

Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2022.vol9.no6.0139

Effects of Absorptive Capacity on Innovation Performance: Evidence from Small and Medium Enterprises in Vietnam

Dan Thi Thanh NGUYEN¹

Received: March 10, 2022 Revised: May 21, 2022 Accepted: May 30, 2022

Abstract

The article investigates the impact mechanism of absorption capacity (potential absorptive capacity - PAC and realized absorptive capacity - RAC) on the innovation efficiency of enterprises through the intermediate variable of dual innovation (exploratory innovation- INOR and exploitative innovation- INOI), based on the actual situation of Vietnam's small and medium enterprises (SMEs). A survey of Vietnam's SMEs was conducted from August 2020 to April 2021. The data was collected through interviews and questionnaires, and 146 valid questionnaires were received. The following results were acquired using SPSS 20.0 software to do correlation and regression analysis of data results.: The results show that the absorptive capacity of enterprises has a positive impact on innovation performance and dual innovation acts as a mediator in how absorptive capacity affects innovation performance. This study deepens the understanding of how absorptive capacity affects innovation performance and provides important new evidence for developing absorptive capacity and dual innovation in both theories and practice in Vietnam's SMEs. The study also proposes several solutions and recommendations to help Vietnam's small and medium enterprises improve their innovation capacity, competitiveness, and performance.

Keywords: Knowledge, Absorptive Capacity, Dual Innovation, Creative Innovation, Exploitation Innovation, Discovery Innovation, SMEs

JEL Classification Code: M10, M16, L20, O31

1. Introduction

Knowledge is one of the factors that help companies achieve growth, and competitive advantage (Kaur, 2019), and has a significant impact on the implementation of the company's innovative growth and development strategies (Filieri & Algezau, 2014, Agramunt & Berbel-Pineda, 2018; Schweisfurth & Raasch, 2018). The extended resource base view believes that the firm's external knowledge sources are of great value to the firm (Kathiravan et al., 2019; Nguyen et al., 2021). However knowledge cannot directly bring competitive advantages to enterprises while the process of acquiring knowledge, using knowledge, converting it into

energy, and helping businesses achieve their goals is not easy (Zahra & George, 2002; Valentim et al., 2015). Therefore, to use external knowledge, enterprises need to innovate first, allowing them to promote technological innovation as an important option for sustainable competitiveness enhancement through recognizing, assimilating, and applying external knowledge in a form suitable for the business. This is called "absorption capacity" (Cohen & Levinthal, 1990). Zahra and George (2002) differentiated between potential and realized absorptive capacity (Zahra & George, 2002). Similar to this point of view, Lane et al. (2006) distinguished exploratory, transformative, and exploitative learning processes (Lane et al., 2006). Absorption capacity allows firms to convert acquired knowledge into productivity, shape their competitiveness and make them stand out from the competition (Aljanabi et al., 2014; Chang et al., 2014). Besides, it can accelerate the improvement of understanding ability and knowledge processing ability. On the other hand, absorptive capacity can promote the innovation efficiency of firms (Wang, 2008; Liu et al., 2021). Therefore, improving the capacity to absorb corporate knowledge is an important driver for enterprises to continuously improve their innovation capacity (Limaj et al., 2016).

¹First Author and Corresponding Author. Lecturer, Department of Management Science and Law, School of Economics and Management, Hanoi University of Science and Technology, Hanoi, Vietnam [Postal Address: No. 1, Dai Co Viet Road, Hai Ba Trung District, Hanoi, Vietnam] Email: dan.nguyenthithanh@hust.edu.vn

In the world, people have divided into 3 groups of countries: development group based on resources, development group based on efficiency, and development group based on scientific and technological progress. Vietnam belongs to the group of developed countries based on resources, the lowest group. In Vietnam, small and medium-sized enterprises (SMEs) have become one of the important drivers of the country's economic development (Hai, 2019). Small and medium enterprises in Vietnam mainly apply a combination of imitation and independent innovation; meanwhile, the absorption capacity of Vietnam's small and medium enterprises is still weak (Business Index Report, 2014). Therefore, it is necessary to further study the absorption capacity and the relationship between the absorptive capacity and innovation efficiency of small and medium enterprises, to improve the absorptive capacity and the innovation performance of SMEs. The article analyzes, synthesizes, and evaluates the relationship between knowledge acquisition capacity, dual innovation, and enterprise innovation performance.

The author hopes to solve practical problems in management and promote innovation in enterprises. Build a theoretical model through literature review and theoretical inference, then use enterprise survey data to explain the internal mechanisms of absorptive capacity affecting the innovation performance of firms. The conclusion of the study is to gain a deep understanding of Vietnam's ongoing innovation-oriented development strategy and the development of Vietnamese enterprise innovation theory and practice, which should be meaningful for reference.

