2013

A Model of ICTs Adoption for Sustainable Development: An Investigation of Small Business in the United States and China

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Abstract

As the driving force behind the economic growth of the United States and China, Information and Communications Technologies (ICTs) have fundamentally shaped a dramatic transformation in Small businesses, which represents the majority of all firms in both countries. However, while ICTs provide new opportunities and significant room of growth for the small business owners, the adoption of ICTs is still a challenge for the owners with limited resources in knowledge, skills, and abilities. In order to investigate how ICTs are adopted in small businesses in the United States and China, Grounded Theory is applied to code the interviews and cases. The contribution of this paper is in the comparative analysis of ICTs adoption in small businesses and the theory building that provides insight into the categories and relationships affecting the ICTs adoption in the two countries.[1]

1. Introduction

The use of Information and Communication Technologies (ICTs) provides new opportunities for small businesses in developed countries and emerging countries. It is well known that small businesses comprise the majority of businesses in regions of the world that are developing [37, 32]. They also comprise the majority of employment in Nebraska [34] and the manufacturing and services sector in China [48]. A world bank study has shown that when small businesses adopt Information and Communications Technologies (ICTs) in their business process, their ability to grow increases [27]. Qureshi et al [31] found

that targeted IT intervention in micro-enterprises increase their chances of survival and stimulate their growth. Other studies in the adoption of IT in micro-enterprises have shown that effective IT interventions may have considerable potential for facilitating IT adoption among micro-enterprises across the United States and the world [45, 21].

The ICTs redefine and make it easier than ever to market products and services across the world. While the definition varies between countries and industries, a small business is a business that is privately owned and operated with a small number of employees and relatively low volume of sales. In the United States, a small business is defined as fewer than 500 employees, and in general with $7 million in average annual receipts [42]. In the United States, small businesses currently represent 99.7 percent of all businesses [53, 23, 4]. In China, small businesses represent 99 percent of all businesses, and they generated 75 percent of all new jobs in the country [40]. Small businesses account for 60% of China's GDP and half its tax revenues [47]. In China, the number of employees ranges from 10 to 100 [48].

Small businesses have been critical to economic development in China for a long time [62]. Their survival and growth contributes to the creation of jobs and wealth in that economy. If small businesses are able to use information systems effectively, they can grow, reap the benefits from their technology, and become profitable [31]. A form of small business, the micro-enterprise, has been shown to grow using IT interventions [31, 20, 14, 15, 43, 44].

While it has been recognized that small businesses are important for industrialization [13], it is not clear how their growth can be supported. As small businesses create jobs and enable communities to survive and thrive, this paper investigates: How can ICT adoption in small businesses in two regions bring about sustainable development? While there are a number of approaches to sustainable development, this paper considers how economic objectives (growth, equity and efficiency), and social objectives (empowerment, participation, social mobility, social

cohesion, cultural identity and institutional development) as defined by the United Nations [51] are achieved. Vargas [55] views the sustainable development of micro-enterprises in a community level.

Mansell and Wehn [25] provide applications of advanced ICTs usage in both developing countries and developed countries in order to achieve the sustainable development. Ferneley and Bell [11] provides two case studies to discover the adoption of Information Systems (IS) and aligning with the strategic development of small businesses. Sadowsski et al [34] investigate the strategic usage of IT for the sustainable development of small and medium size companies. Qureshi [28] integrates the socio-economic model of development to realize long term sustainable development.

Roztocki and Weistroffer [33] provide the overview of the trends in Information and Communications Technology in developing, emerging and transition economics. There are two main research trends intersecting recently, which are the growing recognition of the role of micro- and small enterprises (MSEs) and the growing recognition of the critical development role of ICTs [9, 19].

However, the use of ICTs is a challenge in both developed and developing countries [59, 37]. The process of information technology adoption and use is critical to deriving the benefits of information technology [22].The use of ICTs continues to grow worldwide [51]. In the Asia-Pacific region, China hosts the fastest-growing ICTs markets. China's digital generations have undergone a dramatic transformation with rapid adoption in Information Technology [26, 2010]. On the other hand, the long period of rapid development of the United States economy in the past ten years coincides with significant investment in and the diffusion of ICTs and their applications [38]. Little research has been conducted into the adoption of IT in small businesses between the two countries. This research seeks to understand how ICTs are adopted in small businesses in comparable regions in the USA and China.

