Averting risk or embracing opportunity? Exploring the impact of ambidextrous capabilities on innovation of Chinese firms in internationalization

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Yu Zhou
Department of Organization and Human Resource, Renmin University of China, Beijing, China
Lu Lu
Department of Economics and Business Organization, Renmin University of China, Beijing, China, and
Xiaoxi Chang
Department of Economics and Business Organization, Rey Juan Carlos University, Madrid, Spain

Abstract

Purpose – The purpose of this paper is to examine the impacts of ambidextrous capabilities, explorative capability and exploitative capability on product innovation performance in the context of internationalization and cross-cultural environment; and to examine the moderating effects of CEO's preference of risks and opportunities in the international market on the relationship between ambidextrous capabilities and multinational enterprises' (MNEs) product innovation performance.
Design/methodology/approach – Data were collected from 189 MNEs located in China, which develop international business through export, outsourcing, foreign equity investment or foreign direct investment. Measurement reliability and validity were examined and hierarchical linear regression was used to test the hypotheses.
Findings – Results indicated that both explorative and exploitative capability are positively related to MNEs' new product development and commercialization of Chinese MNEs; and CEO's preference of risks and opportunities in international market plays a significant moderating role in the two phases of product innovation.
Research limitations/implications – This study extends organizational ambidextrous capabilities theory to better understand the effects of explorative capability and exploitative capability on innovation performance in the context of internationalization and national cultural differences. Sample constitution is a possible limitation.
Practical implications – MNEs, especially those from emerging economies, should develop both explorative and exploitative capability to be flexible and competitive in dealing with cultural differences. fully take risks and opportunities should be taken into consideration regarding the international market and national cultural differences, and take an effective contingency strategy, driven by the ambidextrous capabilities toward new product innovation development and commercialization.

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Originality/value – An empirical examination of how ambidextrous capabilities impact on Chinese MNEs' new product development and commercialization connects the organizational ambidexterity theory to the innovation and characteristics of upper echelons.

Keywords Product innovation, Risk aversion, Exploitative capability, Explorative capability, Opportunity preference

Paper type Research paper

Introduction

In the process of enterprise internationalization within the cross-cultural context, it has been an important field of international business to study effective mechanism of enterprise innovation (Knight and Cavusgil, 2004; Phene and Almeida, 2008; Cassiman and Golovko, 2011). Some previous studies have been done from the perspective of technology research and development, focussing on the effect of research input of enterprises on innovation or internationalization performance in the process of international trade or internationalization (Frantzen, 2000; Johansson and Karlsson, 2007). Some other studies have been done from the view of knowledge management and organizational learning, focussing on knowledge exchange mechanism among headquarters and overseas divisions, and its impact on innovation or internationalization performance of enterprises (Zahra *et al.*, 2000; Pla-Barber and Alegre, 2014). Some researchers have also introduced cultural dimension such as Hofstede or GLOBE, and studied the influence of social cultural psychology on enterprise innovation and internationalization performance (Barkema *et al.*, 1996; Drogendijk and Slangen, 2006). There's also research from the micro-level working on the innovation of enterprise internationalization with considerations of cultural diversity, perspective of expatriate individual or a view of mobility from cross-cultural teams (Castellani *et al.*, 2013; Winkler and Bouncken, 2011). These studies have enriched the knowledge about the effectiveness of enterprise innovation in the situation of internationalization from different perspectives.

Technology and knowledge have long been recognized as the core elements of innovation, and the transfer of knowledge and technology among organizational units can provide opportunities for mutual learning and cooperation which will stimulate the creation of new knowledge and, at the same time, increase innovative ability (Kogut and Zander, 1992; Tsai and Ghoshal, 1998). In the case of international operations, it is rather more challenging to transfer knowledge and technology cross countries due to the national cultural differences, as Kedia and Bhagat (1988) pointed out, cultural differences between two nations can play significant roles in determining the efficacy of technology transfers. In addition, cultural difference means dissimilarities in thinking mode and living habit of customers cross nations which requires multinational enterprises (MNEs) to have the ability to acquire new market knowledge especially in the early period of internationalization. Thus, during the process of internationalization, MNEs should develop strong capabilities to explore, transfer and absorb new knowledge of foreign markets to adapt to changes due to cultural differences. On the other hand, with the acceleration of the on-going globalizing process, the local markets have also experienced a cultural shock and customers are more sophisticated and are aware of alternative products and services (Keen and Wu, 2011). Therefore, MNEs still need to develop basic capabilities at the same time to maintain competitiveness in domestic markets. In general, to coping with those challenges caused by cultural differences, MNEs must remain both flexible and competitive in order to survive. Thus, ambidextrous capabilities, including explorative

capability and exploitative capability, become especially important in the process of internationalization (Benner and Tushman, 2003; Keen and Wu, 2011). Explorative capability, defined as the ability to pursuit new knowledge that does not exist in the firm (March, 1991), can help MNEs to promote quick absorption of new knowledge about foreign markets, and to effectively integrate and adapt to the local market to create new customer value. In contrast, exploitative capability involves refining and deepening existing knowledge that result in expanding or enriching current customer value (March, 1991), which can help MNEs to take full advantage of existing knowledge to remain competitiveness in local market, and to exploit and transfer successful experiences to foreign markets.