2. Literature Review

After Cohen and Levinthal (1990) proposed the concept of absorptive capacity, related studies on this issue have appeared in large numbers in the fields of corporate strategic management and innovation management. The positive impact of absorptive capacity on firm innovation performance has been gradually recognized by scholars (Nieto & Quevedo, 2005; Wang, 2008; Limaj et al., 2016). Regarding the mechanism of absorptive capacity on innovation performance, although the available literature has conducted many studies based on the perspectives of direct effects and regulatory effects or as an intermediate variable of other factors, research results are also very rich. (Lewin et al., 2011; Liu et al., 2021); however, most of the studies have not explored the relatively complex mechanism or process of the impact of absorptive capacity on innovation performance. Second, studies lack comprehensive and in-depth analysis of the intrinsic logic of the complex relationship between absorptive capacity and innovation performance and a lack of understanding of the key factors that may have an impact, leading to inconsistent research conclusions about

the correlation between these two factors. Both the positive correlation and the inverted U-shaped relationship have been shown by many studies (Gregory et al., 2001). In addition, it is documented that absorptivity should act as a modifier (Rangus et al., 2017). In this study, the author focuses on answering the question of what is the internal mechanism by which absorptive capacity affects innovation performance? Can exploratory and exploitative innovation constitute an important intermediary that translates absorptive capacity into actual innovation performance? These are key issues that need to be addressed in the process of developing innovation-oriented theory and practice.

With further research, scholars saw that the role of absorptive capacity on innovation performance is also influenced by other factors. Lewin et al. (2011) showed that factors such as organizational structure and incentives affect the relationship between absorptive capacity and innovation performance (Lewin et al., 2011). Alavi and Leidner (2001) tried to integrate the absorptive capacity theory and the social network theory to explain the creative behavior of new projects. They propose that a firm's external network is a type of social capital and that the value of this social capital is related to the firm's absorptive capacity (Alavi & Leidner, 2001). In a similar vein, Fosfuri and Tribó (2008) have built a model from external knowledge acquisition to innovative output (Fosfuri & Tribó, 2008). They found that the spillover of external knowledge cannot directly constitute innovation output but relies on the mediated effect of absorptive capacity. It means external knowledge must pass through a series of activities to identify, understand, internalize, and create new applications that can achieve innovative outputs (Flatten et al., 2015). Other scholars have turned their attention from the direct effect of absorptive capacity on innovation performance to another aspect. Some studies use enterprise-level data to verify the regulatory effect of absorptive capacity from knowledge capital, social capital, knowledge management, and innovation (Nieto & Quevedo, 2005; Escribano et al., 2009).

To measure absorptive capacity, scholars initially used R&D input as a proxy for absorptive capacity, essentially treating absorptive capacity as a unidimensional concept. After the process of research, scholars gradually discovered that absorptive capacity must be a multidimensional concept. Zahra and George (2002) distinguish absorptive capacity into two types, potential absorption capacity and realized absorption capacity, including four aspects of knowledge acquisition, knowledge internalization, knowledge transformation, and application of knowledge (Zahra & George, 2002). Potential absorption capacity includes two aspects, knowledge acquisition and knowledge digestion, and realized absorption capacity includes two aspects, knowledge transformation and knowledge use (Zahra & George, 2002). This concept has been widely recognized by academia.

Then, scholars introduced the multidimensional concept of absorbability into their research to explore the impact of different dimensions of absorbability on innovation performance. Research by Fosfuri and Tribo (2008) found that potential absorptive capacity has a significant positive effect on innovation performance, so potential absorptive capacity is a source of competitive advantage for firms (Fosfuri & Tribó, 2008).

Overall, although previous (Zahra & George, 2002) relationship between a firm's absorptive capacity and innovation performance, these studies seem to suggest that internal competence directly affects outcomes (or performance). To a certain extent, they ignore that a company's absorptive capacity can only be achieved by converting potential absorptive capacity into actual output (or performance). This study will explore more deeply the mechanism of converting capabilities into outputs, considering the contextual impact of the internal and external environment of the enterprise.

3. Research Model and Hypothesis

3.1. Research Model

Knowledge-based theory suggests that the enterprise is a heterogeneous body of knowledge, that enterprise innovation is the transformation and use of existing knowledge, and that knowledge is the basis of innovation (Robertson et al., 2021). In the changing economic environment, especially after Vietnam's economy enters the new normal, lack of internal resources is a common feature of Vietnamese companies. The rapid increase in innovation complexity and increasingly fierce market competition make it difficult for companies to effectively and promptly innovate on their strength alone (Lestari et al., 2020). Thus, absorptive capacity can help companies absorb and transform external knowledge and other innovation resources that have become the basis and prerequisite for companies to achieve innovation success and good innovation performance.

According to the "capacity-behavior-performance" logic chain, absorptive capacity is a prerequisite; innovation performance can only be achieved through innovation activities. The stronger the absorptive capacity of the enterprise, the stronger its ability to absorb, digest, and apply knowledge from the outside. The direct result of digesting and using external knowledge is the promotion of dual innovation activities by firms (Zahra & George, 2002). Dual innovation includes exploitative innovation that focuses on recombining existing knowledge and exploratory innovation activities that focus on developing new knowledge, ultimately driving improvement to improve the innovation performance of firms (Zahra & George, 2002). Of course, with the development of exploratory and exploitative

innovation, the absorptive capacity of enterprises will be further enhanced. But in any case, enhanced absorptive capacity still requires dual innovation operations to deliver actual innovation performance. For companies to survive in today's fiercely competitive environment, they need to continuously develop new products and open up new market segments to meet new requirements, and at the same time, they need to open up new markets. Expanding the full range and functionality of existing products to ensure stable and sustainable profits. It can be said that, by simultaneously implementing exploitative innovation and exploratory innovation activities (Jansen et al., 2006; Gupta et al., 2006), absorptive capacity can be converted into good innovation performance. Therefore, dual innovation activities are likely to be an important intermediary mechanism for directing firm absorptive capacity to actual innovation performance.

