Integrative capability, business model innovation and performance

Contingent effect of business strategy

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Abstract

Purpose – The purpose of this paper is to examine how business model innovation (BMI) mediates the relationship between integrative capability, business strategy and firm performance.
Design/methodology/approach – A literature review provides the model and hypotheses. Using a sample of 165 Chinese firms, the authors conduct the examination using a theoretical model and hypotheses following standard analysis methods.
Findings – The results show that BMI positively mediates the relationship between integrative capability and firm performance. Moreover, a differentiation strategy positively moderates the link between BMI and firm performance, while a cost leadership strategy presents a significantly negative moderating effect.
Research limitations/implications – First, the authors test the hypotheses using data from China; thus data from other emerging economies should be tested. Second, the authors use cross-sectional data in this study making it impossible to verify the dynamic developed in the process of BMI; a longitudinal study could provide a more comprehensive understanding. Third, the authors consider one intermediate mechanism to test the relationship of integrative capability and firm performance; additional factors may link integrative capability and firm performance.
Practical implications – The mediating effect of BMI suggests managers should pay more attention to BMI to improve firm performance, and they should understand that BMI's role varies across different business strategies.
Originality/value – The paper is original in its investigation of the effect of integrative capability and BMI on firm performance using data from China and demonstrates the mediating effect of BMI on the relationship between integrative capability and firm performance.

Keywords Firm performance, Business model innovation, Integrative capability, Cost leadership strategy, Differentiation strategy

Paper type Research paper

Introduction

Recently, strategic management research has paid increasing attention to how a firm improves performance in a dynamic environment (Cacciolatti and Lee, 2016; Bayer *et al.*, 2017); two streams of thought explain this issue. One stream emphasizes the effect of integrative capability that, as an important dynamic capability, contributes to sensing, transferring and

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modifying internal and external resources and capabilities into firms' own capability configuration (Liao *et al.*, 2009; Wei *et al.*, 2015; Helfat and Campo-Rembado, 2016). Moreover, it can integrate fragmented knowledge across boundaries within a firm as a potential source of competitive advantage (Henderson, 1994), enhancing firm performance correspondingly (Woiceshyn and Daellenbach, 2005). The other stream focuses on business model innovation (BMI) (Zott *et al.*, 2011), which is "the method by which a firm builds and uses its resources to offer its customer better value and to make money in doing so" (Afuah and Tucci, 2001). The BMI can result in superior value creation and replace the old way of doing things to become the standard for the competition (Morris *et al.*, 2005). Therefore, BMI is crucial to firm performance for the role of value creation and value capture (Ricciardi *et al.*, 2016).

The implementation of BMI needs the support of organizational capabilities (Teece, 2018). However, there are few studies that explore the relationship between integrative capability and BMI. Furthermore, there has been little work on the mechanism of integrative capability improving firm performance (Wang and Ahmed, 2007; Wei *et al.*, 2015). Therefore, an important theoretical question emerges: how do integrative capability and BMI enhance firm performance together?

The business strategy adopted by a firm affects the relative emphasis that the firm puts on capability development (Gumusluoglu and Acur, 2016). Mckee *et al.* (1989) argue that strategy types, such as reactor, defender, analyzer and prospector, will affect the increasing levels of adaptive capability, which is a kind of dynamic capability. Consequently, examining the effect of business strategy on integrative capability will comprehensively reveal integrative capability's influence on firm performance. Moreover, a prominent concern of contingency theory has been to explore variables related to the strategy and structure of firms, and to explain their contingent effects on firm performance. As a structural template, BMI enables firms to change fundamentally the ways they organize and transact both within and across firm and industry boundaries (Zott *et al.*, 2011; Corallo *et al.*, 2018). Zott and Amit (2008) analyze the contingent effects of product market strategy and business model choices on firm performance using a unique manually collected data set. They show that a good fit between business model and business-level strategy is important for the improvement of firm performance. Therefore, echoing these studies, we attempt to introduce business strategy into the research of integrative capability and BMI in the context of an emerging economy.

To make up these theoretical gaps, we adopt the perspective of dynamic capability and contingency theory, and develop a research framework to analyze the relationship between integrative capability, BMI, business strategy and firm performance using 165 samples from Chinese firms.

Theoretical background and conceptual model

BMI, integrative capability and business strategy

As a holistic innovation for value creation and value capture (Zott *et al.*, 2011), BMI is different from product and process innovation; it emphasizes the re-design of organizational structure, operation mode and business process (Bock *et al.*, 2012), and it promotes identifying and adopting novel opportunity portfolios (Teece, 2018). Moreover, it spans firms' organizational boundaries and supplies a comprehensive way to explain how a firm does business (Zott and Amit, 2008). Thus, BMI is a valid construct for explaining competitive advantage and plays a crucial role in improving firm performance (Bock *et al.*, 2012; Velu, 2017). Furthermore, as a holistic activity, the implementation of BMI requires various organizational resources and capabilities to facilitate the reconfiguration of activities and organizational units, as well as their linkages and relationships (Zott *et al.*, 2011). Accordingly, BMI urges the firm build and enhance its integrative capability (Teece, 2018).

Integrative capability is an ability that constantly reconfigures a firm's resources and capabilities to capture market opportunities; it improves the efficiency of organizational

management and results in superior performance (Teece *et al.*, 1997; Helfat and Campo-Rembado, 2016). It is a multi-dimensional concept (Liao *et al.*, 2009), and includes capabilities such as opportunity recognition (Vandor and Franke, 2016), partner selection (Mindruta *et al.*, 2016), resource match (Eisenhardt and Martin, 2000) and risk control (Das and Teng, 2016). As a specific and concrete representation of dynamic capability, integrative capability emphasizes the coordination and reconfiguration of these capabilities (Teece *et al.*, 1997). Therefore, it can strengthen the firm's ability to scan the external environment, recognize business opportunities, manage resource stock, and align resources and capabilities. Furthermore, it can also meet the need of capability configuration and is critical for improving firm performance (Helfat and Campo-Rembado, 2016).