The research question being investigated is: *How can ICT adoption in small businesses in China and the USA bring about sustainable development?* Data is collected from two sets of small businesses in the USA and China on their adoption of ICTs. Six cases of small businesses, which are micro-enterprises, are analyzed using grounded theory open coding to arrive at categories. Through a process of slicing the data and constant comparison, the categories are developed further to build theory of IT adoption in both sets of micro-enterprises. Grounded theory is applied to systematically gather and analyze the data [52].

2. Theoretical Background

Small businesses have been recognized differently from large businesses for a long time [17]. Street and Meister [45] point out the important role of Information Systems (IS) in small businesses development and growth. They find that internal transparency may well be a concept that offers significant potential for MIS research. Qureshi and Kamal [30] bridges the challenge of small business IT adoption by the usage of cloud computing. Song and Qureshi [44] suggest that effective IT interventions may have considerable potential for facilitating IT adoption among micro-enterprises across the United States and the world.

Li and Avgerou [24] investigate the social embeddedness of industrial networks in the age of the Internet. They conduct two case studies in China to examine the extent of the theoretical views of social embeddedness of economic development through a study of regional industrial networks. They find that IT, electronic tools, and services are strongly socially embedded, sustained through close relationships with the corporation that provides the internet platform as well as the government. Juma and Lee [18] also point out the application of the network revolution into the ICTs area. New network economics and dynamics have combined multiple "positive feedback mechanisms" and "network effects" with disruptive and discontinuous change. The economics and dynamics of network effects are complex and only partially understood. Development is also a complicated process. Analyzing the two is therefore very difficult. There are several theories and approaches to further study the development. Classical economic theory focuses on the market forces as the most efficient way of organizing economics. The classic Marxism declares the state as the key actor in organizing resource distribution and use. Keynesianism states that intervention in the economy helps regions and groups that are disadvantaged. Sustainable development indicates the diversity of approaches to sustainable development [58].

The Information Technology for Development combines the implementation, use and management of Information Technology infrastructures to stimulate human, social and economic development [28]. There are several existing models illustrating Information Technology Adoption and Acceptance. Venkatesh, et al. [56] identify these models: Theory of Reasoned Action (TRA) [1], Technology Acceptance Model (TAM) [7], the Motivational Model [8], Theory of Planned Behavior (TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT). The TOE framework

contains three aspects of context that infer the process by adopting and implementing a technological innovation: technological context, organizational context, and environmental context [61]. Tornatzky and Fleischer define the environment as the external environment [3].

According to the TAM, we define IT adoption as the Perceived usefulness, Perceived Ease of Use and the Perceived Cost. According to the TAM, the perceived usefulness refers to "the degree to which a person believes that using a particular system will enhance his/her job performance" [7, pp320]. The perceived ease of use is defined as "the degree of freedom usage of the system and the technology for the users" [7, pp320].The perceived cost is defined as the "value of money that has been used to get the service". Dai and Palvia [6] employed perceived usefulness and ease of use in their survey of mobile commerce users in China and the US. They found that there were significant differences between users in China and the US in the relationship between perceived usefulness and ease of use and the intention to use mobile commerce.

Environment is an important construct that is defined by Tornatzky and Fleischer [49] as "the arena in which an organization conducts its business". For example, the competitors, the regulations, and the attitude from the government could be the potential environment. To make the environment complete, we add the internal environment to this factor, such as the education level of the employees and the relationship between the employees. For the purpose of this research, there is a difference in the external business environment in the US and China. The internal business environment also differs between the two countries due to the culture and economic differences.

While an organization is normally defined in the dictionary as "a social group which distributes tasks for a collective goal", this research considers the small business as the main unit of analysis. According to the Small Business Administration [41], a Small Business is independently owned and operated and not dominant in its field of operation. More specifically, we define each small business in our case study as one organization of up to 500 employees, which has certain communication processes and structures. This means that different organizations could have a different size, different communication process and different business structure. According to Street and Meister [45], these businesses operate under significant constraints with respect to capital, managerial time, and expertise. They found that information systems could improve communication in the small business.

