

# Relationship of soil moisture characteristic curve and mechanical properties in Entisols and Inceptisols of Iran

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## **Business model innovation themes of emerging market enterprises: Evidence in China**

### **ABSTRACT**

Business model innovation (BMI) is an important carrier for the rapid growth of emerging market enterprises. Yet, the role of the institutional context in BMI themes has seemingly received little attention in the literature. This study aims to conceptualise the BMI themes by integrating the business model theory with institutional attributes of BMI. Drawing on the literature, we propose two BMI themes – pioneering and perfecting, where pioneering BMI creates new market rules and perfecting BMI improves existing transaction rules. Following three sequential studies, we developed and empirically validated the scales of the two themes using two separate primary datasets collected in China. The results suggest that both transactional innovation and legitimacy building are critical to BMI in the emerging market. We contribute to the BMI theory by incorporating institutional attributes to the BMI themes, which allows a better understanding of the BMI activities of emerging market enterprises.

**Keywords:** Business model innovation (BMI); Innovation theme; Emerging market enterprise; Legitimacy

## **1. Introduction**

BMI refers to a system configuration and rearrangement of a series of business model elements according to a specific theme (Zott & Amit, 2010) that creates, delivers, and captures stakeholder values (Teece, 2010; Tidd & Bessant, 2018). Value creation is central to the design of BMI themes (Casadesus-Masanell & Ricart, 2011; Zott & Amit, 2010). Key value-creation themes could be efficiency, lock-in, complementarities, and novelty (Amit & Zott, 2001).

Despite its increased popularity in recent years, the BMI theme is still in its infancy (Hossain, 2017). Specifically, the role of the institutional context in BMI themes has received little attention in the literature (Climent & Haftor, 2021). Scholars argue that BMI themes should be embedded in a specific social context (Hargadon & Douglas, 2001; Chester, Au Joe, & Kan, 2019). The BMI theme in the emerging market context is significantly different from the Western context (Jia, You, & Du, 2012; Chester et al., 2019). Taking China as an example, vast market opportunities and the imperfect institutional context coexist in this emerging market context (Jia et al., 2012). BMI has become an essential attribute of the growth of Chinese emerging enterprises (Wu, Zhao, and Zhou, 2019). In the absence of government policies and other formal systems, grassroots enterprises spontaneously develop transaction norms and networks, promoting the bottom-up institutional reform and market-oriented transformation in China (Nee & Opper, 2016). Alibaba and some enterprises create first-mover advantages by developing new transaction rules from scratch and taking the ‘winner-takes-all’ position. Meanwhile, JD.com and other enterprises grow rapidly and even catch up with the first movers through improving and optimising existing transaction rules. The traditional BMI themes, mainly based on transactional attributes, cannot fully explain the BMI practices of emerging market enterprises, where institutional factors play a critical role in BMI.

How emerging market enterprises and their BMI have been established remains an essential yet underexplored research question.

Moreover, the existing BMI themes are predominantly based on the circumstances in developed economies, with a few exceptions, such as Wu et al. (2019). It is not entirely applicable to emerging economies, especially where market regulations and transaction rules are underdeveloped, but the social power is centralised. There is an ever-increasing need for a new theme of BMI that fits the emerging market where business operations embedded in the theme will ensure the value creation and sustainability of the organisation implementing it (Tsui, 2006; Ghezzi & Cavallo, 2018; Minatogawa et al., 2020).

Given the research gaps, this study seeks to conceptualise the BMI theme and develop the BMI scale of emerging-market enterprises using evidence from Chinese enterprises. Accordingly, our primary research question is: What are the key BMI themes concerning the institutional attributes in emerging markets?

We contribute to BMI literature in this study by (1) conceptualising and examining the concept of ‘contextualisation’ of BMI theme within an emerging-market enterprises context, and (2) developing and validating a scale to improve measurement of BMI themes in the emerging market. We propose that the emerging market institutional context is transferable to the BMI domain and adds a new perspective to existing BMI themes. Responding to calls for contextualization of BMI (Wu et al., 2019; Zott & Amit, 2007; 2008), we propose two primary themes of BMI - pioneering BMI and perfecting BMI, uniquely for emerging market enterprises to create values for the emerging economy context that is also compatible with the wider BMI themes literature. We show empirically that BMI themes in emerging market context uniquely predicts relevant organisational outcomes such as value creation through the coexistence of transactional and institutional

attributes. Finally, we provide practical insights for emerging market enterprises to achieve rapid catch-up and sustained competitive advantage.

The remainder of the paper is structured as follows. We firstly review literature about the transactional and institutional attributes of business models and analyse the impact of the emerging economic environment on the BMI of emerging enterprises. Based on the literature review and the research context, we conceptualise the BMI theme. Conceptualisation provides a research framework regarding concepts involved in the BMI theme and conceptual relationships. Then, we proceed to develop and examine the measurement scale of BMI in the context of the emerging economy through three sequential studies, namely, scale initialisation (study one), scale purification (study two) and scale verification (study three). Finally, we conclude the results and discuss the theoretical contributions and practical implications of the research.

## **2. Theoretical ground and conceptualisation of BMI theme**

Zott and Amit (2010) propose that the business model design follows a two-tier structure between design elements and design themes. The design elements are the components of a business activity system; the design themes are configurations of the design elements, characterising value creation content, structure, governance and the driving force of a business model and reflecting an intrinsically holistic logic of a business model under the specific institutional context (Zott & Amit, 2010; Wu et al., 2019).

### *2.1. Business model elements of BMI theme*

We developed business model elements by following a systematic literature review approach. Using keywords ‘business model\*’, ‘business model innovation’, ‘enterprise model innovation’,

and ‘revenue model\*’, we searched selected eight leading journals in the fields of organisation, management and strategy: Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Journal of Management, Management Science, MIS Quarterly, Organization Science and Strategic Management Journal. This resulted in 156 articles. Further, based on the abstracts, those articles not directly related to the business model were filtered. This resulted in 88 articles. Finally, according to the relevance to thematic perspectives of value creation, 29 business model literature involving hypotheses, propositions and future research directions were selected and analysed accordingly. Table 1 shows the analysis result of six key BMI elements: customer value, market positioning, value network, resource endowment, income model and cost structure. These six BMI elements embody a system of enterprise activities and are associated with the value creation process, the core of BMI themes (Amit & Zott, 2001; Clauss, 2017; Pieroni, McAlloone, & Pigosso, 2019). Referring to Teece’s (2010) BMI as a process of value creation, delivery and capture, and Wu et al.’s (2019) adaptive BMI process of value proposition, value creation, and value capture, we categorised the value creation process into three steps, namely, value proposition, value operation, and value allocation and acquisition. Values are created by changing or configuring the six BMI elements along the value creation process (Table 1). The value proposition is the overall goal; the value operation is the realisation path; the value allocation and acquisition are the final results. The categorisation of the BMI elements into the three-step value creation process enables consistency of the internal BMI elements to contribute to business performance and competitiveness of BMI (Clauss, 2017; Kranich & Wald, 2018; Yang, Evans, Vladimirova, & Rana, 2017).

