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# THE VALUE OF CLOUD COMPUTING TO INTERNET- BASED SMES: A MULTIPLE CASE STUDY FROM CHINA

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***Abstract:** Numerous benefits of cloud computing for middle and small-sized enterprises (SMEs) have been documented in the literature. However, existing research often focuses on cost saving, it is still not clear whether and how cloud computing creates value for SMEs. This study investigates the mechanism through which cloud computing creates value for SMEs based on multiple cases of Internet-based SMEs from China. More specifically, we suggest that three cloud computing related capabilities (i.e., flexibility, integration, and ubiquity capability) are most critical for SMEs to generate value from cloud computing and cloud computing enhances SMEs' performance by facilitating their organizational agility.*

***Keywords:** Cloud computing capability, organizational agility, entrepreneurial performance*

# 1. INTRODUCTION

Cloud computing refers to an information technology (IT) service model where computing services (both hardware and software) are delivered on-demand to customers over a network in a self-service fashion, independent of device and location (Gangwar et al. 2015; Marston et al. 2011). Cloud computing has dramatically changed the mode of traditional IT operation because cloud computing vendors can take care of the development, deployment, upgrading, and maintenance of IT. As a result, client firms can access IT resources on-demand without investing a large amount of money in IT infrastructure and focus on the business use of IT without engaging in the complexity of IT infrastructure. This is highly valuable to firms, especially firms lacking enough financial resource and technical skills for IT implementation.

The use of cloud computing has become increasingly popular in both private and public sections. For example, numerous government agencies and enterprises are expected to rely on the cloud for more than half of their IT services by 2020 (Garrison et al. 2015). A recent survey by IDC suggests that public cloud computing will become a \$127 billion dollar industry by 2018 (Sabi et al. 2016)

Numerous benefits of cloud computing for firms, especially for small-medium enterprise (SMEs) have been noticed in the literature. For instance, cloud computing transfer the fixed costs of IT investment into available costs, which reduces the barrier of IT infrastructure investment for SMEs and increase their ability in dealing with market changes(Chen et al. 2012). In general, it is suggested that cloud computing dramatically lowers the cost of entry for SMEs trying to benefit from compute-intensive business analytics that were hitherto available only to the largest of corporations and it can provide an almost immediate access to hardware resources, with no upfront capital investments for users, leading to a faster time to market in many businesses (Marston et al. 2011).

However, most studies on cloud computing focus on the aspect of cost saving instead of the aspect of value creation, e.g.(Chen et al. 2012; Choudhary et al. 2013; Gupta et al. 2013; Slaven Brumec et al. 2013). It is not clear in existing research how cloud computing can create value for SMEs. More specifically, what are the most important features of cloud computing that are fundamental for contributing to SMEs' value creation? What are the mechanisms through which cloud computing affect the business value of SMEs? These are still unanswered questions in the literature. In this study, we investigate these question based on multiple cases of Internet-based SMEs from China. We identify three most important features of cloud computing (i.e., ubiquity, flexibility, and integration) that are critical for SMEs' value creation and suggest that cloud computing enhances SMEs' business value by facilitating the organizational agility of SMEs.

The structure of the paper is as follows. First, we review literature on cloud computing and IT capabilities. We then take the IT-enabled agility perspective and propose the path from cloud computing to SMEs' value creation is through organizational agility. The theoretical framework is illustrated based on evidence of four Internet-based SMEs from China. We conclude the paper by discussing the practical and research application.

## **2. THEORETICAL BACKGROUND**

### **2.1 Cloud Computing**

Many attractive features of cloud computing have been noticed in the literature (Bhattacharjee et al. 2014; Lee et al. 2013; Son et al. 2014). In this paper, we identify three key features of cloud computing that matter most to facilitate the organizational agility of SMEs – *flexibility, integration, and ubiquity*.

The flexibility feature of cloud computing has been highlighted by research. For instance, Armbrust et al. (2010) state that cloud computing provides infinite computing resources available on demand and the ability to pay for use of computing resources on a short-term basis as needed (for example, processors by the hour and storage by the day) and release them as needed. Marston et al. (2011) highlight that cloud computing can provide an almost immediate access to hardware resources, with no upfront capital investments for users, leading to a faster time to market in many businesses. Furthermore, cloud computing makes it easier for enterprises to scale their services according to client demand.

