hypotheses. The survey method and measures used in the study are then presented, followed by the results of empirical analysis by developing structural equation models using the partial least square (PLS) method. Then the paper concludes with discussion and implications.

2. Literature Review and Conceptual Model

In the current highly competitive marketplace, characterized by high velocity change, accelerating product life cycles, narrowing customer niches, mass customization and technological discontinuities, today's product market can appear and disappear quickly (D'Aveni, 1994), and traditional product-centered strategies provide little long-term advantage. As a result, firms are under increasing pressure to develop, strengthen and renew competences in order to adapt to a changing business environment and deliver superior customer value in a timely, responsive and continuous manner. Such links among core competences, environmental turbulence, strategic flexibility and customer value, as proposed by this paper, are summarized in the conceptual model in Figure 1.

2.1 Customer value

Although the significance of customer value is widely recognized, the growing body of research about customer value is quite fragmented and the definition of customer value is divergent. Zeithaml (1988) considered value as the customer's overall assessment of the utility of a product based on the perception of what was received and what was given. Gale (1994) considered it as market perceived quality adjusted for relative product price. Woodruff (1997) defined customer value as a customer perceived preference for and evaluation of product

attributes, attribute performances, and consequences arising from use. In this study, we concur with the majority of researchers who defined customer value in terms of get (benefit) and give (sacrifice) components (Woodruff, 1997; Slater, 1997).

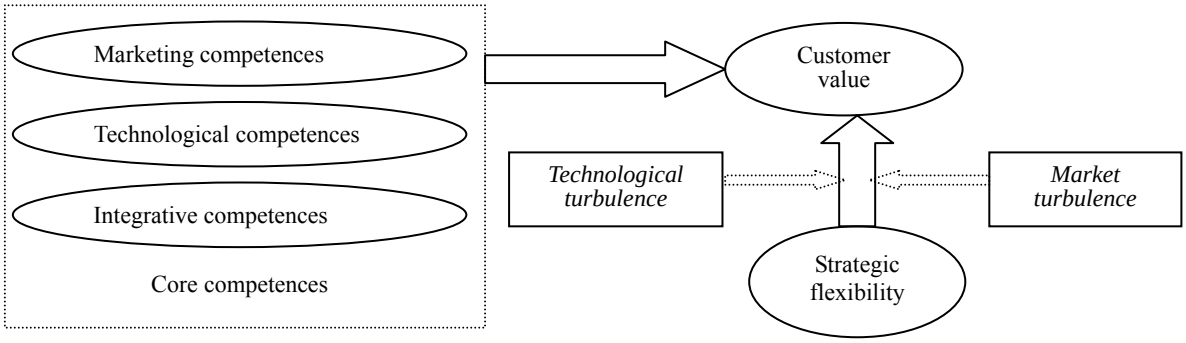

Figure 1 The resource-based antecedents of customer value in turbulence environments

It is clear that factors influencing the benefits customers receive or sacrifices customers have to make will cause different evaluations of customer value, even though different customers may form different opinions over time. For example, product related factors such as product quality and product customization, service related factors such as responsiveness, flexibility, reliability and technical competencies and relationship related factors such as image, time/effort/energy and solidarity, are all customer value drivers or sources (Lapierre, 2000; Zeithaml, 1988). However, one of the key problems that seem to be unsolved is closely related to the process in which firms can deploy their unique competences to create and deliver superior customer value. In this study, we prefer going beyond extant discussions and examining the differentiated impact of specific constituents of core competences and strategic flexibility on the superiority of customer value in turbulent environments, which helps managers to identify priorities and redeploy the scarce resources of their firms toward those competences building processes that contribute most to customer value creation and delivery according to different level of environmental turbulence. In fact, many related studies, especially those in the resource-based field, witness that superior customer value is always derived from the configuration or redeployment of unique and difficult-to-imitate skills, knowledge, resources, assets or competences, which are themselves a complex combination of interlinked processes, routines, technologies and individual skills.