As mentioned above, MNEs need to be flexible in order to adapt to different cultural context and to enhance their competitiveness by upgrading capabilities in the process of internationalization. This is especially important for enterprises from emerging markets (Gammeltoft *et al.*, 2010; Guillén and García-Canal, 2009). China, as a typical example of emerging economies, has begun its transition and promotion from world's factory to innovative economy (Gross, 2013). As a result, Chinese firms are not only strengthening their own innovative capabilities (Nahm and Steinfeld, 2014), but also increasingly promoting their internationalization operations through a variety of ways such as multinational trade, overseas business, foreign investment and strategic mergers and acquisitions (Athreye and Kapur, 2009; Boisot and Meyer, 2008; Rui and Yip, 2008). However, researchers suggested that both large and small MNEs from emerging markets usually face the deficiency of knowledge and capabilities required to compete in foreign markets and to maintain competitiveness in its domestic market (Keen and Wu, 2011). In addition, the internationalization of Chinese enterprises also encounter cultural differences caused by its eastern or Asian culture backgrounds confront with western cultures (Hofstede, 2007; Mathews, 2006; Dunning, 2006). Therefore, studies concerning ambidextrous capabilities of international enterprises, especially for firms from emerging markets such as China, are of important significance, since ambidextrous capabilities enable MNEs to be more flexible and adaptable in the cross-cultural environment.

Taken together, choosing Chinese international enterprises as research object, this study focusses on the specific influence of ambidextrous capabilities on MNEs' innovation performance (new product development and commercialization). In addition, we introduce the risk and opportunity preference of upper echelons as moderators on the relationship between ambidextrous capabilities and innovation performance. The present study can help to further understand how ambidextrous capabilities may have influence on the innovative mechanism of internationalized enterprises, especially for firms from eastern emerging countries.

Theory and hypotheses

Ambidextrous capabilities and innovation in firm internationalization

Both theoretical and empirical studies have demonstrated that the ambidextrous capabilities, including explorative capability and exploitative capability, are the key learning abilities for companies to achieve competitive advantage and innovation (March, 1991; Benner and Tushman, 2003; Gupta *et al.*, 2006). Explorative capability involves the pursuit of knowledge that does not exist in the firm to create new customer value. In contrast, exploitative capability involves refining and deepening existing knowledge that result in expanding or enriching current customer value (March, 1991). As regarding innovation, explorative capability is more related to radical innovation

and involves a shift to different technological trajectory, while exploitative capability involves more incremental innovation, improvements in existing components and builds on existing technological trajectory (Benner and Tushman, 2003). From a perspective of dynamic capabilities, the key elements of a firm to keep long-term competitive advantage and to rapidly adapt to a fast changing external environment in a dynamic atmosphere are to integrate, build, and reconfigure internal and external competencies, knowledge and resources (Teece *et al.*, 1997). Also, Verona and Ravasi's (2003) research shows that the ability of firms to continually innovate was a function of knowledge creation and knowledge integration. Due to this reason, the exploitation of the existing assets and resources in an innovation creating way and the exploration of new technologies and markets to capture existing as well as new opportunities are important for firms operating in changing environment. More relevant researches are increasingly emphasizing the balance between explorative and exploitative capability (Duncan, 1976; Tushman and O'Reilly, 1996; Benner and Tushman, 2003), and some empirical studies have provided evidence in support of the positive effect of ambidextrous capabilities toward enterprise innovation and performance (Gibson and Birkinshaw, 2004; He and Wong, 2004).

Though both explorative capability and exploitative capability can be beneficial to innovation (Atuahene-Gima 2005; Holmqvist 2004; Rothaermel and Deeds 2004), they are particularly important for MNEs innovation. Compared with domestic firms, international enterprises face more tough challenges caused by cultural differences in the process of internationalization. This is because that during the internationalization process, enterprises not only have to remain competitive in foreign market but also have to deal with different consumer habits and preferences which brought by national cultural differences. When dealing with these obstacles, international enterprises should not only remain the stability of existing technologies and businesses but also avoid losing existing basic advantages in host country by leveraging exploitative capabilities. In order to realize effective output of internal capabilities, enterprises need to effectively transmit and use the resources of knowledge from domestic country to overseas market (Keen and Wu, 2011). Meanwhile, enterprises also need to learn the cultural features of overseas market quickly via explorative capabilities, mastering and accumulating new knowledge under cross-cultural circumstances and thus integrate into new environment efficiently (Eriksson *et al.*, 1997). For this reason, from the perspective of long-term development of an enterprise, explorative and exploitative capabilities will contribute for enterprises to gain success in a complicated international competition. Some researchers have also inspected the positive effect of ambidextrous capabilities toward both internationalization and cross-cultural efforts (Han and Celly, 2008; Keen and Wu, 2011; Prange and Verdier, 2011).

Innovation is a multi-facet, multi-phase, and multi-level construct (Sears and Baba, 2011). Prior innovation research has considered technical, process, administrative, business model, marketing, and product/service innovation (Ahuja *et al.*, 2008; Rothaermel and Hess, 2007). Whichever the perspective is, the central tenet of innovation research is its "novelty" and "value-addedness", as initially advanced by Schumpeter (Crossan and Apaydin, 2010). As a comprehensive process, a successful innovation considers both phases of invention and diffusion: the former refers to the generation of new technology/products/services in a scientific light, while the later relates to the commercialization of new products/services in a business lens (Hansén and Wakonen, 1997). Under such strong international circumstances, in order to realize integration of enterprises' capabilities across time, space and culture, the ambidextrous capabilities may simultaneously coexist

and generate an effective blend as called by Eisenhardt and Martin (2000). Such adhesion effect eliminates the clear boundary and difference between each capability and may leave impact on the whole process of innovation like the development of new product and the commercialization of innovation. Therefore, we hypothesize:

H1. In internationalization, firm explorative capability will be positively related to new product development and commercialization.

H2. In internationalization, firm exploitative capability will be positively related to new product development and commercialization.

