

The Moderating Effect of Entrepreneurship Orientation on New Product Innovation Performance

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ABSTRACT

Although entrepreneurship orientation (EO) facilitates firms to achieve competitive advantage, researches pay little attention to elaborate the link between EO and new product innovation performance. As such, we investigate how EO affects new product innovation performance through innovation capability (exploitation and exploration). This study further argues the effects of EO on innovation capability vary with different situations. A sample of 246 new product development teams is utilized to verify the hypotheses. By using a hierarchical regression analysis, the results show that the mediating effects of innovation capability link between EO and new product innovation performance. Moreover, the effects of EO on exploration competence vary with market orientation and technological knowledge. Specifically, the effect of EO on exploration competence is greater under high levels of customer orientation, inter-functional coordination and technological knowledge than low levels.

JEL Classification: O32

Keywords: entrepreneurship orientation; innovation capability; new product innovation performance; market orientation; technological knowledge

I. INTRODUCTION

Firms operating in competitive environments need to explore novel ideas and refine their existing knowledge for developing new products (Tsai et al., 2015). Therefore, for corporations to effectively implement strategies, it is imperative for them to seize market opportunities and respond in a timely manner. Strategic orientation was considered a critical factor for firms to earn competitive advantage. This refers to the strategic directions signifying how firms can convert their decision making and other activities into superior performance (Baker et al., 2016; Gatignon and Xuereb, 1997). Prior studies argue that entrepreneurship orientation (EO) represents the strategic orientation of firms reflecting their decision-making styles, principles, processes, and practices guiding them to enter the new realm (Lumpkin and Dess, 1996). The effect of entrepreneurship orientation on firm performance has been emphasized in the literature (Chen et al., 2012), but little research focuses on new product development (NPD) teams and explores how NPD managers transform their entrepreneurial perspective into new product innovation performance through innovation capability (i.e., exploration and exploitation). From earlier perspectives, this study argues that EO drives firms to consider opportunity-seeking (exploration) and advantage-seeking (exploitation) activities that can attain superior new product performance (Yang et al., 2017; Zhang et al., 2016). Thus, an interesting question that arises is how innovation capability mediates the relationship between EO and new product innovation performance.

Given that exploration competence and exploitation competence are first achieved through EO and then applied to gain competitive advantage, NPD teams lacking in adequate technological knowledge may confront difficulties in accomplishing their goals. In this respect, we investigate the extent to which NPD teams with adequate technological knowledge strengthen their strategic decision for attaining innovation capability. On the other hand, market-driven is most worthy of investigation as firms engage in product innovation (Jaworski et al., 2000). Firms with sufficient market knowledge can perceive their deficiencies and scan the emerging market opportunities that call for development of new capabilities (Atuahene-Gima, 2005). Both EO and market orientation perspectives lead firms to build organizational capability (Chen et al., 2012; Hong et al., 2013). However, this study argues that market orientation might be a complementary approach for managers to make effective decisions on developing new product processes. As such, these views lead to the question of how technological and market knowledge can affect the relationship between EO and innovation capability.

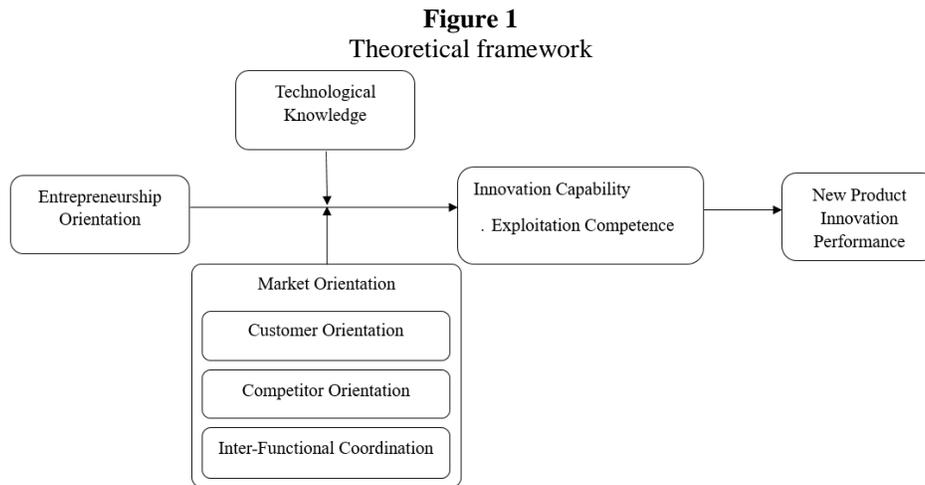
This study addresses several contributions to the EO literature in the NPD realm. First, despite the importance of EO as suggested earlier, the extant literature has little insights on its effect on performance of new products. This study sheds light on how entrepreneurship orientation affects the NPD teams cultivating organizational innovation capability, which in turn impacts on new product innovation performance. Second, the knowledge-based view (KBV) argues that knowledge resources supplement the strategic decisions determining superior product performance (De Luca and Atuahene-Gima, 2007; Grant, 1996). We empirically examine how market orientation provides market knowledge influencing the decision of entrepreneurs on innovation capability. This study also investigates how NPD teams with sufficient technological knowledge strengthen their ability to implement entrepreneurial strategy on capability and earn competitive advantage. As such, we propose that the effects of EO on innovation capability vary with

the technological and market knowledge of firms. By studying the interactive synergic knowledge on capability, we offer additional understanding over previous studies.