Technology in this research is seen to be Appropriate Technology. According to Schumacher [36] it is defined as the "The acquisition of technology appropriate for the small businesses' economic environment". Generally, this means a lower level of technology than being marketed. For example, the technology could be telephones, mobile phones, and radios in the developing countries, and could also be the online billing system, the Vehicle Drive-Thru Detection and Monitoring System, and Near field communication (NFC) payment system in the developed countries.

The concept of development has its roots in the economics of the firm. Development is defined as "the interruption of the business cycle" according to Schumpeter [39] and is often used to describe growth in organizations and the regions in which they reside. The outcomes from the adoption of ICTs on development can be assessed in a number of ways. The measures of economic development most often used are in terms of: increase in income, job creation and clientele [31]. These measures will be used to assess development in small businesses in this research.

The process of Creative Destruction by Tripsas [50] and Schumpeter [39] suggests that entrepreneurs drive capitalism with innovation. These innovations, when implemented, challenge the status quo and upset the equilibrium. Warschauer [57] states that the greatest gains to development are not from the adoption of ICTs in itself, but from the innovative ways in which technology has been adopted. According to Schumpeter [39] it is the innovations that enable businesses to survive businesses cycles that would otherwise destroy them. He suggests that innovation is the implementation of a new change that affects and alters a market. Innovations are not just inventions, but can be new processes or new markets. Schumpeter also suggests that the entrepreneur is the agent of innovation whose adoption of the innovations will enable the business to survive and potentially grow.

Social Embededness in this model is defined as the degree to which individuals or firms are enmeshed in a social network [16]. The author argues the economic action is embedded in structures of social relations, in modern industrial society. The fundamental theoretical underpinnings of the significance of social embeddedness in the economic success of clustered business networks have gradually been elaborated by organizational theorists and economic sociologists. Very few papers apply social embededness to the IT for development area, especially in the small businesses. Since small businesses will have more changes to involve into the social activities, it is important to analyze IT adoption. For countries like China, business, especially in micro-and small

businesses, is conducted in the background of strong social embededness.

3. Methodology

This research uses a qualitative Case study strategy to collect data from six small businesses. This qualitative research strategy enables us to examine a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities, i.e., people, groups, and organizations [12]. Comparing to other qualitative research methods, case study allows researchers to have less a priori knowledge of what the variables of interest will be and how they will be measured [2]. Further to Eisenhardt [10], who illustrates how theory cab be built through case studies, our research follows these steps: First, we select and conduct the definition of the research questions. Then, we selected the cases. Six small businesses in China and United States are chosen. Third, we craft instruments and protocols. Fourth, we enter the field and conduct the case study. Interviews are conducted and the data is recorded. Fifth, we analyze the within-case data. Grounded Theory is applied to systematically gather and analyze the data through open and axial coding [52]. Sixth, we search for cross-case patterns in which the two groups of small businesses are compared and analyzed. The result is a theoretical model of how ICTs are adopted in small businesses to achieve sustainable development.

3.1. Criteria for case selection

Based on existing literature, with the help of ReferenceUSA , which contains data of all registered US businesses, we ascertained several criteria for selecting the cases. These criteria were developed on the basis of the literature and previous studies in this area (see [31]). They are listed in Table 1:

Table 1 Criteria for case selection

Description	Requirement
General Information	The cases should be randomly chosen from the Database.
Challenge	The small businesses are facing challenges in operation, e.g., lack of resources, lack of knowledge, and lack of skills.
Ownership	The ownership of small businesses should be sole proprietorship or partnership.
Potential	The small businesses should 1) have potential to grow and expand their businesses by the usage of IT. 2) have enough funds to invest in IT 3) desire to gain access to new markets.
Years of operation	The small businesses should exist for more than one year, so that endogenous variables lead to the challenge, e.g., lack of cash flow, lack of management can be excluded.
Scale of the Business	The small businesses should follow the criteria of the official definition of small business in China and United.

