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The Role of Human Capital in Information and Communication Technology Adoption for Development: Evidence from China

Completed Research Paper

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ABSTRACT

Emerging economies, in particular China, are powering growth in Asia. While China is seen to lead growth in the emerging markets of Asia, 98% of its manufacturing and production base is powered by small businesses. These businesses represent the majority of all businesses in emerging countries and the growth of these businesses increases with their successful adoption of Information Technology. This paper uses a well-known model in Information Systems Adoption to analyze ICT usage, the effect ICT usage and human capital in the development of the small businesses in China. The reason this model is used is to find out which variables, if any, hold in the case of small businesses in China. As very little research has been done in the IS literature of ICT adoption in small businesses in China, this paper adds to what is known about the role of human capital in ICT adoption for development in China. This paper makes a contribution to the IS acceptance and global development literature by providing concepts that enable IS researchers to study ICT adoption in China.

Keywords: IT for Development, ICTs, Small Business, Technology Adoption.

INTRODUCTION

Emerging economies appear to be powering growth in their regions. As the driving force behind the economic growth of China, Information and Communications Technologies (ICTs) are shaping the ways in which small businesses are able to grow. The majority of current research into the user acceptance and adoption of ICTs focusses on the perceptions of users in large organizations often in developed countries.

This paper considers China in that it fits the generally accepted definition of an emerging economy. While there is no commonly accepted definition of an emerging market, increasing average per capita incomes, growth and economic liberalization appear to be accepted by scholars as they key characteristics of emerging markets (Roztocki & Weistroffer, 2011; Arnold & Quelch, 1998; Li, 2003; Samoilenko, 2008). In particular, the role of ICTs in emerging economies is seen in some cases to bring about higher growth rates (Samoilenko & Weistroffer, 2010; Ngwenyama & Morawczynski, 2009). China's informatization strategy also has the potential to provide its citizens with better growth opportunities through improvements in telecommunications and information infrastructures, better intellectual property rights and cybercrime legislation (Hanna & Qiang, 2010).

Small and medium enterprises (SME) in China contribute more than 60% of China's GDP, more than 50% of taxation, more than 70% of international trade, and 80% of jobs of cities and towns in China, which represent 99% of all businesses in China (Small business, 2013; The Economist, 2009). The use of ICTs provides new opportunities for SME as well as this emerging economy. Small businesses are critical to economic development in China for a long time (Yu et al., 2011). 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 (Qureshi & York, 2008). That is why this paper investigates the factors that affect the adoption of ICT by small businesses in China.

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 (Summary, 2011). In the United States, small

businesses currently represent 99.7 percent of all businesses (USSBA, 2011; Kobe, 2007; CHI Research, 2003). In China, small businesses represent 99 percent of all businesses, and they generated 75 percent of all new jobs in the country. Small businesses account for 60% of China's GDP and half its tax revenues. In China, the number of employees ranges from 10 to 100. Small businesses are critical to economic development in China for a long time (Yu et al., 2001). 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 (Qureshi & York, 2008). 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 (Qiang et al., 2003). Qureshi et al. (2009) found that targeted IT intervention in micro-enterprises increase their chances of survival and stimulate their growth. A number of studies on the implementation of technology have been performed to identify and assess organizational characteristics that could potentially lead to an information system success or failure (Ginzberg, 1981). In Venkatesh et al (2003)'s UTAUT model, there are several components, Performance Expectancy, Effort Expectancy, Attitude toward using technology, Social influence, Facilitating conditions, Self-efficacy, Anxiety, Behavior intention to use the system. Based on the UTAUT model, a survey was designed and data was collected from 118 small business in China. User acceptance is one of the key fundamentals for development and success of small business development. However, it is yet not clear which factors apply to an emerging economy, such as China and nor is it clear how they affect small business entrepreneurs. In this paper a set of variables from the IS literature have been identified that would enable this research question to be answered: **What factors affect the adoption of ICT by small businesses in China?** These variables were used to develop a survey instrument used to collect data from small business owners in two provinces, Zhejiang and Sichuan. Zhejiang is a more developed province with higher growth technology industries while Sichuan is less developed with a largely rural population. In doing so we are able to arrive at a more representative sample of small businesses. The following sections describe the concepts we draw upon from the literature to arrive at our hypotheses and model.

LITERATURE REVIEW

Information Technology Adoption

Preliminary results from qualitative research have shown that IT adoption is an important determinant of how ICT can bring about development in micro-enterprises. In a study by Xiong and Qureshi (2013) of Chinese and US small businesses, perceived usefulness, cost of technology, and licensing fees enables IT adoption in small business and its sustainability. The paper also points out those intervening conditions of human capital such as the education and IT skills of employees that effect economic and social development. Information systems are often relied on to assist growth and development, although small businesses often find technology difficult to implement due to resource constraints (Street and Meister, 2004; Raymond, 1985). Kamal and Qureshi (2009) explore two trends relating to how ICT adoption in micro-enterprises can bring about development. First, micro-enterprises contribute to both economic and social development. Second, ICT can facilitate achievement of an underserved region's development strategies. However, as stated by Kamal and Qureshi (2009), while the majority of research investigates these two trends, few studies focus on the intersection of these two development trends. These trends are: the growing role of micro- and small enterprises (MSEs) and the advancement of information and communication technologies (ICT) (Duncombe & Heeks, 2002). The research finds that poor rural entrepreneurs rely heavily on informal, social and local information systems. The ICTs might play a supplementary role. However, little attention has been paid to the research of the relationship between ICT and the development of small businesses, especially on the individual-level (Walsham & Sahay, 2006). This paper contributes to the intersection of these trends by investigating the outcome of ICT adoption. There are several existing models illustrating Information Technology Adoption and Acceptance. Venkatesh, et al. (2003) identify these models: Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1972), Technology Acceptance Model (TAM) (Davis, 1989), the Motivational Model (Davis et al., 1992), Theory of Planned Behavior (TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT).

Davis (1989) introduces the Technology Acceptance Model (TAM), which discovers how users of information systems come to accept and use technology. Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the key factors of the model. According to TAM, Perceived

Usefulness (PU) is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance”. Also, *Perceived Ease of Use (PEOU)* is defined as the “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). Dai and Palvia (2008) also 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.

Due to the further study, TAM is expanded to TAM2 (Venkatesh & Davis, 2000; Venkatesh, 2000), Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), and TAM3 (Venkatesh et al., 2008). TAM 2 extends TAM by adding the subjective norm, which exerts a significant direct effect on usage intentions over and above perceived usefulness and perceived ease of use (Venkatesh & Davis, 2000). TAM3 posits that the effect of perceived ease of use on perceived usefulness will be moderated by experience; and the determinants of perceived ease of use will not have any significant effects on perceived usefulness over and above the determinants of perceived usefulness (Venkatesh et al., 2008).

Venkatesh et al. (2003) introduce the Unified Theory of Acceptance and Use of Technology (UTAUT). The model proposes that four key constructs, which are performance expectancy, effort expectancy, social influence, and facilitating conditions are direct determinates of usage intention and behavior (Venkatesh et al., 2003). Gender, age, experience, and voluntariness of use are posited to mediate the impact of the four key constructs on usage intention and behavior (Venkatesh et al., 2003). Subsequent validation of UTAUT in a longitudinal study found it to account for 70% of the variance in usage intention (Venkatesh et al., 2003). Im et al. (2011) tested and compare the UTAUT model; they find variables in the well-accepted UTAUT model vary across countries. Zhou et al. (2010) integrate Task Technology Fit (TTF) model and UTAUT model to research the mobile banking user adoption model. They propose that performance expectancy, task technology fit, social influence, and facilitating conditions have significant effects on user adoption. Wang and Wang (2010) study the gender differences in mobile Internet acceptance by using the UTAUT model.

On the individual level, Dai and Palvia (2009) conducted a study on 190 individual mobile commerce users in China and the United States of America. Dai and Palvia (2008) also identified

nine factors that affect mobile commerce adoption by consumers in China and the USA based on the TAM. The Technology Organization Environment (TOE) framework contains three aspects that explain the process of adopting and implementing a technological innovation: technological context, organizational context, and environmental context (Xu et al., 2004).

Li et al. (2011) analyzed the usage of online direct sales channels among the small and medium-sized enterprises (SMEs). Survey was applied to the SMEs in the United States. They found that there are different sets of factors that can determine the SME's initial adoption and post-adoption. Al-Natour and Benbasat's (2009) indicated that more and more research attention is paid to the factors surrounding the use of IT artifacts, rather than the traditional models like TAM and TPB. Given the value of the need to understand IT adoption, we draw upon a unified model that has been widely cited in the literature. In the following sections we add to this literature by developing a model that includes the concept of Development and how information and communication technology usage affects development.