The remainder of this study is organized as follows. Section II presents a related literature review and builds our research hypotheses, guided by theoretical framework. Section III addresses the research design and methods, and Section IV reports the results. Section V discusses the theoretical and managerial implications, the limitations of the study, and future research directions.

II. THEORETICAL FRAMEWORK

The theoretical framework of this study is shown in Figure 1. The specific arguments of the study are introduced in detail as follows.



A. Mediating Effect

Innovation capability, comprising exploration and exploitation competence, represents the competitive strength of corporations and is the core ability of NPD (Tsai and Wang, 2008). Exploitation competence is the ability to refine and extend the existing knowledge of product innovation to sustain existing opportunity. Its targets are better reliability and efficiency of existing innovation activities. On the other hand, exploration competence is the ability to acquire new knowledge and technologies through experiments in creating new products and seizing emerging markets. Its aims are more flexibility and novelty in product innovation development (Raisch and Birkinshaw, 2008). NPD teams pursuing both capabilities face the challenge of fully using their resources to generate both capabilities, because exploration and exploitation competence need teams with different underlying concepts to manage their resources (March, 1991). Therefore, it is critical for managers to resolve the capability-rigidity paradox (Leonard-Barton, 1992). This study views the EO reflecting strategic perspective as a resolution of that paradox by which entrepreneurs show teams the way to proceed and then effectively allocate resources. EO indicates the extent to which corporations with innovativeness, proactiveness, and risk-

taking postures. It also represents the processes, practices, and decision-making of firms that explore and exploit new opportunities (Lumpkin and Dess, 1996). With similar reasoning, if entrepreneurial firms infuse new norms, routines, and social value into their organizational structure, they would effectively acquire new opportunities (exploration) and efficiently refine existing resources in organizational operations to maintain existing opportunities (exploitation).

Corporations that lack forward-thinking and creative perspectives cannot effectively materialize their resources and, for them, EO may be considered a unique resource showing the way to success. NPD managers with higher entrepreneurship would want to increase their innovation capability and achieve excellent new product innovation performance. In essence, the core of entrepreneurship is the spirit of innovativeness on which NPD managers have a higher tendency to support creative ideas and carry out experiments to develop new products (Baker et al., 2016). Further, a proactive spirit means the managers' sense of environment changes, in that they identify and utilize opportunities to create unique value (Chen et al., 2014) and adopt a proactive attitude to strategic action. Risk-taking spirit represents that NPD managers bear various degrees of the risks arising from uncertainty. In these respects, entrepreneurial managers can better identify the changes from market circumstance and are willing to adopt proactive action and make effective and efficient decisions (Jung et al., 2003). Moreover, NPD teams are more willing to carry out innovative activities, implement innovative plans, and share information, stimulating them to attach importance to innovation capability. Furthermore, entrepreneurial managers are also pragmatists and thus balance the cost and risk of developing new useful products (Kortum and Lerner, 2000). As such, entrepreneurship orientation encourages managers to commit their resources to innovation capability. As NPD teams increase their innovation capability, they become capable of exploring new technological knowledge and refine their knowledge of new products targeting flexibility and efficiency to gain competitive advantage. Therefore, in the NPD process, entrepreneurship increases the managers' tendency to invest in exploitation and exploration competence and thereby elevating their new product innovation performance; that is, entrepreneurship orientation affects superior new product innovation performance through innovation capability. From the above arguments, we present the following hypotheses:

Hypothesis 1: Exploitation competence has a mediating effect on the relation between entrepreneurship orientation and new product innovation performance.

Hypothesis 2: Exploration competence has a mediating effect on the relation between entrepreneurship orientation and new product innovation performance.

B. Moderating Effects of Market Orientation

Well-known scholars such as Kohli and Jaworski (1990) and Narver and Slater (1990) systematically studied market orientation from the behavioural and cultural perspectives, respectively. This study follows Narver and Slater's view and argues that the relationship between entrepreneurship orientation and innovation capability varies with the market-oriented culture (Slater and Narver, 1994). From the cultural perspective, market orientation comprises three components: customer orientation, competitor orientation,

and inter-functional coordination. Customer orientation and competitor orientation comprise the activities that gather the information about existing or future customers and competitors respectively and disseminating it throughout the firms; inter-functional coordination means the degree of interaction, communication, and coordination with regard to market information collected and used across organization-wide departments to achieve the organization's common goal (Atuahene-Gima, 2005; Narver and Slater, 1990), which collectively forms the unique strategic resources that guide managers in a certain direction (Hsieh et al., 2008).

