

Study on the influence factors of E-commerce application on the business model of Chinese real estate enterprises

Yiwei Wang¹ and Hui Lv²

¹*School of business, Central South University
Central South University, Changsha, Hunan, 410083, China*

²*Graduate School of translation and interpretation, Tianjin Foreign Studies
University*

Tianjin Foreign Studies University, Tianjin, 300204, China

¹csuwyw@126.com, ²septemberlv@sina.com

Abstract

This paper selects Chinese real estate enterprises as objects of study and obtains large sample data by investigation. Studying the relations among E-commerce application, enterprise sustainable competitiveness and enterprise performance, the paper finds the influence path as well as the influence intensity among them by employing partial least squares (PLS) structural equation modeling. Research findings show that information communication, inner management, purchasing logistics, and network marketing are beneficial to enterprise sustainable competitiveness and the improvement of enterprise performance. Further management suggestions are provided in the later part of the paper.

Keywords: *capability of E-commerce application; enterprise sustainable competitiveness; enterprise performance; PLS structural equation modeling*

1. Introduction

Chinese real estate enterprises are undergoing dramatic change led by E-commerce, which attracts attention of the academic circles. E-commerce connects enterprises, merges business processes, promotes cooperation between enterprises, and changes enterprises' environment of competition by organizational boundary. However, the unpredictability and uncontrollability of all the uncertain factors in the Internet environment result in the difficulty of applying E-commerce in enterprises. Thus, many business leaders of Chinese real estate enterprises can not make full use of the advantages of E-commerce and feel at sea when making strategic plans. It has become an urgent issue for enterprises to study the potential advantages of E-commerce. The study not only depends on enterprises' competition situation and performance but also on the prediction and judgment on the potentiality of E-commerce application. In fact, studies on the mechanism of the influence of E-commerce application on Chinese real estate enterprises are relatively few.

In former studies, scholars like Porter (2001), Wu, Vijay, and Sridhar (2001, 2003) and Zwass (1996, 2003) point out that E-commerce application not only means trades but also helps the integration of management functions of enterprises. Communication with customers as well as cooperation and connection with channel partners, especially the suppliers, are achieved through the application of E-commerce. Wu, Vijay, and Sridhar (2001, 2003) classify the application of E-commerce according to the different business functions. Zeng Qingfeng, Wang Huan, and Huang Lihua (2004) consider that the application of E-commerce reflects in several key business processes and should be the organic composition of some

main business operational actions. Zhu and Kenneth (2002) think that the function of E-commerce finds itself in the degree of its integration with customers, suppliers, and both the up and down of the value chain.

Therefore, the author of this paper considers that for modern enterprises, E-commerce application is a complex system which not only combines the inner business processes of enterprises but also extends to the external business processes in which connections with suppliers (a kind of cooperative partner), channel partners, customers, cooperative partners and competitors are established. In order to enrich studies on the mechanism of the influence of E-commerce application on Chinese real estate enterprises and provide reference for other industries, this paper builds a model to study the relations among the capability of E-commerce application, enterprise sustainable competitiveness and enterprise performance and conducts an empirical study on the mechanism of action and the intensity of influence among them.

2. Theoretical Basis and Model Building

2.1. Theoretical Basis

Enterprise sustainable competitiveness is a key variable in the operation of the real estate enterprises. The capability of E-commerce application influences the internal operation functions of an enterprise and its external interface including customers, suppliers and government sectors. Therefore, the influence of the capability of E-commerce application on enterprises' performance could be an indirect influence through the enterprise sustainable competitiveness or a direct influence through other means. Based on these two different influence paths, it is necessary to build a positivism model demonstrating how E-commerce application capability influences the real estate enterprises' performance. In this part, first the author gives a comprehensive illustration on the theoretical basis of the E-commerce capability, enterprise sustainable competitiveness and real estate enterprise performance and then puts forward the research model and hypotheses of the paper.

Shaw, Gardner, and Thomas (1997) consider that enterprise's E-commerce capability includes the following three aspects: forming the interface between enterprises and customers, involving electronic shopping, product marketing, information retrieval, entertainment and customer service; building connections between enterprises and their partners (suppliers, distributors or retailers), for example, purchasing, filling in purchase orders, logistics cooperation and store management; supporting internal cooperation and activities of departments in the enterprises

Phan (2003) categorizes the capability of E-commerce application into three aspects: E-market mainly including trades of products and services; internal system of organizations and customer services.

Based on the current situation of American enterprises, Wu, Vijay, and Sridhar (2003) purpose four business functions of E-commerce capability: communication, inner management, order reception and purchase.

From the perspective of Internet usage, scholars like Apigian (2005) consider that E-commerce capability consists five aspects: market channels driven by the Internet; inner Internet operation; customer interaction on the Internet; supplier interaction on the Internet; distribution enhanced by the Internet.

Under the view of transformational, Chinese scholars Zhu Zhen and Zhao Jing (2006) ascribe "information sharing capability" and "cooperation process capability" to the essential attributes of E-commerce capability. Researches prove these two capabilities best show the

value of E-commerce. The information sharing capability involves sharing production plans and production capacity with suppliers; sharing customer feedback and order information with suppliers. Cooperation process capability includes providing updated stock data to suppliers, organizing productions in accordance with customers and partners' needs, as well as improving and informationizing the cooperation process.

Based on the previous studies and taking the current situation of real estate industry into consideration, this paper adopting Wu, Vijay, and Sridhar's (2001, 2003) theoretical basis evaluates enterprises' E-commerce capability from the perspective of information communication, internal management, purchasing logistics and network marketing.

To be specific, information communication involves enterprises' communication with customers, suppliers, the public, partners on the platform of E-commerce. Internal management refers to enterprises' management on infrastructure, human resources, technological development, internal logistics and business operation. Purchasing logistics include material purchase and logistics. Network marketing refers to the integration of marketing strategy, marketing, customer service and marketing investigation on the basis of E-commerce application.

In general, enterprise sustainable competitiveness shows in three aspects: enterprise value, customer value and competitive position. Scholars like Helfat (2007) consider that sustainable competitive advantage led by enterprise dynamic capacity finds itself in evolutionary matching. Evolutionary matching means the degree to which enterprises keep dynamic correspondence with both internal and external environment. It emphasizes the current situation and time sequence of sustainable competitive advantage. Realization of evolutionary matching requires three elements: technical matching (cost & quality), customer demands and competition situation. Technical matching reflects enterprises' current capacity of existences. Customer demands determine the obtention of advantages in the future. Competition situation demonstrates the competitive position of enterprises in the industry. Covering all the three aspects of enterprise sustainable competitiveness, these elements possess high quality construct validity.