Development

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 (1934) and is often used to describe growth in organizations and the regions in which they reside. Development has been seen as an economic phenomenon that leads to better livelihoods. Also, the main purpose of development is to spread freedom and its “thousand charms” to the citizens (Sen, 1999). Development is a concept which is considered both theoretically and politically, and is inherently both complex and ambiguous (Summer and Tribe, 2008). The liberalization of economies replaced the animated development practice in 1950s and 1960s. Willis (2005) refers the ‘Modernity’ to a ‘condition’ if being modern or being like the industrialized counties of Western Europe and North America in particular. The Modernity encompasses industrialization, urbanization, increased use of technology and application of rational thinking (Willis, 2005). There are a diversity of development theories and practices (Willis, 2011). Some scholars define development as the diffusion of modernity (Habermas & Ben-Habib, 1981). Some scholars define development as economic growth (Sachs, 1999; Greig et al., 2007). The United Nations Development Program defines development as human progress. The Millennium Development Report (2011) breaks development into eight goals: 1. Eradicate extreme poverty and hunger. 2.

Achieve universal primary education 3. Promote gender equality and empower women 4. Reduce child mortality 5. Improve maternal health 6. Combat HIV/AIDS, malaria and other diseases 7. Ensure environmental sustainability and 8. Develop a global partnership for development. For the purpose of this paper we use the following definition; 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 (1932) 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. (Qureshi et al., 2009) These measures will be used to assess development in small businesses in this research.

Technology is a central ingredient in economic development (Malecki, 1997). Information Technology is a driving force behind economic growth and has fundamentally changed the way people live, not only in developed countries, but also in developing countries. Information and communications technology (ICT) are used by many private enterprises to improve the performance, productivity and competitiveness in the marketplace (UNCTAD, 2011). However, the use of ICT is a challenge in both developed and developing countries (Wolcott, et al., 2008; Schreiner & Woller, 2003;). The development may be inhibited by a lack of understanding of ICT (Sadowski et al., 2002). The world is increasingly interconnected through high-speed mobile communications. Growing demand for information and communications services, combined with technological advances, growing infrastructure and falling prices, are allowing more and more people across the globe to join the information society.

The outcomes from the adoption of Information and Communications Technology on development can be assessed in a number of ways. The measures of economic development most often used are: Increase in income, job creation and clientele (Qureshi et al., 2009). These metrics used to assess development in small businesses. In this model the arrows are bidirectional because the growth of and development of the businesses can bring about greater IT adoption and lead to more technology being purchased and an improvement in the organization and its environment.

RESEARCH MODEL

A number of studies on the implementation of technology have been performed to identify and assess organizational characteristics that could potentially lead to an information system success or failure (Ginzberg, 1981). In the UTAUT model, there are several components, Performance Expectancy, Effort Expectancy, Attitude toward using technology, Social influence, Facilitating conditions, Self-efficacy, Anxiety, Behavior intention to use the system. Based on the UTAUT model, we design the survey. User acceptance is one of the key fundamentals for development and success of small business development. In this research we use the UTAUT model to develop our own model of how IT adoption and human capital in can lead to the growth and development of small businesses.

The first part of our model uses variables from the UTAUT model. Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh et al., 2003). Davis (1989) and Davis et al. (1989) provide the definition of Perceived Usefulness, which is “The degree to which a person believes that using a particular system would enhance his or her job performance”. 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” (Davis, 1989, p320). The perceived ease of use is referred as the “the degree of freedom usage of the system and the technology for the users” (Davis, 1989, p320). The perceived cost is defined as the “value of money that has been used to get the service”.

Job-Fit

The job-fit in this research is defined as “How the capabilities of a system enhance an individual’s job performance” (Thompson et al., 1991). There are two fit perceptions for the job seeker’s, which are Personal Organization fit and personal job fit (Carless, 2005). The Personal Organization fit is defined as ‘the compatibility between people and organizations that occurs when (a) at least one entity provides what the other needs, or (b) they share similar fundamental characteristics, or (c) both’ (Kristof, 1996, p.4-5) . The personal job fit is conceptualized as the match between individual knowledge, skills, and abilities and demands of the job or the needs of an individual and what is provided by the job. (O’Reilly, Chatman, & Caldwell, 1991). Chang et al. (2010) investigate 303 research and development (R&D) engineers from 30 high-technology

firms in Taiwan. The results show that perceived P–O fit and perceived training investment interact jointly to predict knowledge workers' turnover intentions.

Perceived Ease of Use

The perceived ease of use is referred as the “the degree of freedom usage of the system and the technology for the users” (Davis 1989, p.320). Oh et al. (2009) explore the adoption of e-trade innovations by small-medium sized enterprises (SMEs) operating in South Korea. The survey is conducted in 164 SMEs to develop a useful refined model of innovation acceptance and continuity.

Social Influence

Social Influence is referred as “the person's perception that most people who are important to him think he should not perform the behavior in question” (Azjen, 1991; Fishbein & Azjen 1975). Chay (1992) examined the relationship between social support and personality factors as moderators of stress arising from demands in the small business entrepreneurs and employees. Hsu and Lin (2008) investigate the usage of blog by researching the roles of technology acceptance, social influence and knowledge sharing motivation. Theoretically, individuals' perceptions of norms consist of two influences: informational and normative (Deutsch & Gerard, 1995). The first occurs if a user perceives information as enhancing his or her knowledge; the second occurs when a person conforms to the expectations of others in order to obtain a reward or avoid punishment.

Facilitating Conditions

Facilitating Conditions are referred as “Objective factors in the environment that observers agree make an act easy to do, including the provision of computer support” (Thompson et al., 1991). Venkatesh et al. (2008) research the predicting different conceptualizations of system use by research the competing roles of behavioral intention, facilitating conditions, and behavioral expectation. They propose the relationship between facilitating conditions and system use to be fully mediated by behavioral expectation. They also argue that facilitating conditions are expected to be more important for women than they are for men.

Attitude toward using technology

Attitude toward using technology is referred as “An individual’s positive or negative feelings about performing and using technology” (Davis, Bagozzi, & Warshaw, 1989; Fishbein & Ajzen, 1975). Ha and Stoel (2009) integrate e-shopping quality, enjoyment, and trust into a technology acceptance model to understand consumer acceptance of e-shopping. 289 Surveys were conducted among college students. The results indicated that ease of use and enjoyment, and knowledge sharing (altruism and reputation) were positively related to attitude toward blogging, and accounted for 78% of the variance. They also find out that attitude toward blogging significantly influenced a blog participant’s intention to continue to use blogs.

Self-Efficacy

Self-Efficacy in this research is referred as “Judgment of one’s ability to use a technology, e.g., computer, telephone, to accomplish a particular job or task” (Bandura, 1986; Compeau & Higgins, 1995). Schwarzer et al. (1997) compare the German, Spanish, and Chinese versions of general self-efficacy scale. Surveys were conducted among 430 German, 959 Costa Rican, and 293 Chinese university students.

Anxiety

Anxiety in our research is referred as “Evoking anxious or emotional reactions when it comes to performing using the ICT” (Bandura, 1986; Compeau & Higgins, 1995). Beaudry and Pinsonneault (2010) find out anxiety was negatively related to IT use, both directly and indirectly through psychological distancing. Anxiety was also indirectly positively related to IT use through seeking social support, which countered the original negative effect of anxiety.

The Usage of ICT

The usage of ICT consists of Behavioral Intention and Use behavior of the ICT. The behavioral intention to use the system was measured by using the three-item scale from Davis et al. (1989), which was widely used and tested before. The concept was originally adopted from Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). According to TRA, individual’s performance of a specified behavior is determined by his/her behavioral intention to perform the behavior (Davis et al. 1989). Intention as a predictor of behavior is playing an

important, critical, and has been well-established in IS literature and other disciplines (Venkatesh et al., 2003). In our model, the three-item scale from Davis et al. (1989) are adopted.

Human capital

Human capital began its own revolution began in the 1950s and early 1960s with the research of Schultz (1961), Mincer (1958), and Becker and Chiswick (1966). The current era is placing much greater emphasis than before on the importance of knowledge and information to the development of both countries and individuals (Becker, 2011). Human Capital plays in either lowering economic costs or elevating customers' willingness to pay (Porter, 1985, p. 394). Human capital is described and created by changes in persons that bring about skills and capabilities that make them able to act in new ways (Coleman, 1988). Also, human capital can be described as all the competencies and commitment of the people within an organization (Ceridian, 2007).