Scholars consider market knowledge as a precious resource that is heterogeneous and hardly imitable by competitors (Kim and Atuahene-Gima, 2010). After collecting, processing, and utilizing market information, NPD managers would know the customers' value system and have an understanding of the potential customer demands and competitors' current product technology level to help them make effective decisions (Hong et al., 2013). Specifically, sensing the customer demands prompts NPD managers to more understand the emerging market opportunities and uncover their capability deficits. Further, by keeping track of competitor actions, managers gain valuable knowledge that help them effectively allocate resources because they sense the rival's strategy or action and then face time pressure to respond (Hsieh et al., 2015). Of course, inter-functional coordination enables NPD teams to better synthesize, integrate, and utilize their current and newly acquired market knowledge. Thus, under high levels of market orientation, market knowledge becomes a supplementary factor strengthening the managers' commitment resources on innovation capability (Morrish et al., 2010). In this sense, entrepreneurial managers will not only encourage teams to actively meet customer demands through innovative approaches, seeking innovative technological methods, but also adjust their strategic actions to counter their competitors' moves in advance. Besides, with coordination, managers will transform their acquired knowledge to suit their own context and stimulate the teams with broader and in-depth knowledge on innovation capability. In contrast, under low levels of market orientation, managers will rely merely on entrepreneurship, and the NPD teams will have difficulty in producing and successfully selling new products to gain advantage over their competitors. NPD teams may develop unrealistic or inferior ideas relative to their capability and thus decrease their new product innovation performance. From these arguments, we obtain the following hypotheses:

Hypothesis 3: Market orientation positively influences the relationship between entrepreneurship orientation and exploitation competence.

Hypothesis 4: Market orientation positively influences the relationship between entrepreneurship orientation and exploration competence.

C. Moderating Effects of Technological Knowledge

Technological knowledge means the extent to which firms can utilize the level of knowledge to conduct product innovation (Tsai et al., 2015). Insufficient technological knowledge can adversely affect the firms' self-innovation ability, competitive position and sustainable development ability, and even survival ability. Essentially, technological knowledge that entails absorptive capacity enables corporations to employ their prior

related knowledge to recognize, assimilate, and apply external knowledge to their own commercial objectives (Cohen and Levinthal, 1989). Under high levels of technological knowledge, entrepreneurial managers more likely lead the teams to enforce risk-taking and pioneering spirits on NPD process. Technological knowledge confers such NPD teams with ability to accomplish their innovative goals. Moreover, NPD teams with sufficient technological knowledge are more tendencies to explore and refine their capabilities for innovation in which they are capable of recognizing, assimilating, and applying external knowledge into their own contexts to create idiosyncratic and internal capability (Jansen et al., 2005; Zhara and George, 2002). Thus, technological knowledge will make it easier to transform entrepreneurial creativity and ideas and develop new technologies and new products that conform to firm objectives in a short time. On the contrary, under low levels of technological knowledge, entrepreneurial managers face the challenge of developing their capability since even though NPD teams may have a proactive and innovative attitude to pursue NPD, insufficient knowledge will make them feel unable and uncertain on implementing their strategic objectives. Consequently, the effect of EO on innovation capability is smaller under low levels of technological knowledge than under high levels. From the above discussion, we present the following hypotheses:

Hypothesis 5: Technological knowledge positively influences the relationship between entrepreneurship orientation and exploitation competence.

Hypothesis 6: Technological knowledge positively influences the relationship between entrepreneurship orientation and exploration competence.

III. RESEARCH DESIGN AND RESEARCH METHODS

A. Sample and Data Collection

The data used in this study were collected through a survey of the electronics and information technology industries in China. According to the national documents titled “Administrative Measures for the Determination of High and New Tech Enterprises” and “Guidance for Administration for the Determination of High and New Tech Enterprises”, a total of 3,831 electronic information enterprises were identified by the state from the Guangdong and Shandong provinces. The details of these enterprises can be found on the government’s official website (2013–2016). In this study, the questionnaires were filled at the site and sent by e-mail or post. The respondents included top management, R&D managers, and sales managers who had participated in the entire NPD process (Bonner and Walker, 2004). To ensure data accuracy and reliability, the participants were required to note two points. First, a new product refers to one that was launched in the market more than a year ago but has existed for less than three years; this definition was adopted to ensure that the respondents had sufficient information to evaluate performance, and to increase data accuracy. Second, a new product indicates participation in the firms’ product development programs. The respondents were asked to complete the survey based on their involvement in the development of the selected new product. In view of this, we randomly selected 800 participants from the list, receiving 270 completed questionnaires. After removing the invalid questionnaires, which were either blank or had

insufficient data, we were left with 246 valid questionnaires. Therefore, while 34% of the questionnaires were recovered, only 31% of the questionnaires were found to be valid. We further carried out the F test to verify whether there was a response bias but noted no significant difference in the average response of any construct (Armstrong and Overton, 1977).

