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Absorptive Capacity, Incremental Innovative Capability and Firm Performance: The
Moderating Roles of Entrepreneurial Orientation and Transactional Leadership

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Abstract

This study examines the moderating impact of entrepreneurial orientation and transactional leadership in the absorptive capacity-performance linked mediated by innovation. Existing literature has paid little attention to how moderating variables such as entrepreneurial orientation and transactional leadership might affect this mediating relationship. Drawing on organizational learning theory, we propose that entrepreneurial orientation and transactional leadership are the boundary conditions of the indirect effect of absorptive capacity on firm performance through incremental innovative capability. Data collected from 115 firms in China shows that entrepreneurial orientation boosts the impact of absorptive capacity on incremental innovative capability which, in turn, enhances firm performance. In addition, the impact of incremental innovative capability on firm performance is contingent upon transactional leadership.

Keywords: Absorptive Capacity; Incremental Innovative Capability; Entrepreneurial Orientation; Transactional Leadership; Moderated Mediation; China

1 Introduction

Absorptive capacity refers to “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990, p. 128) and is recognized as a key driver of the competitive advantage of a firm (Marabelli & Newell, 2014). Although absorptive capacity has been proposed to directly contribute to firm performance in various theoretical frameworks (Todorova & Durisin, 2007; Volberda, Foss, & Lyles, 2010), empirical findings remain inconclusive (Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011; Wales, Parida, & Patel, 2013).

A recent meta-analysis review shows that absorptive capacity affects firm performance positively via innovation as a mediator, but it remains to be understood about the boundary conditions (Zou, Ertug, & George, 2018). The investigation of different contextual variables on the indirect effect of absorptive capacity on firm performance is important in order to resolve differences in firm performance. Drawing on organizational learning theory, this study proposes a moderated mediation model to investigate how entrepreneurial orientation and leadership style moderate the link from absorptive capacity to innovative capabilities, and to firm performance.

Since the roots of absorptive capacity lie in organizational learning theory (Volberda et al., 2010), the latter is the most widely used theory for the study of absorptive capacity. Based on the organizational learning theory, Bapuji and Crossan (2004) proposed that strategic orientation and leadership affect the benefits of learning and called for more research to investigate the boundary conditions of the link between organizational learning and firm performance. To address this research gap, we integrate entrepreneurial orientation and transactional leadership as two boundary conditions. The objective is threefold.

Firstly, this study investigates the moderating effect of entrepreneurial orientation on the link between absorptive capacity and incremental innovative capability. Internal drivers affect the efficiency and effectiveness of absorptive capacity because a firm's strategic orientation drives the focus on the recognition of opportunities and areas of knowledge to be acquired and the application to create commercial values (Lane, Koka, & Pathak, 2006). Entrepreneurial orientation is one major type of a firm's strategic orientations and represents pursuing opportunities for organizational development (Danny Miller, 1983).

Secondly, we examine the moderating effect of entrepreneurial orientation on the indirect relationship between absorptive capacity and firm performance via incremental innovative capability. Earlier research shows that absorptive capacity has an indirect effect on firm performance via innovation (Zou, Ertug, & George, 2018). The examination of the effect of entrepreneurial orientation on the relationship between absorptive capacity and firm performance is essential to further our understanding of how to realize the strategic value of absorptive capacity.

And finally, the current study aims to investigate the moderating role of transactional leadership in the link between incremental innovative capability and firm performance. Transactional leadership refers to the development of fair and stable exchange relationships between leaders and their followers (Bernard

M. Bass, 1999). Innovation is generally considered risky (Zhou, 2006), and transactional leaders are risk-averse and may consider innovation as deviance from an existing plan. Therefore, transactional leaders may be less willing to support the development of innovation.

2 Theory and hypotheses

Absorptive capacity, defined as the firm's capability to identify, assimilate and exploit knowledge, is crucial for firms to develop knowledge. Since the seminal paper coined the idea, a significant number of research studies have applied, measured, operationalized and re-conceptualized the construct of absorptive capacity (Apriliyanti & Alon, 2017; Volberda et al., 2010). Organizational learning theory argues that firms need to exploit what they have previously learnt and explore and learn new knowledge (March, 1991).

As a learning capability, absorptive capacity is essential in boosting the innovative capabilities of a firm (Cohen & Levinthal, 1990). The firm's ability to acquire and utilize knowledge is closely related to the firm's capacity to innovate (Subramaniam & Youndt, 2005). While Cohen and Levinthal (1990) argue that knowledge from external sources is essential for a firm's innovation process, George et al. (2001) suggest that it is the firm's ability to utilize knowledge in developing innovative products that can enhance the firm's competitive advantage and improve financial performance.

In the seminal work, Cohen and Levinthal (1990) adopt R&D as a proxy for measuring absorptive capacity, and therefore early research has mainly focused on large firms or firms in high-tech industries. Those firms have strong financial resources and human capital to conduct large scales of R&D. However, one European study shows that 55% of small innovative firms and 25% of large innovative firms are not engaging in in-house R&D or adopting contract R&D (Arundel, Bordoy, & Kanerva, 2007). The focus on R&D-intensive sectors limits the generalization of the theory and more research starts to cover firms with fewer R&D activities (Flatten, Greve, & Brettel, 2011; Muscio, 2007) and from different industries (Chang, Chen, & Lin, 2014). Incremental innovations are common in emerging markets, and firms develop incremental innovations more frequently compared to radical innovation, which is new-to-the-world innovation (Pietrobelli & Rabellotti, 2011). For example, in low- and medium-tech industries, firms conduct mostly incremental innovation rather than radical innovation (Sciascia, D'oria, Bruni, & Larrañeta, 2014). Since "incremental innovations are best supported by an absorptive capacity" (Lane et al. 2006, p. 850) and are more relevant to firms in emerging markets and therefore, we adopt the incremental innovative capability as the mediating variable between absorptive capacity and firm performance.