The integration feature of cloud computing has also been documented in the literature. Integration in this paper refers to the integration of applications and data in cloud computing, which enables information sharing and collaboration among users from all over the world. Marston et al. (2011), for instance, suggest that by their very design, cloud-based applications allow information sharing, something that has not been a design consideration for many traditional applications. Thus, in the case of cloud-based office applications, several people can work on different parts of the same document at the same time in Google Docs. This allows for a much richer environment for information sharing and collaborative work. McAfee (2011) claims that one key benefits of cloud computing is to facilitate collaboration. He suggests that some of greatest successes of cloud computing to date have come from allowing groups and communities to work together in ways that were not previously possible.

Another highlighted feature of cloud computing is ubiquity, which means location, device, and time independence. Brynjolfsson et al. (2010) suggest that because the real strength of cloud computing is that it is a catalyst for more innovation, as cloud computing continues to become cheaper and more ubiquitous, the opportunities for combinatorial innovation will only grow. Marston et al. (2011) also emphasize the ubiquity feature of cloud computing and suggest the ubiquitous nature of the cloud allows the cloud applications to have some unique characteristics that are not readily available in their traditional counterparts.

### **2.2 Cloud capability and organizational agility**

Although the advanced features of cloud computing have been widely noticed in research, it is still not clear how firms can exploit such features to contribute to business. We believe that different firms have different abilities in exploiting cloud computing. Following Bharadwaj (2000)'s concept of IT capability, we define "cloud capability" as "firm's ability to acquire, deploy, combine, and reconfigure IT resources in support and enhancement of business strategies and work processes through cloud computing services." This capability is mainly about how firms use cloud computing

services to support their business. With the increasing popularity of cloud computing, cloud capability will eventually make great influence on firms' competitive advantage and performance.

As we suggest that flexibility, integration, and ubiquity are the most important three features of cloud computing that matter to the organizational agility of SMEs, we define a firm's cloud capability in exploiting the features of flexibility, integration, and ubiquity as flexibility capability, integration capability, and ubiquity capability respectively. Due to the advanced features of cloud computing in flexibility, integration, and ubiquity, we propose that firms that can effectively exploit such features should be more agile to sense and response to market changes. That is to say, they have a higher level of organizational agility.

Organizational agility is a firm-wide capability to deal with changes that often arise unexpectedly in business environments via rapid and innovative responses that exploit changes as opportunities to grow and prosper (Lu et al. 2011; Overby et al. 2006).. Sambamurthy et al. (2003) suggest that organizational agility comprises of three interrelated capabilities: customer agility, partnering agility, and operational agility. Customer agility is the co-opting of customers in the exploration and exploitation of opportunities for innovation. Partnering agility refers to ability to collaborate with business partners to explore and exploit innovation opportunities. And operational agility reflects the ability of firms' business processes in responding innovation opportunities quickly and economically.

The advanced features of cloud computing in flexibility, integration, and ubiquity should facilitate SME's customer agility, partnering agility, and operational agility. For instance, the integration of applications and data between SMEs and their customers as well as their ubiquitous access of such applications and data should help SMEs to connect to customers for product design, feedback, and testing and response to market change. Similarly, the integration of applications and data between SMEs and their business partners as well as their ubiquitous access of such applications and data should help SMEs to conduct inter-firm collaboration and to leverage the assets, knowledge, and competencies of their partners in exploiting opportunities. Furthermore, the flexibility and elasticity of cloud computing enable SMEs to quickly response to swift changes in market. The integration of applications and data within SMEs also enables the combination and recombination of business processes to create new processes for exploiting dynamic marketplace conditions (Sambamurthy et al. 2003).

Based on above discussion, we develop a model that illustrate how cloud computing enhances SMEs' performance through the improvement of organizational agility (Fig. 1). As our study investigates SMEs, we focus on entrepreneurial performance such as innovation and growth. Following Yin (2009), we use our theoretical model as a benchmark, comparing our data against the model using analytic induction.

