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IT Capability of Domestic Research Review

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Abstract: Information technology (IT) investment does not necessarily bring a corresponding value returns for enterprises, and the thing that can help enterprises to gain the core competitiveness is IT capability. Based on 78 articles related literature from CSSCI, we found that: 1) We have fruitful achievement, but the quality and quantity need to be increased; 2) Existing literature use a variety of methods in research, but we should pay more attention to empirical research especially case study and secondary data research; 3) we need to strengthen the research of "before" aspect, especially in combination with characteristics of Chinese enterprises and the enterprise's situation characteristic so as to reveal the "logic of thinking" in Chinese enterprise; 4) effective local cooperation study is not enough, especially the need to strengthen the cooperation between native scholars and cross-regional cooperation research across institutions.

Key words: IT capability, information technology, alliance performance

1. INTRODUCTION

A growing body of research shows that information technology (IT) investment does not necessarily bring corresponding value returns. The important means of IT capability is that it can help enterprises to gain the core competitiveness. Bharadwaj starting from the resource-based view, pointed that the ability of enterprises is something that the rivals are difficult to imitate and copy from. So enterprise IT capability can bring competitive advantage to the enterprise and bring the enterprise higher profits.

For defining IT capabilities, Ross, Beath & Goodhue (1996) pointed that , control the costs associated with information technology and through the implementation of information technology to influence organizational goals. IT capabilities can be based on the following three keys: IT human assets, IT technology assets ,the relationship between IT and business management for effective management. Benzie (1997) defines information technology capacity as: effective use of information technology tools and information resources to analysis, processing and presentation as well as being able to simulate measurement and control ability of external events. Bharadwaj (2000) defines information technology ability based on the outlook for: organization use and configure their own IT resources to integrate the ability of organizing other resources.

Tippins and Sohi (2003) considered the effective use of IT capability is the extent of the enterprise IT management within the organization of information. Domestic scholars Kuang Zhijun (2006) defined that the ability of a dynamic IT capability is a relevant conventions and implementation of information technology organizations . According to the internal and external environment changes, the use of resources within the organization design which are accessed, released and mainted related to information technology system, can help us to obtain the ability of sustainable competitive advantage.

For the composition and measure of the IT ability , we can not find an unified understanding in academia. Ross (1996) based on the resource -based view , divided the IT capacity into three parts; human resources, technical resources and relationships resources. Bharadwaj (2000) believes that IT capabilities are based on the IT resources and IT resources will be divided into three categories: IT infrastructure, IT human resources and IT intangible resources. Tippins and Sohi (2003) believe that IT capabilities including IT knowledge, IT operations and IT kind. Domestic scholars Chi Fangwei (2009) divide IT ability into IT resources, applications of IT capabilities and improve the ability of IT. Jiang Luan, Xie Wei-Hong thought that IT capabilities can be

attributed to IT infrastructure resources, IT assets and IT system practices.

Domestic and foreign scholars have done a lot of research on how IT ability influenced the performance of the enterprises, but the conclusion was not consistent. Some scholars, such as Bou-wen Lin (2007), Zhang He said (2008) that, IT capability has a direct positive impact on business performance. While another part of scholars, such as Josefa, RM (2006), Li Zhitang, Wu Guisheng(2009) pointed that , IT capability itself does not have an effect on corporate performance , it must through certain mediating variables to make effect on firm performance . So, what influenced the impact of IT capability on firm performance? For the domestic research in this field, what we can find and what conclusions we can make? To answer these questions, we urgently need to conduct a research on existing domestic system. We need to identify research priorities and direction of domestic scholars so as to glittering for future research and better support the theoretical ability to provide IT systems.