**[Insert Table 1 about here]**

## *2.2. Transactional and institutional attributes of BMI theme*

From the BMI theme perspective, ‘forms follow meaning’ suggests that value creation, as the core of BMI design themes, ‘makes sense’ of the design elements (Battistella, Biotto, & De Toni, 2012). Value creation activities of an enterprise BMI embody both transactional and institutional attributes (Wu et al., 2019).

From the transactional attribute, BMI is the design and architecture of value creation, delivery and acquisition mechanisms (Teece, 2006; 2010), a systematic set of operational activities (Mansour & Barandas, 2017), and the critical business process of the enterprise (Zott & Amit, 2008). Foss and Saebi (2017) suggest that the fundamental purpose of transactional BMI is to obtain a competitive advantage for enterprises in response to market changes. Zott and Amit (2008) use ‘NICE’ (novel, lock-in, complementary, and efficient) to describe the transactional attributes of BMI where enterprises update the elements of business operation, connecting activities, creating a Schumpeterian innovation of ‘creative destruction’ with novelty, stabilising organisational strategic network with lock-in, anchoring cooperative resources with complementarity, and reducing the cost of exchange between businesses with efficiency. Just by virtue of transactional attributes, enterprises can optimise transaction activities, heterogeneous business resources, and release economic value (Zott & Amit, 2010).

Institutions are referred to as the rules of the game in a society (North, 1990). From the institutional attributes, a business model is a rule-based profit-making system (Prendeville, 2017), which governs the enterprise’s external transactional activities (Snihur & Zott, 2015). By creating a structural shaping effect (Prendeville, 2017), the institutional attributes of a business model bring consistency (internal and external matching) and sustainability (dynamic adaptability) to

companies (Casadesus-Masanell & Ricart, 2011; Geissdoerfer, Vladimirova, & Evans, 2018). Moreover, once the business organisation has acquired conformity with the environment and society (Kraus et al., 2020), the new business model architecture will produce a strong value solidification effect. When organisations recognise the potential benefits of changing existing institutions or innovating new ones, they can create and obtain profitable opportunities by establishing or promoting their rules, values, beliefs, and behaviour patterns (Verganti & Öberg, 2013). The institutions mentioned here refer to government regulations and transactional rules and transactional orders in the emerging market.

Table 2 provides a summary of the transactional and institutional attributes of BMI. Given the combined attributes of BMI, whether a business model innovation can lead to the enterprise's competitive advantage depends not only on its transactional activity system but also on its institutional advantages.

**[Insert Table 2 about here]**

The theme of BMI is the source of value creation (Amit & Zott, 2001; Clauss, 2017), which answers the question of 'how to make money' by orchestrating business model elements and stimulates stakeholders to deliver the organisational value proposition (Battistella et al., 2012; Schiavone, Paolone, & Mancini, 2019). Further, the BMI theme is a product of contextualisation, and different BMI themes express various institutional contexts and market conditions (Zott & Amit, 2007, 2008). The BMI theme should wholly describe the institutional and transactional details in addition to the business model elements (Zott & Amit, 2010). However, the BMI theme in the extant literature is mostly derived from Western practices in a more mature institutional environment, where the transactional attributes of the business model are emphasised, and little literature has focused on the institutional attributes.

Amit and Zott (2001) propose the theme of ‘NICE’, laying the foundation for studying the BMI theme. Zott and Amit (2007) developed the theme scale of novelty and efficiency based on the data of 190 European and American enterprises. By investigating Canada's real estate agents, Osiyevskyy and Dewald (2015) propose exploratory and exploitative business model changes from incumbent enterprises dealing with disruptive innovation; however, this research fails to develop scale. Extant literature (e.g. Zott & Amit, 2007; Cheng, Sun, & Song, 2012; Cui & Jiang, 2013; Nyangon & Byrne, 2018) focuses on studying BMI in transaction activities while ignoring the BMI theme. The BMI theme is essential because it is a component of BMI and a process of institutional meaning construction (Verganti & Öberg, 2013). Current literature on BMI themes has made substantial contributions and also limitations (Table 3).

**[Insert Table 3 about here]**

The theoretical limitations indicated in Table 3 highlight the literature gap, which suggests the research need for the institutional structure to be incorporated in the BMI theme, particularly for emerging market enterprises (Hargadon & Douglas, 2001). Hence, this study conceptualises the BMI theme by highlighting the impact of the institutional context on the thematic BMI design of emerging market enterprises, especially where the social power is centralised, while market regulations and transaction rules are underdeveloped, unlike the context of the developed economy (Zott & Amit, 2008).

The focus on the institutional construction of BMI of emerging market enterprises is associated with the emerging market context. In developed economies such as the United States and Canada, BMI as a ‘disruptive’ entrepreneurial activity changes the current business model and creates new values through rearranging the transactional system with higher value creation (Battistella et al., 2012). However, in emerging markets such as China, emerging enterprises tend to practice

thematic BMI through the institutional construction process (Verganti & Öberg, 2013; Wu et al., 2019).

### *2.3. Emerging market context and BMI theme*

China, as one of the largest global emerging markets, is characterised by vast market size, complete application of new technologies, and a unique economic reform model, described as gradual, decentralisation, experimental, and by the ‘touchstones across the river’ approach; meanwhile, clock-speed accelerating competition and constantly shifting competition focus on determining the unique emerging market context (Wu et al., 2019; Cao, Wang, Berkeley, & Tjahjono, 2021). This is similar to the other emerging markets in a transitional context, where opportunities and institutional constraints coexist (Wright, Filatotchev, & Hoskisson, 2005). Emerging markets such as China provide ‘a unique market-feasible and institutionally legal situation’ for BMI research (Jia et al., 2012). The market-oriented transformation follows the path of exploratory reform, which determines the long-term coexistence, intertwining and evolution of formal and informal systems at various levels (Droege & Johnson, 2007). The ‘disordered state of change’ results in a lack of institutions, inadequate institutional supply and even an extremely imperfect institutional environment, which creates an ‘institutional vacuum’ or ‘institutional defect’ in the market (Li, Guo, & Liu, 2008; Nee & Opper, 2016).

