Comparing the impact of different marketing capabilities: Empirical evidence from B2B firms in China

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ABSTRACT

This research compares three key types of marketing capabilities (static, dynamic, and adaptive capabilities) with one another to examine empirically the relative contribution of each capability type to firm performance under different market conditions. Through two empirical studies with business-to-business managers, this study first develops a scale of adaptive marketing capabilities and then investigates the relationships between all three types of marketing capabilities and firm performance. The results show that adaptive marketing capabilities have the greatest impact on market performance. In addition, while environmental turbulence obliterates the contribution of static marketing capabilities (turning the effect negative), it actually strengthens the relationship between adaptive marketing capabilities and firm performance. Finally, dynamic marketing capabilities have a similar impact under low and high environmental turbulence, suggesting the instability in today's marketplace even within relatively "stable" markets. Together, the insights from this research underscore the importance of differentiating among the three types of marketing capabilities and building a firm's capabilities portfolio depending on firm and market conditions.

Keywords: adaptive marketing capabilities, dynamic marketing capabilities, environmental turbulence, firm performance, static marketing capabilities

1. Introduction

Since the late 1980s, strategic issues related to the resource-based view and enterprise capabilities have attracted increasing attention in the marketing strategy literature (Day, 1994, 2011, 2014; Gulati, 2010). Previous research consistently suggests that marketing capabilities can enhance firms' ability to effectively configure and deploy resources, help build a sustainable competitive advantage, and contribute to firms' revenue and profit growth in the long run (Day, 1994, 2011, 2014; Fang & Zou, 2009; Kotabe et al., 2002; Morgan et al., 2009a; Wang et al., 2007; Wiles et al., 2012). Consequently, determining which marketing capabilities to develop and how to foster these capabilities has become an increasingly important issue in increasingly competitive marketplaces.

To answer the question of which marketing capabilities to build, Day (2011) identified three types of marketing capabilities: (1) static marketing capabilities (static MC), or the capabilities of using internal resources to satisfy market demand; (2) dynamic marketing capabilities (dynamic MC), or the capabilities of adjusting own marketing capabilities to the changing market environment; and (3) adaptive marketing capabilities (adaptive MC), or the capabilities of engaging in vigilant market learning, adaptive market experimentation, and open marketing through relationships forged with partners. Although Day (2011) recognized the importance of each of these capabilities, limited empirical research has established the true performance impact of each, especially with regard to adaptive MC. That is, little is known about the relative contribution of the three types of marketing capabilities to firm performance. Moreover, the boundary conditions under which one type of marketing capability may be more important than another remain unclear.

To fill these gaps, this study examines the differential effects of the three marketing capability types on firm performance and explores the role of the market environment in these relationships. To do so, we first develop a valid and reliable measure of adaptive MC. Using it and existing measures, we test the relative impact of different marketing capabilities with data from 225 managers. Our findings suggest that not all marketing capabilities are equally important and that environmental turbulence can partly determine which is more or less influential and thus should receive more attention.

This article contributes to marketing research and practice in three ways. First, as a relatively new construct in the marketing capabilities literature, first proposed by Day (2011), adaptive MC is not well understood, and empirical evidence on its impact is limited in the marketing literature. Anecdotally, however, even *Fortune 500* companies with well-established decision-making systems have failed to respond to rapid market changes (Hedman & Kalling, 2003), suggesting a need to better understand firms' ability to adapt and learn. We take an initial step in this direction by examining adaptive MC's performance impact relative to the other better-known marketing capabilities. The new scale of adaptive MC developed in this research further paves the way for future empirical studies on this construct.

Second, while ideally a firm may want to develop all types of marketing capabilities, it is often not feasible to do so because of resource constraints. Thus, a practically relevant question is on which one a firm should focus. To answer this question, this research extends Day's (2011) work by empirically testing his propositions regarding the relative performance contributions of the three types of marketing capabilities. In doing so, we provide guidance on optimal resource allocation in the development and utilization of the different marketing capabilities.

Third, this research introduces the role of environmental turbulence in the relationship between marketing capabilities and firm performance. It finds that a focus on one marketing capability type may even be detrimental under certain situations. This finding underscores the need to assess a firm's marketing capabilities more holistically in the context of the macro-marketplace.

The rest of this article proceeds as follows: We first lay out the theoretical foundations of our conceptual framework and develop specific hypotheses based on a synthesis of the literature. We then describe the development of an adaptive MC scale and present an empirical test of our conceptual model. We conclude by discussing the theoretical and managerial implications of our findings and delineating the limitations of the study.

2. Theoretical background and hypothesis development

Figure 1 depicts our theoretical framework. In this framework, we follow Day (2011) and identify three distinct types of marketing capabilities. We propose that these three types exert differential effects on firm performance. Furthermore, the influence of marketing capabilities on firm performance may vary depending on the degree of environmental turbulence.

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2.1. Literature review

According to the literature on the resource-based view, the organizational capability is a firm's ability to focus on internal resource allocation to create value (Grant, 1996). The need to

understand the nature of marketing capabilities has attracted increasing attention in the marketing strategy literature (Day, 1994, 2011, 2014; Gulati, 2010). Day (1994) argued that marketing capabilities consist of three broad groups: (1) outside-in capabilities, such as market sensing and channel bonding; (2) inside-out capabilities, such as integrated logistics and technology development; and (3) capabilities that span both approaches, such as new product development capabilities and customer order fulfillment. Furthermore, Day suggested that marketing capabilities could positively affect competitive advantage. Recent empirical studies have verified the presence of a link between marketing capabilities and firm performance (Krush et al., 2015; Mu, 2015; Vorhies et al., 2015; Wilden & Gudergan, 2015).

With the continuous market demand, rapid development of information technology, and shorten product life cycle, marketing scholars have begun focusing on the dynamic perspective to examine marketing capabilities (e.g., Eisenhardt & Martin, 2000; Fang & Zou, 2009; Srivastava et al., 1999; Teece et al., 1997). For example, Srivastava et al. (1999) proposed that marketing capabilities entail redesigning and integrating three core business processes (i.e., product development management process, supply chain management process, and customer management process) to create customer and shareholder value. Following this cross-functional process changing logic, Fang and Zou (2009) first developed a conceptualization of marketing dynamic capabilities and then examined their antecedents and consequences. To close the widening gap between enterprise marketing capabilities and market demands, Day (2011) proposed the adaptive MC, including vigilant market capability, adaptive market experimentation capability, and open marketing capability.