According to Porter's theory of competitive advantage (1985), pressure of competition mainly comes from other enterprises in the same industry. As long as an enterprise could make profit exceeding the average level, it possesses competitive advantage in the industry. Based on enterprise endogenous factors theory, competitive advantage roots in the quantity and quality of resources and the efficiency of using these resources. That is to say, the special strategic resources which enterprises possess are the key factors in creating competitive advantage. In market competition, if an enterprise surpasses others in market shares, profit or growth rate, it is in an advantageous position, and vice versa. If enterprises' competences are relatively the same, it is called balance of power.

Therefore, the author of this paper considers that an enterprise boasting sustainable competitive advantage should features high market shares and profit exceeding the industry's average level.

Enterprise performance refers to the current operating state of enterprises. It is what the management level tries to improve all the time. Enterprise performance has dual implications. It not only includes management effectiveness as well as management and administration efficiency but also incorporates investigation on operating results and management performance of managers and administrators.

The academic circles, for a long time, mistake the financial performance for enterprise performance. Traditional evaluation on enterprise performance pays much attention on the rate of return which is often measured by the rate of return on investment, the base line in judging whether an enterprise is successful. Jacobsen suspects the validity of the rate of return

on investment in judging enterprise performance. Many standards can be found in judging enterprise performance, while disputes over how to understand enterprise performance and what enterprise performance means are still under discussion. Though it is controversial to talk about organizational performance, the concept plays an important part in many strategic studies. Recently, academic circles indicate combining the financial performance and market performance indicators, thus get a comprehensive evaluation method in assessing enterprise performance.

Enterprise performance, in its essence, is a variable relating to many factors. Only the financial performance can not replace enterprise performance and may lead to misunderstanding for the following reasons: financial performance is not suitable for measuring the value of competitive advantage; financial performance can not fully display all the intangible performances; financial performance results in short-term acts and is detrimental to the long-term and stable development of enterprises.

When explain strategic structures, scholars make use of many operation performance indicators to illustrate enterprise performance.

According to the recent academic achievements, enterprise performance includes financial performance, the core indicator, and operation performance. Operation performance, an expansion concept of enterprise performance, involves external operation performance, also known as market performance including market shares and internal operation performance, the internal operation situation of enterprises. All these performances exert influence on financial performance.

In 1990s, with the assistance of 12 companies, Kaplan and Norton put forward the famous performance management mode - the Balanced Scorecard. This mode helps enterprises in planning and accomplishing daily works with more emphasis put on strategic targets. It evaluates enterprise performance from the perspectives of finance, customer, internal business process, learning and growth and incorporates market and financial indicator into evaluation, thus could get a more objective enterprise performance. Under certain circumstances, financial indicator goes against with market indicator. For example, in order to boost market shares, enterprises spend lots of money in promoting, resulting in the decline of financial performance.

In the assessment of enterprise performance in empirical researches, Sucheta Nadkarni and V.K.Narayanan (2007) use sales growth, rate of return on investment and net income growth in evaluating enterprise performance and studying the relations of strategic structure, strategic flexibility, and enterprise performance. Jay J. Ebben and Alecc. Johnson (2005) employ return on invested capital (ROIC), return on equity (ROE), return on assets (ROA) to evaluate enterprise performance. Moses Acquah (2009) use productivity growth rate, sales revenue growth rate, net income growth rate, ROA and return on sales to assess enterprise performance and took Ghana as an example to study the relationship between competition strategies of international joint venture enterprises and enterprise performance. F. Javier Llorens, Luis M. Molina, and Antonio J. Verdu (2005) evaluates enterprise performance from the perspective of sales growth, ROA, profit ratio of sales and performance enhancing and study the flexibility of manufacturing system as well as relation between strategic change with performances.

In Chinese related literature, Sun Jinjun and Wu Yongjian (2006) adopt retained profits, operating income net profit margins, ROE, rate of return on total assets, Tobins' Q and earnings per share to provide a comprehensive indicator in assessing performance of Chinese listed companies. Based on indicators of accounting data, Huang Haibo (2007) uses ROA, ROE and Tobins' Q to judge enterprise performance. Yang Lin and Chen Chuanming (2008) employ EPS, NAPS and CFPS to evaluate enterprise performance.

Considering the development of enterprise performance assessments and the several assessment methods mentioned above, this paper, based on the traditional enterprise performance assessment indicators, adopts both financial and market indicator in evaluating enterprise performance. The method put forward by this paper not only takes characteristics of real estate industry into consideration but also provides a scientific and objective way to assess enterprise performance.

2.1. Model Building

Based on the former studies, the paper purposes the following research model (see Figure 1). There are three variables in the figure: the capability of E-commerce application, enterprise sustainable competitiveness and real estate enterprise performance. This model focuses on the relations of these three variables.