2.2 The constituents of core competences

There are now multiple ways to see core competences, and with different emphases (Meyer et al., 1993; Barton, 1992; Hamel et al., 1994; Bogner et al., 1994; Hall, 1994; WANG et al, 2004). In this paper, we argue that core competences consist of not only technological competences, but also marketing competences and integrative competences. Among them, technological competences refer to the superior and heterogeneous technical assets and ability to combine and transform a set of pieces of knowledge consisting of both practical and theoretical know-how, methods, procedures, experience and physical devices and equipment of a firm into designs and instructions for the creation of desired outcomes (Miyazaki, 1994), which are closely related to product, design, process and information technologies and determine the capabilities to combine various streams of technologies (Wheelwright et al., 1992). Marketing competences are defined as the processes designed to apply the collective knowledge, skills and resources of the firm to the market-related needs of the business, which add value to company offerings so as to meet the competitive demands of customers. Therefore, it is based on a profound

understanding of customers' current and future needs, preferences, factors affecting them and knowledge of competitors' possible action. Integrative competences refer to the capability to combine and deploy firm-addressable assets and capabilities inside and outside the boundaries of the firm/business unit, the ability to combine different functional specialties and exploit synergies across business units or divisions and the ability to integrate the whole dynamic competence building and leveraging process. It is clear that each of them makes a different but important contribution to core competences, and hence to the superior customer value. Generally speaking, technological competences determine which products or services can be provided technically at one time; marketing competences determine which products or services demanded by targeted customers can be identified and delivered; integrative competences reflect the degree of fitness between the above two constituents of core competences and the effectiveness and efficiency of delivering offerings with superior customer value. Hence, we can form the following hypotheses:

Hypothesis 1: Technological competences have a positive impact on customer value.

Hypothesis 2: Marketing competences have a positive impact on customer value.

Hypothesis 3: Integrative competences have a positive impact on customer value.

2.3 Strategic flexibility

The increasing speed and cost of technological change, the rapid shifting of customer preferences and market upheavals, the discontinuous innovations, the convergence of high-technology industries, and the emergence of new global competitors all promise an increasingly uncertain business environment. These dynamically interactive forces demand organizations to be not only efficient and innovative, but also to be strategically flexible. The term strategic flexibility has been widely used by researchers and practitioners to denote a firm's ability to respond to various demands in turbulent competitive environments. Aker et al. (1984) defined it as "the ability of a firm to adapt to substantial, uncertain, and fast occurring environmental changes that have a meaningful impact on the organizational performance, which enables the firm to manage uncertain and fast-occurring markets effectively." Harrigan (1985) looked at strategic flexibility in terms of a firm's ability to reposition itself in a market or to change its strategies when its customers ceased to be attracted. Sanchez (1995) saw strategic flexibility as alternative courses of action or strategic options available to a firm for competing in a dynamic market, which could bestow on the firm of the ability to respond promptly to market opportunities and changing technologies. Therefore, strategic flexibility is the ability of a firm to respond to changes in the environment in a timely and appropriate manner with regard due to the competitive forces in the marketplace, which will have significant influence on customer value and business competitiveness. Furthermore, Das (1995) considered strategic flexibility as the key to effective performance. Michael et al. (1998) concluded that success in the 21st century would depend first on building strategic flexibility that contributed significantly to business competitiveness. Thus we can propose the following hypothesis.

Hypothesis 4: Strategic flexibility has significant positive influence on customer value.

2.4 Environmental turbulence and its moderating role

The high level of strategic flexibility can never be realized without cost. Firms may incur more costs than benefits by maintaining strategic flexibility in relatively stable environments. In turbulent environments, firms need to quickly adjust existing operations or strategic orientation to dynamic environmental changes such as frequent demand fluctuation and technological innovation. So it is very important for a firm to identify the desirable level of strategic flexibility and make it match with the level of environmental turbulence in which it operates. Past research suggests that technological turbulence and market turbulence are two kinds of

environmental turbulence (Boyd et al., 1993; Miller, 1987; Kohli and Jaworski, 1993). Market turbulence represents changes in the composition of customers and their preferences and in competition intensity. Technological turbulence refers to an individual's perception that he or she is unable to accurately predict or completely understand some aspect of the technological environment. As a result, the following hypotheses can be proposed.

