

# An Empirical Study on Impact of Absorptive Capacity on Enterprise Profit and Innovation Performance\*

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**Abstract:** It is the time of world-wide-knowledge economy. Knowledge become an important factor of production, and is essential for the development of enterprises. Thus, enterprise's businesses absorption capacity becomes a hot issue. However, most of the related research lack of deeply analysis on absorptive capacity, and can't clearly explain the impact of absorptive capacity on profit and innovation performance. Based on 205 valid questionnaires, the paper conducts a further study on enterprise absorptive capacity, its profit and innovation performance, set up and verify the mechanism that absorptive capacity affecting its profit and innovation performance.

**Key words:** Absorptive capacity; Profit performance; Innovation performance; Manufacturing enterprises

## 1 Introduction

The concept of absorptive capacity arose from the macro level and was first used to analyze technology catching-up of developing countries. In the book "Economic Backwardness in Historical Perspective", Gerschenkron<sup>[1]</sup> had given the concept of backward advantage, and pointed out that developing countries can utilize stock knowledge in the world, therefore, developing countries have more growth potential than developed countries. Rapid growth potential depends on many factors, the natural endowments, the country's social competence and the technology matching were the most important ones<sup>[2]</sup>. Absorptive capacity is an integral part of social competence, which affects a country's ability to absorb and assimilate knowledge from leading countries.

Cohen and Levinthal<sup>[3]</sup> firstly introduced absorptive capacity into the level of the firm, they argued that absorptive capacity refers to not only the acquisition or assimilation of information by an organization but also the organization's ability to exploit it. From then on, many researches proposed models on absorptive capacity and business performance, the most widely used of them are advanced by Cohen and Levinthal<sup>[3]</sup>, Lane et al.<sup>[4]</sup>, Zahra and George<sup>[5]</sup>, Todorova and Durisin<sup>[6]</sup>.

Lane et al.<sup>[4]</sup> expanded the process and argued that absorptive capacity is a learning process includes three stages, exploratory learning, transformative learning and exploitative learning. Furthermore, absorptive capacity outcomes are divided into commercial and knowledge outputs.

Zahra and George<sup>[5]</sup> reconceptualized the concept of absorptive capacity, took absorptive capacity as a dynamic capability. They argued that absorptive capacity is a set of organizational routines and processes to acquire, assimilate, transform and exploit knowledge. Being a kind of capability, absorptive capacity focus on enterprise's ability of managing its resources especially its knowledge resources, and this ability can improve enterprise performance and competitive advantage.

Todorova and Durisin<sup>[6]</sup> reconceptualized the concept of absorptive capacity given that it has five elements including recognize the value, acquire, assimilate, transform and exploit.

The existing researches give valuable reference for further study, while, however, most of the empirical researches are not only established on foreign enterprises but also lack of comparative studies on profit and innovation performance. Along with the importance of absorptive capacity, a more detailed analysis on absorptive capacity and enterprise performance becomes necessary. Thus, the paper conducts an empirical study on absorptive capacity, profit performance and innovation performance.

## 2 Theoretical Analysis and Hypotheses

On the background of economic globalization and knowledge economy, the competition between enterprises is fierce day by day, furthermore, enterprise interacting with external organizations becomes important. The main purpose of these interactions is to obtain and utilize resources, and then, improve

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enterprise performance. In this process, enterprise absorptive capacity plays an important role.

Cohen and Levinthal<sup>[3]</sup> proposed that absorptive capacity might consist of the abilities to recognize the value of new knowledge, to assimilate it and to apply it to commercial. The three processes are dynamic and depend on the knowledge source and prior knowledge, furthermore, they affect both innovation activity and innovative performance of enterprise. Yli-Renko<sup>[7]</sup> employed a sample of 180 entrepreneurial high-technology ventures based in the United Kingdom, examined the effects of social capital in key customer relationships on knowledge acquisition and knowledge exploitation, confirmed that social capital facilitates external knowledge acquisition in key customer relationships and that such knowledge mediates the relationship between social capital and knowledge exploitation for competitive advantage. Weiyang introduced the perspective of absorptive capacity to analyze the relation of social capital and technological innovation, based on empirical analysis of Chinese manufacture enterprises, the research results show that social capital significantly affects innovation performance by improving absorptive capacity.