Based on the above analysis, this study aimed to investigate the impact of absorptive capacity on innovation efficiency through the mediated effect of dual innovation. The paper proposes a research model as shown in Figure 1.

3.2. Research Hypothesis

3.2.1. Absorption Capacity and Innovation Performance

Absorptive capacity is one of the concepts explaining how companies build up their abilities to learn from external partners and use the new knowledge to innovate and grow (Kotabe et al., 2017; Lis & Sudolska, 2015). Potential absorptive capacity helps companies maintain a competitive advantage by acquiring, assimilating, transforming, and exploiting external knowledge and enhancing the flexibility of resource use, while realized absorptive capacity allows companies directly gain a competitive advantage by creating innovative performance (Rajapathirana & Hui, 2018; Malvestiti et al., 2021). The creation of innovative activities and performance is itself a process of knowledge transfer and use, so there is an overlap with the connotation of realized absorptive capacity. Therefore, to distinguish, absorptive capacity is referred to in this article as potential absorptive capacity, which includes both knowledge acquisition and knowledge assimilation.

In the context of changing external environment, the absorptive capacity of enterprises is reflected in the acquisition and transformation of knowledge sources that have an important influence on the innovation performance of enterprises (Cohen & Levinthal, 1990; Kogut & Zander, 1992). Companies with strong absorptive capacity can absorb more diverse sources of external knowledge and, at the same time, make better use of new knowledge, generate new ideas, explore new business opportunities and improve their innovation performance (Kotabe et al., 2011). Innovation

can be with products or processes, component technology, or design (Tellis et al. 2012). As a productivity booster, innovation benefits firms' competition in the industry (Adner & Kapoor, 2010). It is a "process of industrial mutation that incessantly revolutionizes the economic structure from within" (Schumpeter, 1942).

Meanwhile, innovation performance is an important factor in evaluating the innovation status of enterprises (Kotabe et al., 2011). Innovation performance includes both a linear and holistic approach (Edquist et al. 2018), which is a representative of the achievements and results obtained from innovation, which determines the development of enterprises. Studies rely on the input-output relationship to describe innovation performance (Linton, 2009), considering it as a result of the innovation process, including the development and implementation of innovation activities (Rajapathirana & Hui, 2018; Kalay & Lynn, 2015). The efficient use of innovative resources and capabilities in innovative activities leads to success in the marketplace (Abdulai, 2019; Edquist et al., 2018). Innovation capabilities support businesses to create a competitive advantage over competitors (Kaur & Mehta, 2017) and have a greater capacity to adapt to changes in the environment (Sijabat et al., 2020). Companies with higher innovation capacity, outperforming competitors, have a higher chance of survival (Adeniran & Johnston, 2012). Innovation capacity is a driving force for innovation, enabling the development and application of resources to transform knowledge into innovative outcomes (Rajapathirana & Hui, 2018). Innovation performance increases customer relationship value and financial results (Dekoulou & Trivellas, 2017).

Innovation performance has also been shown to be positively correlated with absorptive capacity (Chen et al., 2009, Huang et al., 2018). With the rapidly changing business environment, organizations need to restructure their businesses to keep up with the pace, stay competitive (Teece, 2007), and create capabilities (Narayanan et al., 2009), allowing them to seize new opportunities (Guerrero et al. 2019, Robertson et al., 2021). Related studies have found that absorptive capacity promotes the speed, frequency, and extent of innovation, thereby enhancing the innovation performance of firms (Zhao et al., 2021). A large amount of research also supports the positive effect of firm absorptive capacity on innovation (Chesbrough, 2003; Aljanabi et al., 2014; Liu et al., 2021). Furthermore, firms with stronger knowledge acquisition can scientifically identify and evaluate external knowledge and information and then selectively acquire information and resources that are beneficial to their innovation, at the same time increasing the success rate of innovative products and shortening the development cycle of new products, thereby creating a positive influence on the innovation activities of enterprises (Chesbrough, 2003; Zahra & George, 2002; Murovec & Prodan, 2009). From the perspective of knowledge transformation, knowledge

transferability refers to an enterprise's ability to analyze and interpret newly acquired knowledge. A good ability to analyze and interpret knowledge is beneficial for the dynamic and efficient use of external knowledge sources for companies based on real-world environments (Darroch, 2005; Gunday et al., 2011). Especially in a rapidly changing business society, having a better understanding of the immediate needs of customers and rapid product improvement and new functionality development is beneficial for businesses to develop new products faster and better to improve innovation performance (Darroch, 2005; Kotabe et al., 2011; Tellis et al., 2012; Delgado-Verde et al., 2016). In light of the above, the following hypothesis is presented:

H1: Absorption capacity has a positive effect on innovation performance.