Ambidextrous balance, risk/opportunity preference of CEOs in internationalization

As we hypothesized above, both explorative and exploitative capabilities have positive impact on firm innovative performance of new product development and commercialization. However, the effects may vary considerably, particularly in a risky internationalization process and cross cultural context.

Even though balancing the ambidextrous capabilities is important, however, many firms may find balancing the two distinct capabilities during the internationalization process a challenge. According to Ireland and Webb (2007), outcomes of explorative activities are uncertain and unpredictable, which may deter some risk-averse managers (Baysinger *et al.*, 1991; John *et al.*, 2008). Another difficulty is the fragility of the transition from exploration to exploitation. When the transition takes place, the enterprise shifts the emphasis from a diversity of market opportunities to a focus on existing skills and routines. This shift requires dramatic changes in corporate operation, structure and culture (Andriopoulos and Lewis, 2009; Gupta *et al.*, 2006). Amplified uncertainty and complexity in the operational domain of an enterprise can further encourage a conservative propensity to resist explorative activities and degrade the already fragile transition between explorative and exploitative activities. Thus, the positive effect of explorative and exploitative capabilities on product innovation becomes vulnerable when taking contextual risks and opportunities into consideration.

For MNEs, international competitive environment is of especially importance. Numerous researchers have acknowledged the challenges firms face when performing distinct tasks in heterogeneous international markets (e.g. Chen and Chen, 1998; Hsu and Chen, 2009; Makino *et al.*, 2002; Tseng, 2007). Particularly, when firms compete in extensive international markets, they will encounter greater uncertainty and complexity and thus may find a new set of challenges to simultaneously practice explorative and exploitative activities (Han, 2007).

According to the Upper Echelons Theory raised by Hambrick and Mason (1984), characteristics of an organization reflect the characteristics of its top management to some extent. In addition, the features of demographics and psychological behaviors of top management generally affect strategic decisions and performances of their enterprises. The process of balancing the enterprise ambidextrous innovation and internationalization contains strategic decisions and actions full of uncertainties and risks, which apparently, to a large extent, is affected by the extent of the CEO's preference of risks or opportunities. CEO's attitude toward risks often refers to risk aversion, which is the general tendency of an individual to avoid or pursue risks (Wiseman and Gomez-Mejia, 1998; Frijns *et al.*, 2013); while CEO's opportunity preference is defined as an individual's general tendency toward taking or not taking the opportunities within the international context.

For the development of new products under innovation, the degree of uncertainties is higher when facing internationalized market (Miller, 1992), thus, the attitude toward risks in international market of CEOs of enterprises will place more delicate influence on such process. When CEO shows a relatively high degree of risk aversion toward international market, the enterprises are likely to adopt more stable and preserved strategic steering when developing new products (Dutton and Jackson, 1987; Wernerfelt and Karnani, 1987), thus reducing resources devoted in explorative process and giving play to exploitative capabilities to avoid risks while coordinating ambidextrous capabilities:

H3a. In internationalization, the degree of CEO's risk aversion on international market will negatively moderate the relation between firm explorative capability and new product development. That is when CEO's risk aversion is high, firm explorative capability will be negatively related to new product development.

H3b. In internationalization, the degree of CEO's risk aversion on international market will positively moderate the relation between firm exploitative capability and new product development. That is when CEO's risk aversion is high, firm exploitative capability will be positively related to new product development.

For commercial transformation under innovation, the internationalized actions of enterprises put many emphases on the opportunities in international market (Zahra *et al.*, 2005), in hope of conducting international business to gain short-term or long-term value returns via international trade, development of overseas business, overseas M&A, etc. Therefore, opportunity preference for the international market of the upper echelons may apparently influence the period of commercial transformation in a more delicate way. When such preference is relatively strong, enterprises may more likely to restrain the devotion to the explorative innovation but to concentrate on playing exploitative capabilities, to facilitate the usage and commercialization of existing knowledge and products/services in the international market:

H4a. In internationalization, the degree of CEO's opportunity preference on international market will negatively moderate the relation between firm explorative capability and new product commercialization. That is when CEO's opportunity preference is high, firm explorative capability will be negatively related to new product commercialization.

H4b. In internationalization, the degree of CEO's opportunity preference on international market will positively moderate the relation between firm exploitative capability and new product commercialization. That is when CEO's opportunity preference is high, firm exploitative capability will be positively related to new product commercialization.

Methods

Sample

To test our hypotheses, we collected data from MNEs of China which develop international business through exportation, outsourcing, foreign equity investment or foreign direct investment. The data collection was accomplished between 2012 and 2013. Questionnaires were sent to CEOs and product managers to collect data. We requested CEOs to provide firms' basic information such as firm age, ownership, industry, whether high-tech entrepreneurs and whether listed. We also surveyed CEOs' attitude to risk and opportunities in international market. Product managers filled in

questionnaires about R&D investment, the total number of new products in last year, and new product profit share of total profit, explorative and exploitative capabilities. After matching the responses of CEOs and those of product managers, the final sample consisted of 189 firms.

Of all responding firms, the average age was 13.44 years (SD = 8.675); 11.5 percent were state-owned enterprises (SOEs), 67.5 percent were private-owned enterprises (POEs) and 21 percent were joint ventures (JVs). Publicly listed firms represented 13.4 percent; 46.8 percent were high-tech enterprises; the average R&D investment proportion of total sales was 16.69 percent (SD = 19.197).

Measures

Dependent variables. New product development. Product managers were asked to report, "In your firm, how many new products, new processes and new technologies have been invented in the last year." Thus, new product development is a count variable of the total number of new products of each firm by bringing those three numbers up.

New product commercialization. The variable new product commercialization refers to the new product profit share of total profit; data were collected from product managers.