Currently, there are few studies that explore the relationship between integrative capability and BMI directly. However, many scholars have discussed the influence mechanism of dynamic capability on business models (e.g. Ricciardi *et al.*, 2016; Velu, 2017; Teece, 2018). In the process of building and developing business models, firms should overcome organizational inertia (Huang *et al.*, 2013), respond quickly to changes in the external environment, search for new valuable stakeholders (Miller *et al.*, 2014), create novel resource configurations, and establish a business operation system suitable for their development. When a firm owns good dynamic capability, it will be outstanding in acquiring, integrating and reconstructing resources, which will result in the creation of new technology and the promotion of the development of the business model (Corallo and Errico, 2011; Achtenhagen *et al.*, 2013). Dynamic capability can also integrate the internal and external resources to promote the production of new products and services (Corallo *et al.*, 2016; Teece, 2018). As new products and services need to match the business model (Corallo *et al.*, 2014), dynamic capability becomes the key factor to promote business model changes. It can promote the firm to allocate resources rationally, reshape the organization practice and integrate organization structure, which helps the firm to identify market change and seize market opportunities quickly (Kulins *et al.*, 2016). Also, the complementarity of key capabilities is conducive to the transformation of business models and the promotion of sustained value creation (Battistella *et al.*, 2017). Therefore, good dynamic capability is the guarantee of effective BMI.

In strategic management literature, cost leadership and differentiation are two important business strategies. Cost leadership strategy refers to reducing operational cost and enhancing managerial control to minimize the cost of research and development (R&D), service, promotion and so on (Porter, 1980). If a firm adopts cost leadership strategy, it needs to build rigorous organization units to implement cost control (Miller and Friesen, 1986). In contrast, differentiation strategy calls for creating unique products and services (Porter, 1980), and it requires the firm pay more attention to R&D capability in order to supply novel products and services.

A firm needs to leverage different capabilities to actualize business strategies (Porter, 1980). For example, product manufacturing capability can positively affect firm performance combined with cost leadership strategy (Swink *et al.*, 2005), while the firm adopting differentiation strategy can effectively leverage product modification capability to improve its performance (Chang *et al.*, 2003). Therefore, a firm has to recognize how to choose proper business strategy to enhance integrative capability more effectively.

Contingency theory suggests that the effect of BMI on firm performance may change with contingent factors (Hacklin *et al.*, 2018). As an important organizational factor, business strategy reflects the strategic position and execution, which will affect the direction and result of innovative activities. In the current literature, there is no coherent understanding of the cause-effect relationships or mutual dependencies in the linkage between firm's strategy and its business model. Teece (2010) points that a firm's business model reflects its strategic planning and execution and represents how it proposes to create and capture value in its target markets. Meanwhile, Zott and Amit (2008) argue that business model design and product market strategy are complements, not substitutes. The business model is a structural

construct that describes the organization of a firm's transactions with all of its external constituents in product markets. Business strategy determines how a firm chooses to position itself against competitors in its addressable market spaces. The contradictory discourse on the influence of business strategy on BMI calls for a theoretical analysis that enhances the understanding of the phenomenon of BMI.

Therefore, based on this discussion, we developed our conceptual mode in Figure 1 to explain the relationship between integrative capability, BMI, business strategy and firm performance.

Hypothesis development

The mediating effect of BMI on the relationship of integrative capability and firm performance

We argue that BMI can improve firm performance. The reasons are as follows. First, the target of BMI is to create value for customers and provide better value experience (Hacklin *et al.*, 2018). When customers acquire new value from products and services, the innovation of the business model can stimulate their desire to purchase novel products and services and improve the firm's performance (Velu, 2017).

Second, BMI depends on the coordination of internal and external resources and capabilities (Zott *et al.*, 2011). This not only ensures the implementation of innovative activities, but also brings about the synergistic effect of resource management, which will produce "one plus one is greater than two" effects. The existence of synergistic effects will improve the efficiency of resource utilization and reduce management costs (Braganza *et al.*, 2017).

Third, BMI will promote R&D investment. The reform of a business model needs novel technologies and resources deriving from R&D activities (Cortimiglia *et al.*, 2015). Therefore, investment in R&D is necessary. Many scholars have confirmed the positive role of R&D in promoting firm performance through innovative business models (Artz *et al.*, 2010; Bigdeli *et al.*, 2016; Winterhalter *et al.*, 2016).

Fourth, BMI can build a barrier to imitation. As a holistic activity, BMI involves comprehensive change of extant business operation modes (Teece, 2010), which is difficult for competitors to imitate. Therefore, it sets up an entry barrier and increases firm performance accordingly.

Since it involves some holistic innovation activities, BMI needs the support of various organizational capabilities (Teece, 2018). As a specific dynamic capability, integrative capability is a key source of innovation (Teece *et al.*, 1997); it can improve business process, optimize organizational control mechanisms and support new product development (Helfat and Campo-Rembado, 2016), which can promote BMI; there are four reasons for this.

First, market opportunity is fleeting in a dynamic environment (Li and Peng, 2008). A firm has to design a new business model to grasp potential market opportunities.

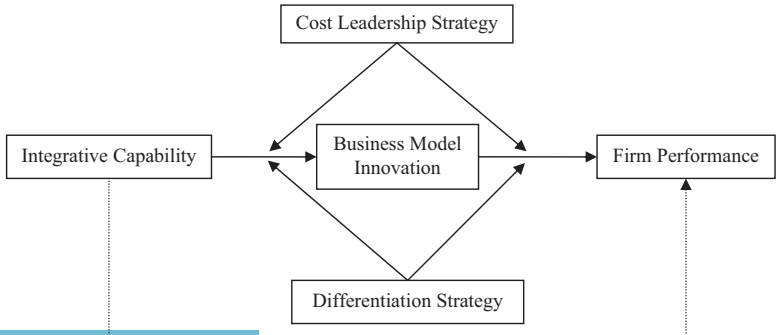

Figure 1.
Theoretical model

As BMI calls for acquiring market trends to facilitate value creation and value capture (Ricciardi *et al.*, 2016), the capability of opportunity recognition urges firms to catch up with market needs and technological change. Therefore, the capability of opportunity recognition becomes a precondition of implementing BMI successfully.