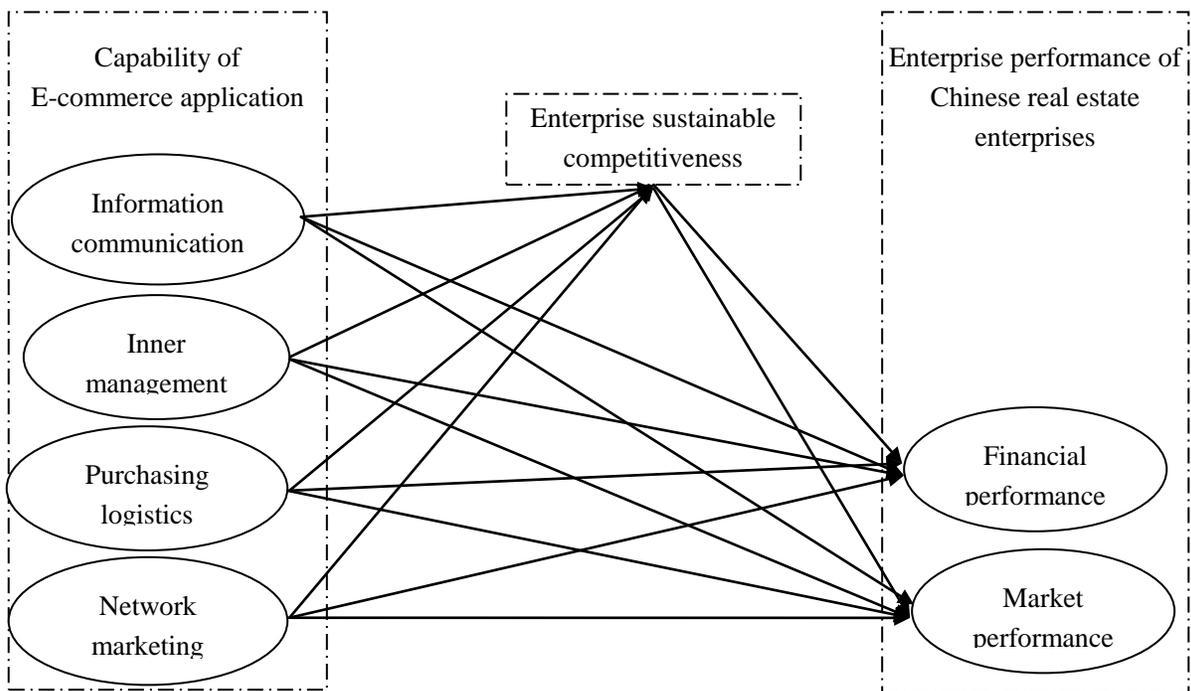


Figure 1. Model of Capability of E-commerce Application

2.1.1. Relation between Capability of E-commerce Application and Enterprise Sustainable Competitiveness

Former studies on enterprise sustainable competitiveness from the perspective of the capability of E-commerce application are relatively few. Previous studies show that E-commerce application has positive influence on enterprise sustainable competitiveness, while they lack specific and detailed explanations of how E-commerce influences enterprise sustainable competitiveness. The paper will focus on this issue.

Soto-Acosta and Meroño-Cerdan (2008) select 1010 enterprises from ten different industries (textile and leather manufacturing, chemical and electrical appliance manufacturing, transportation equipment manufacturing, handicrafts processing and trading, retail industry, tourist industry, commercial services, telecom and computer services as well as health and

social services) in Spain as samples of their investigation. Applying the structural equation model, they prove that E-commerce application has a significant positive influence on enterprise competitiveness.

Lumpkin and Dess (2004) consider that through E-commerce enterprises could enhance sustainable competitiveness.

Chu (2004) proves the relation between E-commerce application and enterprise competitive performance by adopting multi regression method. Chu's study shows that E-commerce application has significant influence on competitive performance and different aspects of E-commerce application vary in influences on enterprise competitive performance.

Zhuang and Lederer (2006) analyze the impact of E-commerce technological resources, human resources and business resources on E-commerce performance and enterprise performance from the perspective of enterprise resources. Research result shows that E-commerce could meet the expectation of enterprise sustainable competitiveness by expanding distribution channels, new marketing medium, enhanced operational efficiency, automated customer service operations, improved customer data collection techniques, as well as interactive information exchanges.

Ren Feng, Li Yuan, Sun Aiyang (2003) build a conceptual model which employs network budget, network tools and applications as independent variables; customer relation management activities, information management activities as mediating variables; sales performance and market improvements as dependent variables. Based on 112 valid questionnaires distributed to 12 industries in Guangdong and other 7 provinces, the research, adopting the structural equation model, proves that network budget, network tools and applications have positive influence on customer relation management activities and information management activities. The conclusion demonstrates that Chinese enterprises by using E-commerce platform could improve marketing activities, enhance enterprises' competitiveness.

Taking previous studies and the current situation of China's real estate industry into consideration, this paper considers the capability of E-commerce application has positive influence on enterprise sustainable competitiveness. Hypotheses are as follows:

H1a: the stronger the capability of information communication, the stronger the enterprise sustainable competitiveness.

H2a: the stronger the capability of inner management, the stronger the enterprise sustainable competitiveness.

H3a: the stronger the capability of purchasing logistics, the stronger the enterprise sustainable competitiveness.

H4a: the stronger the capability of network marketing, the stronger the enterprise sustainable competitiveness.

2.1.2. Relation between Real Estate Enterprise Performance and Enterprise Sustainable Competitiveness

Competitive advantage is not equal to performance, for competitive advantage is a long-term conception. Ma and Hao (2006) discuss three relations between enterprise performance and competitive advantage. Suhong Li, Bhanu Ragu-Nathan, T. S. Ragu-Nathan, and S. Subba Rao (2006) explain relations of supply chain management, competitive advantage and enterprise performance and indicate that supply chain management may lead to higher level of competitive advantage, thus improving the organizational performance. Scott L. Newbert (2008) studies relations of value, scarcity, competitive advantage and enterprise

performance from the perspective of empirical method. The study proves that competitive advantage is the intermediary between scarce resources and enterprise performance, namely the resources and capability of enterprises may not result in higher enterprise performance. Enterprises, in the first place, should improve competitive advantage by integrating enterprise resources and then improve performance. The study also serves as supporting evidence to Barney's theory which says that enterprises owing value and scarce resources could achieve competitive advantage.

Lakhal, L (2009) studies quality, competitive advantage and organizational performance by using SEM. Research result indicates that the improvement of quality may lead to competitive advantage and then improve organizational performance. The study shows that quality influences organizational performance and competitive advantage both directly and indirectly. The literature of strategic management shows that differences of strategies result in differences of performances. (Barnett and Burgelman, 1996; Sehendel, 1996), and the sustainable excellent performance comes from sustainable competitive advantage (Barney, 1997; Grant, 1998; Roberts, 1999).

Few studies have been conducted on competitive advantage and enterprise performance in China. Some scholars combine market orientation, supply chain management with competitive advantage and enterprise performance. Wang Yonggui and Zhang Yuli (2003) study the relations of enterprise competitive performance with organizational learning, core competence, and strategic flexibility. Employing competitive advantage as an intermediary, Zhang Xuelan (2005) combines market orientation and organizational performance and discusses the relations of market orientation, competitive advantage and organizational performance. The study also displays how environment characteristic and strategic types influencing the relation between market orientation and competitive advantage.

Therefore, this paper considers that the improvement of sustainable competitiveness has positive influence on real estate enterprise performance. Hypotheses are as follows:

H5a: the stronger the enterprise sustainable competitiveness, the better the financial performance.

H5b: the stronger the enterprise sustainable competitiveness, the better the market performance.

2.1.3. Direct Relation between Capability of E-commerce Application and Real Estate Enterprise Performance

Few studies have been carried out on relation between capability of E-commerce application and China's real estate enterprise performance. Most of the researches emphasize relations between capability of E-commerce application and enterprise performance. No specific researches involve the relation between capability of E-commerce application and China's real estate enterprise performance.

Saini and Johnson (2005) identify three capabilities for E-commercial enterprises in achieving better enterprise performance. The three capabilities are information technology capability, strategic flexibility and trust building capability. The study also points out the nature together with degree of market orientation is the key factor influencing E-commerce capability. In the study, S & J use data from 122 electronic intermediary services providers and test the influence of capability of E-commerce application on enterprise performance like related profit, marketing and ROI. Result of the study shows that E-commerce application, under the proper market orientation, has influence on enterprise performance.