Human capital can be assessed in terms of education and social embeddedness. Social Embeddedness is defined as the degree to which individuals or firms are enmeshed in a social network (Granovetter, 1985). Boyer-Wright and Kottermann (2008) compared E-government issues in emerging parts of the world, including Eastern European, Asian countries and advanced countries.

They also note that education and on-the-job training of individuals play important roles in ICT use in the three domains. Ngwenyama and Morawczynski (2009) indicate that economic factors, human capital, geography, and civil infrastructure factors should be considered during the analysis. Balamoune-Lutz (2003) argues that ICT diffusion is not associated with education by using the cross-sectional data from the World Economic Forum's (WEF) Government Information Technology Report (GITR).

Education and Training expenditure are the key variables used to assess Human Capital. Education in its broadest, general sense is the means through which the aims and habits of a group of people sustain from one generation to the next. Training is the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies. Training has specific goals of improving one's capability, capacity, and performance. It forms the core of apprenticeships and provides the

backbone of content at institutes of technology (also known as technical colleges or polytechnics).

Development of Small Business

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 (1932) and is often used to describe growth in organizations and the regions in which they reside. The outcomes from the adoption of Information and Communications Technology 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 (Qureshi, Keen, & Kamal, 2009). These measures will be used to assess development in small businesses in this research.

The process of Creative Destruction by Tripsas (1997) and Schumpeter (1942) suggests that entrepreneurs drive capitalism with innovation. These innovations, when implemented challenge the status quo and upset the equilibrium. Warschauer (2004), states that the greatest gains to development are not from the adoption of ICT in itself, but from the innovative ways in which technology has been adopted. According to Schumpeter (1942) 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 suggests that the Entrepreneur is the agent of innovation whose adoption of the innovations will enable the business to survive and potentially grow. Initial research model was developed based on the instrument.

Quantitative research, including factor analysis, and SEM was conducted to further conduct systematic empirical investigation of different factors and relationship in the model. As we discussed above, job-fit, perceived ease of use, social influence, facilitating conditions, attitude toward using technology, self-efficacy, anxiety, human capital, development of small business are important parts that form the model.

The model developed for this research uses variables from the UTAUT model (Venkatesh, 2000). Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her attain gains in job performance (Venkatesh et al., 2003).

Davis (1989) and Davis et al. (1989) provide the definition of Perceived Usefulness, which is “The degree to which a person believes that using a particular system would enhance his or her job performance”. 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” (Davis, 1989). The perceived ease of use is referred as the “the degree of freedom usage of the system and the technology for the users” (Davis 1989, p. 320). The perceived cost is defined as the “value of money that has been used to get the service”.

An instrument is developed to further construct the research model. Important factors, e.g., Perceived Usefulness, Perceived Ease of Use, Social Influence Subjective Norm, Facilitating Conditions, Attitude toward using technology, Self-Efficacy, Anxiety, Usage of ICT, Human Capital, and Development of Small Business are proposed with definition and survey questions which adopted from the UTAUT study of Venkatesh et al. (2003). Those represent independent and dependent variable utilized in the current research project. From the research model, we conduct our research hypotheses.

H1: Perceived usefulness (PU), Job-Fit (JF), Perceived ease of use (PEU), Facilitating conditions (FC), Attitude toward using technology (ATT), and anxiety (AX) will make a positive impact on the usage of ICT.

As first hypothesis comprises the first part of the research model, we expect to see the variables will have a positive impact on the usage of ICT among small businesses. Because these are seen to enable businesses to better adopt ICT.

H2: Usage of ICT and Human Capital will make a positive impact on the Development of Small Business.

Human capital is described and created by changes in persons that bring about skills and capabilities that make them able to act in new ways (Coleman, 1988). Also, human capital can be described as all the competencies and commitment of the people within an organization (Ceridian, 2007). Since the average spent on the employees are critical to the improvement of human capital for small businesses, in this research we expect to see ICT and Human Capital will make positive impact on the usage of Development of Small businesses in China. The Annual Cost of Training and Education Per Person (TEE) is considered as important factor to probe the human capital of small businesses. Table in the appendix provides the instrument for

the data collection based on the model. Figure 1 suggests the initial research model for this paper.

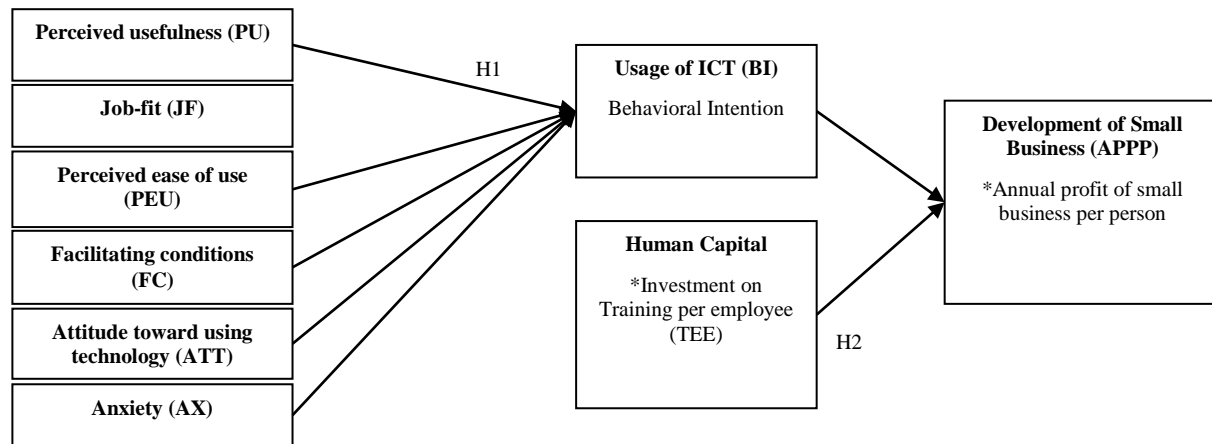


Figure 1: Initial Research Model

RESEARCH METHOD

Since the growth of an emerging economy such as China is being powered by ICTs, this paper investigates, what factors affect the adoption of ICT by small businesses in China? Following an analysis of data collected from 118 small businesses in a high growth province and a largely rural province, this paper arrives at a set of factors that affect the acceptance of ICT in China and their outcomes on small business development. Then multiple regression is carried out to test two hypotheses to analyze the relationship between the UTAUT variables and ICT usage, and the effect of ICT usage and Human Capital in the Development of Small businesses in China. In this study, the construct of Development is considered as a measure of growth of small businesses. Our structural equation modeling (SEM) showed that Usage of ICT (BI) and Human Capital (TEE) have a positive effect on the Development of Small Business (APPP) giving us strong support for our theoretical model. The theoretical contributions of this paper are threefold: first, we show which technology acceptance factors affect ICT usage in a unique context, that of small businesses in China; second, we add to the IT acceptance theories by measuring an outcome of ICT adoption in terms of an economic development variable; and third we measure the effects of human capital on ICT usage. This theoretical model and the combination of

variables and their relationships tested, to the best of our knowledge, have not been studied at this time and add to the literature on IT acceptance.

In this paper, series of statistical analysis, including factor analysis and SEM were conducted to answer the hypothesis and research question. In this section, the discussion of survey participants, research setting, instrument administration, and research results is provided. Factor analysis is applied to investigate the relationship between several factors that adopted from UTAUT model and the usage of ICT. Structural Equation Modeling is applied to further investigate the relationship between usage of ICT, the human capital and the development of small business.

Research Setting and data collection

The quantitative phase of the current research focuses on empirically testing our research model from newly gathered data. There are 118 small businesses in Zhejiang Province and Sichuan Province involved in the survey. There are two parts of the survey, which are ICT related and E-Commerce related. In this paper, we will use the ICT related survey. The survey was translated from English to Chinese and then translated to English again to make sure the meaning of each question does not change during translation. There are three parts of the survey. Section A: Basic Information- provides the basic information of small business. Section B: Survey questions- provides opportunity for small business owners to answer the 7- point scale survey. Table 1 provides the characteristics of small businesses.