Second, BMI requires more resources and capabilities than product and process innovation (Teece, 2018). However, a single firm may not have sufficient resources to innovate its business model (Bouncken and Fredrich, 2016; Velu, 2017). Thus, cooperating with other firms becomes an inevitable choice to obtain plenty of resources (Mindruta *et al.*, 2016). Then, proper partners can supply the firm with necessary resources to reform its business model. In consequence, whether or not a firm has the capability of partner selection will be crucial for BMI.

Third, the capability of resource matching can enhance the efficiency of resource utilization, decrease resource slack (Mackelprang and Malhotra, 2015) and lead to the extra return from synergistic effect (Huang and Li, 2017), which is critical for improving firm performance. Since it involves diverse resources and capabilities, the success of a business model depends on the accumulation of important resources (Zott *et al.*, 2011). Therefore, the capability of resource matching plays an important role for BMI.

Fourth, because a business model involves broad fields, risk control becomes crucial (Das and Teng, 2016). BMI encompasses the pattern of firms' economic exchange with external partners (Bouncken and Fredrich, 2016). The ability to control risk can minimize partners' conflict, provide mechanisms to deal with it (Das and Teng, 2016), ensure the stabilization of innovation activities, and improve BMI.

Especially in a dynamic environment, a firm needs to leverage integrative capability to build a unique competitive advantage through BMI (Velu, 2016). Effective combination of various capabilities readjusts current business processes so that novel products and services can be accepted by customers (Wang and Ahmed, 2007). Accordingly, we argue that, as a bridge between integrative capability and firm performance, BMI can enhance firms' ability to create value more effectively. The mediating effect of BMI is reflected in two aspects.

First, organizational reform is complementary to the external environment. In a dynamic environment, if a firm is unable to update its current operation mode and organizational structure, it is possible to lose customers' focus (Zhou and Wan, 2016). Without a correct estimation of market demand, the arbitrary reform of organizational structure will lead to confusion, which not only results in the loss of resources, but also damages a firm's performance. The ability to recognize opportunity contributes to identifying and grasping the newest market trend (Vandor and Franke, 2016), which is a prerequisite for the firm's implementation of organizational reform. The capabilities of partner selection and resource matching are also important for making use of internal and external resources and capabilities, which play a key role in promoting the efficiency of reform. Therefore, integrative capability builds a solid foundation for the implementation of organizational reform. Meanwhile, as a holistic activity, BMI needs the support of organizational structure (Teece, 2018). The re-design of the mode of operation, structure and value creation requires effective organizational reform (Zott *et al.*, 2011). Therefore, integrative capability can enhance BMI and improve firm performance accordingly.

Second, compared with product and process innovation, BMI can create more value for customers with the support of integrative capability. The reason for this is that the recognition of market opportunities will contribute to fulfilling customers' urgent needs, which is the base of value creation and value capture. Meanwhile, cooperation with partners can provide sufficient resources for BMI so that the firm can create products and services to meet customers' demand through the configuration and coordination of

internal and external resources. In a dynamic environment, accurate and rapid value creation and value capture are crucial for improving firm performance. Therefore, we argue that:

H1. BMI positively mediates the relationship of integrative capability and firm performance.

The moderating effect of business strategy on the relationship between integrative capability and BMI

Dynamic capability can be affected by contextual factors, such as resource condition and business strategy (Teece, 2018). Different business strategies guide a firm to distribute resources diversely and formulate distinct structures (Porter, 1980). Therefore, business strategy can influence the effect of integrative capability on innovative activity. Further, cost leadership strategy and differentiation strategy need the support of different resources and structures (Porter, 1980). In consequence, the interactive effect of integrative capability and cost leadership strategy on BMI will be different from that of integrative capability and differentiation strategy.

In the dynamic environment of China, there are ample market opportunities to acquire superior performance. Most firms have been built for cost advantage rather than novel innovation capability (Li and Peng, 2008). In this case, the firm adopting cost leadership strategy prefers to pursue high efficiency of opportunity recognition and resource reconfiguration to improve the efficiency of the value chain (Madhok *et al.*, 2010). Cost leadership strategy can strengthen the accuracy of information acquirement (Stock *et al.*, 2017), which is crucial for innovative activities.

With the logic of differentiation strategy, a firm will design various novel products. But if the firm focuses valued resources on the needs of scarce customers, it will disturb normal production planning, even though the customers ignored by competitors can be explored. Differentiation strategy encourages firms to choose partners with diverse backgrounds, resources, capabilities and geographic attributes (Hashai *et al.*, 2018). Indeed, a firm can obtain varied resources through cooperating with different partners. However, indiscriminate cooperation may cause difficulties in communication and coordination between partners, which inevitably increases the cost of management.

Moreover, integrative capability emphasizes resource matching to form a synergistic effect so as to facilitate BMI. In the process of matching resources, the arbitrary configuration will inevitably lead to confusion, which may increase management costs and decrease the efficiency of resource allocation. Neglecting efficiency will hamper the actualization of innovation (Vaccaro *et al.*, 2012). Therefore, a cost leadership strategy can maintain effective execution of resource matching better than a differentiation strategy.

Finally, the ability to control risk can ensure the stabilization of innovation activity (Das and Teng, 2016), which minimizes partners' conflict, provides a governance mechanism, and enhances BMI. The basic principle of risk control is to improve the efficiency of risk management (Kerr, 2016). Different from cost leadership strategy, differentiation strategy does not emphasize the importance of efficiency. Diverse control mechanisms may result in managerial confusion. In consequence, the firm adopting a cost leadership strategy can perform well in risk control. Therefore we argue that:

H2a. The relationship between integrative capability and BMI will be positively moderated by emphasis on a cost leadership strategy.

H2b. The relationship between integrative capability and BMI will be negatively moderated by the emphasis on a differentiation strategy.