Lane et al. (2006) conduct a thematic analysis and reveal that absorptive capacity has been mainly applied in the study of organizational learning, interorganizational learning, innovation, knowledge, organizational structure, and organizational scope. Since the roots of absorptive capacity lie in the literature of organizational learning (Volberda et al., 2010), organizational learning theory is the most widely used theory for the study of absorptive capacity. The organizational learning theory is developed by Cangelosi and Dill (1965) and it focus on the importance of the creation and utilization of knowledge.

It has become one of the important research fields in the area of management (Easterby - Smith et al., 2000). Therefore, organizational learning theory will be evoked as the overarch theory for the research framework of the current study.

2.1 Entrepreneurial orientation moderates the impact of absorptive capacity on incremental innovative capability

Absorptive capacity is a dynamic process, including exploratory learning, transformative learning, and exploitative learning (Lane et al., 2006). Exploratory learning plays the role of a funnel that allows a firm to search broadly for knowledge to meet the firm's specific needs (Zahra & George, 2002). Transformative learning enables the firm to combine new knowledge with existing knowledge (Lane et al., 2006). Exploitative learning enables the firm to utilize transformed knowledge to create new knowledge. Incremental innovative capability primarily draws upon the firm's existing knowledge (Subramaniam & Youndt, 2005). Absorptive capacity continuously reinforces the existing knowledge base, which leads to the enhancement of incremental innovative capability. A recent meta-analysis review shows that absorptive capacity has a strong impact on the generation of innovation (Song et al., 2018).

Entrepreneurial orientation affects how the firm explores, transforms, and exploits external knowledge, thereby influencing the effectiveness and efficiency of absorptive capacity in creating incremental innovative capability. Firstly, firms with strong absorptive capacity can recognize and acquire valuable knowledge from external sources through exploratory learning. Entrepreneurial firms are proactive in identifying new trends (Lumpkin & Dess, 1996) and taking risks to advance into new markets (D. Miller & Friesen, 1978). Earlier research indicates that entrepreneurial firms would fully utilize absorptive capacity to scan the environment (Hambrick, 1982) and can discover more knowledge than non-entrepreneurial firms (Stevenson & Jarillo, 2007). With the same level of exploratory learning capability, entrepreneurial firms are able to leverage absorptive capacity to acquire more knowledge that is useful and to create greater incremental innovative capability.

Secondly, firms with strong absorptive capacity develop routines and processes to assimilate valuable knowledge through transformative learning. Innovativeness refers to a firm's tendency to support new ideas and engage in experimentation (Lumpkin & Dess, 1996). For innovative firms, employees are supported to innovatively combine newly acquired knowledge with existing knowledge stock, make unconventional connections between existing knowledge, or interpret old knowledge in new ways, which update the prevailing knowledge base (Griffith, Noble, & Chen, 2006).

Thirdly, firms with strong absorptive capacity can effectively exploit transformed knowledge and create new knowledge. The exploitation requires sharing of relevant knowledge among members within the firm, which promote comprehension and mutual understanding. Entrepreneurial orientation creates an open and collaborative environment, which facilitates the flow of knowledge among different units within the firm (Wang, 2008). Therefore, entrepreneurial orientation can enhance the process efficiency of absorptive capacity in creating incremental innovative capability. Overall, firms with greater entrepreneurial orientation can take better advantage of absorptive capacity, resulting in better incremental innovative capability. Thus, we propose:

Hypothesis 1: Entrepreneurial orientation positively moderates the impact of absorptive capacity on incremental innovative capability such that the higher a firm's entrepreneurial orientation, the greater the effect of its absorptive capacity on its incremental innovative capability.

2.2 Absorptive capacity, incremental innovative capability, and firm performance: the moderation effect of entrepreneurial orientation

Research in organizational learning and absorptive capacity indicates that the mere acquirement of knowledge from the external environment does not guarantee success in the application (Lane et al., 2006). The success of internalizing external knowledge enhances the firm's innovative capability which may lead to superior performance (George et al., 2001). Therefore, absorptive capacity is a necessary but insufficient prerequisite to enhancing firm performance. The value of absorptive capacity needs to be realized by the creation of innovative products which form the foundation of superior performance (Nonaka & Takeuchi, 1995). A meta-analysis shows that innovation fully mediates the link between absorptive capacity and firm performance (Zou et al., 2018). "Incremental innovations are best supported by an absorptive capacity" (Lane et al. 2006, p. 850), therefore, it is expected that incremental innovative capability can also mediate the positive effect of absorptive capacity on a firm's performance.