Comparable regions in China and the United States are selected for this study. With approximately 7 trillion US dollars of GDP of 2011 [46], China is the biggest developing country in the world and United State is the biggest developed country with 14.59 trillion US dollars of GDP in 2010 [60]. As one of the fastest growing economies, China's small businesses are also growing. On the other hand, small businesses enjoy the biggest market in the United States, so we expect to see similarities and differences in IT adoption between the two countries. Comparing small businesses in these two countries will shed light into the ways in which ICTs adoption may enable growth.

3.2. Data collection and analysis

The data is collected through in-depth face to face interviews with small businesses in the USA and via telephone interview for the small businesses in China. Three of the small businesses in the US belong to the restaurant industry, while the three small businesses in China belong to service, sales industry, and restaurant industry. We conducted six case studies, and group them into small business in US and small business in China. Open coding is applied accord to Urquhart [52]. Further to Urquhart et al. [52] the data was analyzed using grounded theory open coding where every slice of the data is compared with all existing concepts and constructs to see if it enriches the categories. Constant comparison, iterative conceptualization, theoretical sampling, scaling up, and theoretical integration are conducted in the analysis part.

4. Results

We conducted six case studies, three of them were from Chinese owned business in US, and two of them were Chinese owned Businesses in China. We find that the comparing to the small businesses in China, small businesses in US will have more opportunities to hire higher quality employees, i.e. more educated employees, and get the ICTs service in lower cost. Open coding was conducted to slice the data and arrive at labels as explained in Urquhart [52, p359]. These labels were then counted for the frequency with which they occur in the interview transcripts. The following

sections describe the results of the in depth interviews and observations.

4.1 Small Businesses in the USA

4.1.1 Case 1 SW One small business in the United States we interviewed is a Chinese restaurant in the southeast part of the greater Omaha Metropolitan area, known as Bellevue. It is a two restaurant chain, with the second location in west Omaha. The two businesses are located in well-developed areas of the city. The major customers are the local Asian people and young American people. The owner holds a college degree and MBA degree from a local university. There are two groups of employees. One group includes the founders of the restaurant, who all have advanced degrees from a university in the United States. The other group is the people who have part time jobs in the restaurant; most of them are Chinese American and American college students. All of the employees have experience in dealing with computers and software.

The owner of the restaurant invested $3000 in Information Technology at the restaurant this year. First, the company has a land line telephone and fax machine. The telephone enables customers to order the food, book the seats and get the driving directions and parking information. The fax machine enables the restaurant to connect with the other restaurant and other agencies more quickly than the Internet. Second, the restaurant has a website to show restaurant information online, such as menu, location, operating hours, and special offer information. Also, the website enables the customer to order the food and to pay online. Third, the store has a credit card machine, making the payment easier. Fourth, the restaurant provides free Wi-Fi connection for the customers. Fifth, the restaurant purchased customer relationship management software and database management software to retain the relationship with the customers. Sixth, the restaurant purchased an online accounting system called Miracle to save the billing and payment information. However, the system is not durable in the long term. If the system has been running for one or two days, it becomes slow and they need to restart the system in order for it to run properly.

4.1.2 Case 2 JJ There is another small business existing in the western part of the Omaha, Nebraska. The owner of the small business has more than 10 year's experiences in restaurant industry. However, the owner cannot speak or write English, which limits his ability to communicate with the customers. Also, the owner will have more concern about the technology. Currently, the restaurant has the telephone to accept the order. A majority of the orders come

outside of the restaurant. Also, the neighborhood will pay better tips comparing to the other part of the Omaha.

They have the Wireless Digital Drive-Thru System, enabling the clear and consistent communications with both customers and employees. The limited employees can perform very efficiently. Also, the system saves a lot of time for the business owners. Also, in the restaurant, free Wi-Fi connection is established to satisfy the customers.

4.1.3 Case 3 CK CK is a family owned restaurant located in the heart of North Omaha, Nebraska. The restaurant is famous for catfish nuggets and fried chicken. The facility of the small business is not maintained in a good condition. The restaurant does not have very clear logo for the customer parking. There are three employees in the restaurant. Two of them are African American. The other employee was an African American young male.