Although the notion of marketing capabilities differs from that of market orientation, the relationship between these two areas should not be ignored. Previous research has addressed this

issue, arguing that marketing capabilities are the behavioral representation of MO (Fang & Zou, 2009; Morgan et al., 2012). Narver et al. (2004, p. 336) define the following two types of market orientation: "*a responsive market orientation* is a business's attempt to understand and to satisfy customers' expressed needs, whereas *a proactive market orientation* is the attempt to understand and to satisfy customers' latent needs." Subsequently, scholars found that these two market orientations have different effects on firm performance (Atuahene-Gima et al., 2005; Jaeger et al., 2016). Therefore, further empirical research is necessary for this important field to explore whether these distinct types of marketing capabilities exert differential effects on firm performance. In the following section, we form the starting point of our theoretical framework by discussing the differences among the three types of marketing capabilities: static MC, dynamic MC, and adaptive MC (Day, 2011).

2.2. Three types of marketing capabilities

Static MC. Some marketing scholars have used the organizational capability approach to identify necessary marketing capabilities, including advertising, product development, channel management, marketing communication, selling, marketing information management, marketing planning, and marketing implementation (Vorhies, 1998; Vorhies & Morgan, 2005). Although there are many practical examples of firms learning new competencies with regard to the marketing mix to be responsive to turbulent environments (e.g., the availability of the commercial web since 1994 has pushed firms to embrace the new technologies of digital and social media[1]), in this study, we view the basic marketing-mix elements as static MC, because they either "[offer] an implicitly static portrayal of organizational capabilities as well-honed and

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[1] Thanks for one of reviewers' valuable comments. Although other possibilities of the marketing-mix can be used to respond to turbulent environments, considering the theme of our study, we prefer to label the basic marketing mix categorically as static MC.

difficult-to-copy routines for carrying out established processes" (Day, 2011, p.185) or focus solely on the ability to exploit and use existing internal resources, while neglecting the firm's ability to explore and adapt to external environmental changes (Barney, 1991; Benner & Tushman, 2003; Morgan et al., 2003). Past blunders of companies such as Nokia and Kodak provide good examples of firms that did not employ strategic resources efficiently to achieve superior performance.

Dynamic MC. Drawing from dynamic capabilities theory and the perspective of turbulent circumstances, marketing scholars have attempted to define a set of dynamic MC (Eisenhardt & Martin, 2000; Fang & Zou, 2009; Srivastava et al., 1999; Teece et al., 1997). Among the cross-functional dimensions of dynamic capabilities, in this study, we adopt Fang and Zou's (2009) definition, which describes dynamic MC as the responsiveness and efficiency of cross-functional business processes for creating and delivering customer value in response to market changes. Compared with static MC, dynamic MC is an enterprise's ability to adjust its own marketing processes to cope with the changing market environment (Benner & Tushman, 2003; Day, 2011). The essence of dynamic MC lies in the idea that an enterprise can quickly adjust and change its internal resources configuration to align marketing management processes with market demand after receiving clear market change signals (Morgan et al., 2012).

Adaptive MC. While dynamic MC corresponds to firms' ability to respond to changes in the environment, firms still rely on their own cross-functional resources to cope with the market changes. Adaptive MC takes a proactive approach, which starts with marketplace information and delves deeply into the problems and questions customers are facing. More formally, adaptive MC is the extensible ability to proactively sense and act on market signals, continuously learn from market experiments, and integrate and coordinate social network resources to adapt to

market changes and predict industry trends. Building on complexity theory (Haeckel, 1999), Day (2011) proposed that adaptive MC consists of three components: (1) vigilant market capability, which employs an early warning system and emerging technologies to glean deep market insights and anticipate market changes and unmet needs; (2) adaptive market experimentation capability, which involves continuous learning from market experiments; and (3) open marketing capability, which helps firms create and maintain relationships with partners by using new media and social networking technologies to extend their periphery.

In summary, static, dynamic, and adaptive MC are essential marketing capabilities that differ in terms of their theoretical foundation, market understanding, strategic priorities, and inner components. Table 1 presents a comparison of the three types of marketing capabilities. In the following section, we further propose that the three types of capabilities have differential effects on firm performance.

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2.3. Differential effects of marketing capabilities on firm performance

To enhance performance, enterprises integrate and leverage the various components of static MC, such as advertising, product development, and channel management, to help realize their strategic competitive advantage and enhance performance (Day, 1994; Dutta et al., 1999; Hooley et al., 1999). These processes are designed to apply the collective knowledge, skills, and resources of the firm to satisfy market-related needs, enabling the firm to add value to its products and services and take advantage of market opportunities (Vorhies, 1998).

Dynamic MC can help a firm develop its specific competencies to address changing environments by moving from stationary processes to the constant release and integration of market knowledge. Helfat (1997) found that dynamic capabilities enable firms to create new products and business processes and quickly respond to changing market conditions. Fang and Zou (2009) also found that dynamic MC helps firms create and deliver superior customer value through responsive and efficient marketing processes as well as establish and maintain competitive advantage and superior performance.

As mentioned previously, firms under static MC use their internal resources and capabilities to satisfy current customers, exploit existing products and distribution channels, and advertise existing brands (Bruni & Verona, 2009); however, static MC may ignore market changes or over-emphasize the application of marketing-mix capabilities. For example, it usually takes a great deal of effort for firms to reduce costs and set a lower price to beat the competition, design an excessive advertising campaign to gain high market reputation, or redesign packaging to improve the product grade. Such implications may generate sales growth in the short run, but to maintain the growth over time, firms need to continue investing large amounts of money; the financial expenses accompanying these marketing efforts, however, may offset the gains, and as a result, a positive profit may not be realized.

Compared with static MC, which focuses on exploiting and using existing resources or processes to satisfy current market demand or deal with market competition, dynamic MC emphasizes firms' cross-functional process changing capability to respond to market changes by exploring and reactively integrating resources. In other words, dynamic MC can help firms respond to environmental changes by adjusting their cross-functional processes, such as product development management, supply chain management, and customer management (Fang & Zou,

2009; Xu et al., 2018). In addition, dynamic MC can help firms maintain a sustainable advantage over their competitors and thus achieve superior performance. This discussion leads to our first hypothesis:

H₁: Dynamic MC has a stronger positive relationship to firm performance than static MC.