Independent variables. Ambidexterity is the main independent variable in this study. We followed the established measurement of ambidextrous capabilities (Zahra *et al.*, 2000; Atuahene-Gima, 2005), which includes two dimensions with total ten items. Product managers made evaluations of their firms' ambidextrous capabilities. Five-point Likert scales were used to this measurement with anchors of "extremely bad" (1) and "extremely good" (5). The Cronbach's α of this scale was 0.918.

Explorative capability. Five items were used to measure firm explorative capability. Sample items included, "learned product development skills and processes (such as product design, prototyping new products, timing of new product introductions, and customizing products for local markets) entirely new to the industry" and "strengthened innovation skills in areas where it had no prior experience."

Exploitative capability. Five items were used to measure firm exploitative capability. Sample items included, "upgraded current knowledge and skills for familiar products and technologies" and "invested in enhancing skills in exploiting mature technologies that improve productivity of current innovation operations."

Moderators. In this study, we used CEO's preference of risks and opportunities for international market as moderator variables, both were measured with five-point Likert scales.

Risk aversion. Risk aversion was measured by asking CEOs, "What's your attitude towards the risks in international market", with anchors of "strongly dislike" (1) and "strongly like" (5). Scores were reversed to present risk aversion.

Opportunity preference. Opportunity preference refers to the degree of CEOs' preference to opportunities in international market. The item is, "What's your attitude towards the opportunities in international market", with anchors of "strongly dislike" (1) and "strongly like" (5).

Control variables. We employed several control variables that may impact upon the results. We controlled for the development stage of the firm through including variable of firm age. We controlled for the ownership status of the firm with three dummy variables, SOE = 1, POE = 1 and JV = 1. Industry was controlled with manufacturing

(1 = manufacturing) and service (1 = service). We also included dummy variables to distinguish between high-tech and non-high-tech firms (1 = high-tech enterprise), publicly listed and non-listed firms (1 = listed). We further controlled R&D investment of firms, assuming that the ones have more R&D investment are more likely to have more new products.

Reliability and validity

As shown in Table I, explorative capability and exploitative capability were highly related ($\gamma = 0.743$, $p<0.01$), we conducted confirmatory factor analysis using LISREL 8.70 (Jöreskog and Sörbom, 2004) to make sure they are two distinctive dimensions. We compared the two-factor model to a one-factor model (combining all items into one latent factor). Results of comparison are presented in Table II. As shown, the fit of model with two factors ($\chi^2 = 82.02$, df = 34, GFI = 0.92, NFI = 0.96, RMSEA = 0.089) is better than one-factor model ($\chi^2 = 153.58$, df = 35, GFI = 0.85, NFI = 0.94, RMSEA = 0.138). The factor loadings of each item are presented in Table III, all the items have factor loadings greater than 0.70.

We further calculated composite reliability (CR) and the average extracted variances (AVE). CR for explorative capability is 0.878, AVE = 0.591; and for exploitative capability, CR = 0.876, AVE = 0.585. All the CR are above 0.80, and the AVE are above the recommended 0.50 level (Hair *et al.*, 1992). Thus, the measurement of ambidextrous capability has adequate reliability, convergent validity, and discriminate validity.

Results

Table I displays the means, standard deviations, and correlations for all of the key variables. We first examined the main effects of explorative capability and exploitative capability on new product development and commercialization; Table IV and Table V present the results. As shown in the Table IV, explorative capability was positively related to new product development ($\beta = 0.250$, $p < 0.01$), and to new product commercialization ($\beta = 0.229$, $p < 0.01$). *H1* was supported. In addition, exploitative capability was positively related to new product development ($\beta = 0.282$, $p < 0.01$), and to new product commercialization ($\beta = 0.217$, $p < 0.05$), supported *H2* (Table V).

To test the moderating effects of risk aversion and opportunity preference, we examined the effects hierarchically: control variables first, followed by independent variables and moderator variables, interaction terms last. All variables were standardized as recommended (Frazier *et al.*, 2004). Table VI summarizes the results.

H3a predicted that the degree of CEO's risk aversion would negatively moderate the effects of explorative capability on the new product development. Results showed that the interaction term was significantly related to new product development ($\beta = -0.376$, $p < 0.01$). To interpret the general pattern of the interactive influence, we followed the procedure suggested by Aiken and West (1991) computing slopes one standard deviation above and below the mean of the moderating variable. Figure 1 showed that explorative capability is more positively related to number of new products when risk aversion is low. Thus, *H3a* was supported.

H3b predicted that the degree of CEO's risk aversion would positively moderate the effects of exploitative capability on new product development. Results showed that the exploitative capability and risk aversion interaction was significantly related to new product development ($\beta = 0.300$, $p < 0.05$). Figure 2 presents the interaction pattern. As shown in Figure 2, exploitative capability is more positively associated with new product development when risk aversion is high. Supported *H3b*.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Explorative capability	3.642	0.755	1														
2. Exploitative capability	3.794	0.629	0.743**	1													
3. Risk aversion	2.952	0.626	−0.186**	−0.147*	1												
4. Opportunity preference	3.460	0.706	0.239**	0.131	−0.438**	1											
5. New product development	35.323	181.246	0.252**	0.325**	−0.077	0.092	1										
6. New product commercialization	31.719	23.928	0.240**	0.210**	−0.014	0.170*	0.063	1									
7. Firm age	13.440	8.675	0.012	0.210**	−0.043	−0.039	0.273**	0.049	1								
8. SOE	0.100	0.302	0.012	0.003	0.140	−0.020	0.251**	−0.107	0.175*	1							
9. POE	0.661	0.475	0.026	0.023	−0.110	−0.014	−0.189*	0.019	−0.098	−0.467**	1						
10. JV	0.196	0.398	−0.112	−0.058	0.082	0.046	−0.038	0.044	−0.017	−0.165*	−0.690**	1					
11. Hi-tech industry	0.468	0.500	0.130	.096	−0.014	0.089	−0.014	0.144	0.079	0.004	−0.047	0.127	1				
12. Listed	0.134	0.342	−0.021	−0.038	0.060	−0.049	0.066	0.037	0.046	0.084	−0.317**	0.277**	−0.007	1			
13. Manufacturing	0.561	0.498	0.003	0.041	−0.017	0.106	−0.010	−0.020	0.107	0.012	−0.002	0.034	0.084	−0.035	1		
14. Service	0.243	0.430	−0.066	−0.173*	−0.057	−0.014	−0.100	0.048	−0.088	−0.026	0.067	−0.062	0.024	−0.002	−0.641**	1	
15. RDI	16.691	19.197	0.130	0.044	−0.019	−0.024	−0.053	0.183*	−0.074	−0.053	−0.102	0.127	−0.028	0.054	−0.075	0.101	1