How does the emerging market context affect the BMI theme of emerging market entrepreneurial enterprises, which is different from that of developed economies? Firstly, the changing market environment in China’s economic transformation provides a potential for BMI to identify and develop market opportunities for value creation. The first general transformation is from the seller’s market to the buyer’s market in the market system. Customer value becomes

focused, and therefore market segmentation is more specific, and new value propositions continuously emerge (Yang et al., 2017). Meanwhile, China's introduction of the market system, replacing the planned-economy system, has intensified market competition and deepened multi-level market space (Jia et al., 2012). The market supply and demand situation has rapidly changed. The product cycle is shortened on the supply side, and the economy of scope begins to counter economies of scale. On the demand side, customer demand and service are iteratively updated; customer experience and feedback constantly promote value creation, and new customer value propositions call for new business models (Zott & Amit, 2010; Spieth & Schneider, 2016; Tan et al., 2019). The second general transformation is that cross-border collaboration, via the Internet and technological innovation, has become the new norm of businesses (Mansour & Barandas, 2017; Ghezzi & Cavallo, 2018; Chester et al., 2019), which results in optimising the cost structure, transforming the traditional linear profit model, and making novel value distribution and acquisition possible. From the industrial economy to the Internet era, the transaction time has been expanded; the value chain has been shortened or reconstructed; information asymmetry as a source of profit-making has gradually disappeared (Minatogawa et al., 2020).

Secondly, institutional legitimacy becomes an original driver for emerging market enterprises' BMI (Wright et al., 2005; Snihur & Zott, 2015). BMI is a new organisational system formed by the interaction of internal and external value networks. The new organisational system will impact the original transaction rules and, at the same time, has to be subject to the legitimacy of social norms and cultural cognition (Snihur & Zott, 2015). How to build the legitimacy of BMI? The earlier strategy school of thought regarded legitimacy as the institutional system - the fundamental societal belief, emphasising the regulation, norms and isomorphism of the organisation's environment (DiMaggio & Powell, 1983; Meyer & Scott, 1983). The later strategy school of

thought regards legitimacy as an operational resource extracted from the external environment by organisational managers, who look outward and attach importance to institutional changes (Suchman, 1995; Snihur & Zott, 2015).

Following the later strategy school of thought, the endogenous and organisational initiative recognises that institutions' diversity, conflict, and complexity provide space for choosing and applying dynamic strategies (Zimmerman & Zeitz, 2002; Scott, 2008). Building legitimacy is a strategy incentive responding to institutional constraints (Wu et al., 2019) by creating new market rules for growth and sustainable performance (Suchman, 1995; Zimmerman & Zeitz, 2002). We argue in this study that institutional inadequacies provide attractive opportunities for integrating institutions with a strategic choice for the BMI themes (Peng, 2003). This is a unique aspect of the BMI theme in the emerging market context, different from developed economies.

Thirdly, under the bottom-up institutional path of economic reform, the widespread existence of 'institutional vacuum' and 'institutional defect' is an important feature of the emerging economy different from the mature market in the West (Li et al., 2008). The unique context substantially influences the BMI theme of emerging market enterprises, aiming to change the existing situation to their preferred status (Hargadon & Douglas, 2001). The 'institutional vacuum' and 'institutional defect' in the emerging economic condition provide a huge space for two primary themes of BMI (Li et al., 2008), which are termed pioneering and perfecting BMI in this study. Pioneering BMI aims to identify and establish new market opportunities, and perfecting BMI improves existing ones. 'Institutional vacuum' refers to the situation that the current institutional system has not yet been established, and it lacks rules, regulations and legislations (Li et al., 2008). The institutional vacuum provides an excellent opportunity for pioneering BMI by those organisations with explorative competence, preconceived ideas and a preference for a 'winner-takes-all' first-mover

advantage. 'Institutional defect' represents the failure of the existing institutional system to regulate normative economic activities and even plays a barrier role (Peng, 2003; Li et al., 2008). This provides a great opportunity for perfecting BMI by those organisations with powerful insights, unwilling to fall behind and good at exploitative innovation, to catch up with the competitors.

Drawing on BMI theoretical ground and the unique emerging market context, we propose in this research that pioneering BMI and perfecting BMI are the two primary themes of BMI, uniquely for emerging market enterprises to create values. A detailed thematic comparison of pioneering and perfecting BMI follows.

#### *2.4. Thematic comparison of pioneering and perfecting BMI*

Table 4 provides a thematic comparison of perfecting and pioneering BMI. The pioneering BMI acts on the transaction system vacuum, hunting for customers' hidden needs, forecasting the market, reconstructing or creating new transaction structures, and transaction rules through BMI, thus leading the market behaviour. Specifically, pioneering BMI has the following elements and themes: (1) Customer value. Pioneering BMI focuses on the potential needs of customers, providing customers with differentiated products (or services) and customer experience (Visnjic, Wiengarten & Neely, 2016; Tan et al., 2019). Information communication technology (ICT) and digital technologies have facilitated entrepreneurial pioneers to create new rules and seek value creation opportunities through pioneering BMI (Spieth & Schneider, 2016; Prendeville, 2017; Li & Tan, 2019; Rachinger et al., 2019). (2) Market positioning. Pioneering BMI proactively anticipates the market and breaks the conventional way to discover new opportunities and explore new markets (He & Wong, 2004). Usually, they first occupy the cognitive space of customers to

establish a good reputation, brand image and gain a strong competitive advantage (Martins, Rindova, & Greenbaum, 2015). (3) Value network. Pioneering BMI actively builds up cooperative innovation networks, aiming to create an interactive upstream and downstream industry chain or a delicate business ecosystem of stakeholders (Osiyevskyy & Dewald, 2015; Schiavone et al., 2019). (4) Resource endowment. Pioneering BMI is creatively looking for sources of technology and creativity (Subramaniam & Youndt, 2005; Saebi & Foss, 2015; Sorescu, 2017) to consolidate value networks further and lead to novel transaction mechanisms consistently (Paiola, Schiavone, Grandinetti, & Chen, 2021). (5) Income model. Pioneering BMI breaks the rules of existing games and prefers products or service development projects with higher risk and higher return opportunities (Christensen, 2006; Visnjic et al., 2016). Therefore, the enterprises pioneer new profit models or more revenue channels and sources. (6) Cost structure. Pioneering BMI integrates external assets and establishes better operating cost-sharing and revenue sharing mechanisms with partners (He & Wong, 2004; Nyangon & Byrne, 2018), and the overall asset turnover is fast.