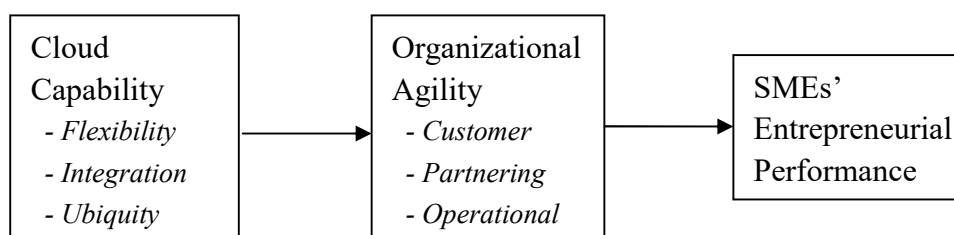


Figure 1: The research model

### 3. METHODS

#### 3.1 Case Selection

This research used a multiple-case strategy to describe the phenomenon (Yin 2003). Yin (2009) mentions that researchers should select exemplary cases that reflect strong, positive examples of the phenomenon of interest; the multiple cases should also show replication logic to prove the theoretical generalization of the phenomenon. Following such suggestions, the current research selected four cases.

Table 1: Case Introduction

Cases	Introduction
<b>Firm A</b>	Founded in 2002, Firm A now has about 700 full-time employees, with more than 850,000 clients from 23 industries. It is one of key e-business software and service companies in China and many firms with e-business turnover more than RMB100 million are their customers. It aims to provide one-stop e-business services by offering products such as Channel King, DRP (distribution resource platform), and TaoEx (for Taobao.com).
<b>Firm B</b>	Firm B was founded in 2010, with 50 full-time employees and annual sales of about RMB 5 million. It is the third largest online storage company in Chian, mainly providing online storage and document services. Its mission is to offer high-quality and easy services for organizations and groups.
<b>Firm C</b>	Firm C was founded in 2009, with a 100 full-time employees and annual sales of more than RMB 80 million. It is a leading education technology developer in China, aiming at improving domestic teaching quality. The firm is a pioneer in introducing cloud computing, massive dataset mining, artificial intelligence and mobile-terminals (iPad/iPhone/Android platform) into teaching.
<b>Firm D</b>	Founded in 2008, Firm D has about 30 full-time employees and annual sales of more than RMB 2 million. It is one of leading independent companies that provide third-party electronic data security management systems and services. Its main services include telephone recording evidence collection, Internet evidence collection, and intellectual property rights protection.

#### 3.2 Data Collection

The primary source of information was gathered through onsite interviews. In designing the interviews, it is important to identify key informants who know the most about a particular topic in the organization and have decision-making authority for the general interested areas (Myers 2009). In this study, two interviews were conducted with the head of IT department of each organization. Both IT

executives are knowledgeable and highly involved in the IT issues. The interviews were based on open-ended questions with a predesigned interview protocol to assert the reliability of case study research (Yin 2009). The questions were carefully worded and divided into two parts: (1) general understanding of the company's background, IT activities, and cloud computing issues; and (2) in-depth understanding of the role of cloud computing in their business processes. Both interviews were recorded on tape, and lasted around 1 hour. Follow-up phone calls were made for clarifying unclear issues arising from the onsite interviews. Information from secondary sources such as project documents and internal reports from the interview companies, reports in newspapers/magazines and internet documents were also used to supplement the understanding of the organizations' cloud computing usage and its role in business operations during the investigated period (Devadoss et al. 2003; Teo et al. 2006).

### **3.3 Case Analysis Method**

Following Yin's (2009) suggestions and based on the theoretical model, we first divided the data into several categories, including issues related to cloud computing, organization agility, and firms' entrepreneurial performance. After that, we use the method of analytic induction to analyze the cases (Glaser et al. 1967). The analytic induction involves the following steps: First, a rough definition of the phenomenon to be explained is formulated. Second, an hypothetical explanation of that phenomenon is formulated. Third, one case is studied with the object of determining whether the hypothesis fits the facts in that case. Fourth, if the hypothesis does not fit the facts, either the hypothesis is reformulated or the phenomenon to be explained is re-defined, so that the case is excluded. Fifth, practical certainty may be attained after a small number of cases has been examined. Sixth, this procedure is continued until a universal relationship is established, each negative case calling for a redefinition or a reformulation. Seventh, for purposes of proof, cases outside the area circumscribed by the definition are examined to determine whether or not the final hypothesis applies to them (Yan et al. 1994).