As argued in hypothesis 1, entrepreneurial orientation positively moderates the effect of absorptive capacity on incremental innovative capability. Taken together, we argue that entrepreneurial orientation can bolster the positive impact of absorptive capacity on firm performance via incremental innovative capability. Entrepreneurial firms are proactive in identifying new trends and active in pursuing new opportunities. They are more willing to utilize absorptive capacity to discover opportunities through their network contact (Engelen, Kube, Schmidt, & Flatten, 2014). However, the interactive effects of absorptive capacity and entrepreneurial orientation on firm performance might still need to reply on incremental innovative capability as a mediator. Therefore, we propose:

Hypothesis 2: Incremental innovative capability mediates the interaction effect of absorptive capability and entrepreneurial orientation on firm performance.

2.3 The moderating effect of transactional leadership in the link between incremental innovative capability and firm performance

The incremental innovative capability enables the firm to refine prevailing products or services to satisfy the needs of customers and create profit for the organization (Auh & Menguc, 2005). Earlier research shows that the characteristics of the top management team moderate the relationship between novelty and firm performance (Amason, Shrader, & Tompson, 2006). Top leaders have direct control over what activities are rewarded and what behaviors are encouraged (Bryant, 2003). Transactional leaders create an organizational culture that focuses on following existing rules and norms (Bernard M Bass & Avolio, 1993). Building on the prior research that an uncertainty avoidance culture negatively moderates the relationship between incremental innovation and firm performance (Mueller, Rosenbusch, & Bausch, 2013), we propose that transactional leadership is a key situational factor that could negatively affect the positive effect of incremental innovative capability on firm performance.

Resource endowment plays a pivotal role in the success of incremental innovation (Mueller et al., 2013). Innovation is generally considered risky (Zhou, 2006), and may be considered deviant from norms. Incremental innovation generally creates relatively predictable and clear outcomes (Mueller et al., 2013), however, transactional leaders are risk-averse and may perceive incremental innovation as risky and consider it as deviance from an existing plan. Therefore, transactional leaders are less willing to support the development of innovation. When employees utilize incremental innovative capability to refine existing products, with less support from the firm, fewer innovative products will be created, which causes lower firm performance. For this reason, when employees utilize capabilities to develop incremental innovations under high transactional leadership, it is less likely that the capability will make as great a contribution to the firm as will the application of capability under low transactional leadership. Therefore, we propose:

Hypothesis 3: Transactional leadership negatively moderates the impact of incremental innovative capability on firm performance.

Figure 1 illustrates the conceptual model of this study.

INSERT FIGURE 1 ABOUT HERE

2.4 Data collection

China is the second-largest economy in the world and its market is highly competitive. From the perspective of innovation, one observes that firms in China have been devoted to acquiring technologies to develop innovative products to catch up with global rivals and remain domestically competitive (Li & Atuahene-Gima, 2001; Zhou & Li, 2012). Therefore, China is an ideal setting to investigate the proposed model.

The questionnaire was developed in English and then translated into Chinese, and then the Chinese version was translated back into English to ensure the accuracy of the translation of measurement (Brislin, 1970). The questionnaire is distributed to 10 managers of five firms in 2019 to pilot test the validity of its instruments and survey items are modified based on the findings.

Two informants from each company were invited to participate in the survey. The data collection was conducted in two phases. Firstly, questionnaires were distributed to 140 firms in Guangdong province in China from November to December 2019. A local financial institution facilitates the distribution and collection of surveys. Questionnaires are distributed to managers who have extensive knowledge of their organizational variables in the proposed research model. The respondent positions are mainly top executives and production managers. To increase the response rate and the quality of data, informants are guaranteed confidentiality and informed that there is no right or wrong answer for each item. Among 140 firms, 103 firms responded to the survey, representing a response rate of 73.6%. Secondly, additional data are collected through the network of MBA graduates and students. Invitations are sent out to 77 senior managers directly and they are invited to fill in the questionnaire through Wen Juan Xing, a web-based

platform in China. The second phase of data collection includes more regions in China. Senior managers from 57 companies participated in the survey and the final sample size is 160.

Overall, the response rate for the two phases of data collection is 73.73%. Responses from 45 firms are excluded due to too much missing data or respondents indicating low familiarity with the topic or incomplete paired questionnaires (e.g., the second informant did not participate in the survey). The final effective sample consists of 115 companies, representing a rate of 53.00%. A t-test on the company size, measured by the number of employees, shows no statistical difference between samples from the first phase of data collection and samples from the second phase of data collection.

Table 1 shows the profile of surveyed companies. Among 115 firms, 27.0% operate for more than 20 years, 52.2% have been operating between 10 and 20 years, and 20.9% operate for less than 10 years. In terms of the size of the firms, 23.5% have less than 100 employees, 14.8% have 100-200 employees, 14.8% have 201-300 employees, 12.2% have 301-500 employees, 25.2% have 501-2000 employees, and 9.6% have more than 2000 employees. 115 firms are from different industries including manufacturing, chemical, plastic products, textiles, automobiles, information and communications technology, etc.

INSERT TABLE 1 ABOUT HERE

Among the first informants' group, 50.4% are males and 47.0% are females. 36.5% of respondents are in the age group of 20-35 and 50.4% are in the age group of 36-50. Most respondents have an associate or undergraduate degree. The average tenure in the current job position is 6.35 years (SD = 4.23). The average tenure in this company is 9.66 years (SD = 6.23). The average tenure in this industry is 13.89 years (SD = 7.68). For the second informants' group, 59.1% are males and 37.4% are females. 35.7% of respondents are in the age group of 20-35 and 58.3% are in the age group of 36-50. The majority of respondents have an associate or undergraduate degree. The average tenure in the current job position is 5.63 years (SD = 3.62). The average tenure in this company is 8.78 years (SD = 5.33). The average tenure in this industry is 12.29 years (SD = 6.35).