In contrast, perfecting BMI acts on the defects of the existing transaction system by paying attention to customers' precise needs and responding to the market quickly (Tan et al., 2019). Perfecting BMI improves market behaviour by adjusting and optimising the existing transaction structure and transaction rules through BMI. The pioneers are not always the most profitable organisations in innovation. In the case of easier imitation, dynamic market, weak intellectual property protection, and immature transaction mechanisms, perfecting innovators may learn from the mistakes made by the pioneers (Chung & Tan, 2017). Using the pioneers' capital and knowledge spillover effects (Haunschild & Miner, 1997; Ghezzi & Cavallo, 2018), perfecting BMI achieves business growth at a much lower cost than the pioneering enterprise. Specifically, the perfecting BMI shows the following elements and themes. (1) Customer value. Perfecting BMI

focuses on customer needs (Narver, Slater & Maclachlan, 2004), paying more attention to the operation of more mature products or services (Subramaniam & Youndt, 2005), and continuously improving and optimising products or services (He & Wong, 2004; Visnjic et al., 2016; Li & Tan, 2019). (2) Market positioning. Perfecting BMI adapts to market behaviour (He & Wong, 2004), aiming to follow the leaders in the market, improve the incompleteness of transactions, continuously consolidate and expand the market scope, and steadily cultivate their competitive advantage. (3) Value networks. Perfecting BMI integrates into external collaborative innovation networks (Narver et al., 2004) and systematically and frequently monitors stakeholders (Subramaniam & Youndt, 2005; Paiola et al., 2021) to adapt to new operational processes, practices and norms. (4) Resource endowment. Perfecting BMI optimises the transaction process and product knowledge and technology (Osievskyy & Dewald, 2015; Li & Tan, 2019). It provides services to stakeholders in the value network by utilising their complementary assets (Kim & Min, 2015; Paiola et al., 2021) and gradually achieves a leadership position in the industry. (5) Revenue model. Perfecting BMI seeks improvement in stability, engages in low-risk projects, receives a relatively fixed source of income, and obtains a stable profit. (6) Cost structure. Perfecting BMI strives to make transactions more transparent and services more efficient (Zott & Amit, 2007; Nyangon & Byrne, 2018; Tan et al., 2019), thereby reducing transaction costs and making the transaction scale more malleable.

**[Insert Table 4 about here]**

### **3. Scale development and validation procedure**

Although scale development methods have been discussed in the literature, the key steps are similar and less controversial (Yu, Zhao, & Fan, 2019). In this study, we follow Churchill's scale development steps (Churchill, 1979). After conceptualising the BMI theme, we conducted three sequential studies to develop the BMI scale for emerging market enterprises. Study one was to develop the initial scale. In study two, an exploratory analysis was conducted to purify the scale and revise the measurement items. In study three, we performed a confirmatory study to validate the scale. In the following sections, we provide details on the entire process and criteria used at each stage of the development.

#### *3.1. Study one: Scale initialisation*

##### **3.1.1. Preliminary items generation**

The preliminary generation of items was developed in study one by following two steps. Step one was to generate initial items pool measuring BMI from the extant literature: Nine items measuring perfecting BMI and eleven items measuring pioneering BMI (Table 5). Due to the identified literature gap that most BMI literature is based on developed markets, we designed step two to ensure that BMI indicators from step one of the literature deduction were relevant to the BMI of emerging market enterprises. Through semi-structured interviews with six industrial experts, we also explored new items pertinent to the emerging market context in this step.

Referring to Wright et al. (2005) and Li et al. (2008), we define emerging market enterprise in this research as a relatively young business organisation that has already experienced some years of growth and is still at growth-seeking stage (Covin & Slevin, 1990). From February to March

2018, we conducted six face-to-face interviews with entrepreneurs and founders of six emerging enterprises founded in the last eight years. These companies were mainly involved in e-commerce, network technologies, artificial intelligence, online education, software development, and automation businesses. The interview questions and objectives of the interviews are summarised in Appendix A.

We obtained an in-depth understanding of both pioneering and perfecting BMI through content analysis of the notes taken from the interviews. The two terms and categories, i.e. pioneering and perfecting BMI, were regarded as closely relevant to and coexisting in the emerging enterprises' BMI. Furthermore, it was confirmed by the interviewees that the six BMI indicators fit the scenario of emerging enterprises and are suitable for the market scenario - transforming and evolving towards a market economy. This view is consistent with similar studies, e.g., studies on dual innovation models in complementary relationships (Zott & Amit, 2007; Osiyevskyy & Dewald, 2015). Adjustments were made to the measurement questionnaire items based on the interviews. We revised the phrasing of scale items to ensure clarity of expressions and conformance with business jargon. Redundant and inappropriate items were also removed from the scale. We also added new items based on the interviews. For the pioneering BMI section, we added two new items 'various own marketing channels different from other competitors in the industry' and 'prefer projects with higher risk and higher return opportunities'. For the perfecting BMI section, we added three more items 'tend to follow the innovation of market leaders, in terms of market development', 'persist allocation of human, financial and material resources within the existed strategic framework', and 'prefer low-risk projects' (Table 5).

**[Insert Table 5 about here]**

### **3.1.2. Assessment of candidate items**

The primary purpose of inviting academic scholars and subject experts to assess the candidate items was to ensure the content validity of the measurement tools (Churchill, 1979). In addition to the two research investigators, we invited one professor in strategic management, one associate professor in entrepreneurial management, and two PhD candidates in business management to assess the measurement scale and further improve its content validity. They compared the definition and measurement items of measured constructs and made judgements on the following three aspects. Is the measurement item redundant? Does the measurement item correspond to the construct definition? Does the measurement item cover the measurement scope? The experts evaluated each item one by one, and only if four out of six of the experts agreed was the item retained for the next stage. Based on the experts' assessments, we also merged, revised, and deleted specific scale questions. For instance, we removed one item measuring pioneering BMI (i.e. '*good at integration and utilisation of external assets, with overall asset turnover being fast*') and two items from the perfecting BMI scale (i.e. '*own relatively fixed income sources and stable revenue*' and '*enable transactions to be malleable*'). This resulted in a 21-item scale, including eleven items on pioneering and ten items on perfecting BMI.

## *3.2. Study two: Scale purification*

### **3.2.1. Sample and data**

We conducted the first questionnaire survey from April to May 2018 to explore the thematic dimensions and purify the scale. It was administered by email to 270 emerging enterprises in the science parks and development zones of Beijing, Shenzhen, Nanjing and Ningbo, representative cities in northern, southern, and eastern China. From 248 collected copies, we excluded those enterprises whose ages were less than one year and more than eight years (Covin & Slevin, 1990; Wright et al., 2005), those who did not consistently engage, and those with completion rates less than 75%. Eventually, 162 valid questionnaires were used for statistical analysis. Among the

sample, 87.5% of the emerging enterprises have fewer than 100 employees; 9.5% have more than 100 and less than 500 employees; only 3% have more than 500 employees. The sample details are shown in Table 6.

**[Insert Table 6 about here]**

### **3.2.2. Exploratory factor analysis**

SPSS software was used for exploratory factor analysis (EFA). First, we performed the item-to-total of the initial scale. According to the result, the item ‘prefer low-risk projects’ was removed from the perfecting BMI since its CITC (Corrected Item-Total Correlation) value (i.e. 0.371) was lower than the defined threshold value of 0.4 (Hair, 2010). Next, we performed EFA with the remaining 20 items. The MSA (measure of sampling adequacy) value of the 20 items in the KMO (Kaiser-Meyer-Olkin) test was 0.885 (>0.7), and the chi-squared value for Bartlett’s test of sphericity was 2091.983 ( $p < 0.01$ ), indicating sampling adequacy for factor extraction.

The principal component analysis was used for the factor analysis. Based on an eigenvalue greater than one and varimax rotation, we obtained three factors. Among these factors, the third factor had only one item, namely ‘*prefer projects with higher risk and higher return*’, significantly different from the other items. We decided to remove this item.