## **4. ANALYSIS RESULTS**

In this section, we analyze and discuss the cases' data, and use qualitative description to show the relationships between the variables.

### **4.1 Cloud capability**

As suggested above, we focused on SMEs' three types of capabilities in exploiting cloud computing: flexibility capability, integration capability, and ubiquity capability.

Flexibility capability reflects a firm's ability in fast scheduling IT resources in response to market changes. Following Nelson and Ghods (1998), we define flexibility capability as a firm's ability in leverage cloud computing resources to adapt to both incremental and revolutionary changes in the business or business process with minimal penalty to current time, effort, cost, or performance. Cloud computing enables firms to rapidly deploy new software applications and to scale services easily

(Marston et al. 2011). With cloud computing, IT services are used by “pay as you go”. Therefore, firms avoid the most heavy and dull hardware and software burden (e.g., buying and installing servers, installing network connections, testing appliances, deploying and maintaining software etc.).

*“We are more flexible after using cloud computing. For example, an online shop which has not many orders at ordinary time. However, when it implements a sales promotion activity, e.g., offering discounts or ‘seckill’, the suddenly booming orders make the website crashed. In this situation, the shopkeeper will come to us to complain. After we cooperate with Aliyun (a cloud computing services provider), everything become ok. If a client’s demand in computing resources increases or it needs to add new applications, our side has a resource pool and we can keep up uploading things. Thus we can help clients solve this problem.”(Firm A)*

*“We can meet the special demand of each school by using rapid software deployment, and handle the teachers’ and students’ demand in data storage and processing by buying more cloud servers and cloud storage. A typical example is to handle the data storage and processing during the final exam.”(Firm B)*

Integration capability means firms can integrate internal and external cloud computing resources to support and enhance decision making and business processes. Following Saraf et al. (2007), we focus on the application and data integration within a firm and between a firm and its customers and business partners. For firms, cloud computing platform is a shared environment. The sharing of data and applications will greatly enhance decision-making and business operations, and thus contribute to the efficiency of the whole society.

*“The IT infrastructure of our company now is on the cloud. Data and software applications all are centralized on the cloud, and can be easily redistributed according to the need of each staff.”(FirmB)*

*“Our products are bound together with e-commerce platforms such as Taobao, Tmall, Amazon and so on. Users can quickly set up a online shop in Taobao, Tmall, and QQmall with our products. And we provide one-stop solutions, including the customer interface design, order processing and all other e-business processes. In addition, we can integrate data from different e-commerce platforms. It means our clients can set up online shops in Taobao, Tmall and other e-commerce platforms at the same time and we can help them handle the integration of data.”(Firm A)*

*“We are more aware of the real needs of customers. For example, we can analyze our customers’ transaction data and behavioral data as they are stored in the cloud. Based on the analysis results, we can find what customers really like and what customers really want, which help to improve our products. (Firm A)*

Ubiquity ability is a firms’ ability to acquire cloud computing services anywhere and anytime through various networked equipments (e.g., PC, Pad, smart phone) (Buyya et al. 2009). Due to the special attributes of cloud computing, the main parts of data processing and software applications are in the cloud, not in terminals such as PC and pad. Therefore, cloud computing greatly reduces the technical requirement of terminal equipments and enables firms to access IT services anytime and anywhere.

*“Our employees, at home or in the office, can access the Internet at any time and place to operate or maintain our e-commerce software.”(Firm A)*

*“No matter where we go, we can work using the Internet, accessing massive computing and storage resources.”(Firm B)*



The analysis results on the three cloud capabilities (i.e., flexibility, integration, and ubiquity capability) in the four case firms are summarized in Table 2.