Basically, the restaurant is not maintained in a good condition. The restaurant does not have a very clear advertisement. Also, they don't have very clear customer parking area. Inside, the facility was not maintained in a good condition. The owner was defensive during the interview. The owner uses the credit card to conduct the business. Besides that, they do not use other advanced information technology. The owner declares that most of the customers come from the local neighbor. Potential customers from western Omaha are not willing to go to north Omaha to buy food. Computer is only used for personal purpose. From the observation and interview, this small business is highly embedded into the local culture, community, and environment.

There are several reasons lead to that. First, the age of the business owner would potentially impact the behavior in the usage of the Information Technology. Second, the comparatively low development neighborhood also hinders the speed of development. Third, the small business is highly embedded into the community.

4.2 Small Businesses in China

4.2.1 Case 3 HJH The small business over which the interview was conducted is in the capital of the Sichuan province, Chengdu. The restaurant is locally owned with two locations. They serve "simmer pot" food. This cooking style has a rich history which dates back to the Qing Dynasty. The location of the main restaurant is in the southeast part of the city, which is very close to Sichuan University. The other location is in the southwest part of the city. The major patrons of the store are students. The owner of the store has a

college degree. There are two groups of employees, one group is primarily young people from the rural area of the Sichuan Province, and their ages range from 18-23. The majority of young people for the rural area have their high school diploma; none of them have college degree. The other group of the employees are the people aging from 40-50. The majority of the employees from this age group do not have high school some of them are illiterate.

The owner of the restaurant invested $500 in Information Technology each year. First, the restaurant acquired a fixed line telephone to attract more customers and maintain the existing customer base. The telephone enables the customers receive important information from the restaurant (e.g. the opening hours, the menu, and the location of the store) thereby improving both attraction of new customers and retention of existing customers. Second, each employee was given a two-way radio to help improve intercommunication. The two-way radio enabled the chef to make quick responses in accordance with the demand of the customers. This system reduces the customers' waiting time on an average of 10 minutes per ticket. Third, the restaurant provided a free basic Wi-Fi connection available in both the dining area and waiting area. This restaurant does not provide a website or the online ordering service. The restaurant does not accept credit card payments; only cash is accepted.

4.2.2 Case 4 LY The last small business we conducted the interview is in Jiaxing, Zhejiang Province, China. The owner is a young Chinese man, who has college degree in economics. They provide international trade service for the customers in United States. The company established in 2009. Currently there are 10 employees. Senior managers and new college students are the two groups. The company uses lots of technology to help them conduct the business. As it is an international trade company, majority of work will be finished online through email and instant message software. Also, the company chooses Taobao.Com and Alibaba.Com as the B2B service providers. However, the cost of information technology, e.g., international telephones calls, international fax, and business use of Internet is still a concern for the business owner. Besides, the new college students still need time to get familiar with the work under an Information Technology environment. The online training system provides opportunities for new employees to embrace the IT environment quickly. Besides that, the company purchased the customers relationship management (CRM) software to help maintain the relationship between customers.

In this case, through the open coding, we observe very high perceived usefulness in the labels. However, high cost of ICTs in China really hinders the development of ICTs adoption, even though small business owner applies advanced ICTs like B2B, and CRM software.

4.2.3: Case 6 XMJ XMJ is a family owned small business that provides production and sales of valves located in Yuhuan County, Zhejiang, China. Yuhuan is well known for the production of valves. There are five family members managing one plant and one sales center. Since production and sales of valves are labor intensive industry which does not require high education, none of employees has college degree. According to the interview, majority of employees do not know how to use Information Technology related products. Currently, the small business has telephone and fax machine to communicate with business partners and customers. However, customers of XMJ are not willing to use IT. Since all the sales and customers are in China, they only use telephone and fax machine. Secondly, due to high cost of Internet connection for small business in China, the small business owner is not willing to spend extra on that. Third, it is told that they tried the customer relationship management software before, but they did not believe it's worth the money.