2. OBJECT OF STUDY AND SAMPLE

Research on the progress that the domestic IT capability theory had made must be base on the analysis through domestic core journals. For this article, literature sources mainly through domestic academia recognized Chinese Social Science Citation Index (CSSCI).Numerous studies abroad show that information technology (IT) cannot bring direct sustainable competitive advantage. IT itself does not directly enhance the performance of the enterprise and the thing that can bring competitive advantage is IT capabilities. Therefore, this study included journals (2012-2013) in management, economics, social sciences integrated, and comprehensive university journals to retrieve the source of these four journals from CSSCI from 2007 to 2012. With " IT " " IT capability "as a nominated keyword search, we get 105 literature on IT capabilities , fifteen of which extend excluding journals , ten duplicate documents, two is not research on IT ability , we eventually get 78 samples of this study.

After sorting the 78 literature related to IT capability by source categories, we find that there are fifteen literatures up to the intelligence journal publications. A-level publications, such as scientific research, research management, Nankai Business Review and the Journal of Library and Information Service were a collection of five, five , four and seven literature . Seen in this light, the intelligence journal publications make an important contribution to the domestic IT capacity theory. Sorting the 78 literature related to literature species, the 78 documents are from 21 kinds of publications. But on the other hand , most of the journal have literature on IT capabilities in five years, which shows that excellent domestic IT capability literature has yet to be increased and research efforts in this area is still not enough.

3. DATA ANALYSIS

3.1 The analysis on publish year.

The published literature in journals CSSCI on the whole, showed a downward trend. What worrying us is that only six articles published in 2012 and the number of published literature are so little. From this, you can launch two possibilities , one is that study abroad for domestic IT capacity are earlier than us and their theoretical system is also better. To this end, the early researchers in the domestic field are more likely to understanding, learning and exploration the ability about IT capability. In recent years, scholars have not only to learn and explore, but also to seek innovative and breakthrough on this field. They try to find out how to use IT for competitive advantage which is difficult to achieve. With the increasingly high demand on theoretical and practical value by CSSCI journal literature, less literature about IT capability are published in recent years. The second is that, due to the demand of the knowledge and ability for innovation in continuous improvement, coupled with changes in the external environment, the study on IT capability is no longer simply the ability to

study IT itself, but also with the competitive environment, a comprehensive organizational structure and other factors analysis. The research on these issues need to invest more time and manpower.

3.2 An Analysis of Authors

In a total of 78 documents, 10 literatures have a single author, 31 literatures have two authors and 37 literatures have more than three authors. Among them, only six literatures have four authors and two has five or more. Thus, the number of authors are mostly kept in two or three, rarely more than five, and it shows that 2-3 collaborative research is the mainstream academic research activities in IT capacity. One is because of the IT capabilities needed large amount of information with reference to empirical research and need to use more resources and capabilities. Second, because of the professional of the IT capability, it is easy to have a cooperative research tendencies. In this study, we found that there is a cross between lots of co-authors study habits. But authors belonging to different units in one literature are only 34.62%, indicating a relatively small inter-agency cooperation across national universities and the lack of adequate inter-unit collaboration platform for cooperation mechanisms. Based on research involving multi-enterprise IT capability and its ability to conduct and analyze utilization, coupled with situational characteristics of China, cooperation between domestic scholars will help to get more research.

3.3 An Analysis of Research Methods

From the use of research methods, using a large sample survey data and a large sample of second-hand data are in the majority, respectively are 34 and 16. Followed by the theory and literature research, there are 19 literatures. Few of the literature using other methods, such as the decision to build the model, technology acceptance model, case studies and so on. Visible for IT capability in terms of types of literatures, the most common method is sample analysis, which is related to IT capability itself. IT capability can not show up by itself, it needs the help of some experimental factors, such as the amount of business knowledge, ability to learn quickly, sharing capabilities and flexible capacity. The main reasons are as follow: 1. One stems from the method itself has strong empirical data convincing. 2. Throughout all kinds of research methods, interviews can dig a large number of information, but it has a disadvantage on time consuming. 3. Fieldwork method is practical and real, but it is hard to get a large number of data samples. 4. Theory and literature analysis is systematic and time saving, but the actual effect is poorer and can't have access to a large number of data samples. 5. Questionnaire survey and second-hand sample data method which access to large amounts of data information effectively and strong pertinence is good for the study of IT capability.