Selecting 260 American manufacturing enterprises (both Hi-tech and traditional manufacturing enterprises) Zhu and Kraemer adopt financial indicators like rate of profit, cost

saving and inventory turnover efficiency to conduct the study with the method of regression analysis. Result of the study shows that E-commerce capability has a significant correlation with inventory turnover efficiency, while has no obvious relation with rate of profit. In terms of cost saving, it is influenced by the type of enterprises. Hi-tech enterprises do better in cost saving, while traditional manufacturing enterprises add the cost. Zhu conducted another survey on 114 American retail businesses in 2004. In this study, Zhu employs rate of profit, cost saving, inventory turnover efficiency and ROA as dependent variables and uses the study method of regression analysis. The study shows that E-commerce capability has a significant influence on rate of profit, has certain influences on cost saving and inventory turnover efficiency, while has no obvious influence on ROA.

Studying the data collected from 143 enterprises in the UK, Khalid Hafeez and Kay Hooi Keoy build an E-commerce capability model by using SEM and employing business strategy, supply chain strategy and E-commerce agility as variables. The result shows that in the UK, the success of E-commerce has an important relation with business strategy, supply chain strategy and E-commerce agility. E-commerce strategy and supply chain strategy have a direct influence on enterprise performance.

Jin Nan, Wu and Wei Junzhong (2009) study three large-scale iron and steel enterprises in China by using the method of summary and comparison. Study result indicates that E-commerce resources are the necessary but not sufficient factors in enhancing enterprise performance.

Collecting data of E-commerce application in 175 manufacturing enterprises in China, Chinese scholars Lv Lan and Zhao Jing (2008) test the relations of E-commerce capability, electronic purchasing process performance and enterprise financial performance in electronic purchasing business. Adopting the study method of PLS, the study finds that the capability of E-commerce application has no direct influence on enterprise performance but has significant influence on electronic purchasing process. Electronic purchasing process performance has an influence on enterprise financial performance.

Based on the previous studies mentioned above, this paper proposes that the capability of E-commerce application has a positive influence on real estate enterprise performance. Hypotheses are as follows:

H1b: the stronger the capability of information communication, the better the financial performance.

H1c: the stronger the capability of information communication, the better the market performance.

H2b: the stronger the capability of inner management, the better the financial performance.

H2c: the stronger the capability of inner management, the better the market performance.

H3b: the stronger the capability of purchasing logistics, the better the financial performance.

H3c: the stronger the capability of purchasing logistics, the better the market performance.

H4b: the stronger the capability of network marketing, the better the financial performance.

H4c: the stronger the capability of network marketing, the better the market performance.

3. Research Design

3.1. Scale Design

Based on the literature of E-commerce application, enterprise sustainable competitiveness

and enterprise performance both at home and abroad, the scale uses successful real estate enterprises like Wan Ke and Wan Da as samples, displaying the current situation and characteristics of E-commerce application in real estate enterprises in China. The scale adopts Likert five-point scale design in which numbers 1-5 are used. Number 5 means “very important” and Number 1 means “unimportant”.

The scale of capability of E-commerce application is based on Wu, Vijay and Sridhar’s (2003) measuring framework and Shaw (1997), Zwass (1996,2003) and Apigian’s (2005) research results. Taking the results of experts’ interviews and enterprises’ senior managers’ interviews, the scale is designed to conduct assessment from four angles: information communication, inner management, purchasing logistics and network marketing. Based on the research results of Helfat (2007) and Porter (1985), scale design of Xiang Baohua (2003), and cases study of real estate enterprises, the scale of enterprise sustainable competitiveness is designed including the factors of enterprise value, customer value and competitive position. Employing financial performance and market performance as measuring indicators, the scale of enterprise performance refers to research results of Sucheta Nadkarni and V. K. Narayanan (2007), Moses Acquah (2009), Huang Haibo & Yang Lin (2007) and Chen Chuanming (2008) and takes the current situation of real estate enterprises in China into consideration. See scales in Table 2.

In the research, the author takes the scale of enterprise and E-commerce diffusion process as control variables and adopts the order variable measurement. The scale of enterprise is classified into four grades: less than 100 people, 101-500 people, 501-1000 people and more than 1000 people. E-commerce diffusion process is directly reflected in E-commerce processes which include electronic purchasing, electronic order and customer relation management (CRM). According to the amount of the three kinds of processes, E-commerce processes can be divided into three development phases: basic informatization phase featuring only the inner informatization; initial adoption phase featuring the adoption of key processes; process integration phase featuring the integration of upper and lower supply chains.

3.2. Research Method

First is the questionnaire predicts of the large-scale real estate enterprises in Hunan, China. According to the feedback of enterprises, expressions of some questions in the questionnaires are revised. Then, 580 questionnaires are sent to the major enterprise in eastern and central China. Interviews, E-mails, mails and telephones are also used in conducting the research. Due to the fact that it is difficult to collect all the samples, the research, combing random selection and quota sampling, adopts the method of non-probability sampling. Specific steps are as follows:

First, get the list of real estate enterprises which widely use E-commerce in major industrial cities of all provinces.

Then, determine the list of enterprises which need researching according to the amount of enterprises in each province and the proportion of quota.

People who manage E-commerce application in enterprises like department heads, operating department managers (purchase department, sales department) or general managers are required to fill in the questionnaires. 106 questionnaires are acquired a month later after giving out the questionnaires, making the recovery rate as 18.2%. Among the 106 questionnaires, 7 of them are considered as invalid ones due to the large amount of missing values and the low positions of the people being investigated. 99 questionnaires are valid, making the effective rate as 93.3%. The number of recovered samples ranges from 60 to 150. In the author’s research, the number of samples reaches the average level in researches both at home and abroad.

3.3. Sample Characteristics

Valid samples mainly come from large scale real estate enterprises like Wan Ke, Heng Da, Jin Di, Wan Da and Long Hu. (see Table 1). These enterprises are mainly located in central and southern China where developed and under developed areas lie. The structure of samples best shows the developmental level of E-commerce in different areas in China. The scale distribution of enterprises is reasonable for medium-sized and small enterprises occupy 70% of the total investigated enterprises. Viewed from the perspective of ownership, state-owned, Sino-foreign joint venture and private-operated enterprises occupy a third of the total number of enterprises respectively.

Table 1. Properties of Samples

	quantity	ratio (%)		quantity	ratio (%)
Staff number			Business capital (million yuan)		
<100	32	32.3	<5000	29	29.2
100—500	34	34.3	5000—10000	35	35.3
501—1000	22	22.2	10000—30000	21	21.2
>1000	10	10.1	>30000	14	14.1
Diffusion process					
Basic informatization	37	37.3			
Initial adoption	39	39.3			
Process integration	22	22.2			

3.4. Research Bias Analysis

Research bias test includes answer deviation and common method bias. In order to know the unbiasedness of answers, the research conducts one-way analysis of variance on the seven variables of the model according to the early and later recovered questionnaires. (see Table 2). Result of analysis shows that there is no significant difference between the early and later recovered questionnaires. ($p > 0.05$) The independent variables and dependent variables answered by the same people in the questionnaires may lead to the common method biases. This kind of artificial co-variation will exert strong influence on the relations of variables in the model and may result in the wrong conclusion.