Table 2: The flexibility, integration, and ubiquity capability of case firms

<b>Constructs</b>	<b>Firm A</b>	<b>Firm B</b>	<b>Firm C</b>	<b>Firm D</b>
<b>Flexibility capability</b>	<i>The firm quickly adds personalized applications in software products according to client's needs.</i>	<i>The firm quickly adds document sharing function and more plug-ins based on its original online storage business.</i>	<i>The firm meets the special demand of each school by using rapid software deployment.</i>	<i>The firm uses cloud server to handle the instantaneous increase in evidence collection and processing.</i>
<b>Integration capability</b>	<i>The operation of information systems is on the cloud server, all departments' data and software applications are concentrated in the cloud.</i>	<i>The information system architecture is in the cloud; data and software applications are concentrated in the cloud, and distributed according each department's need.</i>	<i>Company's business and data are structured in the cloud; business and data are highly integrated.</i>	<i>Data and applications are stored in the cloud; the level of data integration is high.</i>
<b>Ubiquity capability</b>	<i>Employees either at home or in the office can access the Internet at any time and place for e-commerce software operation and maintenance.</i>	<i>Employees can work using the Internet, accessing massive computing and storage resources.</i>	<i>Using mobile terminals, both employees and customers can acquire services at any time and place.</i>	<i>Employees can work with mobile terminals, and customers also can use mobile terminals to grab and backup information.</i>

#### 4.2 Organizational Agility

According to Sambamurthy (2003), organizational agility is the ability to detect opportunities for innovation and seize those competitive market opportunities by assembling requisite assets, knowledge, and relationships with speed and surprise. Also, three types of organizational agility have been identified: customer agility, partnering agility, and operational agility. Customer agility is the co-opting of customers in the exploration and exploitation of opportunities for innovation and competitive action moves. Customer agility describes firms' ability to leverage the voice of the customer for gaining market intelligence and detecting competitive action opportunities. Partnering agility is the ability to leverage the assets, knowledge, and competencies of suppliers, distributors,

contract manufacturers, and logistics providers through alliances, partnerships, and joint ventures. Partnering agility enables firms to build a network of strategic, extended, or virtual partnerships to explore opportunities for innovation and competitive action. Operational agility reflects the ability of firms' business processes to accomplish speed, accuracy, and cost economy in the exploitation of opportunities for innovation and competitive action. Operational agility ensures that firms can rapidly redesign existing processes and create new processes for exploiting dynamic marketplace. All four firms in our study show certain level of organizational agility, including customer agility, partnering agility, and operational agility. During the interview, the interviewees talk a lot about the agility of their firms.

*“We conduct data mining on information about students’ assignments and exams as well as exams to provide personalized teaching strategies to schools. Such methods can improve the exam grade of a class by 20%-30%. For example, we assign homework according to each student’s knowledge and such practice can effectively improve learning outcomes and also benefit ourselves. We not only provide software but also teaching strategies, which is the main difference between us and our competitors.”(Firm C)*

*“Our products are developed based on the special characteristics of popular e-commerce platforms such as Tmall, Taobao, and QQmall. As a result, our products such as TaoEx and Easy Store are highly bound together with the workflows of different e-commerce platforms. If entrepreneurs want to set up online shops in these e-commerce platforms, using our products are most convenient.”(Firm A)*

*“There is no problem if clients have some unplanned special requirements because our products are highly scalable. When a customer’s needs change, we can quickly deploy software applications in the back servers.”(Firm C)*

More evidences of organizational agility in the four firms are summarized in Table 3.

Table 3: Organizational agility of case firms

	<b>Firm A</b>	<b>Firm B</b>	<b>Firm C</b>	<b>Firm D</b>
<b>Customer agility</b>	<i>Providing customers with value-added services through datamining on information from customer interaction.</i>	<i>The customers’ data are stored in the cloud. Developing different applications according to customers’ need.</i>	<i>Mining customers’ behavior data and providing more optimization strategy</i>	<i>Cooperation with customers to collect the special justice electronic information</i>
<b>Partnering agility</b>	<i>Rapidly developing innovative applications that integrate with business partners (e.g., TaoEx with Taobao).</i>	<i>Cooperation with R&amp;D units of big companies and research groups of universities to improve the document sharing services</i>	<i>Alliance with the education bureaus, publishing press, and schools to increase firm’s competitiveness</i>	<i>Strategic cooperation with China telecom, taobao, Hangzhou anti-piracy center, etc, and be the electronic information</i>