Hypothesis 5: The greater the market turbulence, the stronger the relationship between strategic flexibility and customer value.

Hypothesis 6: The greater the technological turbulence, the stronger the relationship between strategic flexibility and customer value.

3. Methodology

3.1 Research design

Our research design entailed a large-scale cross-sectional survey. To lay the groundwork for our research and to develop measures, we conducted field research with senior manager representatives of high-technology firms in China, including in-depth interviews. After completing the first round of field study, we sought to identify subsets of measures that were unique and possessed "different shades of meaning" to informants (Gerbing and Anderson, 1988). We submitted a list of constructs and corresponding measurement items to two panels of academic experts in strategic management and marketing areas. On the basis of the feedback from these two panels of experts and a second round of group interviews, we prepared a draft questionnaire that included the items judged to have high consistency and face validity with the construct. We used two parallel double translations to translate the questionnaire into Chinese. The final stage of measurement development consisted of two pretests of the resulting questionnaires, with representative respondents to identify wording problems or ambiguities.

3.2 Data collection and sample

The sampling population consists of high technology firms located in Tianjin, Shenzhen and Beijing of China with the senior managers of firms as the target respondents. A stratified sampling method was firstly used to ensure an equal distribution of respondents, and random sampling was applied in each area to identify potential respondents based on the name list provided by a big consulting firm in China. As a result, a total of 400 firms were identified. Then the measurement items and their scales identified in the pilot study were formatted in questionnaires that were personally administrated by the authors. The purpose was to collect retrospective information on the firms investigated. These procedures helped to improve the response rate and allowed the collection of additional business information. Finally, 248 responses were considered valid. At the same time, we also asked each firm selected to choose randomly three to five active customers who have transactions with the firm within the past 1 year based on its customer database. This enables us to measure customer value in perspective of the real customers rather than the perspectives from senior managers. Totally, 122 firms whose customer responses are equal to the above three among the 248 responding firms are considered valid and data from the two sources (one is senior manager survey and the other is customer survey) are merged together according to each individual firm. The final sample included the following industries: computer related products, electronics, electric equipment, telecommunications equipment, pharmaceuticals. To examine any non-response bias and the representative of the participating firms, multivariate analysis of variance was conducted to compare the possible differences in total assets, number of employees and R&D spending among both responding firms

and non-responding firms. The results were not significant at the 99% confidence level, suggesting no significant difference between the two groups.

3.3 Measures

A big problem in a systematic empirical research in resource-based theory is that core competences are frequently discussed for one or a few individual companies only (Hamel et al., 1994). However, our decomposition of core competences helps to apply multidimensional measurements looking at a variety of indicators discussed in related literature. All the constructs in this study were measured with multiple-item scales, with respondents answering all questions using a Likert-type scale ranging from 1 to 7 (see Table 1) by comparing their major competitors. Although certain items were developed specifically for the Chinese context, many were derived from existing validated scales.

For marketing competences, technological competences and integrative competences, eight items were identified respectively based on extant literature and manager interviews (WANG et al., 2004; Eisenhardt and Martin, 2000; Tuominen et al., 1997; Tyler, 2001; Torkkeli and Tuominen, 2002; Danneels, 2002; Lapierre, 2000; Gupta et al., 1986; Han, Srivastava, 1998; Griffin and Hauser, 1996; Day, 1994; LI and Calantone, 1998; Douglas, 2000, etc.). For environmental turbulence, three items were retained each for market turbulence and technological turbulence respectively. For strategic flexibility, nine items were identified based on extant literature (Sanchez, 1995; Das, 1995; Ybarra and Wiersema, 1999; Grewal and Tansuhaj, 2001). For customer value, three items were used to measure the trade-off of benefits and sacrifices discussed above.