With regard to adaptive MC, Day (2011) noted that it enables enterprises to strengthen the exploration of external resources and capabilities, obtain all kinds of cooperative opportunities, and integrate network resources to gain competitive advantage. All three components of adaptive MC discussed previously can play a role in affecting firm performance. Vigilant market capability allows leaders to spot opportunities and threats before rivals do, because vigilant leaders take a longer time horizon, employ a more flexible approach in strategy development, and incorporate more diverse inputs and tools into scenario planning, real-options thinking, and dynamic monitoring (Day & Schoemaker, 2008). Thus, vigilant market learning can help organizations anticipate and adapt to future market developments proactively and reduce the gap between enterprise response and market changes, resulting in a sustainable advantage over competitors (Day & Schoemaker, 2008) and superior performance.

The second component of adaptive MC, the capability to probe and learn through market experimentation, facilitates the accumulation of first-hand market knowledge and improves internal market learning ability. Knowledge-based view theory maintains that experimental knowledge is more silent and difficult to edit and exchange than informational knowledge (Kogut & Zander, 1992; Reed & DeFillippi, 1990). Thus, investing in small market experiments can generate a wealth of new insights, leading to improved performance through sustainable competitive advantages.

The third adaptive MC component, open marketing through ubiquitous networks, makes it easy for firms to communicate with their partners in an open manner. Open marketing can help firms "forge relationships with those at the forefront of new media and social networking technologies and mobilize the skills of current partners" (Day, 2011, p. 183). Thus, compared with the closed model, open networks can help firms access broader resources and specialized skill sets beyond firm boundaries (Dyer & Singh, 1998), which in turn improve firm performance by developing long-term partnerships with stakeholders.

Although both dynamic MC and adaptive MC help firms cope with market changes, there is a potentially longer delay in using dynamic MC. Building on the previously described domain and definition of dynamic MC, in this study, dynamic MC means responsive and cross-functional process changing capability to create and deliverer customer value in response to market changes (Fang & Zou, 2009). This process often creates a time gap between initial market change and firm response, by which it may already be too late to respond effectively. In support of this view, Ambrosini and Bowman (2009) suggest that dynamic capabilities do not always lead to a sustainable competitive advantage, especially when the specific dynamic capabilities exhibit common features and their functionality is duplicated across firms. By contrast, adaptive MC, through vigilant market learning and experimentation, helps firms identify and initiate changes before such changes become detectable to other organizations. As many potential threats and opportunities can arise initially as weak and ambiguous signals (Day & Schoemaker, 2006), adaptive MC allows a firm to detect, interpret, and act on these critical signals in the periphery of their business environment more quickly than competitors, leading to a significant competitive advantage (Ma et al., 2009).

In adopting the "meet and satisfy customer needs" perspective, traditional marketing management has usually focused exclusively on reactively meeting explicit customer needs, while ignoring latent or implicit demand (Miles & Darroch, 2004). Complexity theory (Haeckel, 1999) argues that many organizations are self-adaptive units, facing an ever-changing and complex environment and undergoing continuous processes. Therefore, instead of being reactive to change, the new function of marketing capability (adaptive MC) is to anticipate, identify, and explore customers' explicit and implicit needs and sometimes even create change in the external environment. Apple is the perfect embodiment of adaptive MC. No customer gave Steve Jobs and Apple the design for the iPhone or the iPad, and these products were not moves in reaction to competition in the immediate short-term environment. Rather, they came through intense listening combined with a creative leap among Apple's engineers and other business partners to tackle and train customers' perceived needs. In such a market situation, if firms rely solely on their own resources and capabilities, survival will become increasingly more difficult. To solve this problem, firms need to extend their resources beyond firm boundaries and cooperate with other business partners to keep pace with rapid market changes (Dyer & Singh, 1998). However, as we noted previously, dynamic MC remains a domain of firms' cross-functional business processes (Fang & Zou, 2009) and thus is confined to their own organizational boundaries. This leads to the following hypothesis:

H$_2$: Adaptive MC has a stronger positive relationship to firm performance than dynamic MC.

2.4. Moderating effects of environmental turbulence

Environmental turbulence refers to changes in industry structure and competitive environment, including market turbulence, competitive intensity change, and technological turbulence (Caves & Porter, 1977; Jaworski & Kohli, 1993). Traditionally, managers prefer a

low level of environmental turbulence because stable environments are more predictable. With the development of information technology and the global economy, business environments have become increasingly complicated and more turbulent. In such environments, traditional sources of competitive advantage can easily erode. We propose that such environmental turbulence may affect the extent to which each marketing capability type affects firm performance.

Static MC focuses on utilizing marketing knowledge and skills to transform marketing inputs to outcomes (Vorhies, 1998; Vorhies & Morgan, 2005). Comprehensive static MC can be effective in a stable environment, as comprehensiveness or the extent to which organizations are exhaustive or inclusive in making strategic decisions has been shown to have a positive relationship with organizational performance in a stable environment (Fredrickson & Iaquinto, 1989; Fredrickson & Mitchell, 1984). The opposite is true in an unstable environment. In a quick-changing market, if managers stick to their own knowledge and experience to arrange internal resources rather than listening to the market, they tend to miss market opportunities and ignore potential risks, which may cause market failure and financial loss. As a result, static MC might even become a burden to the enterprise, exerting a negative impact on firm performance under high environmental turbulence. This is summarized in the following hypothesis:

H$_{3a}$: The relationship between static MC and firm performance is weaker when environmental turbulence is high than when it is low.

Compared with static MC, dynamic MC acknowledges the uncertain nature of the environment and emphasizes external environment changes (Benner & Tushman, 2003). However, the dynamic MC may still cause some issues because dynamic MC encourages the enterprise to quickly adjust and reallocate internal resources to better match the market demand only after receiving clear signals of environmental changes. It takes time to absorb new

information, interpret its meaning, and then mobilize a coalition to act, hence creating a time lag between environmental change and firm response (Day, 2011). In a high level of environmental turbulence, this time lag will become more obvious and serious, and the effect of dynamic MC on firm performance might be weakened and even turned negative because changes to the resource base may not be in line with or may fall behind environmental changes (Ambrosini et al., 2009; Zahra et al., 2006). This leads to the next hypothesis:

H3b: The relationship between dynamic MC and firm performance is weaker when environmental turbulence is high than when it is low.

Adaptive MC aims to understand evolving customer needs, energize the organization to proactively anticipate market changes and forge relationships with stakeholder and partners (Day, 1994; Day, 2011). An enterprise with adaptive MC not only vigilantly senses environment changes but also has a strong willingness to continuously learn from experiments (Day, 2011; Teece, 2009). Through such continuous market experiments, the enterprise will accumulate a set of skills and knowledge that enable them to stay synchronized with market changes without a time gap (Teece, 2009). This will help companies accurately predict and respond to market trends even under a high level of environmental turbulence. In addition, with the proactive relationships built with key stakeholders and partners, an enterprise with adaptive MC can utilize the available information and resources from its partners to overcome the information and resource limits imposed by the turbulent environment. Thus, we hypothesize the following:

H3c: The relationship between adaptive MC and firm performance is stronger when environmental turbulence is high than when it is low.