B. Measures

Because the construct measures used in this study are from the extant scale, we use or adapt the existing measures for our purposes. For item evaluation, we use the seven-point scale from 'strongly disagree' to 'strongly agree'; this is for grading purpose. We use the following methods to measure each construct: (1) Entrepreneurship orientation is based on Li et al. (2006); the respondents are required to state the extent to which NPD managers attempt to use constructs for product development. (2) Market orientation consists of three dimensions: customer orientation, competitor orientation, and inter-functional coordination; for measuring market orientation, we used the scale based on the work of Atuahene-Gima (2005). (3) For measuring innovation capability, we use the scale used by previous scholars (Atuahene-Gima 2005; Zahra et al., 2000). Innovation capability is divided into exploitation competence and exploration competence; this shows the extent to which NPD teams achieved their product development goals. (4) Technological knowledge is based on the Community Innovation Survey 2010; in this survey, the respondents need to point out the degree of trying to involve innovation activities in the NPD process. (5) For new product innovation performance, we applied the scale used by Atuahene-Gima, Slater, and Olson (2005); this requires managers to evaluate the innovation performance of their new product.

In addition, we use two control variables to control for the confounding effects that might influence our hypotheses results. One is firm age, and the other is firm size. Firm age is used to identify the conditions in which the corporations were built; the firms' experiences and routines may cause or impede them to explore new products. Firm size indicates the extent to which the resources are utilized to help NPD teams develop new products (Tsai et al., 2011).

C. Reliability, Validity, and Descriptive Statistics

This study adopts the coefficient Cronbach's α to test the reliability of factors; confirmatory factor analysis (CFA) is used to assess the reliability and validity of the measures, including eight constructs. The measures are shown in Appendix A; these include the factor loading, composite reliability (CR), average variance extracted (AVE), and fit index. The CFA model results show that it reasonably fits with the data ($\chi^2/DF = 2.24$, RMSEA = 0.07, NFI = 0.94, CFI = 0.97, IFI = 0.97). According to Fornell and Larcker (1981), the CR shows that all constructs are above 0.7; this indicates that the results are accepted (Bagozzi and Yi, 1988). All loads show a significant level, indicating convergent validity (Bagozzi et al., 1991). Table 1 shows the correlation of the constructs.

For discriminative validity, we conduct a series of Chi-square tests on all constructs to determine whether the unrestricted model is significantly superior to the restricted one (Anderson and Gerbing, 1988). All combinations lead to a higher critical value ($\Delta\chi^2(1) = 3.84$ is at the 5% significance level), showing the discriminative validity acceptable to each scale. Therefore, we conclude that the constructs are different from one another and that the content measures are valid.

Table 1
Correlation coefficients

	CO	COO	IFC	Exploit	Explore	TK	EO	NPP	FA	FS
1	1									
2	0.66**	1								
3	0.60**	0.61**	1							
4	0.60**	0.50**	0.74**	1						
5	0.54**	0.55**	0.62**	0.66**	1					
6	0.61**	0.56**	0.66**	0.72**	0.68**	1				
7	0.53**	0.38**	0.54**	0.59**	0.47**	0.62**	1			
8	0.37**	0.30**	0.51**	0.45**	0.41**	0.43**	0.40**	1		
Mean	5.87	5.49	5.60	5.64	5.56	5.51	5.67	5.40	5.00	3.81
SD	0.66	0.94	0.92	0.95	0.87	0.96	0.83	0.96	2.21	1.91

*p<0.05, **p<0.01

Note: CO: Customer Orientation; COO: Competitor Orientation; IFC: Inter-Functional Coordination; Exploit: Exploitation Competence; Explore: Exploration Competence; TK: Technological Knowledge; EO: Entrepreneurship Orientation; NPP: New Product Innovation Performance; FA: Firm Age; FS: Firm Size

IV. ANALYSIS AND CONCLUSION

In the data analysis process, we mainly adopt hierarchical regression to verify the proposed hypotheses.