We then employed the same steps and ran the second, third, and fourth EFA. Two factors were obtained from the second EFA. However, the item ‘*share operating costs and common benefits with partners*’ was removed due to cross-loadings (0.568 and 0.506). In the third and fourth EFAs, we released two other items with cross-loadings— ‘*make transactions more transparent and reduce transaction costs*’ (0.490 and 0.516) and ‘*own more revenue sources and innovative profit models compared with its peers*’ (0.670 and 0.480).

The final result was obtained after the fifth EFA, giving 16 remaining items (Table 7). The corresponding factor loadings of the two factors were all above 0.495 (>0.4). The eigenvalues of factors 1 and 2 were 5.234 and 4.223, respectively. The cumulative variance contribution rate of the two factors was 59.104% (>50%).

**[Insert Table 7 about here]**

In Table 7, we can see that the Cronbach's  $\alpha$  values of the two factors were greater than 0.7 (0.916 and 0.866), suggesting that the factors extracted have good internal consistency and that the measurement items converge to the corresponding factors as expected.

### *3.3. Study three: Scale validation*

Study three was to validate the scale through confirmatory factor analysis (CFA). That is to test the independence and validity of the scale extracted from the EFA and examine its explanatory power of the thematic practices of BMI of emerging market enterprises.

#### **3.3.1. Data collection**

Using the same survey instrument as in Study Two, we collected additional data from June to August 2018. Data collection was provided by a professional data service company in China. From the database, 648 eligible companies were randomly contacted for the survey, and 536 copies were returned, including 378 valid questionnaires. The effective response rate of the questionnaire was 58.3%. Within the sample, 89.2% of the emerging enterprises have fewer than 100 employees; 9% have between 100 and 500 employees; 1.8% have more than 500 employees. The number of questionnaires issued, the area and the randomness of distribution, and the industry categories

involved made this additional sample more representative than the first sample. See Table 7 for the comparison of the two survey samples.

### **3.3.2. Reliability and validity test**

To validate the factors generated by the EFA process, we collected an additional dataset with the 16 questionnaire items obtained from the EFA process, resulting in a sample of 378 observations (Table 7). Amos software was used for the analysis. Figure 1 shows the test results.

The absolute fit indices for the model are acceptable, e.g.,  $X^2=208.581$ ,  $df=91$ ,  $X^2/df=2.292$  ( $>2$ , and  $<5$ ),  $RMSEA=0.059$  ( $<0.08$ ), and  $GFI=0.935$  ( $>0.9$ ). The relative fit indices, e.g.,  $IFI=0.972$  ( $>0.9$ ),  $NFI=0.952$  ( $>0.9$ ),  $RFI=0.937$  ( $>0.9$ ), and  $CFI=0.972$  ( $>0.9$ ), and the parsimony fit indices, e.g.,  $PGFI=0.626$  ( $>0.5$ ) and  $PNFI=0.722$  ( $>0.5$ ), are satisfactory (Hair, 2010). These results show that the two thematic dimensions of BMI of emerging enterprises had good construct validity in the emerging economic situation. A significant correlation existed between the two factors; the model's goodness of fit was satisfactory, and the model had parsimony. Therefore, the thematic measurement model was satisfactorily validated.

**[Insert Figure 1 about here]**

To obtain better practical applicability, we further validated the thematic measurement model. We conducted validity testing on the second batch of 378 samples. Table 8 shows the results. The Cronbach's  $\alpha$  values for pioneering and perfecting BMI were 0.930 and 0.915, respectively—far higher than the critical value of 0.7 (Hair, 2010). The scale measurement model thus had good reliability and internal consistency. Also, Figure 1 shows that all loadings were above 0.6 ( $>0.5$ ). Factor loadings for pioneering BMI ranged from 0.71 to 0.85, and factor loadings for perfecting BMI ranged from 0.63 to 0.80. The corresponding CRs (critical ratios) of the path coefficients

were all greater than 3.29 and passed the significance test at the level of  $p < 0.001$ . The composite reliabilities of the two latent variables were 0.927 and 0.912 ( $> 0.6$ ), respectively. Thus, the scale had good convergent validity, and the model had ideal internal quality.

From the known factor loadings in the structural equation, we could calculate AVE (average variance extracted) to carry out the discriminant validity test (Klein, 2010). After calculation, the AVEs for pioneering and perfecting BMI were 0.616 and 0.568, respectively—both higher than the threshold value of 0.5. Also, the two latent variables had a significant correlation, and the correlation coefficient was 0.702. Table 8 shows the details. Following Fornell and Larcker's (1981) criterion, if the square root of the AVE is greater than the correlation coefficients in all rows and columns, the variables have good discriminant validity.

**[Insert Table 8 about here]**

#### **4. Discussion**

This paper conceptualises the BMI theme of enterprises in the context of transformational emerging economies. It uses two sets of independent sample data for EFA (exploratory factor analysis) and CFA (confirmatory factor analysis). The results show that BMI in emerging economies includes two thematic dimensions: pioneering BMI and perfecting BMI. The two thematic dimensions have good reliability and validity in the overall structure. The two themes can better explain the BMI activities of emerging market enterprises in transformational emerging economies.

#### *4.1. Theoretical contributions*

The research made several theoretical contributions to BMI. Firstly, this paper draws attention to the role of the institutional context in the emerging market as an understudied perspective in BMI research. We advanced literature on the contextualisation of BMI (Wu et al., 2019; Zott & Amit, 2007) and the BMI of Chinese emerging enterprises in particular (Li et al., 2008). Scholars have pointed to the need to deepen understanding of institutional contexts to extend existing BMI themes and reveal alternative explanations (e.g., Zott & Amit, 2010; Wu et al., 2019). For example, Hossain (2017) has recently called for theories to reflect BMI in emerging market contexts better. We have begun to answer these calls by highlighting the impact of the institutional context on the thematic BMI design of emerging market enterprises by developing and validating a scale to improve BMI themes' measurement in emerging markets. Our study responds to the Previous studies have focused on developed economies like United States, Canada and Western Europe with the assumption that market regulations and transaction rules are well developed and that BMI is seen as a 'disruptive' entrepreneurial activity. It was also assumed that BMI could change the existing business model and create new values by rearranging the transactional system with higher value creation (Battistella et al., 2012). However, in emerging markets like China, where market regulations and transaction rules are underdeveloped and social power is centralised, BMI practices could not be fully understood with the existing transaction-based BMI theory.

The thematic design of 'pioneering' and 'perfecting' BMI developed in this study contribute to a better understanding of BMI in emerging markets. The pioneering BMI acts on the transaction system vacuum, hunting for customers' hidden needs, forecasting the market, reconstructing or creating new transaction structures, and transaction rules through BMI, thus leading the market

behaviour (Nee & Opper, 2016). The perfecting BMI acts on the defects of the existing transaction system by paying attention to customers' precise needs and responding to the market quickly. The two themes of BMI may also provide direction for the thematic BMI of emerging enterprises (Saebi & Foss, 2015).