Table 1: The Characteristics of Small Businesses

	<i>Zhejiang</i>	<i>Sichuan</i>
Number of Small Business	53 (45%)	37 (31%)
Number of Startup	20 (17%)	8 (7%)
Average Number of Employees	5.51	5.71
Average Spent on Training and Education Per Employee (USD)	166.14	170.76
Average Profit Per Employee (USD)	16636.68	15970.91

The subject of the survey is the assessment of the small business owners' usage of ICT, human capital, and the development of small businesses. ICT in this research is defined as Appropriate Technology. According to Schumacher (1989) Appropriate Technology is defined as the "The acquisition of technology appropriate for the small businesses' economic environment". In this definition, ICT is used in a very broad sense. For example, the technology could be something as simple as corded, landline, telephones. It could also include basic mobile phones, and radios in the developing countries. In more advanced areas technology is an online billing system, an iPad ordering system, and a Near Field Communication (NFC) payment system.

Statistical Data Analysis Methods

Once collected, the data was analyzed in a two-step process. First factor analysis was conducted to examine how the responses on a number of measured variables influence each other. In other words, examination of patterns of correlations between the variables will be conducted (Hair et al., 2005).

Since in the model there are more than five factors, so the Principal Component Analysis (PCA) is conducted in the first step of the research. Given that a large number of measures were used in the data collection survey, this research uses a form of Principal Component Analysis (PCA) to arrive at a relatively small number of components that account for the variability. The reason we conduct the PCA is because we have obtained measures on a number of observed variables and we wish to develop a smaller number of artificial variables (Cattell, 1966; Hatcher & Stepanski, 1994). Factor analysis, including both principal component analysis and common factor analysis, is a statistical approach that can be used to analyze interrelationships among a large numbers of original variables into a smaller set to the structure of the variables considered; factor analysis becomes an objective basis for creating summated scales (Hair et al, 2010). The value of KMO is 0.924. The value of Bartlett's test was significant at .001 level. Both of the value suggest data set is suitable for PCA.

Data reduction was performed by conducting factor analysis to arrive at communalities (Smith, 2002). Extract Eigenvalues are provided to further support. Eigenvalues are applied in the Principal components analysis PCA is performed on the covariance matrix or the correlation matrix (in which each variable is scaled to have its sample variance equal to one). Varimax rotation was used because of better interpretation of the factor and factor loading (Hair et al,

2010). To measure sampling adequacy, Kaiser-Meyer-Olkin (KMO) was used to test if data are fitted to factors well based on correlation and partial correlation. KMO can be used to identify which variables to drop from the factor analysis because they lack multi-collinearity according to Hair et al (2010). The measure of sampling adequacy (MSA) is measured by the KMO statistic. As a measure of sampling adequacy, the KMO predicts if data are likely to factor well based on correlation and partial correlation (Hair et al, 2010). Factor rotation was applied to the data. Unrotated factor solutions extract factors in the order of their variance extracted. The first factor tends to be general factor and it counts for the largest amount of variance. The second and subsequent factors are then based on the residual amount of variance. Each accounts for successively smaller portions of variance Hair et al (2010). .

Once the data reduction was complete, the second step was regression to further investigate the impact the factors can make to the usage of ICT among small businesses in China. Then, multiple regressions is applied to analyze the relationship between variables. Both hypotheses are tested based on the existing data.

DATA ANALYSIS

In this section, data analysis was conducted. Data was gathered via survey from different small businesses in two provinces in China. Overall data from 118 small businesses were gathered. We use the seven point scale survey, and nine factors are identified according to the survey. The development of small business is measured through the mean value of Annual Profit Per Person (APPP), and Annual Cost on Training and Education Per Person (TEE). The value for these variables is higher compared to the other variables because the other variables are measured in a 1-7 scale while the APPP and TEE is measured directly through the annual profit per person in USD. As we can see, the mean of BI, ATT, PU, FC, AX, PEU, and JF are all higher than 4. While in the survey, the lower the score, the less unlikely small business is willing to use the ICT. All Descriptive Statistics of the Sample are described in Table 2. We found that the UTAUT model was only partially supported. Perceived usefulness (PU), Perceived ease of use (PEU), Social influence (SI), Facilitating conditions (FC), Attitude toward using technology (ATT), Self-Efficacy (SE), and Anxiety (AX) are were thought to be potentially important determinants of the behavioral intention to use the system. However, this was not the case in this research.

Table 2: Descriptive Statistics

	N	Mean	Std. Deviation	Coefficient of Variation
BI	118	4.44	1.159	26.10%
TEE*	118	167.90	184.572	109.93%
APPP*	118	16382.79	16806.694	102.59%
ATT	118	4.4047	1.09920	24.96%
PU	118	5.115254	1.1765244	23.00%
FC	118	4.3136	1.03682	24.04%
AU	118	4.316384	1.0911432	25.28%
PEU	118	4.450847	1.1217162	25.20%
PE	118	4.3771	1.04990	23.99%
Valid N (list wise)	118			

* These variables are measured by USD; other variables are measured by 1-7 scale.

Furthermore, following Riemenschneider et al (2003), we found the “collected” could help us understand the IT adoption decision better comparing to the traditional TPB or TAM. We use UTAUT instead and found the Human capital together with the ICT usage could support the sustainable development. The following sections illustrate the data analysis.

Construct Validity

Principal Components Analysis (PCA) is applied to derive a relatively small number of components that can account for the variability found in a relatively large number of measures. Factor analysis searches for such joint variations in response to unobserved latent variables. Factor analysis was conducted to understand variability among observed, correlated variables, which include Perceived usefulness (PU), Job-fit (JF) ,Perceived ease of use (PEU), Social influence (SI), Facilitating conditions (FC), Attitude toward using technology (ATT), Self-Efficacy (SE), and Anxiety (AX). Perceived usefulness (PU), Perceived ease of use (PEU), Facilitating conditions (FC), Attitude toward using technology (ATT), Job-Fit (JF), and Anxiety (AX) in the survey. They are identified as the most important factors in the model. Summarily, this analysis confirms the validity analysis of the UTAUT model by showing strong correlation for most items belonging to the same construct.

Factor Loading

Then, correlation among constructs was examined to ensure that the constructs represent the factors arrived at. The factor loading for scale items based on the VARIMAX rotation are analyzed. Perceived usefulness (PU) (0.811), Facilitating conditions (FC) (0.7474), Perceived ease of use (PEU) (0.6818), Attitude toward using technology (ATT) (0.7), Job-Fit (JF) (0.68425), and Anxiety (AX) (0.738) are identified as key factors that affect the adoption of ICT. As there was no factor loading for SI and SE, they were excluded from the analysis. Most of the remaining items represented good convergent and discriminant properties. Thirty items are divided into six constructs. Overall, the constructs developed by Venkatesh et al. (2003) fared well in this replication, even though they were based on different samples and context settings. This is vital because it indicates the general applicability of these constructs for different types of research questions. Summarily, this analysis confirms the validity analysis of the UTAUT model by showing strong correlation for most items belonging to the same construct. These are illustrated in the following table 3:

Table 3: Cumulative Initial Eigenvalues

	Perceived Usefulness	Facilitating Conditions	Perceived Ease of use	Attitude toward using technology	Job-Fit	Anxiety
E.Value	16.553	1.785	1.058	.955	.808	.697
% of Variance	66.131	7.140	4.230	3.820	3.233	2.788
Cumulative %	66.131	73.271	77.501	81.321	84.554	87.342

Initial Eigenvalues

We found that the UTAUT model was only partially supported by our analysis. Perceived usefulness (PU), Perceived ease of use (PEU), Social influence (SI), Facilitating conditions (FC), Attitude toward using technology (ATT), Self-Efficacy (SE), and Anxiety (AX) are were thought to be potentially important determinants of the behavioral intention to use the system. However, this was not the case in this research. Only two factors were supported these were: Perceived Usefulness and Facilitating.

Furthermore, following Riemenschneider et al (2003), we found the “collected” could help us understand the ICT adoption decision better comparing to the traditional TPB or TAM. Our factor analysis showed that Attitude toward using technology, Perceived Usefulness, Facilitating

Conditions, Anxiety, Perceived Ease of use are related to the adoption of ICT. Also, according to initial eigenvalues, the first six components can explain the 87.342% of the whole model. The attitude toward using technology plays the most important role in the whole model. According to Table 3 the perceived usefulness could explain 66.131% the model among all the factors. In sum, the attitude toward using technology is playing the most important part between the different factors. Table 4 provides an overview of factor loading.