2.5. Overview of the studies

To test our research hypotheses, we focus on business-to-business (B2B) firms as the research context. As discussed previously, adaptive MC as a relatively new construct has been subject to limited empirical study due to the lack of a reliable way to measure the construct. As such, in the following sections, we first report a study developing a scale to measure adaptive MC, following the procedures proposed by Churchill (1979) and Anderson and Gerbing (1988). We then test the hypothesized relationships through data collected in a second study.

3. Study 1: Adaptive marketing capabilities scale development

3.1. Item generation and purification

As discussed previously, we follow Day (2011) to define adaptive MC as a latent construct consisting of three dimensions: vigilant market capability, adaptive market experimentation capability, and open marketing capability. To generate the measurement items for adaptive MC, we conducted a comprehensive literature review as well as 12 in-depth interviews with sales and marketing directors in China. Based on the information collected, an initial pool of 24 items was developed across the three dimensions of adaptive MC. We then invited nine marketing scholars to evaluate the face validity of the items, and 18 items were retained from this process.

To purify the items and assess the reliability of construct, we conducted a survey with 120 senior marketing managers attending a particular executive education program called EDP (Executive Development Programs) in one of the Southeast University in China. 100 usable and in-person surveys were collected, producing a response rate of 83.3%. An exploratory factor analysis was conducted first to identify the underlying dimensions and purify the items. From

this analysis, items that had high loadings above .40 on another dimension and items that loaded below .40 on their own dimensions were removed from the scale (Peterson, 2000). With the remaining items, a three-factor structure emerged, including vigilant market capability (4 items), adaptive market experimentation capability (4 items), and open marketing capability (4 items). These three factors had eigenvalues ranging from 1.12 to 6.74 and accounted for 78.75% of the variance.

3.2. Scale validation

To validate the underlying structure obtained from the EFA, we conducted another survey with 85 senior marketing managers in China. In this second round of data collection, we succeed in receiving the support of Development and Reform Commission in Quanzhou (one of the major city in Fujian province) to contact 85 senior managers located in the Quanzhou Qingmeng Industrial Zone, Quanzhou Torch Industrial Zone, and Quanzhou Taiwanese Investment Zone. During the survey, one of the officers accompanied the research team and helped us complete the data collection. Using the collected data, we conducted a confirmatory factor analysis. A 12-item, three-factor model was estimated. Inspection of model fit revealed a reasonable overall fit (χ^2 (51) = 80.04, *p*<.01; CFI = .96; GFI = .88; TLI = .95; RMSEA = .08). The 12 items had standardized loadings ranging from .69 to .94 and hence were all retained. The results of this confirmatory factor analysis are reported in the last column of Table 2.

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We further evaluated the scale's convergent validity by examining the average variance extracted (AVE) for each dimension. The AVE measures the amount of variance captured by the items in each dimension. Researchers suggested that an AVE value of .50 or higher provides support for sufficient convergent validity (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). The AVEs for the three adaptive MC dimensions ranged from .62 to .78, lending support to the convergent validity of the scale. Discriminant validity among the three dimensions of our adaptive MC scale was then tested through the approach suggested by Fornell and Larcker (1981). Specifically, discriminant validity between two factors is established when individual AVE for each factor exceeds the squared correlation between two factors. In this case, all possible pairs of dimensions passed the test, suggesting sufficient discriminant validity of the three dimensions. Overall, the 12-item, three-dimensional adaptive MC scale appears to be a valid and reliable scale. We acknowledge that the sample size for validating the adaptive MC scale is rather small in this study. Hence, we use a larger sample in Study 2 to again check the validity and reliability of the scale and to test the hypothesized relationships shown in Figure 1.

4. Study 2: Comparing the effects of different marketing capabilities

4.1. Data collection

For Study 2, we followed the data collection procedure suggested by Roy et al., (2001) and Fang and Zou (2009), and recruited managers from domestic and international B2B firms operating in China. We first created a random sample from a list of firms registered with local governments in China. These firms came from various B2B industries. We then called and emailed the general manager or sales and marketing director of each firm to explain the purpose

of this research and request participation. Seven hundred and fifty managers expressed an

interest in participating in the survey, and we hand-delivered the questionnaire to each manager.

Of these 750 firms, 225 firms eventually completed and returned the questionnaire, for a

response rate of 30%. To assess non-response bias, early and late respondents were compared

with regard to major constructs in the model and we did not find any significant difference

(Armstrong & Overton, 1977). This indicates that non-response bias is not likely to be a concern

in this study.

4.2. Measures

In the survey, we used the 12-item adaptive MC measure developed in Study 1. The

measures for the other constructs were adapted from previous studies (see Table 3 for the

measurement items). Because all existing measures were originally in English, we created the

Chinese version for all measures following the commonly used translation-back translation

procedure (Brislin, 1980).

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Static MC. We adapted eight items from Vorhies and Morgan (2005) to measure static

MC. The eight items capture eight different aspects of marketing capabilities: pricing, product

development, channel management, marketing communications, selling, market information

management, market planning, and marketing implementation. These items were measured on a

7-point scale anchored at "far below major competitors" (1) and "far above major competitors"

(7).

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Dynamic MC: We adapted the three-item measures of dynamic MC from Fang and Zou (2009). The three items were also measured on the same 7-point scale as above to capture the responsiveness and efficiency of cross-functional business processes.

Environmental Turbulence: We adapted the measures of environmental turbulence from previous studies (Gulati & Higgins, 2003; Hough & White, 2003; Jaworski & Kohli, 1993). The measure has three dimensions (market turbulence, technological turbulence, and competitive intensity), and each dimension has four items. Twelve items were used to measure the managers' perception of changes in customer needs, technology, and competition. We factor-analyzed the items and found that all of them loaded above .75 on a single factor with an eigenvalue of 2.085. Hence, we combined the twelve items into a single scale ($\alpha = .94$).

Firm Performance: We adapted the measures of firm performance from previous studies (Bonner et al., 2005; Matsuno et al., 2002; O'Cass & Ngo, 2012; Sheng et al., 2011). Firm performance was measured as market performance, including market share growth, new customer acquisition, customer satisfaction, and sales goal achievement. These items were measured by the same 7-point scale anchored at "far below major competitors" and "far above major competitors".