Although the definition of absorptive capacity has not yet reached a consensus, most researches admit that enterprise absorptive capacity is a kind of process ability. And there are four typical process models on absorptive capacity. Integrated previous literatures on absorptive capacity<sup>[5][6]</sup>, this research redefine the concept of absorptive capacity. The essence of the absorptive capacity is a kind of accommodation capacity in the ever-changing business environment. The absorptive capacity is a processing ability including four dimensions, which are recognizing the value, and acquiring, assimilating as well applying resources.

Enterprise external network is a main source of enterprise resources. However, due to the limited time and capability, it is difficult to find the most valuable one in the redundant resources. And this has an important effect on performance. Empirical evidence on relations of learning and innovation shows the importance of recognizing value to enterprise performance<sup>[8][9]</sup>.

On the basis of recognizing the value of industry conditions, market opportunities and technology trends, enterprises also need to acquire these resources. Acquire resources and enterprise performance has a positive relation. And this is confirmed by subsequent empirical research<sup>[7][10][11]</sup>.

Knowledge gained from external network may be full of inspiration, but often be ignored due to its difficult to be understood<sup>[12]</sup>. Therefore, the outside knowledge can only be useful through a process of being assimilated<sup>[4]</sup>. That is, assimilating resources is an important part of absorptive capacity and, has a positive effect on its performance.

Applying resources refers to the ability of transferring the assimilated knowledge to commercial utilization, and thereby enterprise can create a new competitive ability<sup>[3]</sup>. The empirical study<sup>[10]</sup> shows that for cross-border joint ventures, the ability of applying knowledge from its parent company is positively associated with its firm performance.

Based on the above analysis, the hypotheses are proposed:

H 1a The stronger of enterprise ability to recognize the value, the stronger of its profit performance.

H 1b The stronger of enterprise ability to recognize the value, the stronger of its innovation performance.

H 2a The stronger of enterprise ability to acquire resources, the stronger of its profit performance.

H 2b The stronger of enterprise ability to acquire resources, the stronger of its innovation performance.

H 3a The stronger of enterprise ability to assimilate resources, the stronger of its profit performance.

H 3b The stronger of enterprise ability to assimilate resources, the stronger of its innovation performance.

H 4a The stronger of enterprise ability to apply resources, the stronger of its profit performance.

H 4b The stronger of enterprise ability to apply resources, the stronger of its innovation performance.

### 3 Methodology

#### 3.1 Sample selection and data collection

The following analysis is according to 205 valid questionnaires based on three sampling criteria: history of at least 3 years; no less than 20 employees; manufacturing enterprises in Shandong Province of China. First, sample enterprises are 3-year upper which can eliminate the abnormal volatility of enterprise performance. Second, enterprises' employees less than 20 are mostly in start-up period that

enterprise network depend on not enterprise but entrepreneur. Third, external network and absorptive capacity of manufacture enterprises are more stable.

The questionnaires are collected from target-company's senior management. 298 responds are received from 470, and 205 of them are valid. The response rate is 63.40% and the valid response rate is 43.62%.

### 3.2 Variables

Dependent Variable is enterprise performance which has two dimensions. On one side is profit performance, measured by change rate of recent 3-years' sale income; on the other side is innovation performance, measured by change rate of recent 3-years' new business output.

Independent variable is absorptive capability, measured by the ability of recognizing the value, acquiring resources, assimilating resources and applying resources. The measurements on absorptive capability are established on literature reviewing, Chinese enterprise interviewing and factor analysis.