Table 4 Factor loading

		Component						Communalities
		Perceived Usefulness	Facilitating Conditions	Perceived Ease of use	Attitude toward using technology	Job-Fit	Anxiety	
Perceived Usefulness	PU-1	0.829	0.200	0.241	0.212	0.202	0.197	.910
Perceived Usefulness	PU-2	0.818	0.215	0.331	0.232	0.135	0.128	.013
Perceived Usefulness	PU-3	0.851	0.192	0.202	0.233	0.167	0.194	.922
Perceived Usefulness	PU-4	0.847	0.201	0.206	0.260	0.188	0.086	.910
Perceived Usefulness	PU-5	0.710	0.162	0.273	0.250	0.359	0.191	.832
Perceived Ease of Use	PEU-1	0.346	0.270	0.712	0.239	0.289	0.197	.880
Perceived Ease of Use	PEU-2	0.325	0.273	0.726	0.234	0.222	0.263	.881
Perceived Ease of Use	PEU-3	0.328	0.322	0.747	0.199	0.154	0.245	.893
Perceived Ease of Use	PEU-4	0.369	0.294	0.603	0.348	0.325	0.168	.841
Perceived Ease of Use	PEU-5	0.355	0.219	0.616	0.258	0.339	0.339	.850
Job-Fit	JF-1	0.211	0.330	0.321	0.297	0.650	0.238	.824
Job-Fit	JF-2	0.245	0.166	0.216	0.297	0.764	0.263	.876
Job-Fit	JF-3	0.282	0.336	0.235	0.288	0.689	0.196	.844
Job-Fit	JF-4	0.350	0.355	0.269	0.191	0.634	0.294	.846
Attitude toward using technology	ATT-1	0.344	0.284	0.159	0.681	0.349	0.269	.883
Attitude toward using technology	ATT-2	0.290	0.167	0.303	0.786	0.229	0.182	.906
Attitude toward using technology	ATT-3	0.330	0.291	0.251	0.758	0.265	0.148	.924
Attitude toward using technology	ATT-4	0.425	0.293	0.235	0.659	0.246	0.182	.850

Facilitating Conditions	FC-1	0.185	0.797	0.234	0.122	0.252	0.236	.858
Facilitating Conditions	FC-2	0.206	0.815	0.227	0.196	0.201	0.226	.887
Facilitating Conditions	FC-3	0.240	0.733	0.272	0.228	0.253	0.273	.859
Facilitating Conditions	FC-4	0.251	0.682	0.209	0.366	0.160	0.195	.768
Anxiety	AX-1	0.197	0.304	0.319	0.251	0.263	0.722	.886
Anxiety	AX-2	0.256	0.407	0.229	0.288	0.222	0.688	.888
Anxiety	AX-3	0.188	0.279	0.239	0.123	0.271	0.804	.904
E.Value		16.553	1.785	1.058	.955	.808	.697	
Cronbach's alpha		0.976	0.957	0.935	0.955	0.940	0.932	

Extraction Method: Principal Component Analysis

Value less than .603 is not significant and only the significant values have been highlighted.

Assessment of Correlation

To test the hypotheses, AMOS was used to conduct structural equation modeling (SEM). Based on the earlier validity analysis, PU, FC, PEU, ATT, JF, and AX were thought to be potential important determinants of the behavioral intention to use the ICT. Accord to the result, Perceived ease of use (PEU) (.366), Facilitating conditions (.013***) and Attitude toward using technology (ATT) (.000***) are correlated to the use of ICT. This means that when small business owners find the technology easy to use and have a positive attitude to it, they will use the technology. However, Perceived Usefulness, Job Fit, Facilitating Condition (cost) and Anxiety were not supported.

The findings from the correlation analysis of our research are different from the results of UTAUT empirical validation by Venkatesh et al. (2003). In Venkatesh et al. (2003)'s analysis, data were gathered from two organizations to validate UTAUT and to increase validity of the preliminary test on the model. It appeared that performance expectancy, effort expectancy, and social influence affect the behavioral intention, while facilitating conditions, attitude toward using technology, self-efficacy, and anxiety do not influence the behavioral intention. For our current research, Perceived usefulness (PU), Job-fit (JF), yields an insignificant effect on the adoption of ICT, whereas Perceived ease of use (PEU), Attitude toward using technology (ATT), Facilitating conditions (FC) Anxiety (AX) appear to be correlated with the adoption of ICT.

These are the factors that affect ICT adoption by small businesses in China. This is illustrated in figure 1.

Table 4: Regression Weights of the model

			<i>Estimate</i>	<i>S.E.</i>	<i>C.R.</i>	<i>P</i>
BI	<---	PU	-.021	.055	-.376	.707
BI	<---	JF	-.017	.059	-.282	.778
BI	<---	PEU	.052	.058	.904	.366
BI	<---	FC	.155	.063	2.474	.366
BI	<---	ATT	.430	.059	7.291	***
BI	<---	AX	.338	.062	5.479	***
APPP	<---	BI	1962.444	1088.954	1.802	.072
APPP	<---	TEE	63.324	5.506	11.500	***

*** is significant at the 0.001 level

Also, we identify Usage of ICT (BI) and Human Capital (TEE) will have positive effect to the Development of Small Business (APPP). We found strong support for our theoretical model, as H2 were supported with high significance based on data collected from N=118 small business owners. H1 below is only partially supported

H1: Perceived usefulness, Job-Fit, Perceived ease of use, Facilitating conditions, attitude toward using technology, and anxiety will make a positive impact on the usage of ICT.

At the fourth step of the research, we want to see how much impact the PU and FC and make to the development of small business. In order to achieve that, regression is applied to the research. The data is shown below.

ATT and PU can directly make impact to the development of small business. Both ATT and PU are significant to the APPP. The high standard error of this data set is due to the differences between the annual profit of small businesses in two areas, and that will not make effect to the result of the analysis. In the next step, we will analysis how the human capital can make effect to the development. We find out that both Usage of ICT and Human Capital can play a significant role towards the development of small business, which is measured by the annual profit of small business.

H2: Usage of ICT and Human Capital will make a positive impact on the Development of Small Business. The hypothesis is supported from our data.

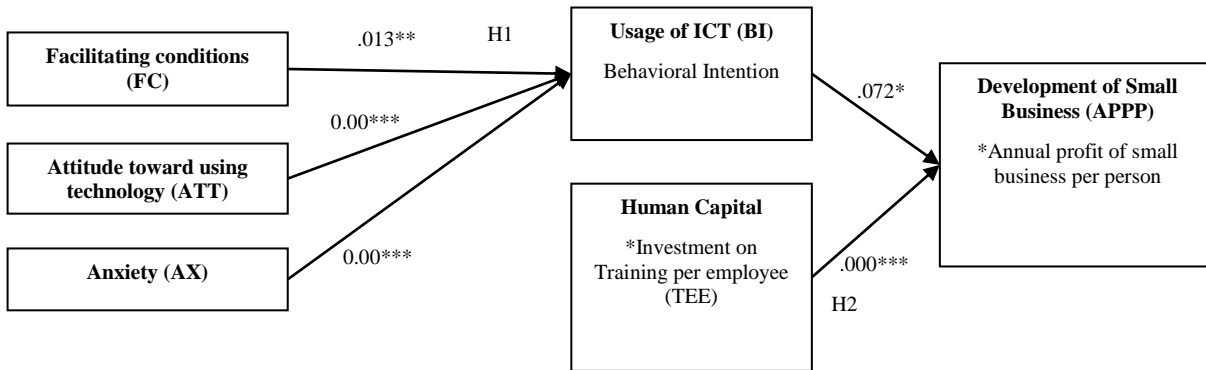


Figure 2: Revised Research Model

As shown in the revised research model, facilitating conditions (FC), attitude toward using technology (ATT), and anxiety (AX) are significant and will make a positive impact into the usage of ICT (BI). Also, the usage of ICT (BI) and human capital are significant and will make a positive effect towards the development of small business (APP). Discussion will be conducted based on the result of factor analysis and SEM.

DISCUSSION

This analysis suggests that the human capital and usage of ICT can have a significant impact on the development of small businesses in China. In China, even though the usage of ICT is limited due to culture, government and business environment accord to the paper by Xiong and Qureshi (2012), it is still important to consider usage as an important factor for the development of small business. In a paper by Wolcott, Kamal, & Qureshi (2008), it is pointed out that the lack of resource is still a challenge for the small business. In order to achieve the development of small businesses, IT therapy might be a solution (Qureshi et al., 2008).