2.5 Measures

The questionnaire uses a Likert scale for each construct. The measurements are adapted from the used scaled in the existing literature.

2.5.1 Independent variable and mediating variable

Absorptive capacity is measured with 18 items to capture the effective exploratory, transformative and exploitative learning of knowledge (Lane et al., 2006). The measure of *absorptive capacity* is adopted

from the study of José Luis Ferreras-Méndez, Newell, Fernández-Mesa, and Alegre (2015) which has been validated in other research (J. L. Ferreras-Méndez, Fernández-Mesa, & Alegre, 2019). Cronbach's alpha of absorptive capacity is 0.964. Absorptive capacity is the mean score of 18 items. *Incremental innovative capability* construct is adopted from Subramaniam and Youndt (2005)'s research. Respondents are asked to rate their organization's capability to generate incremental innovations in the products/services they introduced. Cronbach's alpha of incremental innovative capability is 0.919. Incremental innovative capability is the mean score of 4 items.

2.5.2 Moderating variable and dependent variable

Entrepreneurial orientation construct is developed by Covin and Slevin (1989) and it measures three behavioral characteristics of the firm, including innovativeness, proactiveness, and risk-taking (Covin & Slevin, 1989). Many other studies have used this scale (Engelen et al., 2014). The measurement scale includes 9 items to measure a firm's innovativeness, proactiveness, and risk-taking and they are reflective scales. Cronbach's alpha of entrepreneurial orientation is 0.915. Entrepreneurial orientation is the mean score of 9 items. *Transactional leadership* is measured with contingent reward (B. M. Bass, Avolio, Jung, & Berson, 2003; Dayan, Di Benedetto, & Colak, 2009). The measurement scale includes 4 items (He, Song, Yang, & Chen, 2020). The respondents are asked to indicate the frequency of the CEO showing specified behavior in the statements on a 5-point Likert response scale from 1 (not at all) to 5 (always). Cronbach's alpha of transactional leadership is 0.826. Transactional leadership is the mean score of 4 items.

The measurement of *firm performance* is adopted from Gong, Law, Chang, and Xin (2009). The respondents are asked to evaluate the firm's performance compared with major competitors on a five-point scale ranging from "much worse than our competitors" to "much better than our competitors". The respondents need to evaluate the firm performance in areas of profit, total sales growth, market share, total asset growth, after-tax return on total assets, after-tax return on total sales, and labor productivity. Objective data on firm performance is difficult to collect and often it is inaccurate in research in China (Gong et al., 2009). These relative firm performance measures have been applied in research in China (Gong et al., 2009; Gong, Zhou, & Chang, 2013). Cronbach's alpha of firm performance is 0.945. Firm performance is the mean score of 7 items.

2.5.3 Control variables

Similar to related studies on absorptive capacity, innovation, and performance, we adopt five control variables. *R&D intensity* is included as a control variable, as it has been used as a proxy for absorptive capacity in many previous studies (Lane et al., 2006). *R&D intensity* is measured by the percentage of R&D expenditures to sales. *Firm age* is measured by the number of years since the firm was established (Wiklund & Shepherd, 2003). I also control for the effect of *firm ownership*, as in China, firm ownership influences firm performance (Kotabe, Jiang, & Murray, 2017; Xie, Wang, & Zeng, 2018). Following Kotabe et al. (2017)'s measurement scale, it measures with 1 = state-owned, 2 = collectively owned, 3 = private, 4 = publicly listed, 5 = joint venture with a majority stake, and 6 = joint venture with a minority stake. A firm's *past performance* is measured by the increase in the firm's revenue in the last 3 years (Wiklund & Shepherd, 2003). *Firm size* is measured by the log of the number of employees (Kostopoulos et al., 2011).

2.6 Construct reliability and validity

The unidimensionality and convergent validity of the constructs are then tested by confirmatory factor analysis (CFA) using AMOS 27.0.0. Composite reliability (CR) of each construct is all above 0.8, specifically, the CR of absorptive capacity is 0.939, incremental innovative capability is 0.919, firm performance is 0.947, entrepreneurial orientation is 0.860, and transactional leadership is 0.844. All scores are beyond the threshold of 0.7, proposed by Hair, Black, Babin, and Anderson (2010). The results show that all constructs have good reliability. Average variance extracted (AVE) of all constructs are above 0.5 (Bagozzi & Yi, 1988), specifically, absorptive capacity is 0.836, incremental innovative capability is 0.791, firm performance is 0.856, entrepreneurial orientation is 0.675, and transactional leadership is 0.580. The results show that all constructs have good convergent validity.

To measure discriminant validity, the square root of the AVE of all constructs is compared with the inter-construct correlations. The square root of the AVE of each construct is much higher than the correlation with other constructs (Fornell & Larcker, 1981), therefore all constructs have good discriminant validity. Next, confirmatory factor analysis is conducted to measure the discriminant validity. Following Little, Cunningham, Shahar, and Widaman (2002)'s recommendation, we adopt partial aggregation to form parcels for latent variables. For multidimensional constructs, following the suggestion from Kishton and Widaman (1994) and Little et al. (2002), we adopt an internal consistency approach to create parcels that group items together based on the facets to which each item belongs. The five-factor model (absorptive capacity, incremental innovative capability, firm performance, entrepreneurial orientation, and transactional leadership) shows a satisfactory fit with the data ($\chi^2(94) = 121.658$, $\chi^2/df = 1.294$, $p = .029$; CFI = .979, TLI = .974, RMSEA = .051, SRMR = .048).