The moderating effect of business strategy on the relationship between BMI and firm performance

An important function of BMI is to form specific operation modes and value creation/capture mechanisms to avoid imitation from competitors (Zott *et al.*, 2011). When a firm finishes the reform of its business model, it expects to build a unique competitive advantage (Teece, 2018). The firm adopting differentiation strategy can build novel modes for creating and delivering value for customers (Morris *et al.*, 2005), which is crucial for improving firm performance. Moreover, the firm will prefer to pursue the novelty of unique products and services, allocate resources diversely, formulate a relaxed working environment and encourage original ideas to stimulate BMI (Foss and Saebi, 2017). The firm strengthens the positive effect of BMI on its performance, because it can further effectively utilize unique advantages from its business model to create value (Velu, 2016).

The positive effect of BMI on firm performance embodies in the mechanism of promoting R&D investment (Cortimiglia *et al.*, 2015). As R&D activity is costly and will consume massive resources, the firm will control R&D investment to reduce cost under the logic of a cost leadership strategy (Chakravarty and Grewal, 2016), which may decrease the firm's performance correspondingly. In addition, new a business model calls for holistic reform of the operational mode, which is also costly. In consideration of cost control, the reform of the current business model will be reduced accordingly (Teece, 2018), which may affect the novelty of the business model and lead to more imitation. Meanwhile, a cost leadership strategy also pays more attention to the efficiency of resource utilization (Porter, 1980), which will increase imitation and competition, and reduce the positive effect of BMI on firm performance. Therefore, we argue that:

H3a. The relationship between BMI and firm performance will be positively moderated by the emphasis on a differentiation strategy.

H3b. The relationship between BMI and firm performance will be negatively moderated by the emphasis on a cost leadership strategy.

Methods

Sample and data

Most previous studies on BMI were conducted in developed economies, whereas studies are limited in the context of emerging economies (Guo *et al.*, 2016). As research is increasingly conducted in emerging economies, and China is one of the most important emerging economies, it is imperative to conduct empirical studies on BMI in China (Ahlstrom and Ding, 2014).

We used a survey of firms in China to test our hypotheses. To ensure reliability and validity, we conducted in-depth interviews with ten top managers to collect information about BMI and related practices. We developed the survey items by modifying the current measurement of integrative capability, BMI and business strategy based on the interviews and a literature review. All items were translated into Mandarin and modified to reflect the management context of China. After we drafted the items, we met with the same ten senior managers again, asked them to check each item, and revised all items according to their advice. We conducted a pilot study in Chinese with 20 top managers (titled as CEO and general manager). We informed the manager of the academic purpose of this survey in advance and promised that all the data they offered would be confidential and used only in academic studies. We asked the managers to answer all the survey items and discussed with them the clarity of the items and appropriateness of terminology. According to their feedback, we carefully refined the questionnaire to make sure all the items are clearly understandable and comprehensive.

We collected data from different industries (e.g. chemical and pharmaceutical, electrical equipment, general equipment, internet technology and so on) and different areas such as Shaanxi, Jilin, Guangdong, Shandong, Henan, Jiangsu and Shanghai. Due to the uneven economic environment in China, the coastal region and inland areas vary significantly in their economic development (Zhou *et al.*, 2014). Therefore, we chose firms from both coastal provinces (Guangdong, Shandong, Jiangsu and Shanghai) and inland provinces (Shaanxi, Jilin and Henan) to consider such variations. These geographical locations represent the economic, geographic and demographic diversities in China.

Because the contact information of top managers is not publicly available in China, many studies rely on government agencies to provide such lists. In China, local governments often set up economic development zones to host most companies (Wei *et al.*, 2017). We contacted the government agencies of the economic development zones. They provided us with a list of firms including the contact information of the top managers, from which we selected 1,000 firms at random.

We contacted the selected firms and invited them to participate in the research. As mail surveys always receive a very low participation rate, we adopted an on-site survey to ensure access to the right respondents. Although costly and time consuming, this method could ensure that the questionnaire was answered completely and seriously (Sheng *et al.*, 2011).

We requested two managers to finish different sections of the questionnaire to reduce the potential problem of common methods variance (CMV). For each firm, we sent at least two doctoral students as interviewers to conduct the survey. Before the survey, we trained all of the doctoral students in the goal of this research, the content of the questionnaire and the necessary communication skills. The interviewers first contacted the managers to arrange the meeting time. Then they went to the firm, met the managers and conducted the surveys with managers A and B separately. The selection criteria for managers A and B is that the managers should be the CEO or general managers who are in charge of sales, organization operation or R&D. During the survey, the interviewers explained thoroughly the process of the interview and the method of filling in the questionnaire, and asked the questions using a uniform script to eliminate any biases.

We contacted all 1,000 firms to illustrate the objective of the survey. As a result of company policy, some firms politely declined our request and did not participate in the survey. Meanwhile, some firms did not complete most of the questionnaire, and the data were discarded accordingly. In the final database, 165 usable samples were obtained for data analysis. Thus, the effective response rate was 16.5 percent.

In order to check whether there was a significant non-response bias, we performed a *t*-test comparing the responding firms with 150 non-responding firms in terms of the firms' traits such as age, size and ownership. All *t*-statistics were insignificant, which indicated a low possibility of non-response bias (Armstrong and Overton, 1977). Table I represents the profile of the sample.

Constructs and measures

Because there is little public data available in China, studies rely on surveys to collect necessary data (Walker *et al.*, 2014). We developed our survey based on in-depth interviews and previous literature research. All constructs except firm performance are measured using a five-point Likert scale, where "1" means strongly disagree and "5" indicates strongly agree. The respondents we interviewed provided their perceptual evaluations of each item. All survey items are shown in Table II.