Notes: $n = 189$. *$p<0.05$; **$p<0.01$

Table I.
Means, standard deviations, and correlations

H4a concerned the negative moderating effect of CEO's opportunity preference on the relationship between explorative capability and new product commercialization. Results showed that the explorative capability and opportunity preference interaction was significantly related to new product commercialization ($\beta = -0.379$, $p < 0.01$). The interactive pattern displays in Figure 3. As shown in Figure 3, explorative capability is positively related to new product commercialization when opportunity preference is low. *H4a* was supported.

Table II.
Results of confirmatory factor analyses of the measures

	χ^2	df	GFI	NFI	RMSEA
Two-factor model	82.02	34	0.92	0.96	0.089
One-factor model	153.58	35	0.85	0.94	0.138

Table III.
Factor loadings, composite reliability and average variance extracted

	Standardize factor loading	*t*-value	CR	AVE
Explorative capability				
Over the last year, to what extent has your firm			0.878	0.591
1. Acquired manufacturing technologies and skills entirely new to the firm?	0.77	11.64		
2. Learned product development skills and processes (such as product design, prototyping new products, timing of new product introductions, and customizing products for local markets) entirely new to the industry?	0.72	10.68		
3. Acquired entirely new managerial and organizational skills that are important for innovation (such as forecasting technological and customer trends; identifying emerging markets and technologies; coordinating and integrating R&D; marketing, manufacturing, and other functions; managing the product development process?	0.75	11.38		
4. Learned new skills in areas such as funding new technology, staffing R&D function, training and development process?	0.80	12.39		
5. Strengthened innovation skills in areas where it had no prior experience?	0.80	12.32		
Exploitative capability				
Over the last year, to what extent has your firm			0.876	0.585
1. Upgraded current knowledge and skills for familiar products and technologies?	0.77	11.61		
2. Invested in enhancing skills in exploiting mature technologies that improve productivity of current innovation operations?	0.75	11.29		
3. Enhanced competencies in searching for solutions to customer problems that are near to existing solutions rather than completely new solutions?	0.72	10.60		
4. Upgraded skills in product development processes in which the firm already possesses significant experience?	0.83	13.04		
5. Strengthened our knowledge and skills for projects that improve efficiency of existing innovation activities?	0.75	11.22		

	New product development		New product commercialization	
Constant	0.030	0.026	−0.026	−0.022
Firm age	0.256***	0.253***	0.045	0.041
SOE	−0.021	0.035	−0.170	−0.117
POE	−0.433**	−0.358**	−0.050	0.019
JV	−0.334**	−0.240	−0.079	0.019
Hi-tech industry	−0.005	−0.050	0.181**	0.137*
Listed	−0.031	−0.021	0.046	0.050
Manufacturing	−0.134	−0.107	0.042	0.053
Service	−0.168	−0.122	0.027	0.054
RDI	−0.067	−0.113	0.138*	0.092
Explorative capability		0.250***		0.229***
R^2	0.181	0.231	0.069	0.114
Adjusted R^2	0.129	0.177	0.013	0.054
ΔR^2		0.050***		0.045***
F	3.481***	4.240***	1.241	1.921**

Notes: $n = 189$. *p<0.10; **p<0.05; ***p<0.01

Table IV. Hierarchical regression results of the main effects of explorative capability

	New product development		New product commercialization	
Constant	0.030	0.024	−0.017	−0.017
Firm age	0.256**	0.196**	0.048	−0.002
SOE	−0.021	0.013	−0.171	−0.142
POE	−0.433**	−0.404**	−0.047	−0.023
JV	−0.334**	−0.290*	−0.082	−0.041
Hi-tech industry	−0.005	−0.037	0.191**	0.161**
Listed	−0.031	−0.011	0.045	0.057
Manufacturing	−0.134	−0.091	0.040	0.064
Service	−0.168	−0.080	0.043	0.101
RDI	−0.067	−0.097	0.137	0.108
Exploitative capability		0.282***		0.217**
R^2	0.181	0.244	0.074	0.114
Adjusted R^2	0.129	0.190	0.019	0.054
ΔR^2		0.063***		0.040**
F	3.481***	4.551***	1.333	1.914**

Notes: $n = 189$. *p<0.10; **p<0.05; ***p<0.01

Table V. Hierarchical regression results of the main effects of exploitative innovation

Our *H4b* predicted that CEO's opportunity preference would positively moderate the effects of exploitative capability on new product commercialization. Results showed that the interaction term was significantly related to new product commercialization ($\beta = 0.284, p < 0.05$). Interactive pattern shows that exploitative capability is positively related to new product profit when opportunity preference is high (Figure 4).