	<i>Adding and cutting applications according to customers' needs</i>	<i>Elastic dealing with the fluctuation of customers' storage capacity</i>	<i>Products have a good scalability and can immediately response to customers' demand change.</i>	<i>judicial forensics alliance Repaidly increase storage and computing capacity to meet the requirements of telephone record sand information forensics processing.</i>
<b>Operational agility</b>				

### 4.3 Entrepreneurial performance

Entrepreneurial performance is often used to measure the effectiveness of a firm's entrepreneurial behavior. The concept and measurement of entrepreneurial performance usually based on organizational performance. Scholars generally believe that multidimensional indicators should be used to measure entrepreneurial performance for success and failure. Covin and Slevin (1991) first proposed to use growth and profitability to measure the entrepreneurial performance. Since then, many scholars start to measure the entrepreneurial performance based on these two dimensions. In addition, innovation levels and innovation results are also suggested as important dimensions for entrepreneurial performance (Mcgrath 1995). Only enterprises that constantly innovate can continue to grow. Accordingly, we conceptualize entrepreneurial performance in three dimensions: profitability, growth, and innovation. Table 4 summarizes the entrepreneurial performance in profitability, growth, and innovation of our four case firms.

Table 4: Entrepreneurial performance of case firms

	<b>Firm A</b>	<b>Firm B</b>	<b>Firm C</b>	<b>Firm D</b>
<b>Profitability</b>	<i>10-20% decrease in operational costs; annual sales more than RMB 100 million; increased profitability.</i>	<i>20% decrease in costs; increased profits; annual sales about RMB 5 million.</i>	<i>10% decrease in costs; increased profits; annual sales about RMB 80 million.</i>	<i>10%, decrease in costs; increased profits; annual sales about RMB 2-3 million.</i>
<b>Growth</b>	<i>Enhanced customer satisfaction and increased market share; sales growth more than 30% per year.</i>	<i>Sales growth more than 30% per year; enhanced customer satisfaction; Becoming the 3<sup>rd</sup> biggest online</i>	<i>Fast business growth; enhanced customer satisfaction; gaining business from well-known</i>	<i>Growing rapidly; boom in customer number expected.</i>

		storage company in China	organations.	
<b>Innovation</b>	Continuous introduction of new business, such as ECP, ECOS, TaoEx etc.	Adding services such as mobile offices and document systems. Shift from individual services to business services.	Frequent updating in education software; constantly adding new functions to satisfy customerized needs.	Added new funcitons such as Internet evidence collection and intellectual property rights protection

#### 4.4 The relationship between cloud capability and organizational agility

In SMEs, the three types of cloud capabilities (i.e., flexibility, integration, and ubiquity) can be the drivers for organizational agility. Cloud computing can make firms more flexible in using IT resources than before. For instance, with cloud computing, firms can rapidly deploy new software applications, start new business, and deal with the fluctuation of customers' demand (Marston et al. 2011). For example, the scalability of cloud computing makes firms no longer stuck to expensive IT infrastructure and makes it easier to develop new market and new business. And the elasticity of cloud computing helps firms deal with the great fluctuations of customers demand in computing resources (Armbrust et al. 2010). Cloud computing improves a firm's peak loads in IT capacity, and make SMEs also have the same computer power as large enterprises. During the interviews, the managers mention a lot examples on how their flexibility in cloud computing improves their organizational agility.

Table 5: Relationship between flexibility capability and organizational agility

Firm A	Firm B	Firm C	Firm D
"It's very easy to add new applications. Just need to add them in the servers and our customers can click-to-run. Customers don't need to install and can save much trouble."	"There is no problem when a customer suddenly needs 20G storage capacity."	"There are many homework and tests at the end of term, which need more computing resources. This was hard to manage before. Now the elasticity of cloud computing help us solve this problem well."	"Sometimes a photo will be under instantaneous forensics for thousands of times. Under this stituation, the benefit cloud computing is well showing."

Therefore, we propose:

**Proposition 1:** The flexibility capability of a SME is positively related to its agility, especially in the dimension of operational agility.