3.2.2. The Mediating Role of Dual Innovation

Dual innovation refers to the exploratory innovation and exploitative innovation of the organization (Jansen et al., 2006; Holmqvist, 2004; He & Wong, 2004). Specifically, exploitative innovation is a gradual innovation that focuses on improving existing products and processes by integrating existing knowledge; exploratory innovation is a disruptive innovation that concentrates on acquiring new knowledge and developing new technologies, products, and services (Tushman & O'Reilly 1996; Benner & Tushman, 2003). Firms have a strong absorptive capacity because they have a better ability to evaluate and transform knowledge, which can maximize the effectiveness of existing knowledge and promote corporate innovation.

For exploratory innovation, the most important thing is to have a source of knowledge. It is the advantage of companies with strong absorptive capacity. Strong knowledge acquisition can help companies seize opportunities in complex external environments. Knowledge and vast amounts of information are the basis for exploratory innovation. As such, absorptive capacity can help firms widely absorb and assimilate external knowledge, and dual innovation activities, whether exploratory or extractive, are the use of knowledge without enterprises acquiring and transforming through absorptive capacity. Thus, the absorptive capacity drives the dual innovation of the firm.

When considering the impact of dual innovation on innovation performance, exploitative innovation is an innovative combination of existing knowledge that can produce immediate and determinative innovation performance (March, 1991). Exploitative innovation, through the integration or combination of an existing company, to achieve increased products or services, improve quality, and better meet customer needs in specific market segments, thereby improving resource efficiency and increasing sales revenue (Benner & Tushman, 2003). Exploratory innovation has gained key advantages

through the development of new products that are not easily copied and groundbreaking innovations, which have resulted in new, even extended patents further market segmentation, and increase sales revenue. In addition, it also includes the application of new business management techniques and business processes to reduce operating costs, thereby improving the innovation performance of the company.

Overall, the firm's absorptive capacity directly spurred the performance of dual-innovation activities. While dual innovation improved enterprises' innovation performance. Therefore, both exploratory innovation and exploitative innovation may play a mediating role in the process by which absorptive capacity affects innovation performance, so the following hypothesis is proposed:

H2: Dual innovation plays a mediating role in how absorptive capacity affects innovation performance.

H2a: Exploratory innovation plays a mediating role in how absorptive capacity affects innovation performance.

H2b: Exploitative innovation plays a mediating role in how absorptive capacity affects innovation performance.

4. Methodology

This empirical study is founded on primary data poised through the use of a structured questionnaire survey method. The questionnaire for the research was adapted after a systematic examination of several studies, such as Jansen et al. (2006) and Huang et al. (2018). This article uses the 5-point Likert Scale to measure the variables, and the specific measurement methods are as follows:

Explanatory variable. Innovation Performance (INOP) measures innovation performance from the speed of new product development, quantity, efficiency, sales rate, and the number of patents of new products (The speed of new product development; The ratio of new product sales to total sales; The growth rate of patent counts; The success rate of marketing new products; The rate of turnover of new products; Improvements in the process technology and equipment (Huang et al., 2018), total there are 6 items.

Absorption capacity (AC) specifically includes two sub-variables, Potential absorptive capacity (PAC) and Realized absorptive capacity (RAC) (Cohen & Levinthal, 1990; Huang et al., 2018); there are a total of 12 items.

Dual innovation (DINO) consists of two sub-variables: exploitative innovation (INOI) and exploratory innovation (INOR) (He & Wong, 2006; Jansen et al., 2006) has a total of 14 items.

The survey was conducted from August 2020 to April 2021 in the North of Vietnam, in which two rounds of phone collection and a direct survey were carried out; the number of questionnaires was 165, collected 157. After removing 11 questionnaires with major shortcomings, the final number of valid questionnaires was 146, and the recovery rate was close to 89%.

5. Results

5.1. Profile of Business

Table 1 presents the basic information of the sample enterprises.

Table 1: Profile of Business

Characteristic	Classification	Frequency	Percentage
Experience	1–3	15	10.27
	3–5	34	23.28
	5–10	58	39.72
	10–20	37	25.35
	Over 20	2	1.38
	Total	146	100
Number of employees	Under 10	15	10.27
	10–under 50	97	66.44
	50–100	34	23.29
	Total	146	100
Revenue (billion VND/year)	Under 10	17	11.64
	10–100	108	73.97
	100–300	21	14.39
	Total	146	100

5.2. Cronbach's Alpha

According to Field (2013), Cronbach's Alpha acts as an outstanding measurement applied to items that are measured through the Likert scale (Field, 2013). The Cronbach's Alpha for this research is greater than 0.7, showing good

reliability. Second, from the confirmatory factor analysis in Table 2, it can be seen that the KMO of all research variables is greater than 0.7, the cumulative variation of the extracted factors exceeds 60% and the factor load of each item is above 0.5, meaning that inter-item consistency is achieved.