Secondly, this study contributes to the literature on institutional legitimacy (e.g., Wright et al., 2005; Snihur & Zott, 2015). We highlight in this study that pioneering and perfecting BMI is an organisational process of institutional legitimacy (Wu et al., 2019), and legitimacy is a kind of operational resource extracted from the external environmental constraints. Institutional constraints of 'institutional vacuum' and 'institutional defect' in the emerging market provide the original trigger and situational opportunity for pioneering and perfecting BMI themes. As an architecture across organisational boundaries, the business model, with transactional and institutional attributes coexisting, is a transactional structure connected by value proposition, value operation, and value acquisition and an institutional arrangement of stakeholder relationships.

Finally, this paper adds a new perspective to BMI theory by developing and validating a sixteen-item scale to measure 'pioneering' and 'perfecting' within an emerging-market context. The empirical results show that BMI themes in the emerging-market context uniquely predict relevant organisational outcomes such as value creation through the coexistence of transactional and institutional attributes. We conclude that the scale satisfies all criteria for newly developed construct measures and extend the original theme scale based on the developed Western economies. The newly developed and validated scales are suitable for the emerging market context.

#### *4.2. Practical implications*

Firstly, our research suggests that the BMI of emerging market enterprises should strengthen institutional interaction to achieve both transactional innovation and institutional legitimacy. The simultaneous act on innovation development and legitimacy building will be conducive to enhancing enterprises' transactional competition and institutional advantages.

Secondly, the theme and element layers of business model design provide latecomers with operational guidance on designing value creation, positioning the market, and building value networks and resources. Moreover, the pioneering and perfecting BMI themes can explain emerging market enterprises' BMI practices in the context of an emerging economy. Hence, it provides a guideline for the BMI practice of emerging enterprises.

Thirdly, entrepreneurs should consider pioneering and perfecting BMI themes according to local conditions. A pioneering or perfecting BMI theme is vital in motivating stakeholders and developing organisational strategy in BMI (Battistella, 2012). Through pioneering BMI and the first-mover advantage, new transaction rules can be constructed 'from scratch' for the enterprises to gain the initiative to develop and occupy the competitive position of 'winner-takes-all'. Unlike that of the pioneering BMI, through perfecting BMI enterprises receive the latecomer advantage. They can optimise existing transaction rules to grow rapidly at a much lower cost than the pioneers.

#### *4.3. Limitations and future research*

This paper has a few limitations, which could be further explored and examined in future research. First, we only adopted cross-sectional data in terms of sampling, and BMI dynamics remain open for future study. Secondly, we focused on emerging enterprises in China. A

comparative study on BMI practices with emerging enterprises in other emerging markets would be another research direction in the future, as their social and institutional aspects might exhibit significant differences. Finally, successful BMI needs internal leadership and management of a business model development process (Ebel, Bretschneider, & Leimeister, 2016), the collaboration between participants and multi-stakeholders for value co-creation (Schiavone, Mancini, Leone, & Lavorato, 2021), and organisations' cultural embracement of business model change (Chesbrough, 2010). This will be another interesting future research direction. We, therefore, call for more and relevant empirical studies on this aspect.

## **5. Conclusions**

Business model innovation (BMI) is an important carrier for the rapid growth of emerging market enterprises. Yet, the role of the institutional perspective on BMI themes in predicting relevant organisational innovation practices in emerging market contexts has received little attention in the literature. We conceptualised two BMI themes in this context – ‘pioneering’ and ‘perfecting’ BMI. Further, we developed and validated a sound measure for these two BMI constructs. The study unveils how severe institutional constraints motivate emerging market enterprises to cope with the institutional voids and initiate institutional reform through the thematic design of BMI, and finally, to achieve both transactional innovation and institutional legitimacy. Hence, this study made a significant contribution to the theory of BMI themes.

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## Appendix A. Interview questions and purpose

Interview questions	Purpose
<p><b>General questions:</b></p> <p>What do you think business model innovation is?</p> <p>What BMI has your company experienced in the past few years?</p> <p>Do you consider the BMI of your company to be high or low in terms of the aggressiveness of the innovation?</p> <p>Does this innovation involve internal collaboration or an external network? How?</p> <p>Do you view this as the passive perfecting type or the active pioneering type of market rules? Why?</p>	<p>Interviewee's understanding of BMI;</p> <p>Interviewee's awareness of the perfecting vs pioneering types of BMI</p>
<p><b>Specific questions:</b></p> <p>In what kind of products or services does your company provide value to your customers?</p> <p>Does your company tend to open up new markets in unconventional ways or follow the innovation of market leaders? Why?</p> <p>Does your company tend to build a business ecosystem or integrate into the external innovation cooperation network? How if yes?</p> <p>Does your company prefer to develop new technologies and resources creatively or continually optimise existing processes and technologies? Why?</p> <p>Does your company prefer projects with higher risk and higher return or low-risk projects with a relatively fixed income? why</p> <p>Does your company tend to integrate and utilise external assets or make transactions more transparent? Why?</p>	<p>Relevance of the indicators; new items.</p> <p>Customer value</p> <p>Market positioning</p> <p>Value network</p> <p>Resource endowment</p> <p>Revenue model</p> <p>Cost structure</p>

NOTE: We aimed to learn from the general questions about entrepreneurs' understanding of the BMI concept and their awareness of the perfecting vs pioneering types of BMI. From the specific questions, we wanted to know the relevance of the six BMI indicators (e.g., customer values, market positioning, value network, resource endowment, revenue model, and cost structure) to the companies' BMI.

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**Table 1**

Value creation process and BMI elements.

Value-creation process	Coded BMI elements	Primary code	Frequency of primary codes
Value proposition	Customer value	Users' satisfaction, customer value(s), value proposition, value positioning, customer relations, customer information, insight needs, products and services, customer interface, customer knowledge management, value content, value embodiment, transfer benefits, customer value, benefit plate rules, consumption experience	41
	Market positioning	Market segmentation, customer group, competitive strategy, strategic objectives, market opportunities, distribution channels, positioning plate rules, network positioning, competitive positioning, specialisation or diversification	19
Value operation	Value network	Value structure, value network, value network rules, partner network, internal value chain, external value chain, value chain, value curve, pipelines, transfer value, potential economic value	35
	Resource endowment	Resource plate rules, key resources, enterprise operating resources, resources/assets, complementary resources, strategic resources, resource utilisation speed, resource mode, operational activities	28
Value allocation and acquisition	Revenue model	Revenue model, revenue source, revenue sector rule, profit model, revenue-driven, pricing method, sales volume or marginal product price, premium, sales revenue, revenue stream, sales method, profit model, financial aspect, profit, social profit, environmental profit, profit potential, profit sharing	40
	Customer structure	Cost structure, cost layout, explicit cost, capital used, cost structure rules, cost allocation, marginal cost, profit barrier, cost control	25

**Table 2**

Transactional and institutional attributes of BMI.