A. Mediating Effects of Innovation Capability

The mediating effects of innovation capability (i.e., exploitation competence and exploration competence) between entrepreneurship orientation and new product innovation performance are shown respectively in Tables 2. This study takes two approaches to confirm our hypotheses. First, we adopt a three-step regression procedure to verify our mediating hypotheses (Baron and Kenny, 1986). From Model 1 in Table 2, entrepreneurship orientation has a significantly positive influence on new product innovation performance ($\beta = 0.46$, $p < 0.01$). In addition, from Models 2 and 3, entrepreneurship orientation has a positive influence on exploitation competence and exploration competence, respectively ($\beta = 0.65$, $p < 0.01$ and $\beta = 0.49$, $p < 0.01$). Finally, when exploitation competence and exploration competence are added to Model 4, we find a positive and significant influence on new product innovation performance ($\beta = 0.23$, $p < 0.01$ and $\beta = 0.21$, $p < 0.01$, respectively). The degree of entrepreneurship orientation effect on new product innovation performance is reduced (from 0.46 to 0.21), but still remains significant, indicating a partial mediating effect. Second, we used the Sobel test to examine the mediating hypotheses (Hayes, 2013; Sobel, 1982). We found that entrepreneurship orientation has an indirect effect on new product innovation performance through exploitation and exploration, respectively ($0.65 * 0.23 = 0.15$, $t = 2.68$, $p < 0.01$; and $0.49 * 0.21 = 0.10$, $t = 2.42$, $p < 0.01$). In sum, both the Baron and Kenny (1986) three-step procedure and Sobel test confirmed the mediating effect of innovation capability on new product innovation performance. The results support H1 and H2.

Table 2
Results for mediated regression analyses

Variables	Criterion:		Criterion:		Criterion:			
	Exploitation Competence		Exploitation Competence		New Product Innovation Performance			
	Model 2		Model 3		Model 1		Model 4	
	β	t value	β	t value	β	t value	β	t value
FA	0.04	1.28	-0.02	-0.71	0.01	0.26	0.00	-0.11
FS	-0.13	-3.71**	-0.07	-1.89	-0.01	-0.21	0.04	0.87
EO	0.65	11.04**	0.49	8.24**	0.46	6.64**	0.21	2.54**
Exploit							0.23	2.75**
Explore							0.21	2.52**
F value	52.29**		28.24***		15.56**		16.16**	
R ²	0.39		0.26		0.16		0.25	
ΔR^2							0.09	
F change							14.39**	

*p<0.05 and **p<0.01

Note: This study used a two-tailed test for control variables and a one-tailed test for all hypotheses.

B. Moderating Effects

In this section, we verify how the moderating effects of market orientation and technological knowledge affect the entrepreneurship orientation of innovation capability. Statistical analyses results are shown in Tables 3 and 4. Following Aiken and West (1991), the independent and moderator variables form the mean center to avoid multi-collinearity problems. All the estimated coefficients of variance inflation factors (VIF) in the calculated results are below 10 (Mason and Perreault, 1991), indicating that multi-collinearity does not affect the results.

C. Moderating Effect of Market Orientation

From Model 1 in Table 3 and Table 4, the interpretation of exploitation and exploration competence indicates that control variables can be used to explain 8% and 4% of the variance, respectively. From Model 2, once the independent variable and moderator variables are added, R² increases by 58% and 49%, respectively. From Model 2, customer orientation has a positive influence on exploitation competence ($\beta = 0.19$, $p < 0.05$) but no significant influence on exploration competence ($\beta = 0.06$, $p > 0.05$). Furthermore, competitor orientation has no influence on exploitation competence ($\beta = -0.08$, $p > 0.05$) but has a significantly positive influence on exploration competence ($\beta = 0.13$, $p < 0.05$). As regards inter-functional coordination, the results indicate significantly positive influence on both exploitation competence and exploration competence ($\beta = 0.43$, $p < 0.01$ and $\beta = 0.20$, $p < 0.01$, respectively).

As regards the moderating hypotheses, once the interaction item of the independent variable and moderator variables are added, R² increases by 1%. The interaction between entrepreneurship orientation and market orientation has a significant and negative influence on exploitation competence (CO: $\beta = -0.15$, $p < 0.01$; COO: $\beta = -0.12$, $p < 0.01$; IC: $\beta = -0.09$, $p < 0.01$). Therefore, H3 is not supported. On the other hand,

the interaction between EO and CO has a significant influence on exploration competence ($\beta = 0.19$, $p < 0.01$), but the moderating effect of competitor orientation is non-significant ($\beta = 0.06$, $p > 0.05$). Further, the interaction between entrepreneurship and inter-functional coordination has a significant influence on exploration competence ($\beta = 0.11$, $p < 0.01$). Therefore, the moderating effects of customer orientation and inter-functional coordination are supported, but the interaction effect of competitor orientation is not supported. H4 is thus partially supported.

D. Moderating Effect of Technological Knowledge

From Model 2 in Table 3 and Table 4, technological knowledge has a positive influence on exploitation competence and exploration competence ($\beta = 0.32$, $p < 0.01$ and $\beta = 0.38$, $p < 0.01$), respectively, indicating that technological knowledge significantly impacts innovation capability. In Model 6, once the interaction item (entrepreneurship orientation and technological knowledge) is added, R^2 increases by 1% and 4% with regard to exploitation competence and exploration competence, respectively. The interaction effect between entrepreneurship orientation and technological knowledge has a significant influence on exploitation competence and exploration competence (exploitation competence: $\beta = -0.07$, $p < 0.05$; exploration competence: $\beta = 0.12$, $p < 0.01$). Therefore, H5 is not supported while H6 is supported.