Table 2: Analysis of Reliability and Validity of Research Variables

Research Variables	Sub Variables	Cumulative Variance	KMO	Question Items	Factor Loading
INOP (Cronbach's α 0.893)		75.14%	0.854	1.1	0.84
				1.2	0.76
				1.3	0.83
				1.4	0.87
				1.5	0.89
				1.6	0.81
DINO (Cronbach's α 0.851)	INOR (Cronbach's α 0.904)	77.38%	0.801	2.1	0.79
				2.2	0.83
				2.3	0.78
				2.4	0.82
				2.5	0.85
				2.6	0.82
				2.7	0.86
	INOI (Cronbach's α 0.904)			2.8	0.78
				2.9	0.84
				2.10	0.87
				2.11	0.86
				2.12	0.81
				2.13	0.85
				2.14	0.79
AC (Cronbach's α 0.836)	PAC (Cronbach's α 0.735)	61.55%	0.801	3.1	0.75
				3.2	0.73
				3.3	0.65
				3.4	0.68
				3.5	0.70
				3.6	0.71
	RAC (Cronbach's α 0.860)			3.7	0.72
				3.8	0.78
				3.9	0.85
				3.10	0.83
				3.11	0.78
				3.12	0.83

5.3. Correlation Analysis

The results of Table 3 show that innovation performance, dual innovation, and absorptive capacity (including potential and realized absorptive capacity) are significantly correlated and the correlation coefficient among variables is less than 0.6. In addition, the study also examines the phenomenon of variance multicollinearity (VIF) on all explanatory variables participating in the model. The results show that the mean VIF value of each model is less than 2, and the VIF value of each variable is less than 10, indicating that there is no multicollinearity problem, suitable for further regression analysis.

5.4. Regression Analysis and Hypothesis Testing

First, examine the direct effect of absorptive capacity on innovation performance, and then examine whether dual innovation mediates between absorptive capacity and innovation performance.

5.4.1. Impact of Absorptive Capacity on Firm Innovation Performance

Table 4 shows the results of multiple linear regression. Model 1 shows that potential absorptive capacity ($\beta_{PAC} = 0.183, p < 0.001$) and realized absorptive capacity ($\beta_{RAC} = 0.295, p < 0.001$) have a significant impact on innovation efficiency of enterprises. Hypothesis H1 is supported.

5.4.2. The Mediating Role of Dual Innovation

Regarding the mediating role of dual innovation, this paper uses the method of Yuan and MacKinnon (2009) to examine the same. First, we perform a regression of the relationship between innovation performance and absorptive capacity. The results of Model 2 show that the normalized regression coefficients of absorptive capacity are significant, that is, knowledge acquisition ability ($\beta = 0.186, p < 0.001$) and knowledge digestibility ($\beta = 0.293, p < 0.001$). It shows that absorptive capacity has a significant positive effect on

Table 3: Correlation Coefficient Matrix

Variables	INOP	INOI	INOR	KGC	KDC	AGE	SALE
INOP	1						
INOI	0.476***	1					
INOR	0.344***	0.000	1				
PAC	0.158**	0.162**	0.214***	1			
RAC	0.373**	0.460***	0.271***	0	1		
AGE	0.242***	0.147**	0.113*	0.039	0.167**	1	
SALE	0.139**	0.147**	0.042	0.036	0.161**	0.653***	1

Notes: * p -value < 0.1; ** p -value < 0.05; *** p -value < 0.001. Significant at the 0.05 level.

Table 4: Regression Result

Model Control Variables	INOP MODEL 1	INOP MODEL 2	INOP MODEL 3	INOP MODEL 4	INOP MODEL 5
AGE	0.184**	0.187**	0.076	0.082	0.116*
SALE	-0.022	-0.031	0.025	-0.083	-0.008
PAC	0.183***	0.186***	0.187***	0.155**	0.043
RAC	0.295***	0.293***	0.463***	0.226***	0.012
INOI					0.462***
INOR					0.339***
R^2	0.223	0.221	0.264	0.156	0.422
AR^2	0.21	0.204	0.247	0.141	0.407
F	16.133***	13.546***	17.187***	8.946***	26.851***

Note: * p -value < 0.1; ** p -value < 0.05; *** p -value < 0.001. Significant at the 0.05 level.

innovation performance. Then perform a regression of dual innovation on the absorptive capacity.

From Table 4, we can see that Model 3 and Model 4 are regressions based on exploitative innovation (INOI) and exploratory innovation (INOR). Concerning the impact on exploratory innovation, the regression coefficients of knowledge acquisition and knowledge digestibility order are 0.187 ($p < 0.001$) and 0.463 ($p < 0.001$). Concerning the impact on exploitative innovation, the standardized regression coefficients of knowledge acquisition and knowledge digestibility are 0.155 ($p < 0.01$) and 0.226 ($p < 0.001$). Overall, absorptive capacity has a positive effect on dual innovation; finally, the return impact of innovation performance on absorptive capacity. The results of Model 5 showed that only dual innovation including exploratory innovation ($\beta = 0.339, p < 0.001$) and exploitative innovation ($\beta = 0.462, p < 0.001$) had a significant impact on innovation performance. Absorption capacity has an insignificant effect on innovation performance. This suggests that dual innovation completely plays a mediating role in the process of absorptive capacity driving innovation performance, hypothesis H2, H2a, and H2b are all supported.

6. Discussion and Conclusion

To explain the internal mechanism of the impact of absorptive capacity on innovation performance, this study builds and tests the model based on the integrated view of the resource-based perspective and the dynamic capabilities theory, proposes three hypotheses, and then uses the questionnaire survey data to confirm the proposed hypothesis. The results show that the absorptive capacity of firms has a positive effect on innovation performance and dual innovation plays a mediating role in the process of absorptive capacity affecting innovation performance.