Control variables. We included four control variables, firm size, firm age, industry type, and location, that are not of central interest to this study but could have an effect on market performance. Firm size was measured by the number of full-time employees. Age was measured by the number of years the firm had been in operation. To control for industry difference, we used the International Standard Industrial Classification of All Economic Activities (Department of Economic and Social Affairs of the United Nations, 2008) to classify the firms into three main

industrial categories (electronic product manufacturing; machinery, chemical & transportation equipment manufacturing; and other industrial categories). Two dummy variables were created to represent electronic product manufacturing and chemical & transportation equipment manufacturing with other industrial categories being the benchmark. Finally, because our sample firms came from three provinces in China, we also created two location dummy variables to represent Fujian province and Guangdong province with Zhejiang province being the benchmark.

4.3. Adaptive MC scale validation

As mentioned earlier, one of the purposes of Study 2 was to verify the validity and reliability of the adaptive MC scale developed in Study 1 with a bigger sample. Hence, before testing the full measurement model and the conceptual model, we conducted another confirmatory factor analysis using responses to the adaptive MC scale items. A 12-item, three-dimension model was estimated, and inspection of model fit revealed a reasonable overall fit (χ^2 (51) = 75.72, *p*< .01; CFI = .99; GFI = .95; TLI = .99; RMSEA = .05). The 12 items showed standardized loadings ranging from .77 to .94, and the average variance extracted (AVE) for each dimension was.65 for vigilant market capability, .83 for adaptive market experimentation capability, and .78 for open marketing capability, all exceeding the .50 threshold for sufficient convergent validity (Bagozzi & Yi, 1988; Fornell & Larcker, 1981). We further found that each of the AVEs for the three adaptive MC dimensions was larger than the squared correlations between two dimensions (the largest squared correlation was .29), suggesting the discriminant validity of the factors (Fornell & Larcker, 1981). Finally, the Cronbach's alphas were .87 for vigilant market capability, .95 for adaptive market experimentation capability, and .93 for open marketing capability, all exceeding the .70 threshold for acceptable reliability (Anderson & Gerbing, 1988).

4.4. Full measurement model

After verifying the validity and reliability of the adaptive MC scale, we established the full measurement model by conducting a confirmatory factor analysis on all latent constructs. The fit indexes (χ^2 (179) = 254.51, *p*< .01; CFI = .98; GFI = .91; TLI = .97; RMSEA = .04) suggested that the measurement model fitted the data well (Bentler & Bonett, 1980; Cheung & Rensvold, 2002). All loadings were statistically significant and above .66, indicating satisfactory convergent validity (Anderson & Gerbing, 1988). Moreover, according to the criterion suggested by Anderson and Gerbing (1988), the Cronbach's alpha for every factor was above .87, indicating that all constructs have acceptable reliability. To examine discriminant validity, we contrasted a five-factor model consisting of the five constructs (static MC, dynamic MC, adaptive MC, environmental turbulence, and market performance) against a one-factor model and several alternative factor structure models. The fit indexes revealed that the hypothesized five-factor model fitted the data well, and was significantly better than all alternative nested models based on model comparisons (Bentler & Bonett, 1980; Cheung & Rensvold, 2002). Thus, the discriminant validity of the five constructs in this study was confirmed. Given the above results, all five constructs were used in further analyses.

4.5. Common method bias

We used Harman's single-factor test to assess potential common method bias (Podsakoff et al., 2003). We find that no single factor accounted for a majority of the variance (the first factor accounted for 26.64% of the 82.43% explained variance). Our results indicate that the fit of the single-factor model was significantly worse than our original measurement model, as

indicated by a significant increase in Chi-square (χ^2 (259) = 353.66, p <.01). Thus, the common method bias is unlikely to be a concern in this study.

4.6. Hypotheses testing

We tested the hypotheses using hierarchical multiple regression analysis. To mitigate the potential threat of multicollinearity, we standardized all independent variables and used the standardized variables to create the corresponding interaction terms (Aiken & West, 1991). Each of the variance inflation factors (VIF), a multicollinearity indicator, was well below the 5.0 cutoff. Hence, multicollinearity was not a concern. Table 4 presents the descriptive statistics of all variables. The hierarchical regression analysis consisted of four steps. We introduced all control variables into the model in the first stage, all three types of marketing capabilities in the second stage, environmental turbulence in the third stage, and the interaction terms in the fourth stage. The results from all four models are presented in Table 5.

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Insert Table 4 and 5 about here

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As shown in Table 5, we found that both static MC (model 2: β =.13, p < .05) and dynamic MC (model 2: β =.22, p < .01) were positively related to market performance, as expected. To test H1, we employed a Wald test to examine whether the difference between the two path coefficients was statistically significant. Results showed that the two coefficients were not significantly different from each other (χ^2 = .085, ns). Thus, H1 was not supported. We also found adaptive MC to be positively related to market performance (model 2: β =.36, p < .01). As hypothesized in H2, the results of a Wald test showed that the coefficient for adaptive MC was

significantly larger than that of dynamic MC, suggesting that adaptive MC is more impactful on market performance than dynamic MC ($\chi^2 = 7.07, p < .01$). Thus, H2 was supported. We also found the effect of adaptive MC to be significantly greater than that of static MC ($\chi^2 = 6.88, p < .01$).

Besides the main effect of the three marketing capabilities, we also hypothesized that their effects would differ across different levels of environmental turbulence (H3a-H3c). As shown in Table 5 (model 4), environmental turbulence negatively moderated the relationship between static MC and market performance (model 4: $\beta = -.21, p < .01$). To gain more insight into the interaction effects, we used simple slope analysis (Aiken & West, 1991) by decomposing the interaction term. Following the advice to choose theoretically interesting points for conducting simple slope analysis (Spiller et al., 2013), we split environmental turbulence into high vs. low groups using the high (7) and low (1) end points of the environmental turbulence scale. We examined whether the effect of different marketing capabilities on market performance differed at these levels. The simple slope analysis suggests that when environmental turbulence was high, higher static MC led to significantly lower market performance (simple slope= -.55, $p<.05$). In contrast, under low environmental turbulence, static MC had a significant positive effect on market performance (simple slope= 1.11, $p<.01$). This is consistent with the prediction in H3a.

H3b relates to the moderating effect of environmental turbulence on the relationship between dynamic MC and market performance. This was not supported as the interaction between dynamic MC and environmental turbulence was not significant (model 4: $\beta = .08$, ns). We return to this later in our discussion section. Finally, the interaction between adaptive MC and environmental turbulence was positive and significant (model 4: $\beta = .12, p<.10$). A similar

simple slope analysis indicates that when environmental turbulence was high, the effect of adaptive MC on market performance was positive and significant (simple slope= .89, p <.01), whereas this effect became insignificant when environmental turbulence was low (simple slope= − .15, ns). This confirms H3c.

