Absorptive Capacity and Enterprise Performance: An Empirical Study

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Abstract

This is the time of knowledge economy and knowledge becomes an important factor for enterprises. Enterprises external network as the main source of enterprise knowledge, can affect enterprise performance by way of absorptive capacity. Thus, enterprise’s knowledge absorption capacity becomes a hot issue. While, however, most of related researches lack deeply analyses on absorptive capacity, and can’t clearly explain the impact of absorptive capacity on profit performance and innovation performance. Based on 205 valid questionnaires, the paper conducts a further study on enterprise absorptive capacity, profit performance and innovation performance, sets up and verifies the mechanism that absorptive capacity affecting its profit and innovation performance.

Keywords: Absorptive Capacity, Potential Absorptive Capacity, Realized Absorptive Capacity, Profit Performance, Innovation Performance

1. Introduction

The concept of absorptive capacity arose from the macro level and was first used to analyze technology catching-up of lagging countries. In the book “Economic Backwardness in Historical Perspective”, Gerschenkron (1962) proposed the concept of backward advantage, he described that lagging countries can utilize tacit knowledge from the world, and hence had more growth potential than developed countries. Rapid growth potential depends on many factors such as the natural endowments and social competence of the country. Among these factors, technology matching ability is the most important one (Abramovitz, 1986). Absorptive capacity is an integral part of social competence, which affects a country’s ability to absorb and assimilate knowledge from leading countries (Ohkawa & Rosovsky, 1973).

Cohen and Levinthal (1990) first introduced absorptive capacity at the level of the firm. In their opinion, absorptive capacity refers not only the acquisition or assimilation of information by an organization but also the organization’s ability to exploit it.

With the intensification of economic globalization and coming of knowledge economy, it becomes more and more important for enterprises to make full use of its external resources, particularly knowledge resources. Thus, as an enterprise’s capacity to deals with information and knowledge, absorptive capacity has received extensive attention from researchers. A thorough review of the related theory on knowledge absorptive capacity gives us not only a systemic understanding on existing knowledge absorptive capacity researches, but also a proposed directions for further researches.

2. Literature Review

On the background of economic globalization and knowledge economy, the competition between enterprises is getting fierce day by day, and furthermore, enterprise interaction with external organizations becomes important. The main purpose of these interactions is to obtain and utilize resources, and then, improve enterprise performance. In this process, enterprise absorptive capacity plays an important role.

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.
2.1. Theory of Cohen and Levinthal

The most widely used process model of absorptive capacity was advanced by Cohen and Levinthal (1990) that is shown in Figure 1. They argued that absorptive capacity consists of the abilities to recognize the value of new knowledge, to assimilate it and to apply it to commercial purpose. It was a dynamic process and depended on the knowledge source and prior knowledge, and finally affected innovation activity and innovative performance of enterprise.

In this model, they not only firstly introduced absorptive capacity at the level of the firm, but also firstly analyzed absorptive capacity from the process perspective. Therefore, as enterprises’ capacity to deal with information and knowledge, absorptive capacity made a reasonable explanation on tacit knowledge which affected enterprise innovation process.

Besides all the above contributions, this model also has some limitations. On one hand, it ignored the process of knowledge acquisition, which was necessary in the whole process. On the other hand, it ignored enterprise profit performance, which was the most important goal for enterprises.

\[\text{Figure 1. Absorptive Capacity Model of Cohen and Levinthal (1990)}\]

2.2. Theory of Zahra and George

Zahra and George (2002) reconceptualized the concept of absorptive capacity, took absorptive capacity as a dynamic capability and proposed a new model that is shown in Figure 2. Absorptive capacity was a set of organizational routines and processes to acquire, assimilate, transform and exploit knowledge. Being a kind of process capability, absorptive capacity

\[\text{Figure 2. Absorptive Capacity Model of Zahra and George (2002)}\]
focused on enterprise’s ability of managing its resources especially its knowledge resources, and it could improve enterprise performance and competitive advantage.

Different from previous researches, “cognitive” was replaced by “acquire” in their study, and absorptive capacity was divided into potential absorptive capacity (including acquiring and assimilating knowledge) and realized absorptive capacity (including transforming and exploiting knowledge). Meanwhile, new concepts were raised such as activation triggers, social integration mechanisms and regimes of appropriability. Firstly, prior knowledge, knowledge source and complementarity were acquired and assimilated by enterprise under activation triggers. Then, they were transformed and exploited by social integration mechanisms. And under given regimes of appropriability, enterprise competitive advantage was formed (including flexibility, innovation and performance).