IV. CONCLUSION

A. Discussion

This study examines the comprehensive relationship between entrepreneurship orientation, market orientation, technological knowledge, innovation capability, and new product innovation performance. In particular, the study shows that entrepreneurial managers influence new product innovation performance through a mediator, innovation capability. Baron and Kenny's (1986) three-step regression procedure and the Sobel test verify the mediating effect. That is, in developing new products, entrepreneurial managers reflect their strategic postures, such as innovativeness, proactiveness, and risk-taking, which are unique resources that cannot be easily imitated by competitors (Zhang et al., 2016). Moreover, on the one hand, EO boosts exploitation competence, encouraging NPD teams to refine their existing knowledge, sustain their extant opportunity, and increase their new product innovation performance. On the other hand, EO also motivates NPD teams to boldly carry out reforms and innovations and explore new technologies that increase their exploration competence; this elevates new product innovation performance. Thus, innovation capability is value-creating and transforms managers' strategic views into superior competitive advantages by refining existing resources and reconfiguring new knowledge resources (Benner and Tushman, 2003).

Table 3
Results for hierarchical moderated regression analyses (criterion: Exploitation Competence)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β	t value	β	t value	β	t value	β	t value	β	t value	β	t value
Firm age	0.1	2.77**	0.01	0.51	0.00	0.07	0.01	0.45	0.00	-0.08	0.00	0.03
Firm size	-0.2	-4.78**	-0.05	-1.75	-0.03	-1.23	-0.04	-1.57	-0.03	-1.24	-0.04	-1.39
EO			0.14	2.35**	0.09	1.48	0.11	1.92	0.09	1.60	0.09	1.41
CO			0.19	2.30**	0.19	2.34*	0.18	2.28*	0.19	2.35*	0.19	2.35*
COO			-0.08	-1.44	-0.05	-0.87	-0.07	-1.20	-0.03	-0.46	-0.04	-0.80
IFC			0.43	7.37**	0.41	7.08**	0.43	7.48**	0.38	6.29**	0.40	6.88**
TK			0.32	5.60**	0.30	5.24**	0.30	5.33**	0.29	5.21**	0.29	5.16**
EO*CO					-0.15	-2.89**						
EO*COO							-0.12	-2.50**				
EO*IFC									-0.09	-3.26**		
EO*TK											-0.07	-2.68*
F value	11.69		68.76		63.06		62.26		63.92		62.61	
R ²	0.08		0.66		0.67		0.67		0.67		0.67	
ΔR^2			0.58		0.01		0.01		0.01		0.01	
F change			83.64***		8.35**		8.24*		10.62**		7.16*	

*p<0.05 and **p<0.01

Note: This study used a two-tailed test for control variables and a one-tailed test for all hypotheses.

Table 4
Results for hierarchical moderated regression analyses (criterion: exploration competence)

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β	t value	β	t value	β	t value	β	t value	β	t value	β	t value
Firm age	0.03	0.74	-0.04	-1.68	-0.03	-1.18	-0.04	-1.65	-0.02	-0.99	-0.02	-0.94
Firm size	-0.12	-3.08**	0.00	-0.05	-0.02	-0.65	0.00	-0.13	-0.02	-0.66	-0.02	-0.62
EO			0.03	0.43	0.09	1.38	0.04	0.62	0.08	1.31	0.11	1.78
CO			0.06	0.71	0.06	0.71	0.06	0.73	0.06	0.73	0.06	0.69
COO			0.13	2.27*	0.09	1.61	0.13	2.14*	0.07	1.10	0.07	1.28
IFC			0.20	3.21**	0.23	3.67**	0.20	3.20**	0.27	4.27**	0.25	4.03**
TK			0.38	6.25**	0.41	6.79**	0.39	6.35**	0.41	6.90**	0.42	7.09**
EO*CO					0.19	3.40**						
EO*COO							0.06	1.15				
EO*IFC									0.11	3.88**		
EO*TK											0.12	4.30**
F value	6.58		40.91		38.83		36.91		36.91		40.73	
R ²	0.04		0.53		0.53		0.53		0.56		0.57	
ΔR^2			0.49		0.00		0.00		0.03		0.04	
F change			51.89***		11.57**		1.33**		15.03**		18.46**	

*p<0.05 and **p<0.01

Note: This study used a two-tailed test for control variables and a one-tailed test for all hypotheses.