5. Discussion

It is well established in the marketing literature that marketing capabilities affect firm performance. However, as our understanding of marketing capabilities becomes more nuanced, there is an increasing need to examine and compare the relative role various marketing capability types play in firm performance. Filling this gap, the current paper builds on Day's (2011) framework and compares empirically the effects of static, dynamic, and adaptive MCs under different levels of environmental turbulence. Using existing scales for static and dynamic MCs and the newly developed scale for adaptive MC from Study 1, we found that adaptive MC has the greatest impact on firm market performance, while static and dynamic MCs contributed equally to performance. This finding lends empirical support to Day's (2011) theoretical proposition that adaptive MC is the most important marketing capabilities in today's fast-changing market.

Interestingly, the relative dynamics of these effects change when the market environment becomes more or less turbulent. Under low environmental turbulence, static and dynamic MC are both essential to firm performance while adaptive MC has a negligible effect. In contrast, when environmental turbulence is high, dynamic and adaptive MCs become much more critical. In such situations, not only does static MC not help improve performance, but too much static

MC actually hinders firm performance. As consumer demands are difficult to predict in a highly turbulent environment, too much emphasis on traditional marketing efforts (e.g., advertising and promotion) based on a firm's static MC can be easily misguided and may blind the firm's foresight into the uncertain future. These findings dispel the belief that all marketing capabilities are beneficial and the more the better, and suggest the need to adopt a firm's mix of marketing capabilities to the market the firm operates in.

We found that dynamic MC has a significant impact on firm performance, which is consistent with the findings of previous studies (Fang & Zou, 2009; Helfat, 1997; Srivastava et al., 1999; Zollo & Winter, 2002). However, a somewhat surprising finding from our research is that dynamic MC has an equal impact on firm performance under both low and high environmental turbulence. Although dynamic MC is not as agile and responsive as adaptive MC, it is still an important tool for handling change. Our results seem to suggest that today's general market environment is much more unstable than a few decades ago, as customer preferences, technology, and marketing channels continuously evolve. Hence, dynamic MC becomes important in both "low" and high-turbulence markets.

However, as dynamic MC is fundamentally reactive, it has a time lag in responding to market changes (Day, 2011). Consequently, it alone is no longer sufficient under very high levels of environmental turbulence. Adaptive MC takes over as the more critical element that firms need to cultivate in order to maintain high market performance. This result is consistent with our in-depth interviews with some senior managers, who point out that firms' ability to sense and respond to environmental changes in a relatively quick and flexible manner is critical for the success of a company in the uncertain market.

5.1. Theoretical implications

This paper makes several important contributions to the marketing literature, which may help future research on marketing capabilities. We developed a scale of adaptive MC that can be used in future empirical research on adaptive MC. Moreover, consistent with Day (2011), our empirical results confirmed that vigilant market capability, adaptive market experimentation capability, and open marketing capability are the three independent yet correlated dimensions of adaptive MC. Reflecting the importance of adaptive MC, previous studies have examined variables tangentially related to adaptive MC. For example, prior research has suggested that firms' learning-by-doing can help them navigate through an increasingly complicated and fragmented market (Jaworski & Kohli, 1993; Morgan et al., 2009b; O'Cass & Ngo, 2012; Vorhies et al., 2011). While these prior studies allude to the importance of various adaptive capabilities, they are relatively fragmented and do not take into consideration the full spectrum of companies' marketing capabilities. The current paper inspires research on different marketing adaptation tools/strategies to be better integrated into the overarching theme of adaptive MC.

By empirically testing Day's (2011) propositions regarding different types of marketing capabilities, this paper provides new insights into the differential effects of these capabilities on firm performance. Prior studies on marketing capabilities mainly focused on static and dynamic MC. Although some researchers have recognized the importance of adaptive MC, there is a lack of empirical studies on adaptive MC. This paper demonstrates the importance of adaptive MC in the current fast-changing market and will hopefully direct more research attention to adaptive MC. Furthermore, we extended Day's (2011) framework by revealing varying effects of different marketing capability types on firm performance under different levels of environmental turbulence. This result indicates that the relationship between marketing capabilities and firm performance is conditional and dynamic. Such conditional boundaries have been relatively

neglected in the literature. Our results suggest that researchers need to put more emphasis on the boundary conditions when studying the effects of marketing capabilities.

5.2. Managerial implications

With limited resources and an uncertain market environment, marketing managers need more guidance on where to focus their efforts in order to build competitive advantages and achieve superior performance.

Our results point especially highlight the importance of developing adaptive MC to achieve best market performance. To foster adaptive MC, managers should focus on these following suggestions. First, managers should involve customers in into their product development processes to continuously monitor potential opportunities and threats in the marketplace. For example, managers could take advantage of their salespeople's dialogues with customers to anticipate changes in customer needs and then develop a platform to co-create new products with customers to address those changing needs. Some companies, such as the Lego Group like LEGO and Threadless.com, have achieved great success in new product development by motivating customers to provide input and co-design new products. Both specifically, both of the companies encourage customers to share and post their own projects on the corporate websites and allow let the public to vote on the top projects. After collecting the feedback from the public, these companies then use LEGO and Threadless.com will then pick some of the more high-ranked designs and or projects and incorporate them into their new product series. Secondly, managers should continuously conduct tests and experiments in the market to and accumulate first-hand market knowledge. Such market testing and experimentation can help firms build up their marketing capacities and enhance competitive advantage by reducing new product failures and by identifying previously hidden market opportunities and risks. Finally, managers should

develop an open marketing system by connecting internal organizational capabilities with the external environment and creating enduring relationships with customers, channel members, and suppliers (Gulati, 2010). The collaboration between Nike and Apple is a good example of firms achieving market success by taking advantage of utilizing the respective strengths of the partners through an open marketing system.

Our results also suggest that the three that the roles of different types of marketing capabilities play are dynamic and vary when the market environment changes. This sounds a warning or suggestion for large organizations to establish a rich portfolio set of marketing capabilities portfolio based on firm and market conditions. For example, under a low level of environmental turbulence, our results show that the traditional marketing strategies based on static and dynamic MC for adjusting and coping with the market changes could help firms improve their performance. However, when the environmental turbulence is high, these positive effects may disappear or, at least, be are significantly reduced. In extreme cases, static MC may become a burden to a company. Thus, under high environmental turbulence, rather than relying on "old" capability sets, these organizations should work to need to intently cultivate adaptive MC to effectively and promptly cope with the fast-changing environment.