In this model, absorptive capacity was divided into two phases and competitive advantage included both innovation and profit performance. This gave valuable references for future study. However, it didn’t give in-depth analysis on the relations between these four variables.

2.3. Theory of Todorova and Durisin

Based on empirical research, Todorova and Durisin (2007) reconceptualized the concept of absorptive capacity that had five elements including recognizing the value, acquiring, assimilating, transforming and exploiting, shown in Figure 3. They reintroduced the concept of recognizing the value, and argued that transformation represented an alternative process linked to assimilation. Besides social integration mechanism, they proposed power relationships as the new contingency factor. And meanwhile, new feedback links was added to reflect the dynamic aspect of absorptive capacity.

This model gave a reasonable division on absorptive capacity, but still didn’t make a clear explanation on different absorptive capacity stages and different competitive advantage contents.

3. Theoretical Analyses and Hypotheses

The existing researches give valuable reference for further study. Based on previous researches, Yli-Renko (2001) selected 180 high-technology enterprises from the United Kingdom as research samples, he examined the relationships among social capital, knowledge acquisition and knowledge exploitation. He confirmed that social capital facilitates external knowledge acquisition from key customers, then the knowledge mediated the relationship between social capital and knowledge exploitation, and this contributed enterprise competitive
advantage. Wei Ying (2007) introduced the perspective of absorptive capacity to analyze the relation of social capital and technological innovation. Based on empirical analyses of Chinese manufacture enterprises, the research results showed that social capital significantly affected innovation performance by improving absorptive capacity.

Empirical researches based on previous models of absorptive capacity and competitive advantage gave enlightenment for related study. However, they didn’t make a clear explanation on different absorptive capacity stages and different competitive advantage contents.

Competitive advantage includes several dimensions, which are decided by different factors. Different dimension of absorptive capacity certainly influence different dimension of competitive advantage. However, this relation is not clearly explained.

Resources acquired from enterprise external network can only be effective by way of being recognized, being gathered, being understood and being exploited. This process, in essence, reflects the role of absorption capacity. Along with the importance of absorptive capacity, a more detailed analysis on absorptive capacity and enterprise performance becomes necessary.

Integrating previous literatures on absorptive capacity, this research redefines 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, namely recognizing the value, acquiring resources, assimilating resources and 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 (Henderson & Clark, 1990; Teece et al., 1997).

After recognizing the value of industry conditions, market opportunities and technology trends, enterprises also need to acquire these resources. Acquiring resources has positive impact on enterprise performance, which has been confirmed by subsequent empirical researches (Yli-Renko et al., 2001; Lane et al., 2002; Wang Xiaojuan, 2007).

Knowledge gaining from external network may be full of inspiration, but often be ignored due to its difficulty being understood (Rosenkopf & Nerkar, 2001). Therefore, the outside knowledge can only be useful through a process of being assimilated (Lane et al., 2006). That is, assimilate resources being an important part of absorptive capacity, has a positive effect on its performance.

Applying resources refers to the ability of transfer the assimilated knowledge to commercial utilization, and thereby enterprise can create a new competitive ability (Cohen & Levinthal, 1990). The empirical study of Lane (Lane et al., 2002) 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 analyses, the following hypotheses are proposed:

H1: The stronger an enterprise’s ability of recognizing the value is, the better its profit performance is.

H2: The stronger an enterprise’s ability of recognizing the value is, the better its innovation performance is.

H3: The stronger an enterprise’s ability of acquiring resources is, the better its profit performance is.

H4: The stronger an enterprise’s ability of acquiring resources is, the better its innovation performance is.

H5: The stronger an enterprise’s ability of assimilating resources is, the better its profit performance.

H6: The stronger an enterprise’s ability of assimilating resources is, the better its innovation performance is.

H7: The stronger an enterprise’s ability of applying resources is, the better its profit performance.

H8: The stronger an enterprise’s ability of applying resources is, the better its innovation performance is.
4. Methods

4.1. Sample selection and data collection

The following analysis is based on 205 valid questionnaires from manufacture enterprises in Shandong Province of China. Three sampling criteria were followed. First, sample enterprises should be over three years old, which can eliminate the abnormal volatility of enterprise performance. Second, enterprises’ employees should be more than 20, otherwise the enterprise is more likely to be in start-up period when enterprise network depends more on entrepreneur than enterprise. Third, sample enterprises must be in manufacture industry since 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%.