As such, this study supports the role of firm absorptive capacity in promoting innovation. This shows that in the era of open innovation, acquiring and using outside knowledge to compensate for the lack of ability to innovate independently is an important means for companies to promote their innovation. Therefore, companies need to focus on cultivating practical absorptive capacity so that they can effectively drive innovation and achieve sustainable business goals. Dual innovation, on the other hand, is a way to translate external knowledge into actual innovative performance. After acquiring external knowledge, enterprises should invest knowledge resources in exploitative and exploratory innovation activities as soon as possible, not only improving existing products and services but also striving to develop new products and services, to promote the overall improvement of innovation performance.

In the new context of Vietnam, businesses need to give priority to developing their capacity to catch up with

the highest technology level in the technological frontier through receiving and disseminating advanced technologies from foreign countries or multinational companies instead of trying to force the creation of new technology through patenting; equity in the allocation of resources for research and development programs to create new technologies; a range of complementary factors is required for successful innovation projects; strengthen intellectual property protection and develop intellectual property to promote innovation; strengthen the coordination and institutional building of innovation policy.

To remove the weaknesses of the national innovation system in Vietnam, it is necessary to overcome bottlenecks in the business environment, including unnecessary restrictive regulations, competition restrictions, business interference, limited innovation, and finance for start-ups. To improve technology absorption capacity, enterprises firstly receive and apply technology and then proceed to create technology; improve the quantity, quality, and suitability of the workforce; improve the quality and relevance of R&D and knowledge creation.

References

- Abdulai, A. F. (2019). Social capital and innovation performance in firms. In: Thomas, B. & Murphy, L. (Eds.), *Innovation and social capital in organizational ecosystems*. (pp. 81–97). Pennsylvania: IGI Global.
- Adeniran, T. V., & Johnston, K. A. (2012). Investigating the dynamic capabilities and competitive advantage of South African SMEs. *African Journal of Business Management*, 6(11), 4088–4099. <https://doi.org/10.5897/AJBM11.1673>
- Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31(3), 306–333. <https://doi.org/10.1002/smj.821>
- Agramunt, L. F., & Berbel-Pineda, J. M. (2018). The positive moderating effect of absorptive capacity on R&D investment: The case of Argentina's ICT firms. *Anais da Academia Brasileira de Ciências*, 90(3), 3207–3221. <http://doi.org/10.1590/0001-3765201820171036>
- Alavi, M., & Leidner, D. E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1), 107–113. <https://doi.org/10.2307/3250961>
- Aljanabi, A. Q. R. A., Noor, N. A. M., & Dileep Kumar, M. (2014). The mediating role of absorptive capacity in its effect on organizational support factors and technological innovation. *Information Management and Business Review*, 6(1), 25–41. <https://doi.org/10.22610/imbr.v6i1.1098>
- Benner, M. J., & Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited.