The process of the research should be tested through common method biases. First is to conduct Harman single factor analysis. If there are common method biases, the factor analysis will only get a single factor or the first factor will occupies the most variance explanation rate. Using the principal component analysis method, the author could not get a single factor but seven factors. (see Table 2). Variables considered having no direct relation with the model in theory are tested by using Lindell-Whitney's marker variable method. Any high correlation between marker variable and research variable may be related to the common method biases. Therefore, the research selects "the position of person" which involves no variable as a marker and conducts Pearson Correlation Analysis by using the marker and the seven variables mentioned in this paper (see Table 2). Result of the analysis indicates that most of the coefficient of associations have no significant dependency ($p > 0.05$). The mean value of the seven coefficient of associations is 0.083, which proves that there is no significant

common method biases in the research.

4. Empirical Study

4.1. Validity and Credit Analysis

Integrating the method of factor analysis and average variance extracted (AVE), the paper assesses the inside validity and discriminate validity respectively. The paper adopts the reliability level of Cronbach's coefficient measurement scale, uses SPSS 16.0 and extracts the factors whose characteristic roots are greater than one by employing varimax orthogonal rotation. Result of analysis shows that the Kaiser-Meyer-Olkin (KMO) statistical magnitude (0.809) and the sphericity test of Bartlett (<0.001) of the research have reached a higher standard. The analysis is conducted on seven factors namely information communication, inner management, purchasing logistics, network marketing, enterprise sustainable competitiveness, financial performance and market performance and extracts 71.793% variance contribution rate. At the same time, the paper conducts confirmatory factor analysis. With the significance level at 0.01 and the load of all the standard latent variables greater than 0.65 (See Table 2), the inside validity of the paper reaches the standard of the research. Next, the paper uses AVE model to further test the discriminate validity (See Table 3). Result shows that AVE is greater than 0.5 and the square root is greater than the coefficient of association of the cross variables, which makes the research meet the standard of discriminate validity. Reliability analysis is a description of the degree of expression which the indicators have on all the common latent variables. Result of the analysis shows that the coefficient of Cronbach ranges from 0.77 to 0.88, reaching a better level of reliability.

Table 2. Validity Test

Variables and indicators	Standard load	Value of T
Information communication		
Information sharing of E-commerce application inside enterprises	0.67	5.64**
Client base information sharing of E-commerce application	0.91	13.73**
Partner information sharing of E-commerce application outside enterprises	0.80	25.93**
Inner management		
Project developing of E-commerce application	0.69	11.61**
HRM of E-commerce application	0.73	29.82**
Coordination with partners of E-commerce application outside enterprises	0.88	12.37**
Purchasing logistics		
Online bid of E-commerce application	0.65	7.49**
Material purchase & distribution logistics of E-commerce application	0.71	14.11**
Online payment of E-commerce application	0.82	22.08**
Network marketing		
Receive E-payment from customers	0.66	23.20**
Online contract management & customer's account evaluation	0.74	9.03**

Integrated management of channels	0.90	18.01**
Customers' online product selection & configuration	0.77	7.27**
Product distribution on the enterprise website or in the e-market; real-time trades conducted by final consumers, salespersons or channel members	0.89	19.69**
Promotion schemes designed for different categories of customers	0.68	27.02**
Financial performance		
Average pre-tax profit margins of enterprises' total assets	0.68	20.17**
Trade cost	0.91	15.43**
Logistics cost	0.74	5.82**
Market performance		
Sales growth rate	0.75	10.31**
Market shares growth rate	0.84	31.59**
Customer satisfaction	0.73	17.88**
Enterprise sustainable competitiveness	0.80	9.47**
Survival capability (compared with the average level of the same industries)	0.71	11.63**
Customer value creation capability (compared with the average level of the same industries)	0.88	8.92**
Competitive position (compared with the average level of the same industries)	0.74	13.73**

Table 3. Descriptive Statistics, Reliability Test, and Average Extraction of Variation

	1	2	3	4	5	6	7	8	9
Information communication	0.632								
Inner management	0.416	0.720							
Purchasing logistics	0.328	0.258	0.710						
Network marketing	0.412	0.576	0.693	0.901					
Financial performance	0.453	0.531	0.496	0.607	0.835				
Market performance	0.337	0.631	0.586	0.506	0.855	0.360			
Enterprise sustainable competitiveness	0.368	0.726	0.460	0.572	0.534	0.586	0.612		
Scale of enterprises	-0.143	0.081	0.315	-0.093	0.220	-0.149	-0.007	NA	
Diffusion phase	-0.051	0.410	-0.091	0.030	-0.006	0.192	0.290	0.093	NA

Mean value	4.68	3.19	4.03	5.11	6.25	3.52	3.81	1.29	2.20
Standard deviation	0.683	0.544	0.589	0.649	0.683	0.553	0.605	0.730	0.709
Cronbach α	0.738	0.826	0.776	0.838	0.864	0.845	0.687	NA	NA

4.2. PLS Regression Analysis

The research of this paper employs the PLS Graph 3.0 to analyze the structural equation of the research. PLS structural equation and the covariance matrix structural equation all belong to the second generation of path analysis methods. Compared with the later method, PLS path analysis overcomes the problems of uncertain results, uncertainty of factors and violation of distribution hypothesis. When a research is in its initial stage of study and application, it is appropriate to use PLS path analysis. Even the number of samples in the research is not large and the statistics are biased, the research could get an ideal result by using PLS analysis. In recent years, PLS analysis is widely used in studying the application of E-commerce. The focus of this paper is to study the capability of E-commerce application in real estate enterprises in China. Due to the fact that the number of samples is not very large, the research of this paper adopts PLS method to evaluate the factors in order to improve the reliability of the research.

PLS analysis consists the estimated path coefficient and the value of R². The path coefficient reflects relations of latent variables and the degree of influence. The value of R² indicates the degree of explanation which the exogenous latent variables have on the endogenous latent variable and the predictive ability of the model. 200 new samples (same size to the original samples) are generated by using the method of bootstrapping to estimate the significance of all the path coefficients. In general, when the number of the generated samples is around 200, the research could get reliable standard error of estimate and significant level of estimate. Path coefficients and the value of R² of the research's result are shown in Figure 2.