As regards the moderating effects, surprisingly, market orientation (three components) negatively moderates the relationship between EO and exploitation competence. Specifically, increasing market orientation will shrink the effect of entrepreneurship orientation on exploitation competence. One possible reason for this is that entrepreneurial managers are adept at information scanning (Matsuno et al., 2002) and so, under low levels of market orientation, know how to refine existing resources, reduce costs, and efficiently maintain existing opportunities. Entrepreneurial managers may feel that market orientation provides redundant knowledge for developing exploitation competence. On the other hand, customer orientation and inter-functional coordination positively moderate the link between EO and exploration competence. This is consistent with our arguments because entrepreneurial managers are predisposed to risk-taking and innovation that support novelty and creativity in generating new market opportunities in which market knowledge offers customer needs and helps managers uncover their capability deficiencies and mitigate perceived uncertainties. Further, NPD teams under inter-functional coordination mechanisms integrate diverse knowledge and build trust among the team members to better understand their strengths and weaknesses so that entrepreneurs can capitalize on inter-functional coordination mechanisms and explore their capability. Thus, high levels of customer orientation and inter-functional coordination strengthen the effect of EO on exploration competence.

As regards technological knowledge, our findings show a negative moderating effect on entrepreneurship orientation-exploitation. Similarly, because EO enables NPD teams with information-process ability to refine their existing resources, the teams can recognize the technological knowledge for developing exploitation competence with little assistance. On the other hand, the effect of EO on exploration competence depends on technological knowledge. This supports our hypothesis that high levels of technological knowledge provides NPD teams with better ability and propensity to pursue more creative and risky ideas that could strengthen their exploration competence. Moreover, high levels of technological knowledge entails absorptive capacity that helps managers to recognize, assimilate, and utilize external information and knowledge to achieve their objective (Cohen and Levinthal, 1990). As such, the relationship between EO and exploration competence count on the level of technological knowledge.

B. Theoretical Implications

This study makes several important contributions to the existing literature related to EO and innovation. First, it demonstrates the innovation capability in NPD by indicating its mediating role. We argue that EO represents the strategic posture influencing how NPD managers carry out their strategic activities. Innovation capability plays an intermediate role in transforming entrepreneurial perspectives into competitive advantage (Zahra and George, 2002). Moreover, this study further proposes that the effect of entrepreneurship orientation on innovation capability varies with market orientation and technological knowledge. Market orientation is a complementary factor signifying market needs and shows how entrepreneurial managers can mitigate the uncertainties in exploring new capability.

Second, we contribute to the KBV literature and learning theory. According to organization learning, firms ought to balance the relationship between exploitation competence and exploration competence. This indicates that these are the main factors

for corporations to achieve efficiency and flexibility (O' Reilly and Tushman, 2008). In this study, we propose that the entrepreneurs can trigger new product innovation performance through innovation capability. Moreover, according to the literature, knowledge is the valuable resource that promote the development ability and competitive advantage of firms and increase the possibility of their success or survival (Kogut and Zander, 1992). In line with this reasoning, in order to adapt to the changes in the external environment and meet the current and potential market demands, entrepreneurial managers use their market and technological knowledge to find their capability deficits and thereby mend their innovation ability. In such processes, NPD teams may not fall into the familiarity trap and thus show superior product innovation. NPD teams will be more inclined to invest in new ideas or experiments and satisfy customers' requirement in a novel way so as to reduce information asymmetry.

C. Managerial Implications

From the practical perspective, our empirical analysis has shown that entrepreneurship via innovation capability has a positive influence on new product innovation performance. That is, entrepreneurs encourage NPD teams to actively learn, communicate, and proactively participate in innovation activities and thereby build their ability to innovate, which in turn increases new product innovation performance. In addition, business marketers ought to be sensitive to market opportunities or threats, capable of predicting the changes in market supply and demand, and encouraging to teams to actively and independently put forward creative or new ideas. Moreover, entrepreneur managers who depend on technological knowledge might be able to undertake the possible risk of implementing such creative ideas and thus intensify their ability to explore new products.

D. Limitation and Future Development Direction

This study makes a positive contribution to theories and practices, but has certain limitations. First, it focuses on how enterprises transition from entrepreneurship to new product innovation performance through exploitation competence and exploration competence. The two capabilities may interact with each other and produce collaborative competence. Second, the study uses only cross-sectional data for its empirical research and verification of the proposed hypotheses. Future studies could conduct longitudinal data to verify this aspect.