- Academy of Management Review*, 28(2), 238–256. <https://doi.org/10.5465/amr.2003.9416096>
- Business Index Report 2014. *Enterprise research and development institute*. Hanoi: MOF Vietnam.
- Chang, C. H., Chen, Y. S., & Lin, M. J. J. (2014). Determinants of absorptive capacity: Contrasting manufacturing vs services enterprises. *R&D Management*, 44(5), 466–483. <https://doi.org/10.1111/radm.12086>
- Chen, Y. S., Lin, M. J. J., & Chang, C. H. (2009). The positive effects of relationship learning and absorptive capacity on innovation performance and competitive advantage in industrial markets. *Industrial Marketing Management*, 38(2), 152–158. <https://doi.org/10.1016/j.indmarman.2008.12.003>
- Chesbrough, H. W. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Boston, MA: Harvard Business School Press.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152. <https://doi.org/10.2307/2393553>
- Darroch, J. (2005). Knowledge management, innovation, and firm performance. *Journal of Knowledge Management*, 9(3), 101–115. <https://doi.org/10.1108/13673270510602809>
- Dekoulou, P., & Trivellas, P. (2017). Organizational structure, innovation performance, and customer relationship value in the Greek advertising and media industry. *Journal of Business and Industrial Marketing*, 32(3), 385–397. <https://doi.org/10.1108/JBIM-07-2015-0135>
- Delgado-Verde, M., Martín-de Castro, G., & Amores-Salvadó, J. (2016). Intellectual capital and radical innovation: Exploring the quadratic effects in technology-based manufacturing firms. *Technovation*, 54, 35–47. <https://doi.org/10.1016/j.technovation.2016.02.002>
- Edquist, C., Zabala-Iturriagoitia, J. M., Barbero, J., & Zo, J. L. o, J. L. (2018). On the meaning of innovation performance: Is the synthetic indicator of the Innovation Union Scoreboard awed? *Research Evaluation*, 27(3), 196–211
- Escribano, A. E. A., Fosfuri, A., & Tribó, J. A. (2009). Managing external knowledge flows The moderating role of absorptive capacity. *Research Policy*, 38(1), 96–105. <https://doi.org/10.1016/j.respol.2008.10.022>
- Field, A. (2013). *Discovering statistics using IBM SPSS Statistics: And sex and drugs and rock “N” roll* (4th ed). NJ: Sage Publication.
- Filieri, R., & Alguezaui, S. (2014). Structural social capital and innovation. Is knowledge transfer the missing link? *Journal of Knowledge Management*, 18(4), 728–757. <https://doi.org/10.1108/JKM-08-2013-0329>
- Flatten, T., Adams, D., & Brettel, M. (2015). Fostering absorptive capacity through leadership: A cross-cultural analysis. *Journal of World Business*, 50(3), 519–534. <https://doi.org/10.1016/j.jwb.2014.08.010>
- Fosfuri, A., & Tribó, J. (2008). Exploring the antecedents of potential absorptive capacity and its impact on innovation performance. *Omega*, 36(2), 173–187. <https://doi.org/10.1016/j.omega.2006.06.012>
- Gregory, S. N., Greis, N. P., & Fischer, W. A. (2001). Absorptive capacity and new product development. *Journal of High Technology Management Research*, 12(1), 77–91. [https://doi.org/10.1016/S1047-8310\(00\)00040-7](https://doi.org/10.1016/S1047-8310(00)00040-7)
- Guerrero, M., Urbano, D., & Herrera, F. (2019). Innovation practices in emerging economies: Do university partnerships matter? *Journal of Technology Transfer*, 44(2), 615–646. <https://doi.org/10.1007/s10961-017-9578-8>
- Gunday, G., Ulusoy, G., Kilic, K., & Alpkın, L. (2011). Effects of innovation types on firm performance. *International Journal of Production Economics*, 133(2), 662–676. <https://doi.org/10.1016/j.ijpe.2011.05.014>
- Gupta, A. K., Smith, K. G., & Shalley, C. E. (2006). The interplay between exploration and exploitation. *Academy of Management Journal*, 49(4), 693–706. <https://doi.org/10.5465/AMJ.2006.22083026>
- Hai, C. T. (2019). Developing small and medium enterprises in Vietnam today. *Vietnam Journal of Social Sciences*, 11, 20–29.
- He, Z., & Wong, P. (2004). Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. *Organization Science*, 15(4), 481–494. <https://doi.org/10.1287/orsc.1040.0078>
- Holmqvist, M. (2004). Experiential learning processes of exploitation and exploration within and between organizations: An empirical study of product development. *Organization Science*, 15(1, January–February), 70–81. <https://doi.org/10.1287/orsc.1030.0056>
- Huang, D., Chen, S., Zhang, G., & Ye, J. (2018). Organizational forgetting, absorptive capacity, and innovation performance: A moderated mediation analysis. *Management Decision*, 56(1), 87–104. <https://doi.org/10.1108/MD-03-2017-0200>
- Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory innovation, exploitative innovation, and performance: Effects of organizational antecedents and environmental moderators. *Management Science*, 52(11), 1661–1674. <https://doi.org/10.1287/mnsc.1060.0576>
- Kalay, F., & Lynn, G. (2015). The impact of strategic innovation management practices on firm innovation performance. *Pressacademia*, 2(3), 412–429. <https://doi.org/10.17261/Pressacademia.2015312989>
- Kathiravan, C., Bhagavatham, P., Palanisamy, V., & Rajasekar, A. (2019). Influence of entrepreneurial creativity on competitive advantage in automobile engineering and technologies industries. *International Journal of Advanced Science and Technology*, 27(1), 166–172.
- Kaur, V. (2019). *Knowledge-based dynamic capabilities: The road ahead in gaining organizational competitiveness* (1st ed). New York: Springer International Publishing.
- Kaur, V., & Mehta, V. (2017). Dynamic capabilities for competitive advantage: A comparative study of IT