The author also adopts PLS global fit measure put forward by Tenenhaus to estimate the degree of model fitting of the research. Results show that the GoF of the research is 0.517, greater than the high influence marginal value which is 0.36. Therefore, the PLS model of the research is highly and comprehensively effective. Research results show that when the significant level is at 0.1, the assumptions, including H1b, H2b and $p > 0.1$, on the relation between information communication and financial performance and the relation between inner management and financial performance are invalid. Assumptions like H3c and $p > 0.1$ on the relation between purchasing logistics and market performance are invalid. In contrast, assumptions, including H3b, H4b, H5a and $p < 0.1$, on the relations of financial performance with purchasing logistics, network marketing, and enterprise sustainable competitiveness are all valid.

Assumptions, including H1c, H2c, H4c, H5b and $p < 0.1$, on the relations of market performance with information communication, inner management, network marketing, and enterprise sustainable competitiveness are all valid. In the research, the degree of explanation of sharing information ability and cooperation process ability reach 34.5% and 40.2% respectively. Generally speaking, when the degree of explanation of a model could reach 30%, the model possesses good explanatory. Thus, results show that the model of this research possesses good and valid explanatory.

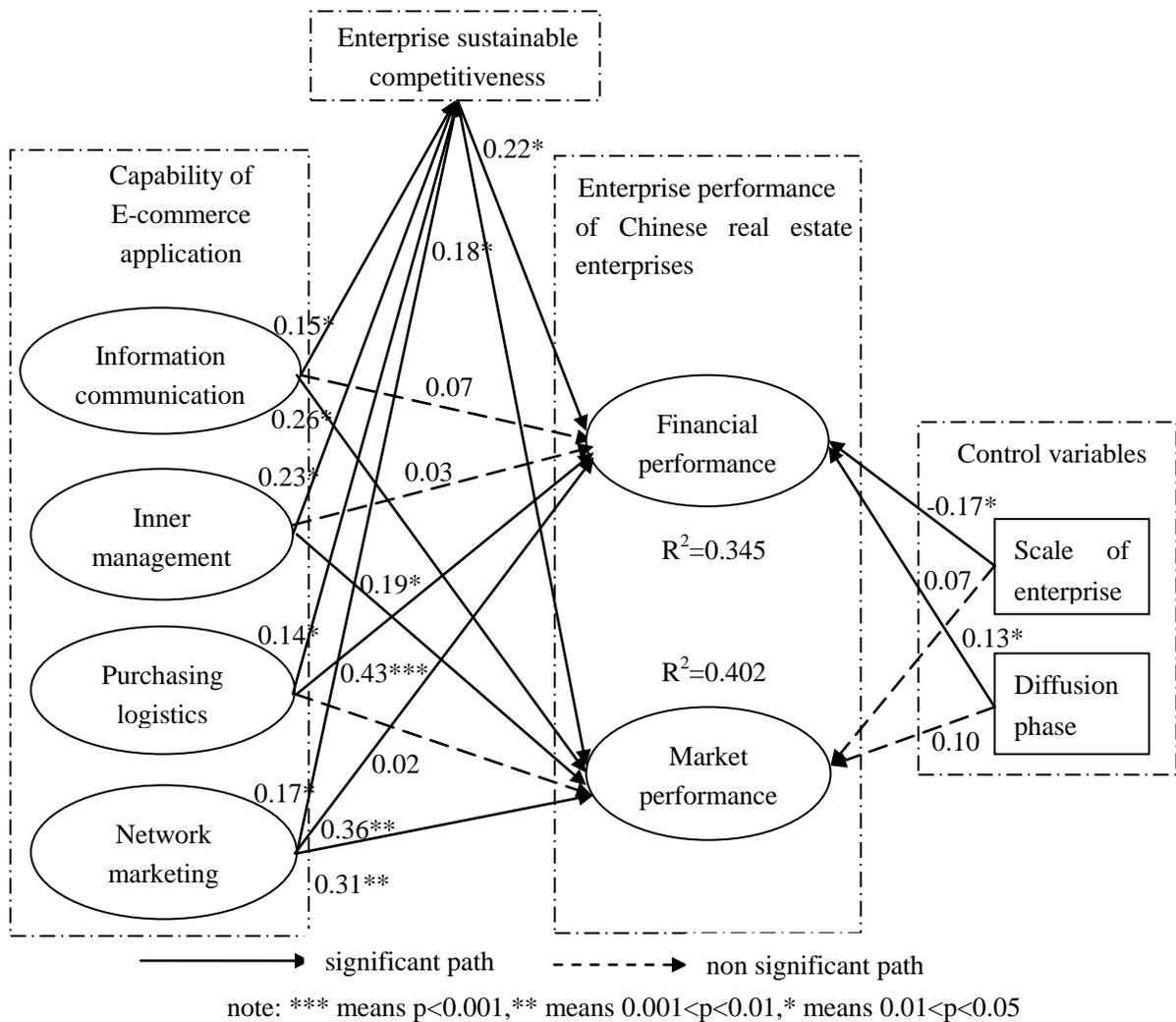


Figure 2. Path Diagram of Test Results

5. Discussions and Management Suggestions

5.1. Findings

In terms of the influence of E-commerce application on enterprise sustainable competitiveness, results of path analysis show that information communication ($\beta=0.15$, $p<0.05$), inner management ($\beta=0.23$, $p<0.05$), purchasing logistics ($\beta=0.14$, $p<0.05$) and network marketing ($\beta=0.17$, $p<0.05$) have significant influence on enterprise sustainable competitiveness. That is to say, the capability of E-commerce application contributes a lot to the improvement of enterprise sustainable competitiveness. This result is in accordance with the former studies' conclusion which is the capability of E-commerce application has positive influence on enterprise sustainable competitiveness.

In terms of the influence of E-commerce application on real estate enterprise performance, purchasing logistics ($\beta=0.43$, $p<0.001$) and network marketing ($\beta=0.36$, $p<0.01$) have

positive influence on financial performance. Information communication ($\beta=0.26$, $p<0.05$), inner management ($\beta=0.19$, $p<0.05$) and network marketing ($\beta=0.31$, $p<0.01$) have positive influence on market performance.

Among the four variables, the network marketing is the only one which not only exerts significant influence on Chinese real estate enterprise performance but also has positive influence on both financial and market performances. The reason explaining for this phenomenon lies in network marketing improves enterprises' sales performance in a short time and thus further improves the financial and market performances of the enterprises. Information communication ($p>0.1$) and inner management ($p>0.1$) show no significant influence on financial performance because these two variables are closely related to the inner management cost and management efficiency of the enterprises and thus they need time and intermediary to exert influence on financial performance. Purchasing logistics ($p>0.1$) has no obvious influence on the improvement of market performance because the informatization management of the purchasing logistics lower the cost of purchasing, which results in the direct improvement of financial performance not the market performance.

In terms of the influence of enterprise sustainable competitiveness on real estate enterprise performance, enterprise sustainable competitiveness shows high positive correlation with real estate market performance ($\beta=0.22$, $p<0.05$) and financial performance ($\beta=0.18$, $p<0.05$). This result is in line with the finding of former researches which is enterprise sustainable competitiveness has significant positive influence on Chinese real estate enterprise performance.