5.3. Limitations and future research

The current paper has several limitations that merit consideration in future research. First, we developed the adaptive MC scale using only sample firms from China in a limited number of industries. Future research is needed to test the scale in different contexts and further evaluate its reliability, validity, and completeness. For example, its ecological validity can be examined in future research by investigating its relationship with related constructs. Future research also needs to test our theoretical framework in other countries and contexts. Secondly, we only

examined the moderating effect of environmental turbulence on the marketing capabilities-performance relationship. Much more research is needed to identify other boundary conditions for this relationship. Finally, addressing the lack of empirical research on adaptive MC, the current research took an initial albeit limited step towards better understanding and operationalizing adaptive MC. Our results point to the critical contribution of this marketing capability type to firm performance. With this in mind, we call for much more empirical research on adaptive MC to explore its antecedents and consequences, especially adopting new media and social networking technologies to foster good inter-organizational relationships with their business partners and gain more competitive advantages.

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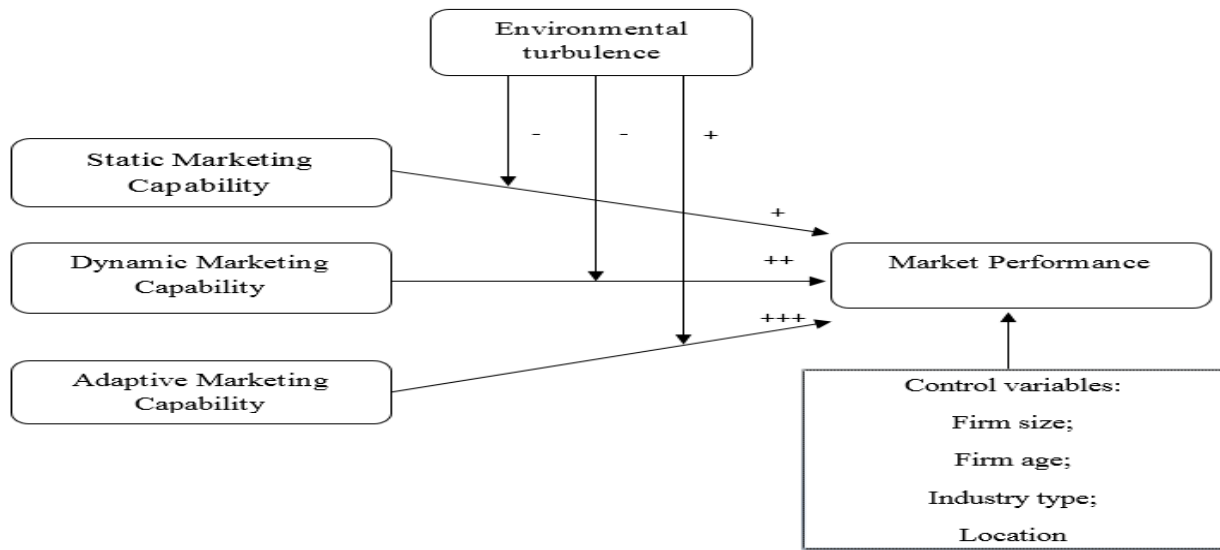
Fig.1 Concept framework linking marketing capabilities to performance

Table 1 Main differences among the three types of marketing capabilities

	Static MC	Dynamic MC	Adaptive MC
Theoretical Foundation	RBV and enterprise capability theory	Dynamic capabilities theory	Complexity theory
Role of Environment	The environment is relatively stable and predictable	The environment is radically and easily changeable and cannot be predicted	The environment is a chaotic and nonlinear business ecosystem
Strategically Focus	Exploiting	Exploring and Reactive	Proactive and Adapting
Key Components	Basic Marketing Mix Capability	Cross-functional Process Changing Capability (Product Development Process, Supply Chain Management process, and Customer Management Process)	Vigilant Market Learning, Adaptive Market Experimentation, and Open Marketing Capability

Table 2 Study 1 Adaptive MC scale summary

Constructs and Measures	Factor Loading	
	EFA	CFA
Vigilant Market Capability	α=.89	AVE=.67 α =.88
1. Our firm is highly sensitive to the market environment and is able to detect market signals (even the weak ones) timely and accurately.	.82	.78
2. Our firm actively collects extensive marketing information through all social networks and media.	.80	.87
3. Our firm is able to forecast market trends based on past histories of consumer demand.	.83	.84
4. New market information is shared within the company and distributed to different divisions in a timely manner.	.72	.79
Adaptive Market Experimentation Capability	α =.94	AVE=.78 α =.93
1. Our firm is willing to actively conduct market experiments or tests based on our own market forecast.	.83	.94
2. Through trial-and-error and experimenting, our firm explores future market trends and develops potentially successful business models.	.83	.86
3. Our firm takes advantage of emerging technologies, such as the Internet, quick-response technologies and database technologies to track market changes and learn from market experiments.	.88	.89
4. Our firm actively learns from a wider range of peer companies, market leaders, and channel partners.	.89	.84
Open Marketing Capability	α =.88	AVE=.62 α =.86
1. Our firm actively seeks a strategic partnership with companies that are complementary with our firm in terms of resources and capabilities.	.84	.87
2. Through coordination and collaboration with our partners, we are able to achieve synergy in effectively and quickly responding to market signals (even the weak ones).	.78	.72
3. Through resource integration with our partners, our firm gains the capabilities for continuous product and technology innovation.	.70	.86
4. Through collaboration and coordination with our partners, our firm improves the capability in developing innovative strategies and tactics.	.79	.69

Notes: α: Cronbach's α; AVE: average variance extracted; EFA: exploratory factor analysis; CFA: confirmatory factor analysis.

Fit indices for CFA: χ^2 (51) = 80.04, p<.01; CFI = .96; GFI = .88; TLI = .95; RMSEA = .08.