2.7 Common method bias

This study uses managers' self-reports to collect all the data, therefore common method bias could be a potential problem (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Using the same respondent for all variables generates the potential for common method bias (Podsakoff et al., 2003). To minimize the possibility of common method bias, we adopt a two-informant method. The first informant for the general questionnaire is mainly top executives who are the most knowledgeable about the overall operation of the entire company (Vanderwerf & Brush, 1990). The second informant answers questions related to the firm's incremental innovative capability, and they are mainly the production manager or R&D director, or operation manager who knows the firm's capability in creating innovation. In order to avoid common method bias, the analysis uses data from the second informant for measuring incremental innovative capability and uses data from the first informant for all other constructs. Furthermore, following the suggestions of Johnson, Rosen, and Djurdjevic (2011), procedural remedies are adopted to reduce the impact of common method variance. In the survey, each construct uses different scale anchors which can reduce common method variance (Podsakoff et al., 2003). Thirdly, the proposed research model includes the interaction effect which is less likely to be affected by common method bias (Evans, 1985).

3 Results

Table II reports the means, standard deviations and Pearson correlation coefficients of all variables studied in this research. As shown in Table II, absorptive capacity is positively correlated with incremental innovative capability. Incremental innovative capability is positively correlated with firm performance. We adopt the PROCESS macro developed by Hayes (2017) to test hypotheses. The PROCESS macro is a path analysis tool that can simultaneously examine the strength of moderation and mediation effects by using bootstrapping procedures (Hayes, 2012, 2017; Preacher, Rucker, & Hayes, 2007).

INSERT TABLE II ABOUT HERE

Hypothesis 1 proposes that entrepreneurial orientation positively moderates the impact of absorptive capacity on incremental innovative capability such that the positive link would be strengthened when entrepreneurial orientation is high. The results are summarized in Table III. Absorptive capacity significantly explains incremental innovative capability ($\beta = 0.4260$, $p = 0.0001$). The interaction term of entrepreneurial orientation and absorptive capacity is significant for incremental innovative capability ($\beta = 0.1826$, $p = 0.0206$, $\Delta R^2 = 0.0358$, $F(1, 106) = 5.5256$). Therefore, entrepreneurial orientation moderates the link between absorptive capacity and incremental innovative capability.

INSERT TABLE III ABOUT HERE

Hypothesis 2 predicts that entrepreneurial orientation enhances the indirect effect of absorptive capacity on firm performance through incremental innovative capability. We adopt SPSS PROCESS macro (model 7) to conduct moderated mediation analysis (Hayes, 2017). The results of 5,000 bootstrap sample reveal that the conditional indirect effect of absorptive capacity on firm performance via incremental innovative capability is significant when entrepreneurial orientation is positive and around 1SD. The point estimate for the indirect effect of absorptive capacity on firm performance is high, $\beta = 0.1217$, $SE = 0.0524$, 95% confidence interval (CI) [.0245, .2281]. For firms with a low level of entrepreneurial orientation (-1SD), the indirect effect of absorptive capacity on firm performance is not significant, indirect effect = 0.0374 (CI) [-.0146, .1004]. In addition, Table IV presents that the index of moderated mediation by entrepreneurial orientation is 0.0341, (95% bias-corrected confidence interval [.0026, .0792]), which indicates the conditional indirect effect of absorptive capacity on firm performance via incremental innovative capability is significantly moderated by entrepreneurial orientation. In summary, the mediating effect of incremental innovative capability is the strongest when entrepreneurial orientation is high, lending support to Hypothesis 2.

INSERT TABLE IV ABOUT HERE

In Hypothesis 3, we propose that transactional leadership negatively moderates the impact of incremental innovative capability on firm performance such that the positive relationship would be weakened when transactional leadership is high. Results are summarized in Table V. Incremental innovative capability significantly explains firm performance ($\beta = 0.3429$, $p = 0.0006$). The interaction term of incremental innovative capability and transactional leadership is negative and significant for firm performance ($\beta = -0.2485$, $p = 0.0358$, $\Delta R^2 = 0.0309$, $F(1, 106) = 4.5203$). Therefore, transactional leadership negatively moderates the relationship between incremental innovative capability and firm performance.

INSERT TABLE V ABOUT HERE

4 Discussion

This study addresses the important research question of how and when absorptive capacity affects firm performance by revealing the underlying mechanisms (e.g., incremental innovative capability) and identifying the boundary conditions (e.g., entrepreneurial orientation & transactional leadership) of the link between absorptive capacity and firm performance. In hypothesis 1, we propose that entrepreneurial orientation positively moderates the impact of absorptive capacity on incremental innovative capability such that firms with a high level of entrepreneurial orientation would enhance the positive effect of absorptive capacity on incremental innovative capability. In hypothesis 2, we propose that entrepreneurial orientation enhances the indirect effect of absorptive capacity on firm performance through incremental innovative capability. In hypothesis 3, we propose that transactional leadership negatively moderates the impact of incremental innovative capability on firm performance and the hypothesis receives full support. Three hypotheses received full support from data collected from firms in the emerging market of China.