Besides, all these control variables have significant influence on enterprise financial performance in which the scale of enterprises is negative effect ($\beta=-0.17$, $p<0.05$) and innovation diffusion phase is positive effect ($\beta=0.13$, $p<0.05$). The fact indicates that enterprise financial performance declines with the expansion of enterprises. In terms of China, the marginal efficiency of management of large-scale enterprises declines while the marginal cost of expansion is rising. In contrast, in a higher diffusion phase, due to the accumulation of experience, adjustment of organizations and learning effect of optimized process, leaders of enterprises have better understanding of the value and advantages of E-commerce application, which leads to the improvement of financial performance.

5.2. Management Suggestions

(a) In order to improve the capability of E-commerce application, one should have an overall understanding of the current advantages and disadvantages of enterprises from the perspectives of information communication, inner management, purchasing logistics and network marketing. Scientific perception on these four aspects needs to be improved. Network marketing has a significant influence on improving enterprise performance. So enterprises should give priority to the network marketing and make appropriate plans considering the other three aspects for the improvement of enterprise performance.

(b) The application of E-commerce provides a good basis of information collection and information analysis for enterprises in the process of decision making. Therefore, it is important for enterprises to enhance the inner information communication level and management efficiency. Research results show that information communication and inner management have no obvious influence on financial performance, which makes many enterprises reluctant to add investment on these two factors. In fact, information communication and inner management have significant influence on market performance and enterprise sustainable competitiveness, which indicates these two factors are very important to the future development of enterprises. Therefore, the urgent issue is that enterprises should

build a scientific and balanced platform for information communication and inner management by using inner resources.

(c) On one hand, the expansion of enterprise exerts negative influence on financial performance. On the other hand, purchasing logistics has a significant positive influence on financial performance. Hence, this paper considers that when undergoing a rapid expansion period, Chinese real estate enterprises should pay attention to the improvement of purchasing logistics. In this way, enterprises could lower operating cost and control the negative influence brought by business expansion while enhance financial performance.

6. Conclusion and Limitations

Employing PSL structural equation empirical study method, this paper studies the relations among capability of E-commerce application, enterprise sustainable competitiveness, and Chinese real estate enterprise performance. Research findings show that capability of E-commerce application has positive influence on enterprise sustainable competitiveness and enterprise performance. Information communication and inner management have positive influence on financial performance and enterprise sustainable competitiveness while exert unobvious influence on market performance. Purchasing logistics has positive influence on market performance and enterprise sustainable competitiveness while exerts unobvious influence on financial performance. Network marketing has positive influence on financial performance, market performance, and enterprise sustainable competitiveness. Purchasing logistics has positive influence on market performance and enterprise sustainable competitiveness while exert unobvious influence on financial performance.

Research findings also reveal that improvement of information communication and inner management capabilities is beneficial to the sustainable development of enterprises and lays solid foundation for further development of enterprises. Improvement of purchasing logistics capability is beneficial to enhance financial performance. Moreover, improvement of network marketing capability will have greater positive influence on enterprise performance. The findings are instructive to real estate enterprises which are in different development phases. More attention should be paid to enhancing the capability of network marketing when enterprises are in their initial stages. When undergoing high development period, enterprises should develop the capability of purchasing logistics which could control the negative effect of rapid expansion. Information communication and inner management should be enhanced to guarantee the sustainable development of enterprises when the enterprises are in mature states.

Limited by the questionnaire survey ability, this paper needs to be improved in the universality of the research result. More samples are important in improving the research. Further studies should be conducted on the relation between the scale of enterprises and E-commerce application.

References

- [1] C. H. Apigian, B. S. Ragu-Nathan, T. S. Ragu-Hathan and A. Kunnathur, "Internet Technology: The Strategic Imperative", *Journal of Electronic Commerce Research*, vol. 6, no. 2, (2005), pp. 123-145.
- [2] P. Barwise, P. R. Marsh and R. Wensley, "Must finance and strategy clash," *Journal of Harv Bus*, vol. 67, (1989), pp. 85-90.
- [3] A. Basu and R. W. Blanning. "Synthesis and decomposition of processes in organizations", *Information Systems Research*, vol. 4, no. 14, (2003), pp. 337-355.
- [4] S. G. Bharadwaj, P. R. Varadarajan and J. Fahy, "Sustainable competitive advantage in service industries: a conceptual model and research propositions", *J Mark*, vol. 57, (1993), pp. 83-98.
- [5] C.-H. Nilsson and J. Demroth, "The strategic grounding of competitive advantage-The case of Scania",