3.4 The Research Object Analysis

There are 35 references without specific subjects in 78 samples. We also found in the data statistics, there are some literature has not proposed specific research object and the description are focused on the conceptual analysis of IT capability. We can see in the forty-three literatures which have a specific research object, IT capability in a particular industry as the object is 30.23%, with ten articles on manufacturing and three on high-tech industries. There are twelve articles using a specific IT capability enterprise as the main object, including information technology enterprise as the object with nine references, research and development of enterprises as the object with two references and one article about partnership enterprise. There were twelve articles used specific people to be the object, including nine articles used senior management or information technology managers as an object; two used the worker of information technology and one on a particular student. Forty-seven new empirical models in this paper has accounted for the vast majority of the specific research object of literature. This shows that the current domestic research in this field has been directly sent to empirical research

and pays more attention to the object of the specific problem. Pay attention to the theoretical and practical value that the specificity of the object classification has made. First of all, the research in the field of IT capability belongs to the category of specific ability, its research object itself has limited in the IT related domain. Second, whether the economy or administrative problems, the divided differences on research object can directly lead to the results of different. Third, the choosing object of study can reflect the research direction and research tendency and it is helpful for us to understand the ideas and methods. According to the above phenomenon, we believe that the study of IT capability should emphasize its specificity and pertinence. We make a clear definition for the research object and conditions so as to lay a foundation for future research.

4. THE MAIN RESEARCH CONTENT

After classifying the contents of the selected literature, a call for "before", mainly describes the factors that affect IT capabilities and the problem on IT capability structure. Another kind calling "consequences", describes the effect of IT capability, such as its influence on alliance performance, its influence on the organizational structure, its impact on organizational learning capability and so on. There is a call "connotation", mainly describes the definition, structure and composition factors of IT capability. In the classification of seventy-eight articles, we found that there are fifty references on describing the "consequences": twenty-four references on "before" and fourteen on the connotation description (with part of the literature in this paper, the content including the above two or three, so total number of article is beyond).

From the content point of view, the influencing factors of IT capabilities are divided into three categories: one is the impact factor of IT capability adoption/absorbing ability, including (1) positive emotions: Ma Qingguo, Wang Kai, Shu Liangchao (2009) believe that positive emotions directly improve adoption intention. We can use the perceived risk, perceived usefulness and perceived ease of use as incomplete mediation variables to improve adoption intention. (2) IT infrastructure, IT management skills as well as the relationship between business and IT skills: Yan Guopeng, Chen Yu (2009), who are studying and establishing the ability of information technology and its theoretical model of the impact of informatization success, think IT infrastructure, IT management skills, and IT ability affects the diffusion and absorption of information technology in enterprises. (3) The prior knowledge, strength of learning, organization structure, management support, and knowledge similar: Ning Dongling, Gao Junshan (2009) establish a structural equation model to research the IT capability elements, and found that prior knowledge, strength of learning, organization structure, management support, and knowledge similar are five elements to make an important role on enterprise information technology potential absorptive capacity. (4) Knowledge sharing, information integration, employee empowerment, strategic planning and training ability (east Ning Dongling, 2009). (5) Strongest leadership, corporate culture, organizational learning, change management, knowledge management ability (Bi Xinhua, Yu Cuiling Yu Baojun, 2009). (6) Organizational knowledge: Chen Wenbo, Ceng Qingfeng, Song Peijian, Huang Lihua (2010) think that organization and information technology related knowledge foundation and the absorption ability, especially the knowledge of implementation in IT and organization of IT integration application ability is the key in the process of enterprise information. (7) Organizational learning: Bi Xinhua, Yu Cuiling, Ji Xiaoyun (2010) pointed out that the evolution of IT absorption capacity is under the guidance of the IT culture around generated variation, internal selection and keep. IT actually is a process of organizational learning, knowledge transfer, absorption and innovation process. (8) Organizational cognition, management, and cultural factors on the IT absorption capacity is larger than IT infrastructure (Yu Cuiling Bi Ting, Shi Ying, Wu Xiao, 2011). Second, factors that influences the use of information technology, mainly including (1) cultural factors: Hu Anan, Huang Lihua, Ling Hong (2009) pointed out that cultural factors impact on the information technology application of three main aspects: mobility, acceptance and use effect which are analyzed based on