4.1 Implications for theory

Although absorptive capacity has been proposed to contribute to a firm's performance in various theoretical frameworks (Todorova & Durisin, 2007; Volberda et al., 2010; Zahra & George, 2002), empirical research shows inconclusive findings on the link between absorptive capacity and firm performance (Flatten et al., 2011; Wales et al., 2013). This research further increases our understanding of the impact trajectories of the absorptive capacity-performance link by examining the complex mechanism and boundary conditions of how and when absorptive capacity leads to superior firm performance. Our findings provide strong evidence that the indirect impact of absorptive capacity on firm performance via incremental innovative capability is stronger for firms with higher entrepreneurial orientation. The findings of this research have three key theoretical implications.

Firstly, our findings show that entrepreneurial orientation enhances the positive relationship between absorptive capacity and incremental innovative capability. Classical theoretical literature proposes that absorptive capacity contributes to a firm's innovative capability (Cohen & Levinthal, 1990) and Lane et al. (2006) argue that "incremental innovations are best supported by an absorptive capacity" (p. 850). The findings of this study are consistent with theoretical expectations and earlier empirical research on the relationship between absorptive capacity and innovative capability (Song et al., 2018). We also contribute to the literature on absorptive capacity by answering the question of how firms could generate higher incremental innovative capability from absorptive capacity. Previous research shows that the relationship between absorptive capacity and innovation is context-dependent (Leal-Rodríguez, Ariza-Montes, Roldán, & Leal-Millán, 2014; Zou et al., 2018). Organizational learning theorists argue that the organizational learning processes need to be aligned well with a firm's strategic orientation (Mary M Crossan et al., 1999). Lane et al. (2006) suggest that future research should be conducted to understand how strategic orientation facilitates a firm's absorptive capacity. This study provides empirical support for the importance of a firm's strategic orientation, specifically, entrepreneurial orientation, to enhance the effectiveness and efficiency of absorptive capacity in creating incremental innovative capability.

Secondly, our findings show that entrepreneurial orientation enhances the indirect effect of absorptive capacity on firm performance through incremental innovative capability. Previous empirical research shows inconclusive findings on the link between absorptive capacity and firm performance (Flatten et al., 2011; Wales et al., 2013). While Wales et al. (2013) contend that entrepreneurial orientation can enhance the positive effect of absorptive capacity on firm performance, our findings support that argument and further enriches it by going deep into the mediating and moderating mechanism. Our findings demonstrate that the interactive effect of absorptive capacity and entrepreneurial orientation has an indirect impact on performance via incremental innovative capability. This finding provides further empirical support to the organizational learning theory that the process of organizational learning has a positive effect on firm performance via mediators (March, 1991; Nonaka & Takeuchi, 1995). This analysis offers a fine-grained perspective by identifying the mechanism and restraint conditions that make absorptive capacity beneficial for firm performance. The identification of boundary conditions is consistent with the call for more studies on moderators to enhance the realization of firm performance from the absorptive capacity (Zou et al., 2018).

Thirdly, our findings show that transactional leadership negatively moderates the impact of incremental innovative capability on firm performance. Vera and Crossan (2004) propose that transactional leadership of top management affects the organizational learning process. A review of organizational learning shows that culture and leadership could facilitate learning and suggest future research could focus on the boundary condition of management support in organizational learning and performance outcomes relationship (Bapuji & Crossan, 2004). However, little attention has been paid to conducting studies to empirically test the moderating effect of transactional leadership on the relationship between incremental innovative capability and firm performance. Our findings reveal that transactional leadership poses a constraint to a firm's ability to achieve the performance benefits of incremental innovative capability. In addition, this study offers an alternative explanation to the inconsistent findings on the relationship between innovation and firm performance (Morgan & Berthon, 2008; Walker, 2005).

4.2 Implications for practice

Our study provides managerial implications on how the firm could effectively utilize absorptive capacity to achieve superior performance. Firstly, our findings show that entrepreneurial orientation enhances the positive link between absorptive capacity and incremental innovative capability. To benefit from a firm's absorptive capacity, top managers of the firm need to adopt a strategic posture emphasizing innovativeness, risk-taking, and proactiveness. Entrepreneurial orientation strongly moderates the relationship between absorptive capacity and incremental innovative capability, therefore managers need to be aware that the potential benefits of absorptive capacity depend on the firm's level of entrepreneurial orientation. The findings indicate that firms with higher entrepreneurial orientation are more adept in leveraging absorptive capacity to create incremental innovative capability, whereas firms with low entrepreneurial orientation may not be able to effectively leverage the value of absorptive capacity to enhance incremental innovative capability.

Secondly, the findings of this study show that the interactive effect of absorptive capacity and entrepreneurial orientation has a positive impact on firm performance through incremental innovative capability. Managers need to be aware that absorptive capacity is insufficient to enhance a firm's performance and the important step is to develop incremental innovative capability. Furthermore, even if a firm has excellent learning capabilities and adopts entrepreneurial orientation as strategic orientation, it might be insufficient to achieve superior performance. The positive interaction effect of absorptive capacity and entrepreneurial orientation still needs to rely on incremental innovative capability to achieve superior firm performance. Therefore, to achieve superior performance, the firm not only needs to develop strong learning capabilities and adopt an entrepreneurial orientation but also needs to build up a strong incremental innovative capability. For managers, operating businesses in emerging markets, it is advisable to develop a strong incremental innovative capability to realize the potential benefit of the interactive effect of absorptive capacity and entrepreneurial orientation for enhancing the firm performance.