Also, human capital and usage of ICT will both make a positive impact on the usage of development of small business. Human Capital and usage of ICT will have a strong impact on the development of small business. All the factors are significant according to the regression result conducted. Comparing to the usage of the ICT, the human capital will make more effect on

the development of small businesses. H2 is supported since both usage of ICT and Human Capital will make positive impact on the development of small businesses.

The findings from the correlation analysis of our research are different from the results of UTAUT empirical validation by Venkatesh et al. (2003). In Venkatesh et al. (2003)'s experiment, data was gathered from two large organizations to validate UTAUT and to increase validity of the preliminary test on the model. It appeared that performance expectancy, effort expectancy, and social influence affect the behavioral intention, while facilitating conditions, attitude toward using technology, self-efficacy, and anxiety do not influence the behavioral intention. For our current research, Perceived usefulness (PU), Job-fit (JF) Anxiety (AX), and Perceived ease of use (PEU) yields an insignificant effect on the usage of ICT, whereas, Facilitating conditions (FC), Attitude toward using technology (ATT), and Anxiety (AX) appear to be correlated with the usage of ICT.

We finish this part by answering the research question, **what factors affect the adoption of ICT by small businesses in China?** The development of small business is highly connected with the usage of ICT in China, as we can see the attitude towards the technology is the most important factor in affecting the usage of ICT. While the human capital, i.e., the training for the employees are more important comparing to the usage of ICT. While during the adoption process, only Facilitating conditions (FC), Attitude toward using technology (ATT), and Anxiety (AX) will play important role for the small businesses to adopt the ICT.

CONCLUSION, LIMITATION AND FUTURE RESEARCH

In this paper, we conduct a research model to study the ICT adoption in the human capital environment. We conducted a two-step quantitative research method in order to research the relationship between the usage of ICT, the human capital factor, and also the development of small businesses in China. First, in the assessment of validity, the existing factors in UTAUT models are retested by using the survey conducted to 118 different small businesses in two provinces in China, i.e. Sichuan and Zhejiang. Factors are reduced to Attitude toward using technology, Perceived Usefulness, Facilitating Condition, Anxiety, Perceived Ease of use, and Job-Fit, which is different from the existing model. While Attitude toward using technology can explain the 21.874% of the whole, these factors in total can explain 66.274% among all the factors.

Then, in the second step, we conducted the Assessment of Correlation to identify how the variables can be connected to each other. Facilitating conditions (FC), Attitude toward using technology (ATT), and Anxiety (AX) are identified to be significant to the usage of ICT. Furthermore, by testing the first hypothesis, Facilitating conditions (FC), Attitude toward using technology (ATT), and Anxiety (AX) also play an important role to the development of small businesses in China.

In order to test the second hypothesis, we conduct the Structural Equation Modeling (SEM) between usage of ICT and the human capital factor towards the development of small business. Our result suggests that both usage of ICT and the human capital can play an important role towards the development of small businesses. Comparing to usage of ICT, human capital will be a much more important factor for the sustainable development for small businesses in China.

Contribution

This paper makes a contribution to the IS adoption literature by investigating ICT adoption in a unique context: that of small businesses in China. In China, small businesses currently represent 99 percent of all businesses, and they generated 75 percent of all new jobs in the country (Small Business, 2011). However, the use of ICT is a challenge in both developed and developing countries (Wolcott et al., 2008; Schreiner & Woller, 2003). As the owners of the small businesses have unique features that are different from the large corporations, it is important to identify the opportunities and threats when they apply ICTs to their businesses.

The theoretical contribution of this research are: 1) that the key factors that affect ICT adoption by small businesses in China have been uncovered: Facilitating conditions (FC), Attitude toward using technology (ATT), and Anxiety (AX) are correlated with the adoption of ICT. 2) The outcomes of ICT adoption are measured in terms of the economic development of small businesses in terms of Annual Profit per Person. 3) The human capital construct measured in terms of the Annual Cost of Training and Education per Person, adds to theories of IT adoption. The analysis shows that the higher the investment in ICT, the greater the usage of ICT will lead to greater profit, hence development of small businesses in China. This addresses the gap in the literature requiring research between the relationship between ICT and the development of small businesses and adds to the literature on IT adoption.

This research also found that for Chinese small businesses, the human capital is very important when they adopt the technology to their businesses. Human capital began its own revolution began in the 1950s and early 1960s with the research of Schultz (1961), Mincer (1958), and Becker and Chiswick (1966). The current era is placing much greater emphasis than before on the importance of knowledge and information to the development of both countries and individuals (Becker, 2011). Human Capital plays an important role in either lowering economic costs or elevating customers' willingness to pay (Porter, 1985). The addition of the human capital factor into the model enables multiple regression to be applied to study how human capital can influence the development of small business as well as the adoption of ICT. These outcomes have not been studied in the IS literature at this time.

Limitations

The present research has a limitation that should be addressed. The original field studies of Venkatesh et al. (2003) to measure the UTAUT model were longitudinal observational designs across industries, while the experimental replication of the current findings did not employ the same research approach. The collected information of moderators used in the original model such as experience, gender, age, and voluntariness has not been accounted for in the current research model. Future studies to retest the UTAUT model with these moderators are encouraged because these factors may better predict the usage behavior indication.

Another limitation for our study is that when choosing factors, Attitude toward using technology with eigenvalue of 0.955 was chosen since it is very close to 1. The reason we select Job-Fit and Anxiety is because they will contribute the cumulative to also 90%, which could largely help improve the result. However, it is still debatable that we choose the factors with Eigenvalue less than 1. We will make change when submitting that for journal publication.

Future research

Although, the UTAUT model developed by Venkatesh et al. (2003) appears to have been acceptably robust across studies and user groups, the model should not be considered as the final instrument to determine the information technology usage. There are two possible ways for the future research; first, cross-country data can be compared between China and US to investigate

the relationship between the two Countries. Second, we will further develop the model and apply the model to different areas in two counties.

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REFERENCES

- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Prentice-Hall, Englewood Cliffs, NJ.
- Al-Natour, Sameh and Benbasat, Izak (2009) "The Adoption and Use of IT Artifacts: A New Interaction-Centric Model for the Study of User-Artifact Relationships," *Journal of the Association for Information Systems*: Vol. 10: Iss. 9, Article 2.
- Arnold, D.j. & Quelch, J.A. (1998). *New Strategies in Emerging Markets*. *Sloan Management Review*, 40(1): 7-20
- Baliamoune-Lutz, M. (2003) *An analysis of the determinants and effects of ICT diffusion in developing countries* *Information Technology for Development* 10 (2003) 151-169
- Bandura, A. (1986) *Social Foundations of Thought and Action: A Social Cognitive Theory*, Prentice Hall, Englewood Cliffs, NJ, 1986.
- Beaudry, A and Pinsonneault, A. (2010) Alain The other side of acceptance: studying the direct and indirect effects of emotions on information technology use. *MIS Quarterly* Volume 34 Issue 4, December 2010 Pages 689-710
- Becker, G.S. and Chiswick, B.R. (1966) *Education and the Distribution of Earnings*. *American Economic Review*, 56: 358-69
- Boyer-Wright, K.M. & Kottemann, J.E., *High-Level Factors Affecting Global Availability of Online Government Services*, *hicss*, pp.199, *Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS 2008)*, 2008
- Brcker, G.S. (2011) *Foreword*. *The Oxford Handbook of Human Capital*. Oxford University Press.
- Carless, S. A. (2005) *Person–job fit versus person–organization fit as predictors of organizational attraction and job acceptance intentions: A longitudinal study* *Journal of Occupational and Organizational Psychology* (2005), 78, 411–429
- Cattell, R. B. (1966). *The scree test for the number of factors*. *Multivariate Behavioral Research*, 1, 245-276.
- Chang, H., Chi, N., and Chuang, A. (2010) *Exploring the Moderating Roles of Perceived Person–Job Fit and Person–Organisation Fit on the Relationship between Training Investment and Knowledge Workers’ Turnover Intentions*. *APPLIED PSYCHOLOGY*:

- AN INTERNATIONAL REVIEW, 2010, 59 (4), 566–593 doi: 10.1111/j.1464-0597.2009.00412.x
- Chay, Y.W. (1993) Social support, individual differences and well-being: A study of small business entrepreneurs and employees *Journal of Occupational & Organizational Psychology* Date: December 1, 1993
- Ceridian UK Ltd. (2007) Human Capital White Paper Retrieved on September 17, 2012 via http://www.ceridian.co.uk/hr/downloads/HumanCapitalWhitePaper_2007_01_26.pdf
- CHI Research. (2003) Retrieved 2011-11-13 from <http://www.sba.gov/advo/research/rs225.pdf>
- Coleman, J.S. (1988) Social Capital in the Creation of Human Capital *American Journal of Sociology*, Vol. 94, Supplement: Organizations and Institutions: Sociological and Economic Approaches to the Analysis of Social Structure (1988), pp. S95-S120
- Compeau, D. R., and Higgins, C.A. (1995) Application of Social Cognitive theory to training for computer skills, *Information System Research* (6:2), 1995, pp. 118-143
- Cronbach L. J. and Meehl P.E. , (1955) Construct validity in psychological tests. *Psychological Bulletin* 52, 281-302.
- Dai, H. and Palvia, P.C. (2009) Mobile commerce adoption in China and the United States: a cross-cultural study. *SIGMIS Database* 40, 4 (October 2009), 43-61. DOI=10.1145/1644953.1644958 <http://doi.acm.org/10.1145/1644953.1644958>
- Davis, F. D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly* 13(3): 319–340
- Davis, F. D., Bagozzi, R.P., and Warshaw, P.R. (1989)“User Acceptance of Computer Technology: A Comparison of Two Theoretical Models”, *Management Science* (35:8), 1989, pp. 982-1002
- Deutsch, M. and Gerard, H.B.(1995) A study of normative and informational social influences upon individual judgment *Journal of Abnormal and Social Psychology*, 51 (1995), pp. 624–636
- Duncombe, R. and Heeks, R. (2002) Enterprise Across The Digital Divide: Information Systems and Rural Microenterprise in Botswana *Journal of International Development* Volume 14, Issue 1
- Factor Analysis (2012) Retrieved from <http://www.qualtrics.com/university/researchsuite/factoranalysisold>
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley, Reading, MA,
- Ginzberg, M.J. (1981) Key Recurrent Issues in the MIS Implementation Process, *MIS Quarterly*, 5 (1981): 47-59
- Golub, Gene F.; van der Vorst, Henk A. (2000), "Eigenvalue computation in the 20th century", *Journal of Computational and Applied Mathematics* 123: 35–65, doi:10.1016/S0377-0427(00)00413-1.
- Granovetter, M. (1992). The sociological and economic approaches to labor market analysis: a social structural view. *The sociology of economic life*, 233-63.
- Greig, A., Hulme, D., Turner, M. (2007). *Challenging global inequality: Development theory and practice in the 21st century*. Palgrave Macmillan, New York, NY, USA.
- Ha , S. and Stoel, L (2009) Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of Business Research* Volume 62, Issue 5, May 2009, Pages 565–571

- Hair, J. F. J. , Black, W.C., Babin, B.J., and Anderson, R. E. (2010) *Multivariate Data Analysis Seventh Edition* Prentice Hall
- Hanna, N. K., & Qiang, C. Z. W. (2010). China's Emerging Informatization Strategy. *Journal of the Knowledge Economy*, 1(2), 128-164.
- Habermas, J and Ben-Habib, S (1981) *Modernity versus Postmodernity New German Critique*, No. 22, Special Issue on Modernism (Winter, 1981), pp. 3-14
- Hatcher, L. & Stepanski, E. (1994). *A step-by-step approach to using the SAS system for univariate and multivariate statistics*. Cary, NC: SAS Institute Inc.
- Hsu, C. and Lin, J.C. (2008) Acceptance of blog usage: The roles of technology acceptance, social influence and knowledge sharing motivation *Information & Management Volume 45, Issue 1, January 2008, Pages 65–74* <http://dx.doi.org/10.1016/j.im.2007.11.001>
- Im, I, Hong, S. and Kang, M.S. (2011) An international comparison of technology adoption: Testing the UTAUT model *Information & Management Volume 48, Issue 1, January 2011, Pages 1–8* <http://dx.doi.org/10.1016/j.im.2010.09.001>
- Kamal, M. and S. Qureshi, (2009). "Sustaining the Growth of Micro-enterprises that Adopt Information and Communication Technologies" *Proceedings of the Second Annual Workshop on Global Development*. Phoenix December. <http://www.globdev.org/?q=node/71>
- Kobe, K.(2007). *The Small Business Share of GDP, 1998-2004*. Advocacy-funded research. Retrieved 2011-11-13 from <http://web.sba.gov/faqs/faqindex.cfm?areaID=24>
- Kristof, A. L. (1996). Person-organization fit: an integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology*, 49, 1–49.
- Li, L. (2003). Determinants of Export Channel Intensity in Emerging Markets: The British Experience in China. *Asia Pacific Journal of Management*, 20:4.
- Malecki, E. J. (1997) *Technology and Economic Development: The Dynamics of Local, Regional and National Competitiveness 2nd edition*. London and Boston: Addison Wesley Longman, 1997.
- Mincer, J. (1958) Investment in Human Capital and Personal Income Distribution, *Journal of Political Economy*, 66 (Aug.): 281-302
- Ngwenyama O. and Morawczynski, O. (2009) Factors affecting ICT expansion in emerging economies: An analysis of ICT infrastructure expansion in five Latin American countries *Information Technology for Development Volume 15, Issue 4, pages 237–258, Autumn (Fall) 2009*
- OH, K-Y., CRUICKSHANK, D. and ANDERSON, A. R., 2009. The adoption of e-trade innovations by Korean small and medium sized firms. *Technovation*, 29 (2), pp. 110-121
- O'Reilly, C.A., Jennifer Chatman and David F. Caldwell *People and Organizational Culture: A Profile Comparison Approach to Assessing Person-Organization Fit* *The Academy of Management Journal* Vol. 34, No. 3 (Sep., 1991), pp. 487-516
- Porter, M.E. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance* New York: Free Press.
- Qiang, C., Pitt, A., & S. Ayers. (2003). *Contribution of Information and Communication Technologies to Growth*. (World Bank Working Paper No. 24). World Bank. <http://Inweb18.worldbank.org/ict/projects.nsf/WSISPublication>
- Qureshi, S. and A. York (2009), *IT Adoption by Small Businesses in Underserved Communities*. 41th Annual Hawaii International Conference on System Sciences (HICSS'08), 2008.

- Qureshi, S. , Kamal, M. and Wolcott, P. (2008) Sustainability of Information Technology Therapy on Micro-enterprise Development. Hawaii International Conference on System Sciences, Proceedings of the 41st Annual
- Qureshi, S., Keen, P. and M. Kamal, (2009). “Business Models for Development: The Global Capability Sourcing Model.” In S. Kamel eds “E-Strategies for Technological Diffusion and Adoption: National ICT Approaches for Socioeconomic Development”, IGI
- Raymond, L. (1985). Organizational characteristics and MIS success in the context of small business. *Mis Quarterly*, 37-52.
- Riemenschneider, C., Harrison, D. and Mykytyn, P. (2003), “Understanding IT adoption decisions in small business: integrating current theories”, *Information & Management*, Vol. 40, pp. 269-85
- Roztocki, N. & Weistroffer, H.R. (2011). Information Technology Success Factors and Models in Developing and Emerging Economies. *Information Technology for Development*, 17, 163-167.
- Sachs, W. 1999. *Planet dialectics: Explorations in environment & development*. Zed Books, London, UK.
- Sadowski, B.M., Maitland, C., and van Dongen, J. (2002) "Strategic use of the Internet by small- and medium-sized companies: an exploratory study," *Information Economics & Policy* (14) 2002, p 75.
- Samoilenko, S. (2008). Contributing factors to information technology investment utilization in transition economies: An empirical investigation. *Information Technology for Development*, 14(1), 52-75.
- Samoilenko, S. & Weistroffer, H. R., (2010). Improving the relative efficiency of revenue generation from ICT in transition economies: a product life cycle approach. *Information Technology for Development*, 16(4), 279-303.
- Schreiner, M. and Woller, G. (2003), “Micro-enterprise development programs in the United States and in the developing world”, *World Development*, Vol. 31 No. 9, pp. 1567-80.
- Schultz, T.W.(1960). Capital Formation by Education. *Journal of Political Economy*, 68(6): 571-83
- Schumacher, E. F. (1989) *Small Is Beautiful: Economics as if People Mattered* NY: Harper Perennial 2nd edition
- Schumpeter, J.A. (1932) *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle* NJ:Transaction Publishers
- Schwarzer, R., Bäcker, J. , Kwiatek, P. Schröder, K. , and Zhang, J.X. (1997) The Assessment of Optimistic Self-beliefs: Comparison of the German, Spanish, and Chinese Versions of the General Self-efficacy Scale *Applied Psychology* Volume 46, Issue 1, pages 69–88, January 1997DOI: 10.1111/j.1464-0597.1997.tb01096.x
- Sen, A.K. (1999) *Development as Freedom* Anchor; Reprint edition
- Smallbusiness (2013). Retrieved on 2013.01.06 via <http://baike.baidu.com/view/58855.htm>
- Smith, L.I., (2002) A tutorial on Principal Components Analysis http://www.cs.otago.ac.nz/cosc453/student_tutorials/principal_components.pdf
- Street, C. T., & Meister, D. B. (2004). SMALL BUSINESS GROWTH AND INTERNAL TRANSPARENCY: THE ROLE OF INFORMATION SYSTEMS. *MIS Quarterly*, 28(3), 473-506.
- Summary (2011) Summary of Size Standards by Industry (2011) <http://www.sba.gov/content/summary-size-standards-industry>