4. Analysis and Results

The partial least squares (PLS) method provides “a way to avoid problems of improper solutions and factor indeterminacy as well as the violations of distributional assumptions” that may be associated with the maximum likelihood (ML) method. Furthermore, the PLS method is superior in detecting the moderating effects of a latent construct under conditions of non-normality and small to medium sample sizes. Therefore, in this paper, the PLS method was used to estimate the models.

4.1 Measurement model

The adequacy of each multi-item scale in capturing its construct was assessed using the measurement model of all constructs by checking internal consistency reliability, convergent validity and discriminant validity. First, the composite reliability for internal consistency is demonstrated, since values for all constructs are above the suggested threshold of 0.7, with a minimum of 0.7213 (see Table 1). Second, the standardized factor loadings for all items are above the suggested cut-off of 0.60 (Hatcher, 1994), with a minimum of 0.625, and are all significant with strong evidence of convergent validity. At the same time, the average variance extracted (AVE) of each construct meets the criterion that a construct’s AVE should be at least higher than 50% to guarantee more valid variance explained than error in its measurement (Fornell, et al., 1981). Third, the constructs also show high discriminant validity since the square root of AVE of each construct is generally higher than the correlations between it and any other constructs in the model (see Table 2).

Table 1 Confirmatory factor analysis results and relevant composite reliability

Constructs and items	Loading	T-value	Alpha
Marketing competences			0.9000
Obtaining real time information about changes of customer needs	0.8319	29.4395	
Communicating with customers about their potential and current demands	0.7903	20.9078	
Involving customers in the process of product testing and assessment	0.8405	31.8783	
Responding quickly to customers' requirements of timely delivery	0.7008	13.0245	
Acquiring real time information of competitors' evolution of strength and weakness	0.7158	14.5033	
Benchmarking the product and service practices of major competitors	0.7005	10.3406	
Building and enhancing large-scale marketing channels	0.7485	16.6819	
Managing close customer relationship for long-term	0.7769	18.0419	
Technological competences			0.8916
R&D investment	0.7695	21.7578	
Technological accumulation	0.7992	21.6854	
On-job raining	0.7439	17.7578	
Attraction and motivation of talented experts	0.6716	11.6781	
Accurate prediction of technological trends	0.7842	6.0276	
Problem-solving by application of new technology	0.8124	16.9997	
Establishment and upgrading of technology standard	0.7489	12.8692	
Leading technology innovation of the industry	0.6250	8.2783	
Integrative competences			0.9133
Communication among different functions in the process of product and service design	0.7354	9.1471	
Information and knowledge sharing among different functions about marketing	0.6743	4.9451	
Information and knowledge sharing among different functions products and services	0.6669	4.0958	
Company-wide information sharing about competing strategies of major competitors	0.6563	4.5072	
Coordination and integration of functions in strategy	0.7327	7.6588	
Embedding of the newly achieved technological findings in new products and services	0.6297	4.5239	
Reflection of customers' demands in final products and services	0.8502	10.1196	
Effective coordination among departments in the implementation of corporate strategy	0.9010	14.3085	
Strategic flexibility			0.9102
Compared with our major competitor, our strategy is very flexible	0.7380	14.5017	
Capability to redirect the strategic positioning quickly and effectively	0.7591	17.4567	
Capability to respond quick to the actions of our competitors	0.8203	24.1078	
Capability to respond quick to rapid changing customer needs	0.7997	23.7734	
Capability to derive benefits from diversity in the environment	0.7306	13.8478	
Build excess resources by hedging and sharing investments across business activities	0.7062	10.3101	
Capability to redeploy strategic resources quickly according to environmental changes	0.7808	18.7502	
Capability to redeploy strategic resources in a cost-efficient way	0.8056	18.4648	
Strategic resources in our firm can be applied for alternative uses	0.6661	8.8262	
Market turbulence			0.7702
Extent of market turbulence in the environment	0.7749	12.1651	
Predictability of market demand and consumer tastes	0.8672	44.2157	
Activities of major competitors and competition intensity	0.6991	8.5805	
Technological turbulence			0.7213
Speed and pace of the change of technologies employed in business process	0.6972	9.4984	
Predictability of technological changes	0.8404	27.7041	
Impact of new technology on operations and competition	0.8580	36.6934	
Customer value			0.8428
The offerings of our firm is value for money	0.8600	22.6133	
Customers believe it is a right decision to transact with our firm based on what they get and what they sacrifice	0.8885	30.0534	
Comparing with offerings of our major competitors, customers believe our firm always provides superior value	0.8857	37.7541	