Attribute perspective	Transactional Attribute	Institutional Attribute
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System	transactional activity system (Zott & Amit, 2010)	institutional rules system (Prendeville, 2017)
Nature	novelty, lock-in, complementarity, efficiency (Amit & Zott, 2001)	consistency, sustainability (Casadesus-Masanell & Ricart, 2011)
Value	value creation by innovating transactions (Zott & Amit, 2008)	value creation by establishing or promoting institutional rules (Snihur & Zott, 2015)
Motivation	to unleash economic value (Amit & Zott, 2001; Clauss, 2017)	to overcome and mitigate institutional constraints (Wu et al., 2019)
Carrier	transactional innovation in the operational business process (Mansour & Barandas, 2017)	institutional innovation in developing and improving institutional rules (Bolton & Hannon, 2016)
Purpose	to link activity units and gain a competitive advantage (Foss & Saebi, 2017)	to obtain benefits of changing existing institutions or innovating new ones (Verganti & Öberg, 2013)

**Table 3**

Review of BMI themes.

BMI themes	Key work	Theoretical contributions	Theoretical limitations
Novel BMI, Lock-in BMI, Complementary BMI, Efficient BMI	Amit & Zott (2001) Zott & Amit (2007)	A business model is an architectural design that depicts transaction content, structure and governance. The four themes of 'NICE' are all designed from the source of value creation, with novelty focusing on Schumpeterian innovation, efficiency on reducing transaction costs, complementarity on anchoring resource base and lock-in on stabilising the strategic network.	The research sample and data are from European and American firms. The BMI scales developed include only novelty and efficiency.
Licensing orientation BMI, Integration orientation BMI	Teece (2006)	Dominant design, appropriability regime, and complementary assets are essential components of profiting from the innovation framework. According to the boundary difference of the firm activity system, Teece proposes licensing orientation and integration orientation BMI. Licensing orientation refers to focusing on R&D and authorising other firms to use; Integration orientation means using complementary assets.	The research focuses on European and American technology firms, and the business model design is regarded only as a means of technology realisation.
Driving-market	Cui & Jiang	Based on the market-oriented theory, they propose	The research highlights

BMI, Market-driven BMI	(2013)	market-driving and market-driven BMI, which is used to answer whether firms participate in the market actively or passively.	the role of the external market but ignores the institutional attributes of BMI.
Technology- theme BMI, Method-theme BMI	Cheng et al. (2012)	Technology-theme and method-theme BMI are proposed to deal with the backward state of Chinese firms in the global competition. Technology-theme mode aims to eliminate the disadvantage of production technology, and method-theme mode seeks to eliminate backward business methods.	They emphasise operational effects but set a technology theme against a method theme.
Explorative BMI, Exploitative BMI	Osiyevskyy & Dewald (2015)	Incumbent firms consider adapting to emerging disruptive innovation and that perception of threats and opportunities is the primary driver of change and proposes explorative and exploitative BMI. Explorative BMI means adopting new methods and changing old practices; exploitative BMI refers to incremental innovation, integrating new business or spin-off from the original organisation.	The research sample is from Canadian real estate agents, and there is no scale development. Explorative and exploitative BMIs are measured by indicators in terms of intermediary company expenses.
Closed BMI, Open BMI	Saebi & Foss (2015)	In the context of open innovation strategy, they put forward closed and open BMI. Closed BMI focuses on single firm and financial resources, and innovation cognition is limited to the inside of a firm. Open BMI focuses on multiple entities, with innovation cognition across the boundaries of firms.	There is no scale development, and institutional attributes of a business model are not considered in this research.
Monocentric BMI, Polycentric BMI	Nyangon & Byrne (2018)	This study proposes monocentric BMI and polycentric BMI. Monocentric BMI is a government-regulated, vertically integrated, asset-driven innovation, and polycentric BMI is a value-added and service-driven innovation with utility modernisation and polycentric governance.	The research emphasises the role of the value network, and the institutional attributes of a business model are not considered.

**Table 4**

Comparison between pioneering and perfecting BMI.

Element	Pioneering BMI	Perfecting BMI
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	Functional interpretation	Sense transfer	Functional interpretation	Sense transfer
Customer value	focus on potential customer needs	innovate the new customer experience	focus on the explicit needs of customers	improve customer experience
Market positioning	forward-looking foresight	market leader	adaptive adjustment of market behaviour	market follower
Value network	actively build a cooperative innovation network	network builder	integrate complementary assets into external innovation networks	network integrator
Resource endowment	create new knowledge or technology	resource exploration	optimise existing knowledge or technology	resource utilisation
Revenue model	projects that favour higher returns opportunities	high-income growth	less risky projects	steady income growth
Cost structure	good at integrating external assets	open and share costs	good at using internal assets	close and reduce costs

**Table 5**

Preliminary BMI items for emerging market enterprises.

Theme & Definition	Indicator	Measurement Item	Reference
Pioneering BMI	Customer value	Provide customers with distinctive and novel products, services or information	Ami & Zott, 2007
Focus on customers' hidden needs, reconstructing or establishing the transaction structure and transaction rules by innovative means through the foresight of the market to innovate new market behaviours.	Market positioning	Bring customers unprecedented, unique, easily perceived value Discover new opportunities and open up new markets in unconventional ways	Narver et al., 2004 He & Wong, 2004
	Value network	Various own marketing channels that are different from other competitors in the industry Build a business ecosystem of benign interaction between stakeholders, and play a central role in it	*new Osiyevskyy & Dewald, 2015
	Resource endowment	Dominate the novel transaction mechanism (such as coordination, reward, or punishment etc.) to construct new operational processes, practices, and norms in the business model Creatively seek technology or sources to develop new resources and capabilities	Amit & Zott, 2007 Subramaniam & Youndt, 2005

		Obtain more new ideas and patents through this business model	Saebi & Foss, 2015
	Income model	Prefer projects with higher risk and higher return opportunities	*new
	Cost structure	Own more revenue sources and innovative profit models compared with its peers	Christensen, 2006
	Cost structure	Good at integration and utilisation of external assets, with overall asset turnover being fast	Nyangon & Byrne, 2018
		Share operating costs and common benefits with partners	He & Wong, 2004
Perfecting BMI	Customer value	Emphasise on perfecting innovation of products or services	Subramaniam & Youndt, 2005
Focus on customers' exact needs, adjusting and optimising the existing trade structure and trade rules by innovation means to change existing market behaviours adaptively through the rapid response of the market.		Often improve the main product or service, to better meet customer needs	He & Wong, 2004
	Market positioning	Tend to follow the innovation of market leaders in terms of market development	Entrepreneur interviews
		Regularly consolidate and expand marketing channels in existing markets	He & Wong, 2004
	Value network	Try to integrate into the external innovation cooperation network with remedial assets	Narver et al., 2004
		Systematically and frequently monitor the satisfaction of transaction partners to serve them better	Subramaniam & Youndt, 2005
	Resource endowment	Continuously optimise existing processes, knowledge and technologies	Osiyevskyy & Dewald, 2015
		Persist allocation of human, financial and material resources within the existing strategic framework	*new
	Income model	Prefer low-risk projects	*new
		Own relatively fixed income sources and stable revenue	He & Wong, 2004
	Cost structure	Make transactions more transparent and reduce transaction costs	Nyangon & Byrne, 2018
		Enable transactions to be malleable	Amit & Zott, 2007

Note: \*New items are originally generated for this study based on interviews with industrial experts.