All the above variables are measured by several questions through Likert-5Points.

## 4 Results

### 4.1 Reliability of the data

SPSS is used to analyze the data and all data belong to normal distribution. The reliabilities analogous to Cronbach alpha values are all above the recommended mini-mum of 0.70. The adjustment CICT are all above the recommended mini-mum of 0.35. Thus, all of the constructs demonstrate good internal consistency and, hence, reliability.

### 4.2 Correlation and regression analysis

According to correlation analysis, shown as Table 1, there are 15 correlations among enterprise absorptive capacity, profit performance and innovation performance. Meanwhile, the correlation between recognizing resources and profit performance, acquiring resources and profit performance are much higher, the correlation between assimilating resources and innovation performance, applying resources and innovation performance are much higher.

**Table 1 Means, Standard Deviations, Ranges, and Correlations for the Variables in the Model**

	1	2	3	4	5	6
1 recognize the value						
2 acquire the resources	-.037					
3 assimilate the resources	.026	-.057				
4 apply the resources	.022	.002	.124			
5 profit performance	.596**	.362**	.198**	.211**		
6 innovation performance	.230**	.117	.583**	.602**	.461	
Means	3.80	3.52	3.64	3.35	2.63	3.00
S. D.	0.71	0.68	0.83	0.92	0.89	0.84
Min.	2.00	1.80	1.33	1.00	0.01	0.50
Max.	5.00	5.00	5.00	4.83	4.56	5.09

N=205. \*  $p \leq 0.05$  (2-tailed). \*\*  $p \leq 0.01$  (2-tailed tests).

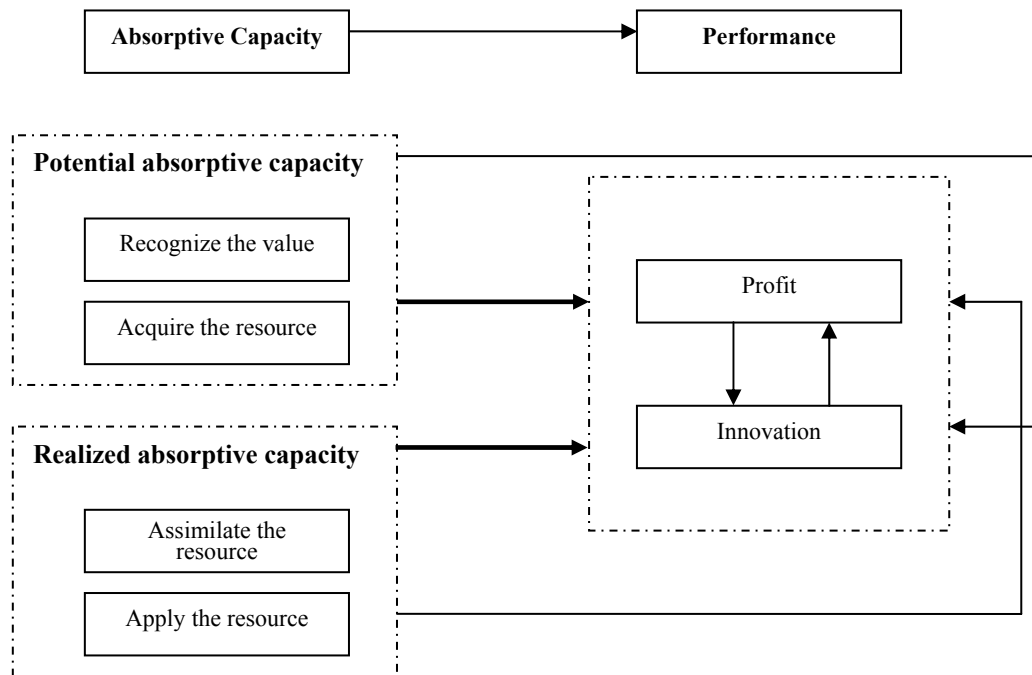
Stepwise method is used to give linear regression and the results are shown in Table 2. The results show that four dimensions of absorptive capacity all have a significant positive impact on both profit and innovation performance; furthermore, the extent of this impact on profit and innovation performance is different.