Integrative capability. Integrative capability includes four dimensions: opportunity recognition, partner selection, resource matching and risk control. Through a literature review on integrative capability, we designed a more comprehensive measurement. Opportunity recognition is measured with six items (Ma *et al.*, 2011; Vandor and Franke, 2016), while partner

Characteristics of responding firms	Number of firms	%
1. Firm age (years)		
< 5	8	4.85
5–10	57	34.54
11–15	49	29.70
16–20	23	13.94
> 20	28	16.97
2. Firm size (number of employees)		
< 50	25	15.15
50–199	59	35.76
200–499	36	21.82
500–1,000	16	9.70
> 1,000	29	17.57
3. Firm ownership		
State owned	44	26.66
Private owned	82	49.70
Foreign owned	36	21.82
Collectively owned	3	1.82
4. Industry		
Agriculture, food and textiles	22	13.33
Electrical machinery and equipment	26	15.76
Chemical and pharmaceutical	21	12.73
Software and information technology services	15	9.09
General and special equipment manufacturing	62	37.58
Other industries	19	11.51
5. Industry type		
High-tech	91	55.20
Others	74	44.80
6. Location		
Coastal areas (Guangdong, Shandong, Jiangsu and Shanghai)	67	40.61
Inland areas (Shaanxi, Jilin and Henan)	98	59.39

Note: $n = 165$

Table I. Profile of responding firms

selection (Shah and Swaminathan, 2008; Mindruta *et al.*, 2016), resource matching (Eisenhardt and Martin, 2000) and risk control (Das and Kumar, 2011; Das and Teng, 2016) are each measured with five items.

BMI. We integrated the research on the business model and business model design to construct a new measurement of BMI with eight items (Teece, 2018; Zott and Amit, 2008).

Firm performance. Past research about firm performance has mainly focused on subjective measurement (Stam and Elfring, 2008). In our study, we measure firm performance using return on assets to acquire an objective reflection of it.

Cost leadership strategy. Based on the research of Zott and Amit (2008), we measure cost leadership strategy compared with a firm's main competitors using four items, which include evaluating the firm's agility in responding to the environment, the rate of equipment utilization, the operational costs and the efficiency of production and organization.

Differentiation strategy. Based on the study of Zott and Amit (2008), we measure differentiation strategy compared with a firm's main competitors using seven items, which include customer satisfaction with new products, numbers of new products, the earnings yield of new products, the response speed to new demand, the consistency between new products and demands, the R&D speed of new products and the speed of new product launch.

	SFL	SFL
Dynamic environment: CR = 0.883		
Measurement model fit: $\chi^2(5) = 9.308$; GFI = 0.956; TLI = 0.946; CFI = 0.923; NFI = 0.969; RMSEA = 0.045		
1. The customers often change their supplier frequently	0.891	
2. The competition is fierce in this industry	0.779	
3. It is difficult to forecast the number of customers	0.645	
4. It is difficult to forecast the change of technologies	0.676	
5. Technological changes provide many opportunities	0.865	
Integrative capability: second-order factor, CR = 0.936		
Measurement model fit: $\chi^2(183) = 373.136$; GFI = 0.824; TLI = 0.940; CFI = 0.948; NFI = 0.903; RMSEA = 0.080		
Opportunity recognition: first-order factor, CR = 0.952	SFL	0.910
Measurement model fit: $\chi^2(6) = 8.010$; GFI = 0.965; TLI = 0.984; CFI = 0.990; NFI = 0.979; RMSEA = 0.044		
1. We can recognize new opportunity from the change of demand	0.873	
2. We can recognize new opportunity from the change of technology	0.907	
3. We can recognize new opportunity from the change of policy	0.878	
4. We can recognize new opportunity from the change of competition	0.900	
5. We can recognize new opportunity from the change of international trend	0.864	
6. We can recognize the unmet demands	0.828	
Partner selection: first-order factor, CR = 0.954	SFL	0.888
Measurement model fit: $\chi^2(5) = 6.335$; GFI = 0.974; TLI = 0.942; CFI = 0.971; NFI = 0.965; RMSEA = 0.041		
1. We can timely find the proper partners	0.896	
2. We can accurately evaluate the potential of partners	0.914	
3. We can quickly build good partnership with partners	0.923	
4. We can design contracts to control the risk of cooperation	0.901	
5. We can establish the cooperation network quickly	0.854	
Resource match: first-order factor, CR = 0.954	SFL	0.909
Measurement model fit: $\chi^2(5) = 8.891$; GFI = 0.958; TLI = 0.961; CFI = 0.981; NFI = 0.974; RMSEA = 0.053		
1. We can match our advantage with partners' resources	0.903	
2. We can use our partners' advantage	0.908	
3. We can use our advantage	0.901	
4. We can optimize resources with the environmental change	0.874	
5. We can optimize resources with the cooperation need	0.906	
Risk control: first-order factor, CR = 0.960	SFL	0.835
Measurement model fit: $\chi^2(5) = 10.382$; GFI = 0.889; TLI = 0.891; CFI = 0.945; NFI = 0.940; RMSEA = 0.055		
1. We can assess the risk of external innovation	0.887	
2. We can avoid the risk of external innovation	0.890	
3. We can transfer the risk of external innovation	0.930	
4. We can separate the risk of external innovation	0.920	
5. We can balance the risk of external innovation	0.919	
Business model innovation: CR = 0.965		
Measurement model fit: $\chi^2(20) = 46.899$; GFI = 0.859; TLI = 0.921; CFI = 0.944; NFI = 0.931; RMSEA = 0.053		
1. We use an innovative business model to trade	0.845	
2. We introduce new operation processes, practices and norms in business model	0.893	
3. We introduce new ideas, methods and product in business model	0.884	
4. Our business model provides value-added products/services	0.843	
5. Our business model creates a new profit mode	0.900	
6. Our business model creates a new profit path	0.923	

Table II.
Measurement items and validity assessment

(*continued*)

	SFL	SFL
7. Our business model creates a new profit point	0.887	
8. Our business model is novel	0.872	
Cost leadership strategy: CR = 0.847		
Measurement model fit: $\chi^2(3) = 6.083$; GFI = 0.981; TLI = 0.924; CFI = 0.975; NFI = 0.964; RMSEA = 0.042		
1. The agility to the environment	0.792	
2. The rate of equipment utilization	0.765	
3. The operational cost	0.645	
4. The efficiency of production and organization	0.836	
Differentiation strategy: CR = 0.947		
Measurement model fit: $\chi^2(14) = 31.129$; GFI = 0.930; TLI = 0.955; CFI = 0.970; NFI = 0.956; RMSEA = 0.049		
1. The customer satisfaction at new products	0.783	
2. Numbers of new products	0.816	
3. The earnings yield of new products	0.781	
4. The response speed of new demand	0.896	
5. The consistency between new products and demands	0.877	
6. The R&D speed of new products	0.908	
7. The speed of new product launch	0.871	

Notes: SFL, standardized factor loading; CR, composite reliability

Table II.