the core issue of cultural perspective, points out the future research should consider the multiple layers of culture and explore the impact of culture on the individual application of information technology. (2) IT strategy factors: Fu Huixian, Huang Guoqing (2009) thought that new product research and development enterprise or product research and development department, when using IT to improve management ability, should not only pay attention to the investment of IT infrastructure itself, but also to the IT strategy, IT technology, IT project management, IT human resources and IT coordinated development. (3) The environmental factors: Xie Weigong, Wang Yongjian, Jiang Luan, Zhang Guangyu, Zhang Depeng (2010) points out that IT capability directly affects the competitive advantage, including infrastructure resources and IT practices significantly influence on competitive advantage, and have no effect on IT relations resources. Du wei, Si You and Wen Pingchuan (2010) are pointed out that environmental pressure while the direct impact on organizational performance is negative, it can use IT to indirectly affects the organization performance ability and knowledge management strategy. Third, the influencing factors of information technology outsourcing: including technical factor, benefit factor, policy factor (Sun Qixia, Chen Juhong, 2008) and labor costs, labor quality, IT infrastructure and the host country's level of economic development (Xue Qiuzhi, Song Lili, 2001).

The influence factors on IT capability are divided into six kinds: respectively on enterprise performance, enterprise ability and advantage, enterprise decision-making, relationship between enterprises, medical insurance, the different degrees of impact knowledge work. In the study of the six aspects of the influence, the effect on enterprise performance research becomes a hot subject. On how IT capability affects corporate performance, many scholars put forward their own different views and opinions. Sums up the main are divided into three categories: direct effects, indirect effects (intermediary variables or adjust) as well as the comprehensive effect. Early more scholars believe that the impact of IT capability on business performance is a direct impact and they think IT capability has a positive correlation on corporate performance. With the growing and development of the enterprise, IT capabilities and enterprise performance relationship slowly into a positive rather than the standard positive correlation relationship and with the continuous complicated external environment, more and more scholars put forward the mutual influence between IT capability and enterprise performance relationship is not single. Part of scholars believe that the need for intervening variable between IT capability and enterprise performance as a bridge, and what is the intermediary variable, academia has not a unified conclusion. Many scholars believe that organizational learning, flexible structure, the enterprise can have very good intermediary role between the relationship. Such as Chi Jiayu, Sun Ling think that organizational learning is the medium that works IT capability on business performance variables. Liang Jiang, Lin Danming, Zeng Chuhong also think that organizational make a partial intermediary role on learning ability between information technology resources and organizational performance relationship. Xie Weihong, Chan PeiXin, jiang Luan think structural flexibility in the relation between IT capability and business performance plays an intermediary role. IT capability, by influencing the internal organization of flexible, external relations, ability of organization and across the border a good impact on organizational performance. Other scholars believe that there are adjustment variables between IT capability and business performance. Unlike the intervening variable, adjust variable can be significantly or not significantly associated with the dependent and independent variables. Its main discussion is to see whether and when to influence, but not necessarily involve how to affect it. Wu Zengyuan, Huang Zuqing and Wu Bei think that relations between enterprises have a significant regulatory role on the relationship between IT capability and enterprise performance. Li Zhitang (2009) points that information capital, human capital and the impact of IT capabilities play a key role on enterprise performance; Lou Runping, Xue Shengjia think that the relationship between information technology and business performance are also affected by the environment, resources, strategy and organization. This shows that domestic scholars has depth of digging in the field of research, but what factors play a role of mediation in

the IT capability and enterprise performance? What factors play a role of regulation and would regulation and intermediary have some collections? This series of problems are still not fully involved in. And we believe it will be one of the research directions in the future.