Table 3 Results of the full measurement model from study 2

Constructs and Measures	Factor loading	CITC	α
Market Performance: [a]			
1. Market share growth	.86	.88	
2. New customer acquisition	.90	.92	
3. Customer satisfaction	.90	.89	.96
4. Sales goal achievement	.90	.92	
Static MC: [b]			
1. Pricing strategy and pricing techniques	.79	.74	
2. New product development capability	.69	.66	
3. Channel management and control	.77	.70	
4. Marketing communication capability (including personal selling, advertising, public relations, and sales promotions)	.75	.68	
5. Sales management	.80	.73	.91
6. Management information system	.81	.77	
7. Marketing planning	.83	.78	
8. Converting marketing strategy into concrete actions	.75	.65	
Dynamic MC: [b]			
1. The cross-functional process across areas of ascertaining customer needs, designing tentative new product solutions and prototypes, manufacturing, and coordinating departmental relationships designing, with the objective of developing and engineering the product that enables the customer to experience maximum value and benefits.	.88	.81	
2. The cross-functional process across areas of acquiring and leveraging customer information, establishing and maintaining relationships with customers and channel members, and providing after-sales service and support of managing relationships with customers, with the objective of learning about their needs and how best to satisfy them.	.90	.83	.91
3. The cross-functional process across areas of selecting and qualifying desired suppliers, establishing and managing inbound and outbound logistics, and designing work flow in product/ solution assembly, with the objective of designing, managing, and integrating own supply chain with that of both suppliers and customers.	.89	.83	
Adaptive MC: [b]			
Vigilant market capability — 1. Our firm is highly sensitive to the market environment and is able to detect market signals (even the weak ones) timely and accurately.	.74	.71	
2. Our firm actively collects extensive marketing information through all social networks and media.	.80	.80	.87
3. Our firm is able to forecast market trends based on past histories of consumer demand.	.76	.74	
4. New market information is shared within the company and distributed to different divisions in a timely manner.	.66	.69	
Adaptive market experimentation capability — 1. Our firm is willing to actively conduct market experiments or tests based on our own market forecast.	.89	.91	
2. Through trial-and-error and experimenting, our firm explores future market trends and develops potentially successful business models.	.85	.87	
3. Our firm takes advantage of emerging technologies, such as the Internet, quick-response technologies and database technologies to track market changes and learn from market experiments.	.88	.87	.95
4. Our firm actively learns from a wider range of peer companies, market leaders, and channel partners.	.89	.89	

Construct	Item			α
Open marketing capability	1. Our firm actively seeks a strategic partnership with companies that are complementary with our firm in terms of resources and capabilities.	.85	.87	
	2. Through coordination and collaboration with our partners, we are able to achieve synergy in effectively and quickly responding to market signals (even the weak ones).	.82	.82	.93
	3. Through resource integration with our partners, our firm gains the capabilities for continuous product and technology innovation.	.81	.85	
	4. Through collaboration and coordination with our partners, our firm improves the capability in developing innovative strategies and tactics.	.82	.84	

Environmental Turbulence: [c]

Construct	Item			α
Market turbulence	1. In our business, customers' product preferences change quite a bit over time.	.90	.93	
	2. It is difficult to predict market and customer preference changes.	.89	.91	.96
	3. It is very difficult to forecast where customer demand in our industry will be in 5 years.	.89	.90	
	4. Constant changes in consumer demands bring hidden opportunities for our company business development.	.82	.84	
Technological turbulence	1. The technology in our industry is changing rapidly.	.90	.93	
	2. Technological changes provide big opportunities in our industry.	.90	.92	
	3. It is very difficult to forecast where the technology in our industry will be in 5 years.	.80	.84	.96
	4. A large number of new product ideas have been made possible through technological breakthroughs in our industry.	.90	.94	
Competitive intensity	1. Competition in our industry is cut-throat.	.92	.94	
	2. Some competitors in our industry use fake brands and products.	.92	.96	
	3. The legal system regulating market competition cannot effectively protect our company's intellectual property.	.92	.94	.98
	4. There are many unfair competition practices in our industry.	.90	.93	

Notes: α: Cronbach's α; CITC: Corrected Item-to-Total Correlation; Static MC: static marketing capabilities; dynamic MC: dynamic marketing capabilities; adaptive MC: adaptive marketing capabilities.

Fit indices for the measurement model: χ^2 (179) = 254.51, $p<.01$; CFI =.98; GFI = .91; TLI = .97; RMSEA = .04.

[a] Compared with your major competitors, your firm's market performance over the past three years was ("far below/far above the competitors") in terms of …

[b] Compared with your major competitors, how do you rate your firm's capabilities in the following areas? ("far below/far above the competitors").

[c] How do you rate your company's market environment ("strongly disagree/ strongly agree").

Table 4 Study 2 descriptive statistics

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1.Firm size	2.59	1.49	1										
2.Firm age	3.52	1.03	-.05	1									
3.Industry type 1	.22	.41	.15**	.13*	1								
4.Industry type 2	.28	.44	.00	.17**	-.33***	1							
5.Location 1	.32	.47	-.03	.12*	.23***	-.07	1						
6.Location 2	.38	.49	.11	.14**	-.05	.06	-.40***	1					
7.Static MC	5.31	.75	-.07	.00	-.07	.03	.05	-.03	1				
8.Dynamic MC	5.02	.96	-.09	-.14**	-.07	-.02	.01	-.07	.08	1			
9.Adaptive MC	5.15	.80	-.08	.02	.04	.04	-.04	.10	.34***	.32***	1		
10. Environmental turbulence	4.60	1.01	.04	-.11*	-.03	-.08	.02	-.00	.11	.14**	.19***	1	
11. Market performance	4.60	.99	.01	.07	.09	.10	.01	.06	.26***	.32***	.48***	.17**	1

Notes: n= 225; *** p <.01， ** p <.05， * p <.1.
Static MC: static marketing capabilities; dynamic MC: dynamic marketing capabilities; adaptive MC: adaptive marketing capabilities; ET: environmental turbulence.

Table 5 Study 2 main model estimates

	Market performance			
	Model 1	Model 2	Model 3	Model 4
Control variables				
Firm size	-.02	.05	.04	.05
Firm age	.02	.05	.06	.05
Location 1	.00	-.00	-.01	.01
Location 2	.06	.03	.03	.03
Industry type 1	.14*	.13*	.13**	.11*
Industry type 2	.14*	.12*	.13**	.12*
Independent variables				
Static MC		.13**	.12**	.09
Dynamic MC		.22***	.21***	.22***
Adaptive MC		.36***	.35***	.38***
Moderator				
Environmental turbulence			.08	.04
Interactions				
Static MC * ET				-.21***
Dynamic MC * ET				.08
Adaptive MC * ET				.12*
R^2	.03	.31	.31	.37
R^2	.03	.27	.01	.06
F	1.17	28.23***	1.83	6.06***

Notes: *** $p < .01$, ** $p < .05$, * $p < .1$.
Static MC: static marketing capabilities; dynamic MC: dynamic marketing capabilities; adaptive MC: adaptive marketing capabilities; ET: environmental turbulence.