Thirdly, transactional leadership weakens the positive effect of incremental innovative capability on firm performance. Top executives with a transactional leadership style should be cautious when making decisions related to innovation as such leadership style could impede the positive effect of incremental innovative capability on firm performance. Leaders should try to mitigate the possible negative impact of transactional leadership style on the utilization of the company's incremental innovative capability to enhance firm performance. Based on the suggestion from Rosing, Frese, and Bausch (2011), transactional leaders can adopt opening leader behaviors. Transactional leaders normally only reward efficiency and they can also reward employees for experimenting with new ideas, then employees are more likely to fully utilize incremental innovative capability in the development of new products, hence having a positive impact on firm performance.

4.3 Limitations and future research

This research has several limitations. Firstly, these findings are based on data collected from firms in China only and the findings may not be generalized in other countries. National culture has a significant influence on the operation of a business, including the development of absorptive capacity, especially under the growing trend toward globalization (Björkman, Stahl, & Vaara, 2007; Doney, Cannon, & Mullen, 1998). Future research could repeat this study on firms from different cultural backgrounds.

Secondly, owing to the time and budget constraints, this research adopts cross-sectional data. To develop a better understanding of the causal relationships among absorptive capacity, incremental innovative capability, and firm performance, future research could design longitudinal studies and adopt the objective financial performance to evaluate the hypothesis. Thirdly, Zou et al. (2018) 's meta-analysis shows that absorptive capacity has a stronger impact on incremental innovation, compared with radical innovation. Therefore, the radical innovative capability may potentially mediate the absorptive capacity and firm performance relationship. It would be more interesting to investigate how absorptive capacity contributes to incremental and radical innovations in different ways and what are the boundary conditions. As incremental and radical innovations require different kinds of knowledge, resources, and capabilities (Cardinal, 2001), the facilitating conditions may vary. As radical innovation is riskier and may take a longer period to develop and be transformed into firm performance (Terziowski, 2010), samples from the high-tech industry and a longitudinal study would be more suitable in that case. Besides, future studies should extend this research by uncovering other potential factors which mediate the positive link between absorptive capacity and firm performance. Finally, the current research examines the boundary condition of two internal factors (entrepreneurial orientation and transactional leadership) in the proposed mediation model. Future research could also investigate characteristics of external factors, which may affect the realization of financial return.

5 References

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Figure 1. Conceptual model: the impact of absorptive capacity on firm performance

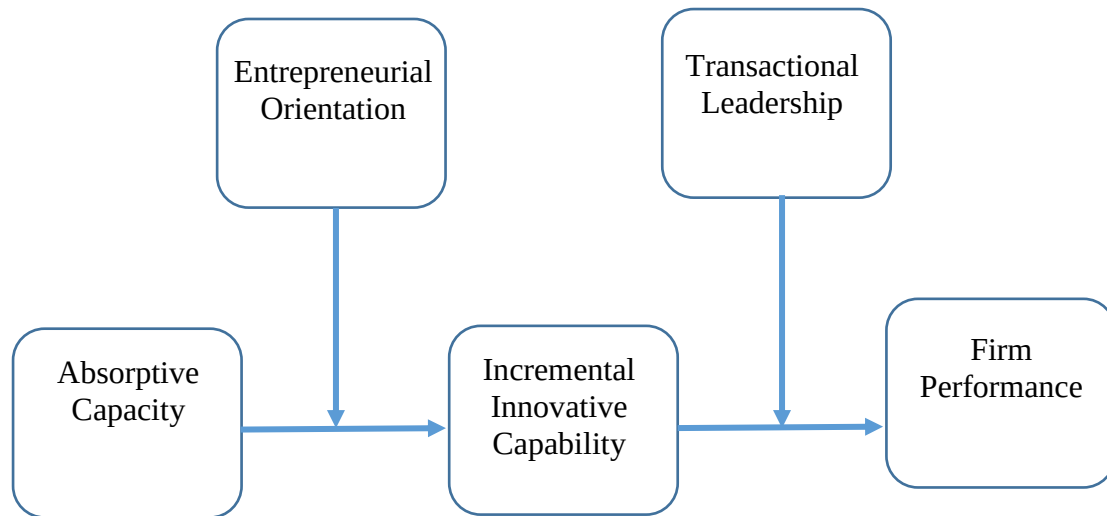


Table 1 Company profiles

	Content	Number	Percentage	Cumulative Percentage
Number of employees	<100	27	23.5	23.5
	100-200	17	14.8	38.3
	201-300	17	14.8	53.0
	301-500	14	12.2	65.2
	501-2000	29	25.2	90.4
	>2000	11	9.6	100.0
Company Age	<10 years	24	20.9	20.9
	10-20 years	60	52.2	73.0
	>20 years	31	27.0	100.0

Table 2 Means, standard deviations, and Pearson correlation coefficients among variables