5. CONCLUSIONS AND RECOMMENDATIONS

Through the integration of the seventy-eight literatures, we sort by the research object, the year of publication, research methods, the author number, research objects and research contents five aspects and draw the following conclusion:

(1) The research results on IT capabilities in domestic in general are very rich. Many scholars make meticulous excavation and put forward many unique insights which laid the foundation of deep for our country in this field. But from the perspective of the quality and quantity of research results, seventy-eight articles from twenty-one different journals, journal source is rich but there are little in class A journal. It shows that there are many research achievements on IT capability in domestic, but are lacks of quality. Second, from the point of view of the number, presents the odd-numbered years rise; even in decline and the decline range is higher than the rising range. Also, in recent years in this field, there are few breakthrough results.

(2) In research methods, most of the literature use the method of sample analysis, using the large sample survey and secondary survey accounted for most of. Thus, domestic studies focus on empirical research of IT capability and pay attention to the data collection, integration, analysis and summary. At the same time, in terms of research methods, the using of model research and case study research is less. This relates to the IT capabilities itself. IT capability is very difficult to simply describe by qualitative analysis, so on the basis of qualitative analysis, quantitative analysis as the means of empirical analysis method has become the mainstream. But on the other hand, parts of the theory and literature research are still stay on studying domestic and foreign literature. The theory innovation ability remains to be promoted. For IT capability study, we strongly advocated on the basis of qualitative analysis, quantitative analysis as the main empirical research methods. Also use field survey, interview and content analysis as the subsidiary empirical research method and work hard to mining new ideas and new paths.

(3) Existing IT ability have certain discussion in the study of alliance governance concept, type, and the consequences, but need to strengthen the IT capability on "before" research, especially in combination with characteristics of Chinese enterprises and the enterprise's situation characteristic, revealing "logic" thinking in the process of IT capability in Chinese enterprise. The literature on IT capabilities mainly involves two aspects: one is what factors influenced IT capability and the constituents of IT capability. Second, IT capability has the impact on enterprise performance and the organizational structure. For these two aspects research, the research of the latter literature is more, especially IT capability on business performance and gaining the core competitiveness for the enterprise. It has to do with that people get to know IT investment does not necessarily bring enterprise performance and IT capability is important means to obtain the core competitiveness of enterprises, also IT capability and enterprise performance has positive correlation and make certain intermediary variable effect on corporate performance. Pay attention to the study of "consequences" shows the researchers pay attention to IT capability's real value and its guiding significance to practical work.

(4) Effective local cooperative research should be strengthened. When observing the number of authors in literatures, there is a cross between authors. We found that many authors have cooperation study habits. IT research need to enhance the cooperation between the domestic scholars especially cross-regional cooperation research across institutions. We found that the proportion of interagency cooperation is very little. We should base on the IT capability study involving more corporate behavior and their mutual relationship analysis.

Combined with China's situation characteristic, interagency cooperation between the domestic scholars research helps to get more results.

Overall, the research in domestic has gradually from the pure literature research to empirical research. But look from the trend of the number of published literature, a general rise in odd-numbered years and fall of even-numbered years is still worrying us. To this end, we hope that the domestic study of IT capability can be more diversified, at the same time, don't confine to the study of foreign theory and extension. Try more empirical research and theoretical innovation. Moreover, we hope that more scholars can pay more attention on IT ability thesis and more famous journals can absorb more literature IT capability which can make the point of view spread on a broader level.

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