## Table 6

Descriptive statistics of two datasets.

Index	Study two sample (n=162)			Study three sample (n=378)		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Enterprise age	1	8	5.32	1	8	5.16
Working years	1	8	3.01	1	8	3.24
Business category	Frequency	Percentage		Frequency	Percentage	
Agriculture	0	0		12	3.17%	
Mining	0	0		2	0.53%	
Manufacturing	52	32.10%		104	27.51%	
Medical	10	6.25%		33	8.73%	
Construction	0	1.23%		5	1.32%	
Finance	8	4.94%		18	4.76%	
IT	88	54.32%		168	44.44%	
Wholesale and retail	2	1.23%		26	6.88%	
Other Services	2	0		10	2.65%	

Note: The two datasets were collected separately for study two and study three in this research. For the convenience of comparison, descriptive statistics of the two datasets are put together in this table.

**Table 7**

Exploratory factors analysis for BMI themes.

Items of thematic dimensions for BMI in the emerging economy	Factor loading	
	Factor 1	Factor 2
Pioneering BMI (Cronbach's $\alpha=0.916/0.930$ ; AVE=0.616)		
BMI1_1: Provide customers with distinctive and novel products, services or information	<b>.779</b>	.118
BMI1_2: Bring customers unprecedented, unique, easily perceived value	<b>.765</b>	.066
BMI1_3: Discover new opportunities and open up new markets in unconventional ways	<b>.808</b>	.202
BMI1_4: Own various marketing channels different from other competitors in the industry	<b>.771</b>	.364
BMI1_5: Build a business ecosystem of benign interaction between stakeholders, and play a central role in it	<b>.684</b>	.330
BMI1_6: Dominate the novel transaction mechanism to construct new operational processes, practices, and norms in the business model	<b>.771</b>	.166

BMI1_7: Continuously searching for sources of technology or creativity and developing new resources and capabilities	<b>.765</b>	.194
BMI1_8: Obtain more new ideas and patents through this business model	<b>.756</b>	.248
Perfecting BMI (Cronbach's $\alpha=0.866/0.915$ ; AVE=0.568)		
BMI2_1: Emphasise on perfecting innovation of products or services	.127	<b>.748</b>
BMI2_2: Often improve the main product or service to meet customer needs better	.254	<b>.730</b>
BMI2_3: Tend to follow the innovation of market leaders in terms of market development	.305	<b>.495</b>
BMI2_4: Regularly consolidate and expand marketing channels in existing markets	.282	<b>.710</b>
BMI2_5: Try to integrate into the external innovation cooperation network with remedial assets	.308	<b>.755</b>
BMI2_6: Systematically and frequently monitor the satisfaction of transaction partners to serve them better	.394	<b>.649</b>
BMI2_7: Continuously optimise existing processes, knowledge and technologies	.238	<b>.697</b>
BMI2_8: Persist in the allocation of human, financial and material resources within the existed strategic framework	.079	<b>.691</b>
Eigenvalue	5.234	4.223
Variance explained (accumulated %)	32.712	59.104

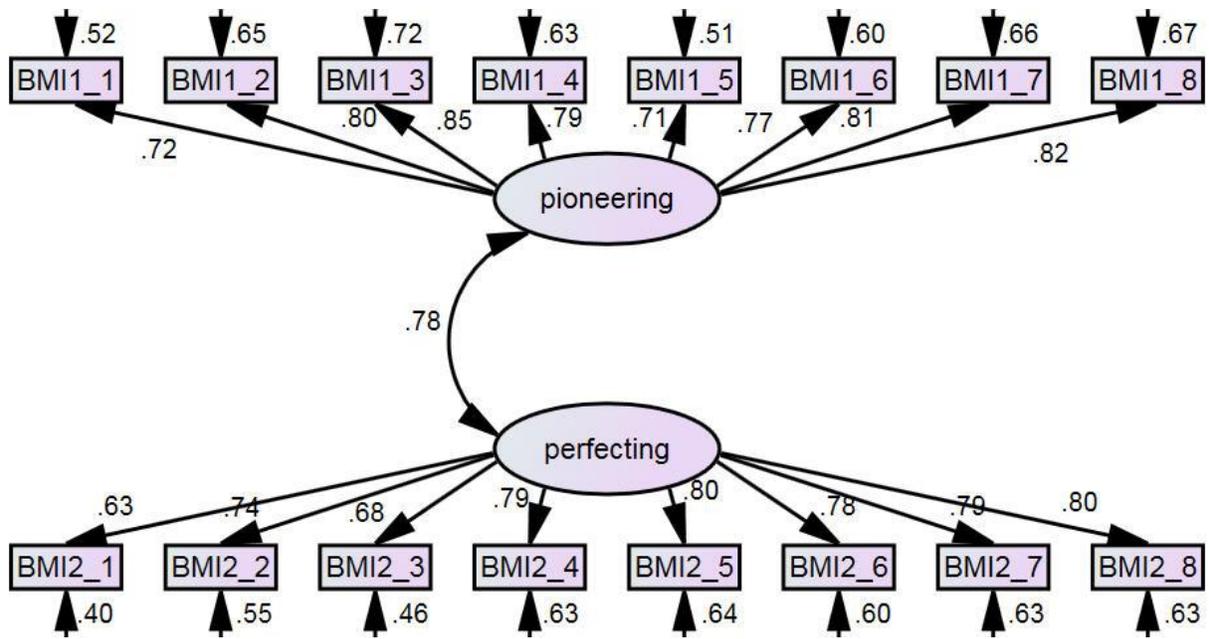
Note: Principal component analysis (PCA) was used to extract the factors, and varimax rotation was conducted. For the convenience of comparison, there are two Cronbach's  $\alpha$  values, representing the reliability values in the two surveys; AVE is the statistical value of the second survey.

### Table 8

Correlation coefficients and descriptive statistics.

	Mean	Standard deviation	1	2
1. Pioneering business model innovation	4.56	1.12	(.785)	.702**
2. Perfecting business model innovation	5.00	0.95	.702**	(.754)

Note: n=378; \*\*  $p<0.01$ , \* $p<0.05$ . The values in parentheses are the square roots of the AVE.



**Fig. 1.** CFA (confirmatory factor analysis) of the measurement models.