- International Journal of Production Economics, vol. 41, (1995), pp. 281-296.
- [6] C. Jan Tow Lawrence, "Building and sustaining the sources of competitive advantage in e-commerce capability", Diss. University of South Australia, (2004).
- [7] R. Durand and R. Coeurderoy, "Age, order of entry, strategic orientation, and organizational performance", *J Bus Venturing*, vol. 4, no. 16, (2001), pp. 71-94.
- [8] F. Javier Llore'nsa, L. M. Molinaa and A. J. Verdu, "Flexibility of manufacturing systems, strategic change and performance", *J. Production Economics*, vol. 98, (2005), pp. 273-289.
- [9] B. S. Hakravarthy, "Measuring strategic performance", *Strategic Manage*, vol. 7, no. 8, (1986), pp. 37-58.
- [10] C. E. Helfat and S. M. Finkelstei, "DynamiceaPabilities: understanding strategic change in organzations", Blackwell, (2007).
- [11] R. Jacobsen, "The validity of ROI as a measure of business performance", *Journal of AmEcon*, vol. 4, no. 77, (1987), pp. 70-80.
- [12] J. J. Ebben and A. C. Johnson, "Efficiency, Flexibility, Or Both? Evidence Linking Strategy To Performance in Small Firms", *Strategy Management Journal*, vol. 26, (2005), pp. 1249-1259.
- [13] J.-N. Wu and W.-J. Zhong, "Application capability of e-business and enterprise competitiveness:A case study of the iron and steel industry in China", *Technology in Society*, vol. 31, no. 1, (2009), pp. 198-206.
- [14] R. S. Kaplan and D. P. Norton, "The Balanced Scorecard: Translating the strategy into action", Boston: Harvard Business School Press, (1996).
- [15] R. S. Kaplan and D. P. Norton, "Linking the balanced scorecard to strategy", *Journal of Manage*, vol. 39, (1996), pp. 53-79.
- [16] K. Hafeez and K. Hooi Keoy, "E-business capabilities model Validation and comparison between adopter and non-adopter of e-business companies in UK", *Strategy Management Journal*, vol. 6, no. 17, (2006), pp. 806-828.
- [17] L. Lakhali, "Impact of quality on competitive advantage and organizational performance", *Journal of the Operational Research Society*, vol. 5, no. 5, (2009), pp. 637-645.
- [18] G. T. Lumpkin and G. Gregory, "E-Business Strategies and Internet Business Models: How the Internet Adds Value", *Organizational Dynamics*, vol. 33, no. 2, (2004), pp. 161-173.
- [19] H. Ma, "Competitive advantage and Firm Performance", *Competitiveness Review*, vol. 2, (2000), pp. 16-17.
- [20] M. Acquaaah, "International joint venture partner origin, strategic choice, and performance: A comparative analysis in an emerging economy in Africa", *Journal of International Management*, vol. 15, (2009), pp. 46-60.
- [21] G. B. Murphy, J. W. Trailer and R. C. Hill, "Measuring performance in entrepreneurship research", *J Bus Res.*, vol. 36, (1996), pp. 15-23.
- [22] D. Otley and R. M. Pollanen, "Budgetary criteria in performance evaluation: a critical appraisal using new evidence," *Account, Organ, Soc.*, vol. 25, (2000), pp. 483-496.
- [23] D. D. Phan, "E-business development for competitive advantages: a case study", *Information& Management*, vol. 40, (2003), pp. 581-590.
- [24] T. C. Powell and A. Dent-micallef, "Information technology as competitive advantage: The role of human, business, and technology resources", *Strategic Management Journal*, vol. 5, no. 18, (1997), pp. 375-405.
- [25] J. S. Reese and W. R. Cool, "Measuring investment center performance", *Journal of International Management*, vol. 56, (1978), pp. 28-46.
- [26] A. Saini and J. L. Johnson, "Organizational Capabilities in E-Commerce: An Empirical Investigation of E-Brokerage Service Providers", *Journal of the Academy of Marketing Science*, vol. 33, no. 3, (2005), pp. 360-375.
- [27] S. L. Newbert and R. Value, "Competitive Advantage and Performance: A Conceptual-Level Empirical Investigation Of The Resource-Based View Of The Firm", *Strategic Management Journal Strat*, vol. 29, (2008), pp. 745-768.
- [28] M. J. Shaw, D. M. Gardner and H. Thomas, "Research opportunities in electroniccommerce", *Decision Support Systems*, vol. 21, (1997), pp. 149-156.
- [29] P. Soto-Acosta and A. L. Meroño-Cerdan, "Analyzing e-business value creation from a resource-based perspective", *International Journal of Information Management*, vol. 1, no. 28, (2008), pp. 49-60.
- [30] S. Nadkarni and V. K. Narayanan, "Strategic Schemas,Strategic Flexibility,and Firm Performance: The Moderating Role of Industry Clockspeed", *Strategic Management Journal*, vol. 28, (2007), pp. 243-270.
- [31] S. Lia, B. Ragu-Nathanb, T. S. Ragu-Nathanb and S. Subba Raob, "The impact of supplychain management practices on competitive advantage and organizational performance", *Journal of the Academy of Marketing Science*, vol. 34, (2006), pp. 107-124.
- [32] N. Venkatraman and V. Ramanujam, "Measurement of business performance in strategy research: a comparison of approaches", *Acad Manage Rev*, vol. 11, (1986), pp. 801-814.
- [33] F. Wu, V. Mahajan and S. Balasubramanian, "An analysis of e-business adoption and its impact on business performance", *Academy of Marketing Science*, vol. 4, no. 31, (2003), pp. 425-447.
- [34] J. Zhao, V. W. Huang and Z. Zhu, "An empirical study of e-business implementation process in China", *IEEE*

- Transactions on Engineering Management, vol. 1, no. 55, (2008), pp. 134-147.
- [35] K. Zhu, "The complementarity of information technology infrastructure and e-commerce capability: a resource-based assessment of their business value", Journal of Management Information Systems, vol. 1, no. 21, (2004), pp. 167-202.
- [36] Z. Youlong and A. L. Lederer, "A resource-based view of electronic commerce", Information & Management, vol. 43, (2006), pp. 251-261.
- [37] 蔡娜. 电子商务能力构成要素: 基于 B2C 的实证研究. 河北工业大学硕士学位论文, (2009).
- [38] 黄海波. 中国房地产类上市公司多元化与企业绩效的实证分析. 西安交通大学学报, no. 1, (2007), pp. 39-48.
- [39] 金占明, 王江, 苏颖. 战略性绩效测控系统的理论述. 预测, no. 6, (2005), pp. 27-30.
- [40] 刘冀生, 许宏强. 企业竞争优势的经济学分析. 南开管理评论, no. 5, (2001), pp. 38-45.
- [41] 吕兰, 赵晶. 基于电子商务能力的电子采购流程绩效实证研究. 中国地质大学学报 (社会科学版), vol. 8, no. 6, (2008), pp. 98-101.
- [42] 曲丹, 李洪心. 电子商务绩效评价体系设计. 东北财经大学硕士学位论文, (2007).
- [43] 项保华. 战略管理—艺术与实务. 上海: 复旦大学出版社, (2007).
- [44] 任峰, 李垣, 孙爱英. 基于网络的企业营销活动实证分析. 南开商业评论, vol. 4, (2003), pp. 37-41.
- [45] 孙进军, 吴永健. 企业多元化、公司业绩与经营者报酬—我国上市公司的实证分析. 技术经济与管理研究, vol. 2, (2006), pp. 41-42.
- [46] 王永贵, 张玉利, 杨永恒, 李季. 对组织学习、核心竞争能力、战略柔性与企业竞争绩效的理论剖析与实证研究——探索中国企业增强动态竞争优势之路. 南开管理评论, vol. 4, (2003), pp. 54-60.
- [47] 杨林, 陈传明. 多元化发展战略模式与企业绩效关系实证研究. 科学学与科学技术管理, vol. 5, (2008), pp. 140-145.
- [48] 张雪兰. 市场导向、竞争优势与组织绩效系研究. 武汉大学博士学位论文, (2005), pp. 136-167.
- [49] 朱镇, 赵晶, 谷文辉, 王学军. 传统企业电子商务战略感知评估研究. 中国地质大学学报 (社会科学版), no. 6, (2007), pp. 19-23.

Authors



Yiwei Wang he received his Bachelor of economics in international economics and trade (2012) from Central South University. Now he is a postgraduate student of management science and engineering at school of business, Central South University. His current research interests include strategic management of enterprises and enterprise network structure.



Hui Lv received her B.A. in English translation (2012) from Tianjin Foreign Studies University. Now she is a postgraduate student of translation at graduate school of interpretation and translation, Tianjin Foreign Studies University. Her current research interests include business English, international business, and translation.