Table 2 Correlation matrix and square roots of average variance extracted

Variables	1	2	3	4	5	6	7
1 Customer value	0.878						
2 Technological competences	0.557	0.767					
3 Marketing competences	0.542	0.596	0.765				
4 Integrative competences	0.582	0.574	0.645	0.750			
5 Strategic flexibility	0.584	0.666	0.605	0.627	0.758		
6 Market turbulence s	0.287	0.262	0.186	0.200	0.174	0.780	
7 Technological Turbulence	-0.249	-0.292	-0.272	-0.158	-0.320	-0.207	0.801

Note: Correlation coefficients are included in the lower triangle of the matrix, and the square root of AVE is on the diagonal.

4.2 Structural models and hypotheses testing

Having established confidence in our measurement model, we develop structural models in two stages. Stage 1 includes only the main factors while Stage 2 includes the moderators and interaction terms as well. Table 3 shows the path coefficients of the models. In order to test the significance of the variables, a bootstrapping method of sampling with replacement is used to obtain the standard errors of the estimates based on 500 bootstrapping runs.

Results in Table 3 indicate that technological competence is statistically significant with β=0.205 and β=0.203 respectively in both stages, thus providing support for a positive influence of technological competences on customer value, which means that Hypothesis 1 is strongly supported. Similarly, results in Table 3 indicate that integrative competence is statistically significant with β=0.245 and β=0.246 respectively in both stages, thus providing support for a positive influence of integrative competences on customer value, which indicates that Hypothesis 3 is strongly supported. Also, results in Table 3 indicate that strategic flexibility is statistically significant with β=0.180 and β=0.522 respectively in both stages, thus providing support for a positive influence of strategic flexibility on customer value, which indicates that Hypothesis 4 is strongly supported. However, we find no significant evidence to support the influence of marketing competences on customer value in both stages, indicating that Hypothesis 2 is not supported. This may be due to the fact that all respondent firms are from high technology industries, which implies a high possibility for technological competences to play a more important role in customer value creation and delivery.

Next we consider the moderating variables. As in regression analysis, the indicators of the predictor and moderator variables are multiplied to obtain the interaction terms after standardization (Chin et al., 1996). As shown in Table 3, the R^2 increases from 0.4512 in Stage 1 to 0.4734 in Stage 2 when moderator and interaction effects are included. The interaction term (Strategic Flexibility*Market Turbulence) is found to be moderately significant (T-value=1.673) while the interaction term (Strategic Flexibility*Technological Turbulence) is not significant (T-value=0.734). Therefore, market turbulence positively moderates the relationship between strategic flexibility and customer value (β=0.626), but the moderating effect of technological turbulence on the relationship between strategic flexibility and customer value is not significant. This indicates that the higher the level of market turbulence, the stronger the relationship between strategic flexibility and customer value (Hypothesis 5 is marginally supported). One of the reasonable explanations is as follows: firms operating with high market turbulence are more likely to launch their products and services continually in order to successfully cater to customers' changing preferences and competitors' attacks, which inevitably increases the significance of strategic flexibility in customer value creation and delivery. By contrast, firms operating in high technologically turbulent environments are more likely to apply new technology to meet similar needs of targeted customers in a more efficient way, which may results in cost reductions or operational efficiency in those firms while the level of

customer value created and delivered may keep unchanged if those firms keep charging the same prices as before.