5. Analysis

The open coding illustrates that there are a few differences between adoption of ICTs in small businesses in the USA and China. A total for each of the labels is provided in the following sections and where needed, theoretical sampling is carried out to enhance the categories. A total of 55 labels were arrived at and found to occur in the transcripts 65 times. The results suggest that small business' ICTs adoption in China are less than that of the United States. Small businesses in Nebraska have access to more advanced technology than small business in Sichuan and Zhejiang. There are differences in ICTs adoption between the two small businesses. These different adoption levels lead the two sets of businesses to two different revenue levels.

When answering the research question, How can ICTs adoption in small businesses in the USA and China bring about sustainable development, we identify the following challenges: the lack of worker knowledge and education, the fear of the technology, the low salary rate, the high cost of ICTs fees, and the regulation on the usage of ICTs limits, and detrimentally affect ICTs adoption in China. The increased knowledge and skill of the employees, the

comparatively high salary, the low cost of the ICTs and the freedom of the usage of the ICTs encourage and supplement ICTs adoption in the United States.

In the group of business in US, more than half the labels indicate the importance of high perceived Usefulness. That indicates the businesses in US in two cases know the importance of information technology. Both high perceived usefulness and low perceived usefulness is observed. Close quantity of labels in high perceived usefulness and low perceived usefulness are found in table 2 below.

Table 2 Results from Small businesses in USA

Category	F(x)	Perce ntage	Labels
Organization	4	15.4%	Long History (4), Highly educated employees (2)
External Environment	4	15.4%	Mixed customers(1), Acceptable cost in IT(1), low trust to outside people(1), underserved(1)
Internal Environment	2	7.7%	Friendly(1)
High Perceived Usefulness	12	46.2%	IT usage from Neighbor (1) Investment in IT (3) IT adoption (7) IT Worth the value (1),
Low Perceived Usefulness	3	11.5%	System is not durable(1) Low trust in IT professionals(1) Computer not for business use(1)
Social Embeddness	1	3.8%	Customers from neighborhood(1)
Total	26	100%	

In the second group of small businesses in China, organization and high perceived usefulness are the most important factors. Close quantity of labels in environment and low perceived usefulness are found in table 3. Social Embededness is also observed in this group. It is clear that these businesses have a greater set of challenges to overcome such as, the cost of technology, language, education and IT skills of employees, and greater reliance on social contacts and word of mouth for customers.

Table 3 Results from Small businesses in China

Category	F(x)	Perce ntage	Labels
Organization	11	19.6%	Long history(1), high education (1), profitable (1), students customers (1) Low educated employees(1), high age employees (1), limited work ability(1), Not enough experience in IT (1), More time (2)
External Environment	12	21.4%	Employees do not know how to use IT (1), not too comfortable to use the IT (1) high rent (1) prefer cash payment (1) License for business (1), additional fee (1), high cost of IT(4) International trade (1), foreign customers (1) Customers do not need knowledge in IT (1), do not communicate on Internet (1)
Internal Environment	5	8.9%	High requirement of English (1), young graduate employees (1), senior managers (1) Employees do not know how to use computer, low educated employees,
High Perceived Usefulness	23	41.1%	telephone (4) Two-way radio (1). IT saves time (7), quick response(1),. Wi-Fi connection (1), Internet (2) Willing to use IT (1), computers (2), online business (1), fax machine (2), Chinese and English website (1),
Low Perceived Usefulness	3	5.4%	low incentive to use IT (1), Low trust in IT (1), Tried the software before not useful at all (1)
Social Embedness	2	3.6%	important address (1) word of mouth (1)
Total	56	100%	

While the categories remain the same, there are differences in ICTs adoption in the small businesses of both countries. The small businesses in US will more easily get the higher quality of employees. According to the six cases, the employees in US will have better education background and knowledge. Cost expertise, education will be the common concerns in both models.

However, the social embededness is added into group 2 small businesses in China. The small businesses in China are different from the ones in the United States. They are strongly connected with the particular social structure, even though it received debates about the positive and negative effects on the economic behavior [54]. While small businesses owners are not able to promote the business by the ICTs, social embededness plays a more important role. Besides that, external and internal environment in each country will be different. In China, the administration fees for usage of ICTs will be much higher comparing to the ones in the United States. The differences in both external and internal environment result different levels of ICTs adoption in both areas.