Discussion

In this study, we discussed the relation between enterprises' ambidextrous capabilities, CEO's preference of risks and opportunities in the international market as well as their product innovation performance. Some previous studies have emphasized that

	New product development			New product commercialization		
	Model1	Model2	Model3	Model1	Model2	Model3
Constant	0.026	0.017	0.005	−0.011	−0.012	0.009
Firm age	0.249***	0.196**	0.225***	0.052	0.042	0.087
SOE	−0.021	0.029	0.068	−0.173	−0.176	−0.184
POE	−0.441**	−0.391**	−0.375**	−0.051	−0.016	0.026
JV	−0.329**	−0.265	−0.257	−0.073	−0.034	−0.027
Hi-tech industry	0.007	−0.035	0.037	0.194**	0.156*	0.181**
Listed	−0.033	−0.009	−0.040	0.038	0.062	0.085
Manufacturing	−0.139	−0.100	−0.092	0.044	0.032	−0.020
Service	−0.170	−0.088	−0.100	0.042	0.071	0.028
RDI	−0.064	−0.101	−0.077	0.132	0.107	0.104
Explorative capability		0.067	0.104		0.122	0.111
Exploitative capability		0.225*	0.172		0.107	0.085
Risk aversion		−0.036	−0.055		0.137	0.138
Opportunity preference		0.029	0.019		0.224**	0.250***
Explorative capability × RA			−0.376***			−0.241*
Exploitative capability × RA			0.300**			0.166
Explorative capability × OP			−0.061			−0.379***
Exploitative capability × OP			0.038			0.284**
R^2	0.181	0.253	0.299	0.075	0.161	0.203
Adjusted R^2	0.129	0.181	0.209	0.019	0.085	0.106
ΔR^2	0.181***	0.071**	0.047*		0.086***	0.042
F	3.449***	3.536***	3.316***	1.332	2.119**	2.092***

Notes: $n = 189$. *$p<0.10$; **$p<0.05$; ***$p<0.01$

Table VI.
Hierarchical regression results of the moderation effects of risk aversion and opportunity preference

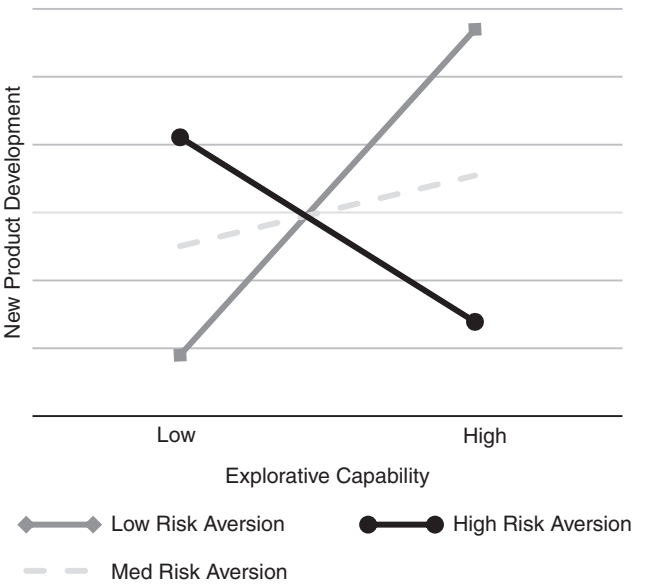

Figure 1.
Moderating effect of risk aversion on the relationship between explorative capability and new product development

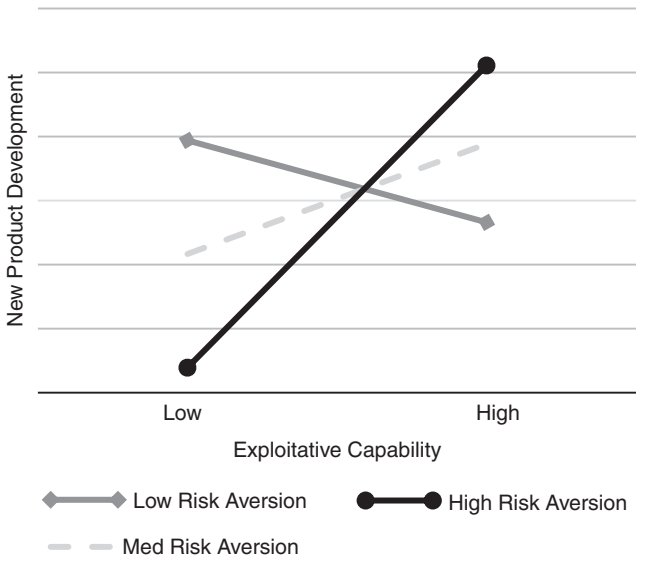

Figure 2.
Moderating effect of risk aversion on the relationship between exploitative capability and new product development

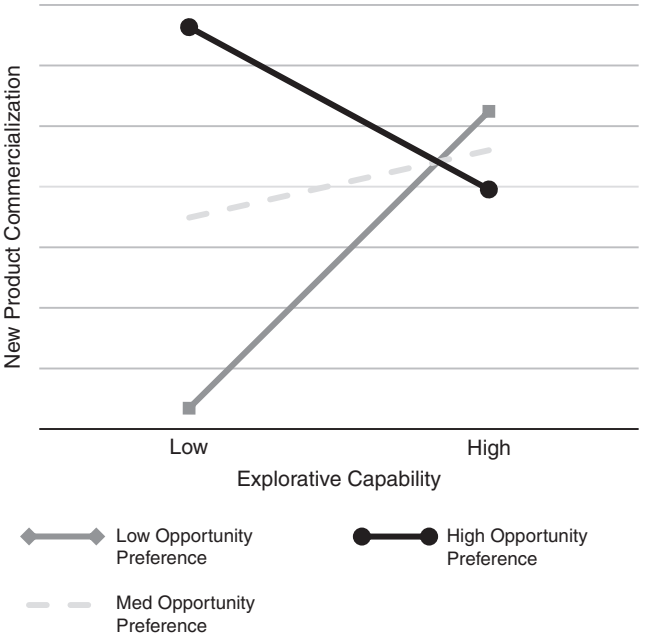

Figure 3.
Moderating effect of opportunity preference on the relationship between explorative capability and new product commercialization

ambidextrous capabilities of enterprises, which are explorative capability and exploitative capability, would have important impacts on its innovation performance. However, with the popularization of internationalization, the number of MNEs increased rapidly; clarifying the relation between ambidextrous capabilities and