- multinationals in India. *Paradigm*, 21(1), 31–51. <https://doi.org/10.1177/0971890717701781>
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*, 3(3), 383–397. <https://doi.org/10.1287/orsc.3.3.383>
- Kotabe, M., Jiang, C. X., & Murray, J. Y. (2011). Managerial ties, knowledge acquisition, realized absorptive capacity and new product market performance of emerging multinational companies: A case of China. In *Journal of World Business*, 46(2), 166–176. <https://doi.org/10.1016/j.jwb.2010.05.005>
- Kotabe, M., Jiang, C. X., & Murray, J. Y. (2017). Examining the complementary effect of political networking capability with absorptive capacity on the innovative performance of emerging market firms. *Journal of Management*, 43(4), 1131–1156. <https://doi.org/10.1177/0149206314548226>
- Lane, P. J., Koka, B. R., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of Management Review*, 31(4), 833–863. <https://doi.org/10.5465/amr.2006.22527456>
- Lestari, S. D., Leon, F. M., Widyastuti, S., Brabo, N. A., & Putra, A. H. P. K. (2020). Antecedent and consequences of innovation and business strategy on performance and competitive advantage of SMEs. *Journal of Asian Finance, Economics, and Business*, 7(6), 365–378. <https://doi.org/10.13106/jafeb.2020.vol7.no6.365>
- Lewin, A. Y., Massini, S., & Peeters, C. (2011). Microfoundations of internal and external absorptive capacity routines. *Organization Science*, 22(1), 81–98. <https://doi.org/10.1287/orsc.1100.0525>
- Limaj, E., Bernroider, E. W. N., & Choudrie, J. (2016). The impact of social information system governance, utilization, and capabilities on absorptive capacity and innovation: A case of Austrian SMEs. *Information and Management*, 53(3), 380–397. <https://doi.org/10.1016/j.im.2015.12.003>
- Linton, J. D. (2009). De-babelizing the language of innovation. *Technovation*, 29(11), 729–737. <https://doi.org/10.1016/j.technovation.2009.04.006>
- Lis, A., & Sudolska, A. (2015). Absorptive capacity and its role for the company growth and competitive advantage: The case of Frauenthal automotive Toruń company. *Journal of Entrepreneurship, Management, and Innovation*, 11(4), 63–91. <https://doi.org/10.7341/20151143>
- Liu, S. M., Hu, R., & Kang, T. W. (2021). The effects of absorptive capability and innovative culture on innovation performance: Evidence from Chinese high-tech firms. *Journal of Asian Finance, Economics, and Business*, 8 No 3 - 1153–1162. <https://doi.org/10.13106/jafeb.2021.vol8.no3.1153>
- Malvestiti, R., Esteves, D. B. L., & Dandolini, G. A. (2021). Absorptive capacity as feedback on the sustainability of organizations. *RAM. Revista de Administração Mackenzie*, 22(1), 1–28. <https://doi.org/10.1590/1678-6971/eRAMR210073>
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87. <https://doi.org/10.1287/orsc.2.1.71>
- Murovec, N., & Prodan, I. (2009). Absorptive capacity, its determinants, and influence on innovation output: Cross-cultural validation of the structural model. *Technovation*, 29(12), 859–872. <https://doi.org/10.1016/j.technovation.2009.05.010>
- Narayanan, V. K., Colwell, K., & Douglas, F. L. (2009). Building organizational and scientific platforms in the pharmaceutical industry: A process perspective on the development of dynamic capabilities. *British Journal of Management*, 20, S25–S40. <https://doi.org/10.1111/j.1467-8551.2008.00611.x>
- Nguyen, D. P. A., WimVoordeckers, J.H., & FrankLambrechts, J. (2021). On external knowledge sources and innovation performance: Family versus non-family firms. *Technovation*, 114(6), 2021, 102448. <https://doi.org/10.1016/j.technovation.2021.102448>
- Nieto, M., & Quevedo, P. (2005). Absorptive capacity, technological opportunity, knowledge spillovers, and innovative effort. *Technovation*, 25(10), 1141–1157. <https://doi.org/10.1016/j.technovation.2004.05.001>
- Rajapathirana, R. P. J., & Hui, Y. (2018). Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation and Knowledge*, 3(1), 44–55. <https://doi.org/10.1016/j.jik.2017.06.002>
- Rangus, K., Drnovšek, M., Di Minin, A. D., & Spithoven, A. (2017). The role of open innovation and absorptive capacity in innovation performance: Empirical evidence from Slovenia. *Journal of East European Management Studies*, 22(1), 39–62. <https://doi.org/10.5771/0949-6181-2017-1-39>
- Robertson, J., Caruana, A., & Ferreira, C. (2021). Innovation performance: The effect of knowledge-based dynamic capabilities in cross-country innovation ecosystems. *International Business Review*, 202, 101866. <https://doi.org/10.1016/j.ibusrev.2021.101866>
- Schumpeter, J. (1942). *Creative destruction: Capitalism, socialism, and democracy*. Manhattan, NY: Harper & Brothers.
- Schweisfurth, T. G., & Raasch, C. (2018). Absorptive capacity for need knowledge: Antecedents and effects for employee innovativeness. *Research Policy*, 47(4), 687–699. <https://doi.org/10.1016/j.respol.2018.01.017>
- Sijabat, E. A. S., Nimran, U., Utami, H. N., & Prasetya, A. (2020). Ambidextrous innovation in mediating entrepreneurial creativity on firm performance and competitive advantage. *Journal of Asian Finance, Economics, and Business*, 7(11), 737–746. <https://doi.org/10.13106/jafeb.2020.vol7.no11.737>
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and micro-foundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>

- Tellis, G. J., Chandy, R. K., & Prabhu, J. C. (2012). Key questions on innovation in the B2B context. In: Lilien, G. L., & Grewal, R. (Eds.), *Handbook of business-to-business marketing* (pp. 582–595). Cheltenham, UK: Edward Elgar Publishing.
- Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review*, 38(4), 8–29. <https://doi.org/10.2307/41165852>
- Valentim, L., Lisboa, J., & Franco, M. (2015). Knowledge management practices and absorptive capacity in small and medium-sized enterprises: Is there a linkage? *R and D Management*, 46(4), 711–725.
- Wang, C. L. (2008). Entrepreneurial orientation, learning orientation, and firm performance. *Entrepreneurship Theory and Practice*, 32(4), 635–657. <https://doi.org/10.1111/j.1540-6520.2008.00246.x>
- Yuan, Y., & MacKinnon, D. P. (2009). Bayesian mediation analysis. *Psychological Methods*, 14(4), 301–322. <https://doi.org/10.1037/a0016972>
- Zahra, S. A., & George, G. (2002). Absorptive capacity: A review reconceptualization and extension. *Academy of Management Review*, 27(2), 185–203. <https://doi.org/10.5465/amr.2002.6587995>
- Zhao, S., Jiang, Y., Peng, X., & Hong, J. (2021). Knowledge sharing direction and innovation performance in organizations: Do absorptive capacity and individual creativity matter? *European Journal of Innovation Management*, 24(2), 371–394. <https://doi.org/10.1108/EJIM-09-2019-0244>