Control variables. First, some empirical literature has found both negative and positive influences of firm age on innovation. Older firms may innovate more effectively because of their past learning, previous routines and capabilities (Coad *et al.*, 2016). Moreover, they also are able to accumulate plenty of resources, managerial knowledge and the ability to handle environmental uncertainty (Levitt and March, 1988). However, as older firms have stronger organizational inertia, it may constrain the firm's ability to change and innovate. If the direction of innovative activities are not well suited to the technological schemata, older firms may generate obsolescence and ignore the importance of innovation. Regarding younger firms, they start business operation without previous resources and routines, and have to carry out innovation continuously to build not only everyday routines but also innovative capabilities. Therefore, the level of innovation is higher for young firms compared to older firms (Capaldo *et al.*, 2017; Petruzzelli *et al.*, 2018). While, in an industry with fierce competition, the focused pursuit of innovation may hamper the growth of young firms. Owing to their lack of experience of operation, young firms need to assess their performance with that of extant firms in order to catch up with the competition. Young firms have to exploit mature technology to maintain steady growth (Huergo and Jaumandreu, 2004), which may restrict their investment in new technology. Therefore, firm age is an important factor affecting innovation and needs to be considered as a control variable. We measure firm age using the natural log number of the duration of the firm.

Second, large firms have more R&D staff and specialized personnel (Macher and Boerner, 2006). They are more likely to recognize the value of unexploited knowledge and reduce fruitless and obsolete discoveries (Petruzzelli *et al.*, 2018). Moreover, as lager firms have plenty of resources and capabilities, they easily find novel and useful combinations among resources to enhance innovation. However, larger firms have more organizational hierarchical levels (Gong *et al.*, 2013), which may reinforce extant operation models and routines, decrease inter-functional interactions and hamper innovative activities. In contrast, small firms have a high level of flexibility and prefer to change operation routines with the external environment. Some studies have also proved that compared with large firms, small firms reveal stronger creativity and innovation (Diaz-Chao *et al.*, 2015;

Gibbons and Watkins, 2010). Nevertheless, small firms have limited resources and capabilities and their ability to cope with risk is weak, which means that the risks originated from innovative initiatives of small firms may be higher than those of large ones (Damanpour, 2010). Therefore, the potential risk can decrease the willingness of small firms to spend valuable and limited resources on risky innovation. Therefore, firm size may have both positive and negative effects on innovative activities. In our study, this potential effect needs to be controlled. We measure firm size using the log number of employees.

Third, a significant trait of China is the coexistence of non-state-owned and state-owned enterprises (SOEs) (Peng and Luo, 2000). As SOEs have relatively easier access to government officials, they can acquire some valuable political resources, which are difficult for non-SOEs to gain. Non-SOEs, such as private firms and foreign-invested firms, lack necessary legitimacy, which constrains the likelihood of receiving market recognition. Therefore, the willingness to innovate in non-SOEs may be weak. In consequence, firm ownership plays an important role in resource acquisition and partner selection in an emerging economy. In our study, firm ownership is measured with a dummy variable (1 = state-owned, 0 = otherwise).

Fourth, the firms involved in high-tech industries and non-high-tech industries reveal significant differences in innovative activities (Loon and Chik, 2019). High-tech firms prefer to invest plenty of resources into innovative activities, while those in non-high-tech industries can equally acquire superior performance through the improvement of organizational efficiency, which may reduce their investment in innovation. Therefore, industry type may affect firms' innovation. We control industry type with a dummy variable (1 = high-tech industries, 0 = otherwise).

Fifth, the external environment will influence the design and innovation of the business model (Pati *et al.*, 2018). As an emerging economy, the market environment of China will also affect BMI. In consequence, we choose the following five items to measure the external environment: customers change their suppliers frequently; competition is fierce in this industry; it is difficult to forecast the number of customers; it is difficult to forecast the change of technologies; and technological changes provide many opportunities.

Assessing CMV

Following the procedures recommended by Podsakoff *et al.* (2003), we undertook both *ex ante* and *ex post* approaches to deal with CMV. First, the most important source of CMV is the problem of using a single informant in data collection. Therefore, we requested two top managers to complete the different parts of the questionnaire. One manager answered the scales for integrative capability and firm performance, while the other finished the scale for BMI. To control the contextual influences, four dimensions of integrative capability were also separated into different pages to reduce disturbance.

Second, CMV often originates from using subjective measurements of dependent variables (Podsakoff *et al.*, 2003). We measured firm performance using objective data. Furthermore, we also assessed the potential CMV *ex post* with a confirmatory factor analysis (CFA) approach. We tested a model that linked all items of the dependent and independent variables to a single factor. This model does not fit the data well (χ^2/df = 3.862, root mean square error of approximation (RMSEA) = 0.132, comparative fit index (CFI) = 0.614). When all items were assigned to their theoretical factors, the model fit the data well. Therefore, the CFA test showed no serious threat of common method bias.

Construct reliability and validity assessment

In order to ensure reliability and validity, we took several scientific steps. We used a variance inflation factor (VIF) test for multi-collinearity and the Kaiser-Meyer-Olkin method to check the appropriateness of explanatory factor analysis. The VIFs are all below the

accepted cut-off point of 10 and KMOs are all greater than 0.6. Therefore, multi-collinearity is not an issue in our study.