Appendix A

CFA of measures

Measure and Source	Operational Measures of Construct	SFL
Customer Orientation (Atuahene-Gima, 2005) AVE=.35 CR=.79 α =.79	● We regularly meet customers to learn about their current and potential needs for new products.	.51
	● We constantly monitor and reinforce our understanding of the current and future needs of customers.	.53
	● We have a thorough knowledge about emerging customers and their needs.	.62
	● Information about current and future customers is integrated in our plans and strategies.	.54
		.50

	<ul style="list-style-type: none"> ● We regularly use research techniques such as focus groups, surveys, and observations to gather customer information. ● We have developed effective relationships with customers and suppliers to fully understand new technological development that affect customers' needs. ● We systematically process and analyze customer information to fully understand their implications for our business. 	.66 .76
Competitor Orientation (Atuahene-Gima, 2005) AVE=.48 CR=.78 α =.83	<ul style="list-style-type: none"> ● We regularly collect and integrate information about the products and strategies of our competitors. ● We systematically collect and analyze information about potential competitor activities. ● Managers in this firm regularly share information about current and future competitors within the company. ● Our knowledge of current and potential competitors' strengths and weaknesses is very thorough. 	.81 .83 .72 .62
Inter-Functional Coordination (Atuahene-Gima, 2005) AVE=.44 CR=.83 α =.87	<ul style="list-style-type: none"> ● The activities of functional units are tightly coordinated to ensure better use of our market knowledge. ● Functions such as R&D, marketing, and manufacturing are tightly integrated in inter-functional teams in the product development processes. ● R&D and marketing and other functions regularly share market information about customers, technologies, and competitors. ● There is a high level of cooperation and coordination among functional units in setting the goals and priorities for the organization to ensure effective response to market conditions. ● Top management promotes communication and cooperation among R&D, marketing, and manufacturing in market information acquisition and use. ● People from marketing, R&D, and other functions play important roles in major strategic market decisions. 	.68 .65 .77 .78 .76 .72
Exploitation Competence (Atuahene-Gima, 2005) AVE=.46 CR=.77 α =.82	<ul style="list-style-type: none"> ● Upgraded current knowledge and skills for familiar products and technologies. ● Enhanced competencies in searching for solutions to customer problems that are near to existing solutions rather than completely new solutions. ● Upgraded skills in product development processes in which the firm already possesses significant experience. ● Strengthened our knowledge and skills for projects that improve efficiency of existing innovation activities. 	.75 .62 .78 .79
Exploration Competence (Atuahene- Gima, 2005) AVE=.43 CR=.79 α =.82	<ul style="list-style-type: none"> ● Acquired manufacturing technologies and skills entirely new to the firm. ● 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. ● 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). 	.67 .69 .84 .74

	<ul style="list-style-type: none"> ● Learned new skills in areas such as funding new technology, staffing R&D function, training and development of R&D, and engineering personnel for the first time. ● Strengthened innovation skills in areas where it had no prior experience. 	.61
Technological Knowledge (The Community Innovation Survey issued by OECD in 2010) AVE=.44 CR=.84 α =.89	<ul style="list-style-type: none"> ● In-house R&D: Creative work undertaken within your enterprise to increase the stock of knowledge for developing new and improved products and processes (include software development in-house that meets this requirement). 	.64
	<ul style="list-style-type: none"> ● External R&D: Same activities as above, but performed by other enterprises (including other enterprises or subsidiaries within your group) or by public or private research organizations and purchased by your enterprise. 	.58
	<ul style="list-style-type: none"> ● Acquisition of advanced machinery, equipment (including computer hardware) or software to produce new or significantly improved products and processes. 	.74
	<ul style="list-style-type: none"> ● Acquisition of external knowledge: Purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other enterprises or organizations for the development of new or significantly improved products and processes. 	.78
	<ul style="list-style-type: none"> ● Training for innovative activities: Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes. 	.84
	<ul style="list-style-type: none"> ● Design: Activities to design, improve or change the shape or appearance of new or significantly improved goods or services. 	.81
	<ul style="list-style-type: none"> ● Other activities to implement new or significantly improved products and processes such as feasibility studies, testing, routine software development, tooling up, industrial engineering, etc. 	.77
Entrepreneurship Orientation (Li et al., 2006) AVE=.43 CR=.75 α =.78	<ul style="list-style-type: none"> ● Our manager has a strong emphasis on R&D, technological leadership and innovation. 	.70
	<ul style="list-style-type: none"> ● Our manager has a strong tendency for high-risk NPD projects which have a chance of very high returns. 	.61
	<ul style="list-style-type: none"> ● Our manager has a tendency to initiate action that competitors respond to. 	.74
	<ul style="list-style-type: none"> ● Our manager has a tendency to be a leader, always introducing new products, service or technology first. 	.67
New Product Innovation Performance (Atuahene-Gima et al., 2005) AVE=.67 CR=.89 α =.90	<ul style="list-style-type: none"> ● This new product reached firm's objectives of market share. 	.88
	<ul style="list-style-type: none"> ● This new product reached firm's objectives of sales. 	.91
	<ul style="list-style-type: none"> ● This new product reached firm's objectives of returns on investment. 	.75
	<ul style="list-style-type: none"> ● This new product reached firm's objectives of profitability rate. 	.79

Model Fit Indices: $\chi^2 / DF = 1681.44 / 751 = 2.24$, CFI = 0.97, NFI = 0.94, IFI = 0.97, RMSEA = 0.07

SFL: Standardized Factor Loadin

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