6. A Model of ICTs Adoption for Sustainable Development

The second stage of this analysis is axial coding to arrive at a theoretical model. Corbin and Strauss [5] describe this as relating categories to their subcategories, and the relationships are then tested against data. This entails identifying the Causal Conditions that lead to the main Phenomenon and the Strategies and Context affecting that phenomenon. Through axial coding, we discover the causal conditions leading to the main phenomena of technology adoption and sustainability, that high perceived usefulness is the casual condition leading to the technology adoption phenomenon that lead to strategies such as investments in technology and training that bring about consequences of economic and social development. We also discover the intervening conditions such as the education and IT skills of employees that effect economic and social development. The technology adoption phenomenon brings about strategies in which some small business will choose to invest in IT, some small business will choose to invest in training systems. Some companies will outsource the service to third party, e.g., Alibaba.com and Taobao. Com. This model is illustrated in figure 1, below:
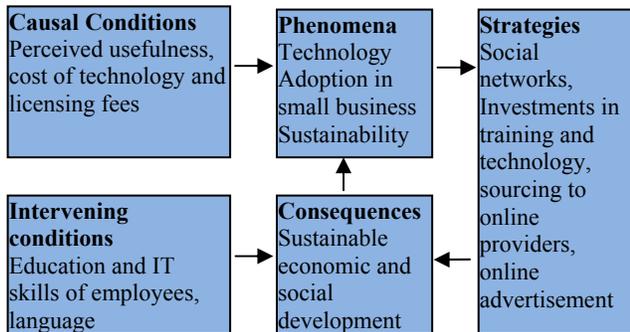

Figure 1: Model of Technology Adoption for Sustainable Development

Achieving sustainable development entails a combination of factors to be in effect. According to the World Bank and the United Nations, sustainable development entails the simultaneous achievement of economic (growth, equity and efficiency), social (empowerment, participation, social mobility, social cohesion, cultural identity and institutional development) and ecological objectives (ecosystem integrity, carrying capacity, biodiversity and protection of global commons) [55].

Qureshi et al [29] suggest that in order to sustain improvements in the growth of micro-enterprises, organizational and technical infrastructures are needed to provide technical and business assistance within the community in which the entrepreneurs reside. In order to ensure sustainable development, one must consider the growth of micro-enterprises within the context of a larger development strategy that takes into account the social capital needed to sustain them. Qureshi et al [29] state that economic improvements in microenterprises can be achieved by growth stimulation, equitable distribution of resources, and increasing the efficiency of factors of production through the IT training and technology interventions. They state that social objectives can be can be achieved by empowering owners through participation in social and cultural activities that reinforce their identity. Both of these economic and social objectives need to be addressed if the model presented here is to bring about sustainable development.

7. Conclusions and future research

The analysis in this paper has illustrated differences in ICTs adoption in small Chinese owned businesses in the USA and China. Using in depth case studies of six small businesses, three in the US and three in China, to collect data on their ICTs adoption, we were able to glean insights into the differences in ICTs adoption. Through open coding the data are labeled and the slices of data are compared to existing concepts to enrich the theory. The theory building is conducted through axial coding to show how sustainable development can be achieved through ICTs adoption by small businesses. The resulting theoretical model illustrates how ICTs are adopted by small businesses in the two countries.

The contribution of this research is in the comparative analysis and theory building. The concepts could be used to inform more depth in the data collection could be achieved through more case studies, observations and follow-up with existing cases. As more labels were discovered in Chinese small business group than the United States one, the differences have been uncovered in the comparative analysis. Future research could use the categories and models developed in this research to assess ICTs adoption in a larger group of small businesses. In the second stage of research project, a quantitative research method will be applied in order to further investigate the research question.

A limitation of the research is that further in depth data collection could enhance the reliability of the results analyzed in this paper. Additional interviews after a period of time could through light into the extent that the categories discovered in this research remain.

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