As an effective method, composite reliability is operationalized by testing Cronbach's α to assess inter-item consistency (Cronbach, 1951). Because all constructs are measured based on the previous literature research, they are modified to fit the context of China. Therefore, 0.700 of α value is properly considered as the cut-off value. In Table II we find that all α values of factors are above 0.700, which means that all constructs reveal good composite reliability (Fornell and Larcker, 1981).

Validity refers to the extent to which an instrument measures what it is supposed to measure (Churchill, 1979). Convergent validity tests whether all items of a construct measure one common factor (Campbell and Fiske, 1959). Convergent validity is demonstrated through the statistical significance of factor loadings at a given α value ($p = 0.050$). A loading of 0.700 suggests that half of the item's variance can be attributed to the construct. As shown in Table II, all the items are above this threshold, implying the statistical significance of relationships between items and constructs.

Analysis and results

The descriptive statistics in Table III show basic information of each factor and correlations among all factors in this study.

We use regression analysis to test the mediating effect of BMI and the moderating effect of business strategy (Baron and Kenny 1986). Tables IV–VI present the steps used for and results of testing the hypotheses. Using the method of standardization, we minimize the threat of multicollinearity (Aiken and West, 1991). In addition, all the VIFs are below 3, meaning there is no significant multicollinearity in this research (Neter *et al.*, 1990).

In order to test the mediating hypothesis, we follow the criteria of Baron and Kenny (1986). Table IV illustrates the results of mediating effect. Integrative capability positively affects firm performance ($b = 0.349$, $p < 0.001$ in model 2). BMI also presents a positive effect on firm performance ($b = 0.425$, $p < 0.001$ in model 3). From Table V, we find that integrative capability shows a significantly positive effect on BMI ($b = 0.699$, $p < 0.001$ in model 2). However, when we regress firm performance with integrative capability and BMI together in model 4, the coefficient of integrative capability becomes insignificant ($b = 0.102$,

	1	2	3	4	5	6	7	8	9	10
1. Firm age	1.000									
2. Firm size	0.433**	1.000								
3. Firm ownership	0.431**	0.286**	1.000							
4. Industry type	0.078	0.135	0.075	1.000						
5. Dynamic environment	−0.094	−0.165*	0.000	−0.040	1.000					
6. Integrative capability	−0.192*	0.100	−0.206**	0.026	0.120	1.000				
7. BMI	−0.163*	0.099	−0.213**	0.073	0.143	0.736**	1.000			
8. Cost leadership strategy	−0.061	0.161*	−0.153*	0.017	0.036	0.679**	0.542**	1.000		
9. Differentiation strategy	−0.222**	0.041	−0.180*	0.109	0.155*	0.683**	0.556**	0.619**	1.000	
10. Firm performance	−0.068	0.022	−0.123	0.050	−0.148	0.329**	0.393**	0.167*	0.333**	1.000
Mean	2.558	2.350	0.270	0.550	3.314	3.749	3.600	3.750	3.784	0.152
SD	0.717	0.648	0.444	0.499	0.446	0.526	0.627	0.470	0.606	0.273

Notes: $n = 165$. *,**Significant at the 0.05 and 0.01 levels (two-tailed), respectively

Table III.
Descriptive statistics and correlation matrix

Table IV.
The results of mediating effect of BMI

	Dependent variable: firm performance							
	Model 1		Model 2		Model 3		Model 4	
	β	t-value	β	t-value	β	t-value	β	t-value
Firm age	−0.056	−0.609	0.019	0.209	0.015	0.179	0.025	0.291
Firm size	0.049	0.554	−0.045	−0.522	−0.058	−0.704	−0.068	−0.810
Firm ownership	−0.117	−1.349	−0.050	−0.598	−0.024	−0.297	−0.020	−0.248
Industry type	0.051	0.654	0.042	0.566	0.019	0.267	0.022	0.304
Dynamic environment	−0.144****	−1.821	−0.194*	−2.578	−0.217**	−2.951	−0.219**	−2.983
Integrative capability			0.349***	4.454			0.102	0.956
BMI					0.425***	5.584	0.354**	3.314
R^2	0.043		0.150		0.201		0.206	
Adjusted R^2	0.013		0.118		0.171		0.170	
F value	1.437		4.646***		6.622***		5.803***	

Notes: $n = 165$. *$p < 0.050$; **$p < 0.010$; ***$p < 0.001$; ****$p < 0.100$

Table V.
The results of moderating effect of business strategy on BMI

	Dependent variable: BMI					
	Model 1		Model 2		Model 3	
	β	t-value	β	t-value	β	t-value
Firm age	−0.168****	−1.908	−0.018	−0.286	−0.023	−0.344
Firm size	0.252**	2.999	0.065	1.044	0.055	0.870
Firm ownership	−0.219**	−2.638	−0.084	−1.395	−0.076	−1.246
Industry type	0.075	1.007	0.057	1.060	0.046	0.830
Dynamic environment	0.172*	2.287	0.070	1.291	0.059	1.047
Integrative capability (IC)			0.699***	12.338	0.625***	7.400
Cost leadership strategy (CLS)					0.058	0.730
Differentiation strategy (DS)					0.044	0.548
IC × CLS					0.037	0.509
IC × DS					−0.069	−0.924
R^2	0.129		0.556		0.563	
Adjusted R^2	0.102		0.540		0.535	
F value	4.709***		33.026***		19.876***	

Notes: $n = 165$. *$p < 0.050$; **$p < 0.010$; ***$p < 0.001$; ****$p < 0.100$

Table VI.
The results of moderating effect of business strategy on firm performance

	Dependent variable: firm performance					
	Model 1		Model 2		Model 3	
	β	t-value	β	t-value	β	t-value
Firm age	−0.056	−0.609	0.015	0.179	0.100	1.250
Firm size	0.049	0.554	−0.058	−0.704	−0.028	−0.365
Firm ownership	−0.117	−1.349	−0.024	−0.297	−0.067	−0.889
Industry type	0.051	0.654	0.019	0.267	0.008	0.117
Dynamic environment	−0.144****	−1.821	−0.217**	−2.951	−0.202**	−2.950
BMI			0.425***	5.584	0.370***	4.333
Cost leadership strategy (CLS)					−0.274**	−2.991
Differentiation strategy (DS)					0.463***	4.722
BMI × CLS					−0.269**	−2.987
BMI × DS					0.452***	4.715
R^2	0.043		0.201		0.344	
Adjusted R^2	0.013		0.171		0.302	
F value	1.437		6.622***		8.090***	

Notes: $n = 165$. **$p < 0.010$; ***$p < 0.001$; ****$p < 0.100$

$p > 0.100$). Moreover, we also use the Amos 22 and the Sobel test to further verify that the mediating effect of BMI is really significant (BootLLCI = 0.0559, BootULCI = 0.2374, $z = 3.20$, $p < 0.01$). Therefore, there exists significant mediating effect of BMI on the relationship between integrative capability and firm performance. *H1* is supported.