According to the empirical result, enterprise absorptive capacity can be divided into the potential absorptive capacity and the realized absorptive capacity. The potential absorptive capacity is the ability to recognize and acquire resources such as information, knowledge and technology. It represents the abundance of resources and mainly affects the profit performance. The realized absorptive capacity is the ability to assimilate and apply resources. It mainly decides the ability of innovation, and therefore, it affects both the innovation performance and the profit performance. the potential absorptive capacity mainly affects enterprise profit performance and the realized absorptive capacity mainly affects enterprise innovation performance.

**Table 2 Results of Linear Regression**

	R	R2	△R2	Sig. (F)	Sig. (t)	D-W	VIF max
$Y_1 = 0.602F_1 + 0.394F_2 + 0.183F_3 + 0.174F_4$	.758	.574	.566	.000	.000	2.057	1.076
$Y_2 = 0.532F_4 + 0.521F_3 + 0.210F_1 + 0.154F_2$	.831	.690	.684	.000	.000	1.971	1.005

F1: recognize the value; F2: acquire the resources; F3: assimilate the resources; F4: apply the resources; Y1: profit performance; Y2: innovation performance.  $0.05 \leq p \leq 0.1$ .



**Figure 1 Revised Concept Model**

According to the above analysis, hypotheses 1a, hypotheses 1b, hypotheses 2a, hypotheses 2b hypotheses 3a, hypotheses 3b, hypotheses 4a, hypotheses 4b are all supported. The revised concept model is shown in Figure 1.

Make a further analysis of the regression model, the results show that the four dimensions of absorption capacity has different effects on profit and innovation performance. More specifically, the profit performance is mainly determined by the two dimensions, namely, recognizing value and acquiring resource, while the innovation performance is mainly determined by the two dimensions which are assimilating and applying resource.

Recognizing value is enterprises' ability to identify useful resource; acquiring resource reflects the speed, quantity and cost of acquiring external resource. These two features will have a direct significant impact on enterprise profit performance. Assimilating and applying resource are mainly the process of recycling external resource, and therefore, these two features will also have some impact on enterprise profit performance.

Knowledge and information from external can only be most useful through the process of applying, assimilating and applying resource determine this process, and thus affect enterprise innovation performance directly and apparently. For recognizing value and acquiring resource, they affect innovation performance indirectly.

## 5 Conclusions

The paper probed into the four dimensions of absorptive capacity, set up and verified the mechanism that enterprise absorptive capacity affecting its profit and innovation performance.

According to the empirical analysis, the impact of enterprise absorptive capacity on enterprise profit and innovation performance is multidimensional. Specially speaking:

Firstly, the four dimensions of enterprises absorptive capacity affect enterprise profit and innovation performance significantly.

Secondly, recognizing value and acquiring resource do not affect profit performance significantly, but affects innovation performance apparently. That is, the impact of these two dimensions on enterprise innovation performance is indirect. Assimilating and applying resource do not only affect profit performance but also affect innovation performance significantly and directly.

Third, the absorptive capacity can be divided into the potential absorptive capacity and the realized absorptive capacity, which coincide with the research of Zahra and George<sup>[5]</sup>. Further, the potential absorptive capacity is the ability to recognize and acquire resources such as information and it mainly determines the profit performance. The realized absorptive capacity is the ability to assimilate and apply resources, and it mainly determines the innovation performance.

There isn't a mature questionnaire on absorptive capacity, thus, the questionnaire used in this research is by way of literature reviewing, enterprise interviewing and factor analysis, which decreases its reliability. Besides, this research is based not on longitudinal research but on lateral research, and thus, it can't give a reasonable explanation from dynamic perspective.

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