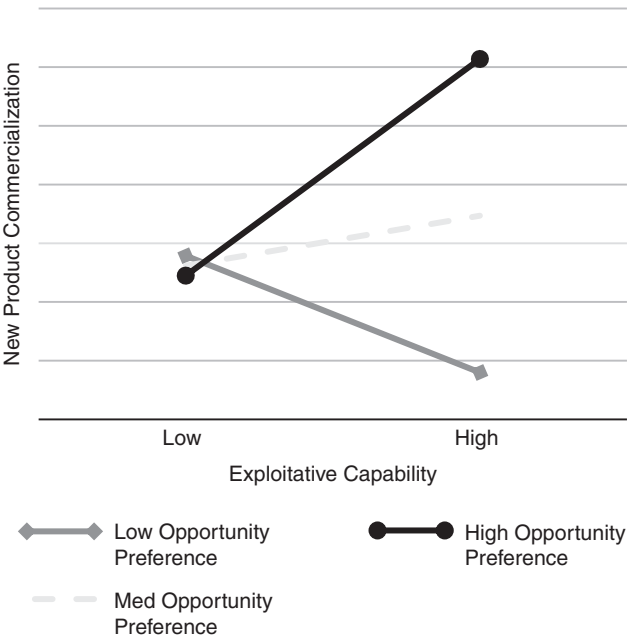

Figure 4.
Moderating effect of opportunity preference on the relationship between exploitative capability and new product commercialization

innovation is of primary importance for understanding how MNEs can benefit from explorative and exploitative capabilities in the processes of internationalization. In this context, our study makes several contributions both theoretically and practically.

Theoretical contributions

Building on a large sample of Chinese MNEs in a wide range of industries, our study advances organizational ambidexterity literature as it takes a significant step in establishing ambidextrous capabilities as an important antecedent of the development and commercialization of new product within a firm in the context of internationalization. Since the concept of organizational ambidexterity was raised (Duncan, 1976; March, 1991), scholars have conducted a lot of researches in this field (Bauer and Leker, 2013; Li *et al.*, 2010; Benner and Tushman, 2003). However, few studies on enterprises' ambidextrous capabilities in an international background have been done. In this study, we investigated the influence of MNEs' ambidextrous capabilities on product innovation (new product development and commercialization), which may further enrich the ambidextrous theory. Results of this study shows that explorative capability and exploitative capabilities of MNEs will have a significant positive impact on its product innovation performance. On one hand, the present study verifies that in an international context, enterprises' ambidextrous capabilities may contribute to achieve fully exploring internal and external knowledge and thus further improve its innovation performance; on the other hand, by taking Chinese MNEs as research object, our study also suggests that firms from emerging economies should develop both explorative and exploitative capability while participating in international competition.

In addition, our research finds out that not only explorative capability and exploitative capability have important benefits in terms of enhancing MNEs' product

innovation, but it also proves that the two mechanisms are different. Previous studies have found that the volatility, the uncertainty, and competition of the external environment will affect the realization of ambidextrous capabilities and have impact on innovation performance of the enterprise (Jansen *et al.*, 2006). Comparing with other companies, MNEs are facing international market competition with more uncertainty and risky, which requires MNEs to have better adaptability and coordination. March (1991) considered that the adaptability of organization stems from satisfying seemingly conflict activities. Therefore, how to make a balance between explorative and exploitative capabilities becomes the key to achieve competitive advantage in international market competition (Hsu *et al.*, 2013; Mueller *et al.*, 2013). Some study points out those characteristics of upper echelons play an important role in an enterprise to adapt to the external environment and to develop appropriate strategic decisions (Geletkanycz and Hambrick, 1997). CEOs will consider the influence of the external environment when making strategic decisions, which particularly works to MNEs. Based on this, we introduce risk and opportunity preference of CEOs in their multinational operations as the moderator to discuss the impact of enterprises' explorative capability and exploitative capability on mechanism of product innovation performance, connecting the ambidextrous capability theory with MNEs, innovation and the cultural psychology of upper echelons. Our results show that characteristics of upper echelons have a great impact on the achievement of dynamic equilibrium and effectiveness of MNEs' ambidextrous capabilities.

Innovation is a complete process of invention and commercialization (Hansén and Wakonen, 1997). In this study, we divide the effectiveness of innovation into two output phases which are the development of new product and the commercialization of the product. Then, we managed to find out the impact of upper echelons risk/opportunity preference and ambidextrous capabilities on the two output phases. Particularly, when CEOs have a high level of risk aversion, enterprise explorative capability and new product development are negatively correlated, but enterprise exploitative capability is positively correlated with new product development. In addition, when the opportunity preference of CEO is high, enterprise explorative capability and new product commercialization are negatively correlated but exploitative capability is positively correlated with new product commercialization. This study concludes that: First, CEOs tend to adopt a more prudent and conservative strategy for new product development when they hold a high level of risk aversion toward international market, in order to give scope to use exploitative capability to avoid risks by reducing making investment on explorative innovation process. Second, when CEOs hold a high level of opportunity preference on the international market, MNEs are more likely to inhibit investment on explorative innovation but make emphasis on the use of exploitative capability, improving the utilization and commercialization of existing knowledge and products/services in the international market. Third, from the product innovation process, the impact of the ambidextrous capabilities can be greatly influenced by the risk preference of upper echelons during the new product development phase, but CEO's preference of opportunity may more likely to act on the stage of the commercialized transformation of new product.