Table 3 PLS path analysis results: main effects and the moderating effects

Hypo-theses	Exogenous variables	Stage 1		Stage 2		Assessment
		Path coefficient	T-values	Path coefficient	T-values	
H1	Technological competences	0.205	2.769	0.203	2.571	Support
H2	Marketing competences	0.074	0.612	0.089	0.711	No
H3	Integrative competences	0.245	2.046	0.246	1.863	Support
H4	Strategic flexibility	0.180	0.681	0.522	2.134	Support
H5	Strategic flexibility * market turbulence			0.626	1.673	Support
H6	Strategic flexibility * technological turbulence			0.107	0.734	No
	R square	0.4512		0.4734		

5. Discussion, Conclusion and Implications

Based on our SEM models developed by using PLS-GRAPH, we found that it is not only technological competences, but also integrative competences that have a significantly positive influence on customer value while no significant evidence was found to support the influence of marketing competences on customer value in high-technology firms in China. At the same time, as expected, strategic flexibility do has a significant and positive impact on customer value in today's turbulent environments which enable firms to responds rapidly and effectively to increasingly changing environments, especially those changes of customer preferences and competitor's actions. Although it is found that the influence of strategic flexibility on customer value will be enhanced with the level of environment turbulence increases, this conclusion can only applied to the context of market turbulence.

Such findings are of both academic and practical implications. For managers in high technology firms, if they expect to create and deliver superior customer value, they have to set the priority to build and upgrade both technological and integrative competences continuously and keep them far beyond the level of threshold. However, this does not mean that managers can ignore the development of marketing competences, which is very critical for firms to detect what customers really value and should be kept at least at the threshold level. At the same time, as far as the environment turbulence is concerned, managers have to enhance the strategic flexibility of their firms according to the level of environment turbulence in order to respond in a timely, responsive and continuous manner to meet the increasingly changing demands of customers. However, taking the incurring costs to keep high level of strategic flexibility into consideration, managers have to understand the major sources of environmental turbulence. Only when market turbulence is dominant, is it the rational choice for managers to make a great effort to enhance strategic flexibility of their firms based on the environmental turbulence level since the influence of strategic flexibility on customer value will increase accordingly when market turbulence becomes stronger. For researchers, our research is just a further step towards in-depth understanding of the process and mechanisms for firms to create and deliver superior customer value by leveraging unique competences and capabilities. It is true that core competences do contribute to firm performance, which has been explored and examined conceptually and empirically. However, how such core competences create and deliver superior customer value is an unsolved question and little is known about which parts of the complex constituents of core competences contribute the most to the creation and delivery of customer value. Furthermore, little is known about the particularity of the antecedents of customer value in turbulent environments although it is widely held that business environments

today are becoming more turbulent. Based on our findings, researchers may go further in future and explore what other factors influence the contribution of different constituents of core competences and strategic flexibility to superior customer value, when and why some constituents of core competences or strategic flexibility may become more important, how different kinds of environmental turbulences moderate these impacts.

These results need to be interpreted within the limitations as far as the exploratory nature of this study is concerned. A limitation is its cross-sectional design, which means that an important step for further research is the collection and analysis of longitudinal data. Given the large population of high technology firms in China, replicating and extending this study in other regions of the country may test the generalization of our findings and provide a basis for an external validation of the framework. At the same time, although our measurement model shows good reliability and validity, there is still a long way for us to go to establish well-developed scales of complex constructs such as core competences and strategic flexibility. Within this framework, moreover, further advances in knowledge can be made by deepening the search for sources of competences and customer value, and also by expanding the framework across industries and national boundaries.

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