Table V reveals the moderating effect of business strategy on integrative capability. Model 2 has indicated that integrative capability positively influences BMI ($b = 0.699$, $p < 0.001$). Model 3 tests the moderating effect of business strategy on integrative capability. We find that a cost leadership strategy does not show a significant moderating effect on integrative capability ($b = 0.037$, $p > 0.100$). The moderating effect of differentiation strategy on integrative capability is also insignificant ($b = -0.069$, $p > 0.100$). Therefore, *H2a* and *H2b* are not supported.

Table VI shows the moderating effect of business strategy on BMI. Model 2 presents that BMI has a significantly positive effect on firm performance ($b = 0.425$, $p < 0.001$). Model 3 tests the moderating effect of business strategy on BMI. Cost leadership strategy presents a significantly negative moderating effect on BMI ($b = -0.269$, $p < 0.010$). While, the moderating effect of differentiation strategy on BMI is significantly positive ($b = 0.452$, $p < 0.001$). Therefore, *H3a* and *H3b* are supported.

Discussion

In this study, by analyzing the relationship between integrative capability, BMI, business strategy and firm performance, we explain how integrative capability and BMI affect firm performance together and how business strategy contingently influences the relationship between integrative capability, BMI and firm performance from the perspectives of dynamic capability theory and contingency theory. The results show that BMI positively mediates the relationship of integrative capability and firm performance. Furthermore, in the context of adopting a cost leadership strategy, BMI shows a negative effect on firm performance. While, when a firm adopts differentiation strategy, BMI positively affects firm performance.

We also find that the moderating effect of business strategy on integrative capability is insignificant, which does not support *H2a* and *H2b*. This result indicates that as integrative capability and BMI show a strong positive relevance ($r = 0.736$) in our sample data, the moderating effect of business strategy has become unimportant. In order to verify this possible moderating effect, scholars can examine new sample data from other countries to evaluate the relationship between integrative capability and business strategy.

Theoretical contributions

Our study makes two important theoretical contributions to the integrative capability and business model literature. First, it identifies the mediation effect of BMI. Although some studies have argued the positive effect of integrative capability on firm performance (Liao *et al.*, 2009; Wei *et al.*, 2015; Helfat and Campo-Rembado, 2016), the influence mechanism is still unclear and exists as a black-box between them. We introduce BMI to the integrative capability literature to explore this mediation effect and propose that the firm that has integrative capability can acquire superior firm performance through an innovative business model. This result not only provides initial evidence that the effective combination of integrative capability and BMI can improve firm performance, but also unpacks the extant black-box and reveals unclear linkages among integrative capability, BMI and firm performance. Through testing the mediation effect, we find integrative capability is a crucial antecedent of BMI, which also enriches the literature on BMI.

Second, this study extends the contingency perspective of business strategy by investigating the moderating effects of cost leadership strategy and differentiation strategy on integrative capability and BMI. Although the moderating effect of business strategy on integrative capability is insignificant, the results still indicate that cost leadership strategy

and differentiation strategy exist and have a distinct effect on integrative capability. Meanwhile, these two strategies reveal a significant moderating effect on BMI. We elaborate the fit between business strategy and BMI and prove that the complements of a business model and a differentiation strategy will result in superior firm performance in the context of an emerging economy, which extends the literature on contingency theory.

Managerial implications

Our findings have some important managerial implications. First, managers should pay more attention to the indirect role of integrative capability in improving firm performance. Managers often take for granted that when the firm has good integrative capability, it can acquire superior performance. However, the positive effect of integrative capability on firm performance needs the implementation of actual organizational activities, such as change in and innovation of the business model. Through proactive BMI, the firm can make full use of the capabilities of opportunity recognition, partner selection, resource matching and risk control; it can also renew management and operation models, enhance the efficiency and productiveness of value creation, and result in an outstanding performance. Therefore, with good integrative capability, the application of BMI may be a wise choice to improve firm performance.

Second, to leverage the positive role of BMI in improving firm performance, managers should understand that the role varies across different business strategies. When a firm adopts a cost leadership strategy, BMI is less effective in enhancing firm performance. However, when the firm emphasizes a differentiation strategy, BMI is more effective in strengthening firm performance. When a firm pays more attention to the change and innovation of its business operation model, it is an effective way to acquire superior performance through creating novel products and services. In other words, under the idea of differentiation strategy, the firm implementing BMI can meet customers' needs for novel products, obtain more recognition from the market and produce an outstanding performance.

Limitations and future research

Despite its theoretical contributions, this study still has some limitations that should be addressed in future research. First, we test our hypotheses using data from a single country: China. Although this may not cause serious theoretical bias, differences of institutional environment can lead business strategy to play distinct roles in affecting integrative capability and BMI. More data from developed and other developing countries should be examined to further verify these hypotheses.

Second, cross-sectional data makes it impossible to assess the dynamic process of BMI. Therefore, a longitudinal study should be undertaken to acquire more comprehensive understanding in the future, which can also provide causal interpretation of our empirical findings.

Third, we use one intermediate mechanism to test the relationship of integrative capability and firm performance. There may be still other factors linking these two constructs, such as open innovation, which is a new trend in recent research. These other factors should be investigated.

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