4.2. Variables

Dependent variable is enterprise performance which has two dimensions. One is profit performance, measured by the change rate of recent 3-years’ sale income. The other is innovation performance, measured by the 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-5 Points scale.

5. Results

5.1. Reliability of the data

SPSS is used to analyze the data and all data is normally distributed. The reliabilities are tested by Cronbach alpha values that are all above the recommended minimum of 0.70. The adjustment CICTs are all above the recommended minimum of 0.35. Thus, all of the constructs demonstrate good internal consistency and hence, reliability.

5.2. Correlation and regression analyses

According to correlation analyses, shown in Table 1, there are 15 correlations among enterprise absorptive capacity, profit performance and innovation performance. Meanwhile, the correlation between recognizing the value 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 recognizing the value                        | 2 acquiring resources | 3 assimilating resources | 4 applying resources | 5 profit performance | 6 innovation performance |
| 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 ≤ 0.05 (1-tailed), ** p ≤ 0.01 (2-tailed tests)
Stepwise method is used to give linear regression and the results are shown in Table 2. The results showed that four dimensions of absorptive capacity, namely recognizing the value, acquiring resources, assimilating resources and applying resources, 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.

**Table 2. Results of Linear Regression**

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R²</th>
<th>ΔR²</th>
<th>Sig. (F)</th>
<th>Sig. (t)</th>
<th>D-W</th>
<th>VIF max</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_1 = 0.602F_1 + 0.394F_2 + 0.183F_3 + 0.174F_4$</td>
<td>.758</td>
<td>.574</td>
<td>.566</td>
<td>.000</td>
<td>.000</td>
<td>2.057</td>
<td>1.076</td>
</tr>
<tr>
<td>$Y_2 = 0.532F_4 + 0.521F_1 + 0.210F_3 + 0.154F_2$</td>
<td>.831</td>
<td>.690</td>
<td>.684</td>
<td>.000</td>
<td>.000</td>
<td>1.971</td>
<td>1.005</td>
</tr>
</tbody>
</table>

F1: recognizing the value; F2: acquiring resources; F3: assimilating resources; F4: applying resources; Y1: profit performance; Y2: innovation performance. 0.05 ≤ p ≤ 0.1.

According to empirical results, enterprise absorptive capacity can be divided into potential absorptive capacity and 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, affects both the innovation performance and the profit performance. According to the above analyses, hypothesis 1, hypothesis 2, hypothesis 3, hypothesis 4, hypothesis 5, hypothesis 6, hypothesis 7 and hypothesis 8 are all supported. The revised concept model is shown in Figure 4.

![Revised Concept Model](image)

**Figure 4. Revised Concept Model**

Making a further analysis on the regression model, the results show that every dimension of absorption capacity has different effects on profit and innovation performance. More specifically, the profit performance is mainly determined by two dimensions which are recognizing the value and acquiring resource, the innovation performance is mainly determined by two dimensions which are assimilating resource and applying resource.
Recognizing the value is enterprises’ ability to identify useful resource. Acquiring resource reflects the speed, quantity and cost of acquiring external resource. These two features have a direct significant impact on enterprise profit performance. Assimilating resource and applying resource are mainly the process of recycling external resource, and therefore, have some impact on enterprise profit performance.

6. Conclusions and discussions

6.1. Conclusions

The paper probes into the four dimensions of absorptive capacity, sets up and verifies the mechanism how enterprise absorptive capacity affects its profit and innovation performance. According to the empirical analyses, the impact of enterprise absorptive capacity on enterprise profit and innovation performance is multidimensional.

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

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

Third, the absorptive capacity can be divided into potential absorptive capacity and realized absorptive capacity, which coincides with the research of Zahra and George (2002). Furthermore, the potential absorptive capacity is the ability of recognizing and acquiring resources such as information, it mainly decides the profit performance. The realized absorptive capacity is the ability of assimilating and applying resources, it mainly decides the innovation performance.

6.2. Limitations and future directions

There has no 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 on lateral research rather than longitudinal research, and thus, it fails to give a reasonable explanation from dynamic perspective.

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8. References