Practical implications

This research has practical implications on guiding enterprises to reasonably coordinate relations among risks, opportunities and innovation in the process of internationalization.

First, our research shows that in the process of internationalization, enterprises need to secure the balance of ambidextrous capabilities of organizations since both explorative and exploitative capabilities have a positive effect on innovation practice of MNEs. Product innovation of internationalized enterprises requires full utilization of their exploitative capabilities based on existing knowledge and skills to improve products and enhance services in order to expand and participate in international market competition on basis of their existing capacities. Meanwhile, MNEs should focus on the future, and make full use of their explorative capabilities to quickly absorb and learn new knowledge, experience in the international market, and thereby achieving sustainable development through various ways of attempts and innovation.

Second, developing explorative capability and exploitative capability is of more significance for firms from emerging economies. Since those firms from developing countries usually eager to enter a foreign market without full preparation of knowledge and capabilities required to adapt to a different competitive environment and to maintain competitiveness in domestic market. Strong explorative and exploitative capability, especially the balance of the ambidextrous capabilities, can enhance their flexibility and adaptability.

Third, our research also shows that the preference of risks and opportunities in international market could significantly adjust the effectiveness of ambidextrous innovative capabilities of MNEs. The process of new product innovation can be divided into two phases which are new product development and new product commercialization. The MNEs' CEO attitude toward risks and opportunities would play different roles in the influence of ambidextrous capabilities of enterprises on the two phases of product innovation. Specifically, the attitude to risks would have more impacts on the development stage of new product, while their preference of opportunities would have more impacts on the business transformation stage of new product. Therefore, MNEs should have specific considerations of different stages of innovation, and carry out a contingency strategy. For example, from the perspective of promoting new product development, MNEs should make more use of exploitative capability when dealing with high aversion of risks in international market. While in the situation of lower risk aversion, enterprises should adopt more explorative capability. From the perspective of the promotion of new product commercialization, MNEs should make more use of exploitative capability under the situation of good opportunities or otherwise accumulate explorative capability.

Limitations and future extensions

Although our study provides important insights regarding organizational ambidexterity and product innovation in the context of internationalization, it can be extended in the following ways.

First, this study has put the impacts of ambidextrous capabilities of enterprises on product innovation performance in the condition of internationalization, but the operation was mainly carried out by taking multinational corporations as enterprise samples without involving models with variables that may directly relate to cross culture and internationalization. Future research can take a further step to consider cross-cultural orientation of enterprise internationalization (e.g. from emerging country to developed country), introducing and examining some factors of cross culture and cross system.

Second, in the samples we collected of internationalized firms, enterprises carry out their international operations with different strategies. For example, some export products and have service outsourced, some realize their internationalization through

foreign equity or direct foreign investment. In different internationalized management models, ambidextrous capabilities of enterprises may have different effectiveness, future research can explore the influence of different forms of international strategy on ambidextrous capabilities and innovation.

Third, our samples come from Chinese international enterprises. Although enterprise samples of China during the reform period have strong representative willing in the research of the balance in ambidextrous capabilities and innovative, we still hope to have more evidence of internationalized enterprise from other countries to test relevant theories.

Conclusion

Our study introduced effective mechanisms of organizational ambidextrous capabilities of enterprises on enterprise innovation to the condition of internationalization to carry out our investigation, and combined innovative theory of ambidextrous capabilities of enterprises with the expectations of upper echelons on risks and opportunities in international market. Through empirical study, we have found that in the process of internationalization, explorative and exploitative capabilities have synergistic effect, which both plays a directly promoting role in the output of firms in different stages, new product development and commercialization. Furthermore, these positive effects could be significantly moderated by the expectations of enterprise upper echelons on risks and opportunities in international market. With a high degree of aversion to international market risks or obvious opportunity preference, enterprise exploitative capabilities are more conducive to the development of new product and its commercialization, while the explorative abilities were more conducive to the development of new product and its commercialization. In a word, with the uncertainty caused by cross-cultural development and innovation, enterprises should fully consider risks and opportunities from the international market, and take an effective contingency strategy through the driving of ambidextrous capabilities toward new product innovation development and commercialization.

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About the authors

Yu Zhou is an Associate Professor in the Department of Organization and Human Resource at the School of Business, Renmin University of China. He received his Doctoral Degree in Human Resource Management from the Renmin University, and his Doctoral Research was carried out in a joint-PhD program at the Rutgers University. He is also affiliated as a Wertheim Research Fellow with Labor and Worklife Program in the Harvard Law School, Harvard University. He specializes in research on the strategic effectiveness of people management in Chinese context and globally. His work has appeared in journals such as *Human Resource Management*, *International Journal of Human Resource Management*, *Human Resource Management Review* and so on.

Lu Lu is a PhD Candidate in the Department of Organization and Human Resources at the School of Business, Renmin University of China. She has research interests in organizational behaviors and human resource management. Lu Lu is the corresponding author and can be contacted at: lulu_0922@ruc.edu.cn

Xiaoxi Chang is a PhD Candidate at the Department of Economics and Business Organization, Rey Juan Carlos University, in Madrid, Spain. Her research interests include international business, cross-cultural management and cultural project management.