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Absorptive capacity	5.763	0.900	1									
2. Incremental innovative capability	5.409	1.077	.348**	1								
			0.000									
3. Firm performance	4.873	1.084	.412**	.375**	1							
			0.000	0.000								
4. Entrepreneurial orientation	4.430	1.271	.338**	.238*	.473**	1						
			0.000	0.010	0.000							
5. Transactional leadership	4.157	0.734	.522**	.278**	.282**	.278**	1					
			0.000	0.003	0.002	0.003						
6. R&D intensity	2.432	1.134	-0.082	0.142	0.122	0.165	-0.019	1				
			0.382	0.129	0.193	0.078	0.838					
7. Past performance	7.804	2.202	0.076	.254**	.337**	.208*	0.032	0.076	1			
			0.419	0.006	0.000	0.026	0.735	0.421				
8. Firm size	5.331	1.349	0.034	0.081	0.177	0.126	0.032	-0.101	0.092	1		
			0.722	0.391	0.059	0.179	0.732	0.281	0.329			
9. Firm age	15.804	7.383	-0.038	-.279**	-0.003	0.072	-0.024	-0.167	-0.111	.362**	1	
			0.688	0.003	0.975	0.446	0.796	0.074	0.237	0.000		
10. Firm ownership	2.546	0.990	-0.035	0.044	0.073	0.055	0.035	0.021	0.166	0.167	0.099	1
			0.713	0.637	0.438	0.562	0.707	0.824	0.076	0.074	0.295	

Note: N=115, significance level: * p<0.05, ** p<0.01,

Table 3 Results of moderation analysis of hypothesis 1

Variables	Coeff.	SE	t	p	95%CI
Absorptive capacity	0.4260	0.1077	3.9540	0.0001	[.2124, .6396]
Entrepreneurial orientation	0.0440	0.0808	0.5443	0.5874	[-.1162, .2042]
Int_1	0.1826	0.0777	2.3507	0.0206	[.0286, .3366]
Firm age	-0.0352	0.0105	-3.3647	0.0011	[-.0560, -.0145]
Firm ownership	0.0194	0.0860	0.2256	0.8220	[-.1511, .1899]
Firm size	0.1027	0.0566	1.8148	0.0724	[-.0095, .2148]
Past performance	0.0732	0.0429	1.7070	0.0908	[-.0118, .1582]
R&D intensity	0.0844	0.0826	1.0215	0.3094	[-.0794, .2482]

DV: Incremental innovative capability

Int_1: Absorptive capacity X Entrepreneurial orientation

Note: N = 115. *Coeff.* = Regression coefficients; *SE* = Standard Error; *t* = Population t value; *p* = Probability level; *CI* = Upper and lower Confidence Interval. $R^2 = 0.3126$, $F(8, 106) = 6.0250$, $p < 0.0001$.

Table 4 Conditional indirect effect of absorptive capacity on firm performance through incremental innovative capability at different levels of entrepreneurial orientation

	Coeff.	SE	t	p	95%CI
Absorptive capacity	0.4068	0.1029	3.9524	0.0001	[.2028, .6109]
Incremental innovative capability	0.1867	0.0935	1.9962	0.0484	[.0013, .3722]
R&D intensity	0.1256	0.0803	1.5640	0.1208	[-.0336, .2849]
Firm ownership	0.0068	0.0853	0.0797	0.9366	[-.1622, .1758]
Firm age	0.0081	0.0108	0.7530	0.4531	[-.0133, .0296]
Firm size	0.0739	0.0568	1.3004	0.1963	[-.0388, .1865]
Past performance	0.1276	0.0426	2.9986	0.0034	[.0432, .2120]
Direct and indirect effects					
Direct effect	0.4068	0.1029	3.9524	0.0001	[.2028, .6109]
Conditional Indirect effect		BootSE			
High	0.1217	0.0524			[.0245, .2281]
Mean	0.0795	0.0347			[.0155, .1524]
Low	0.0374	0.0290			[-.0146, .1004]
Index of moderated mediation	0.0341	0.0197			[0026, .0792]

Note: N = 115. *Coeff.* = Regression coefficients; *SE* = Standard Error; *BootSE* = bootstrapping standard errors; *t* = population t value; *p* = Probability level; *CI* = Upper and lower Confidence Interval. $R^2 = 0.3292$, $F(7, 107) = 7.5030$, $p < 0.0001$. For indirect effect, low = one standard deviation below the mean; mean = the mean of entrepreneurial orientation; high = one standard deviation above the mean.

Table 5 Results of moderation analysis of hypothesis 3

Variables	Coeff.	SE	t	p	95%CI
Incremental innovative capability	0.3429	0.0963	3.5606	0.0006	[.1520, .5338]
Transactional leadership	0.2045	0.1222	1.6731	0.0973	[-.0378, .4469]
Int_1	-0.2485	0.1169	-2.1261	0.0358	[-.4802, -.0168]
Firm age	0.0144	0.0116	1.2449	0.2159	[-.0085, .0373]
Firm ownership	-0.0322	0.0896	-0.3590	0.7203	[-.2098, .1455]
R&D intensity	0.0801	0.0832	0.9626	0.3379	[-.0849, .2452]
Firm size	0.0710	0.0595	1.1937	0.2352	[-.0469, .1890]
Past performance	0.1353	0.0447	3.0272	0.0031	[.0467, .2239]

DV: Firm performance

Int_1: Incremental innovative capability X Transactional leadership

Note: N = 115 *Coeff.* = Regression coefficients; *SE* = Standard Error; *t* = population t value; *p* = Probability level; CI = Upper and lower Confidence Interval. $R^2 = 0.2744$, $F(8, 106) = 5.0106$, $p < 0.0001$.