Cloud computing facilitate the integration of data and processes within firms as well as between

firms and their partners/customers. In fact, cloud platform is considered as a “shared environment” for firms (Krikos 2010). Firms using cloud computing services usually store their business and other data in the cloud, which has the potential to become a huge data center. This data center may promote the information exchanging between firms and their clients in various industries, which will help firms improve their services and develop new market opportunities. Furthermore, when firms put their information systems and business on the cloud, they can quickly change the data and software interfaces according to market changes. Such practices will improve the collaboration between firms and their partners/customers. All the firms in the interview have noticed that integration contributes to organizational agility.

Table 6: Relationship between integration capability and organizational agility

Firm A	Firm B	Firm C	Firm D
<i>“Integration with popular e-commerce platforms such as Taobao and Amazon help us to develop new products and value-added services and to explore new business opportunities to make our company more competitive.”</i>	<i>“Through data analysis and communication with customers, we find the online storage cannot meet their needs. So we develop a new business called document collaboration to catch this market opportunity.”</i>	<i>“We integrate the products and services of our alliance partners, which make us an influencing player in the market.”</i>	<i>“We form strategic cooperation with China telecom, Taobao, Hangzhou anti-piracy center and law firms. Competitors are difficult to entry our market.”</i>

Hence, we propose:

**Proposition 2:** The integration capability of a SME is positively related to its agility, especially in the dimensions of customer agility and partnering agility.

The ubiquity of cloud computing makes firms no longer to be stuck by time and space in using IT services. With cloud computing, the majority of data processing and software applications are in the cloud, not in the terminals. These feature of cloud computing make it possible for a firm’s employees to use pad or smart phone to work. Firms no longer need to buy advanced and expensive physical devices and employees can access massive computing resources to support their work anywhere and anytime. This makes a firm’s operation, either routine or emergence, more convenient, as suggested by our interviewees (see Table 7).

Table 7: Relationship between ubiquity capability and organizational agility

Firm A	Firm B	Firm C	Firm D
<i>“Now it is more convenient to maintain our software. Anyway, now the server is not in</i>	<i>“No matter where we go, we can access massive computing resources or increase</i>	<i>“Our employees telecommute by using tablet PC.”</i>	<i>“For our services such as Internet forensics, employees and customers use it via</i>

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<i>the machine room. We</i>	<i>storage space to meet a</i>	<i>mobile phones."</i>
<i>can even work at</i>	<i>customer's needs via</i>	
<i>home."</i>	<i>the Internet."</i>	

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Hence, we propose:

**Proposition 3:** The ubiquity capability of a SME is positively related to its agility, especially in the dimension of operational agility.

#### **4.5 The relationship between organizational agility and entrepreneurial performance**

A number of studies have suggested that organizational agility is positively related to firm performance (Lu et al. 2011; Sambamurthy et al. 2003; Tallon et al. 2011). After using cloud computing, all four firms in our study show an improvement in organizational agility and a steady increase in entrepreneurial performance, including innovation performance, growth performance, and profitability performance. For instance, Firm A enjoy enhanced customer satisfaction and increased market share due to its flexibility in dealing with market changes and continuous introduction of innovative products and services. Firm B constantly adds new service such as mobile office and document collaboration. As a result, the company has become the third largest online storage company in China, with sales growth rate more than thirty percent. Firm D's annual sales reaches RMB 2 million with only 30 employees due to its frequent introduction of new services such as Internet evidence collection and intellectual property rights protection that meet customers' emerging needs. Hence, we propose:

**Proposition 4:** Organizational agility is positively related to the entrepreneurial performance of SMEs.

## **5. CONCLUSIONS**

Research has listed lots of benefits of cloud computing for SMEs, such low initiative and maintenance costs, flexibility and elasticity in computing capacity, facilitating new types of applications and services that were not possible before. Unlike prior studies that often focus on the cost-saving aspect of cloud computing, This study investigates the mechanism through which cloud computing creates value for SMEs based on multiple cases of Internet-based SMEs from China. More specially, we investigates how firms leverage the ubiquity, flexibility and integration characteristics of cloud computing to enhance SMEs' organizational agility. Through the improved organizational agility, SMEs can catch more market opportunities and improve their performance. Our study provides a new perspective on understanding the business value of cloud computing for SMEs.

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