- Summer, A. & Tribe, M.A (2008) *International development studies : theories and methods in research and practice* London ; Thousand Oaks, Calif. : Sage, 2008.
- The Economist (2009) China's struggling smaller firms Small fish in a big pond <http://www.economist.com/node/14409584>
- Thompson, R.L., Higgins, C.A., and Howell, J.M. (1991) Personal Computing: Toward a Conceptual Model of Utilization, *MIS Quarterly* (15:1), 1991, pp. 124-143
- Tripsas (1997) Unraveling the Process of Creative Destruction: Complementary Assets and Incumbent Survival in the Typesetter Industry. *Strategic Management Journal*, Vol. 18 (Summer Special Issue), 119–142 (1997)
- United Nations, (2010) *The Millennium Development Goals Report*;New York.Retrieved on 2011.11.06 via <http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf>
- USSBA, (2011) *United States Small Business Administration Advocacy Small Business Statistics and Research*. Retrieved 2011-11-14 from <http://web.sba.gov/faqs/faqindex.cfm?areaID=24>
- Venkatesh, V. and Davis, F. D. (2000), "A theoretical extension of the technology acceptance model: Four longitudinal field studies", *Management Science* 46(2): 186–204
- Venkatesh, V. (2000), "Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model", *Information systems research*, 11, pp. 342–365
- Venkatesh, V. , Brown, S. A. , Maruping, L.M. , and Bala, H. (2008) Predicting different conceptualizations of system use: the competing roles of behavioral intention, facilitating conditions, and behavioral expectation, *MIS Quarterly* Volume 32 Issue 3, September 2008 Pages 483-502
- Walsham, G., and Sahay, S. (2010) Research on information systems in developing countries: Current landscape and future prospects. *Information Technology for Development*, 12:1, 7-24
- Wang H.W. and Wang, S.H. (2010) "User acceptance of mobile Internet based on the Unified Theory of Acceptance and Use of Technology: Investigating the determinants and gender differences," *Social Behavior & Personality: An International Journal*, vol. 38, no. 3, pp. 415–426, 2010
- Warschauer, M. (2004) *Technology and Social Inclusion: Rethinking the Digital Divide* 272 pages. The MIT Press, Cambridge.
- Willis, K. (2005) *Theories and Practices of Development*. London: Routledge.
- Wolcott,P., Kamal, M, Qureshi, S. (2008) Meeting the challenges of ICT adoption by micro-enterprises *Journal of Enterprise Information Management* 21. 6(2008): 616-632.
- Xiong, J. and Qureshi. S. (2012) Analysis of Information and Communications Technology Adoption between Small Businesses in China and the United States *Proceedings of the Eighteenth Americas Conference on Information Systems*, Seattle, Washington, August 9-12, 2012.
- Xiong, J. and Qureshi. S. (2013) A Model of ICTs Adoption for Sustainable Development: An Investigation of Small Business in the United States and China *46th Hawaii International Conference on System Sciences (HICSS 2013)*

- Xu, S., Zhu, K., Gibbs, J.,(2004) Global Technology, Local Adoption: A Cross- Country Investigation of Internet Adoption by Companies in the United States and China Electronic Markets Volume 14, Number 1, 2004
- Yu, J., Wang, Y., Wang Y., Song, L., (2011) The research on the China's small business development strategy. Management World. 2011 V.2
- Zhou T. , Lu, Y. and Wang, B. (2010) Integrating TTF and UTAUT to explain mobile banking user adoption Computers in Human Behavior Volume 26, Issue 4, July 2010, Pages 760–767

APPENDIX INSTRUMENT

Variable	Definition	Items
Perceived Usefulness (PU)(Davis 1989 and Davis et al 1989)	The degree to which a person believes that using a particular system would enhance his or her job performance	PU-1. Using ICT in my job would enable me to accomplish tasks more quickly. PU-2.Using ICT would improve my job performance. PU-3. Using ICT would enhance my effectiveness on the job. PU-4. Using ICT would make it easier to do my job. PU-5. I would find ICT useful in my job.
Perceived Ease of Use (PEU) (Davis 1989 and Davis et al 1989)	The degree to which a person believes that using a system would be free of effort.	PEU-1.Learning to operate Information Communication Technology would be easy for me. PEU-2.I would find it easy to get the Information Communication Technology to do what I want it to do. PEU-3.My interaction with Information Communication Technology would be clear and understandable. PEU-4. I would find Information Communication Technology to be flexible to interact with. PEU-5. It would be easy for me to become skillful at using Information Communication Technology. PEU-6. I would find Information Communication Technology easy to use.
Job-Fit (Thompson et al. 1991)	How the capabilities of a system enhance an individual's job performance	JF-1 I would find the Information Communication and Technology useful in my job. JF-2 Using the Information Communication and Technology enables me to accomplish tasks more quickly. JF-3 Using the Information Communication and Technology increases my productivity. JF-4 If I use the Information Communication and Technology, I will increase my chances of getting a promotion.
Social Influence (SI) (Ajzen 1991; Davis et al, 1989)	The Person's perception that most people who are important to him think he should or should not perform the behavior in question (Ajzen, 1991; Fishbein and Ajzen 1975).	SI-1. People who influence my behavior think that I should use e-Commerce and Information SI-1.People who influence my behavior think that I should use Information Communication and Technology. SI-2.People who are important to me think that I should use Information Communication and Technology. SI-3.In general, the organization has supported the use of the system.
Facilitating Conditions (FC) (Thompson et al. 1991)	Objective factors in the environment that observers agree make an at easy to do, including the provision of computer support (Thompson et al. 1991).	FC-1. I have the resources necessary to use Information Communication and Technology. FC-2. I have the knowledge necessary to use Information Communication and Technology. FC-3.The Information Communication and Technology I use are not compatible with other technologies I use. FC-4.A specific person is available for assistance with technical difficulties.
Attitude toward using technology (ATT)	Attitude toward using technology is referred as "An individual's positive or negative feelings about performing and using technology" (Davis Bagozzi, & Warshaw, 1989; Fishbein & Ajzen 1975).	ATT-1 Using Information Communication and Technology is a good idea. ATT-2 The Information Communication and Technology makes work more interesting. ATT-3 Working with Information Communication and Technology are fun. ATT-4 I like working with Information Communication and Technology.
Self-Efficacy	Self-Efficacy in this research is referred as "Judgment of one's ability to use a technology, e.g.,	SE-1I could complete a job/task using the technologies... SE-2 If there was no one around to tell me what to do as I go. SE-3 If I could call someone for help if I got stuck.

	computer, telephone, to accomplish a particular job or task” (Bandura, 1986; Compeau and Higgins, 1995).	SE-4If I had just the built-in help facility for assistance.
Anxiety	Anxiety in our research is referred as “Evoking anxious or emotional reactions when it comes to performing using the ICT” (Bandura, 1986 and Compeau and Higgins, 1995).	AX-1 I feel apprehensive about using the technologies. AX-2 It scares me to think that I could lose a lot of information using the system by hitting the wrong key. AX-3 I hesitate to use the system for fear of making mistakes I cannot correct.
Human Capital	Changes in persons that bring about skills and capabilities that make them able to act in new ways (Coleman, 1988). Also, human capital can be described as all the competencies and commitment of the people within an organization (Ceridian UK Ltd., 2007) .	Open Question 1: Average Spent on Training and Education Per Employee
Development of Small business	Diversity of approaches to sustainable development; some are very market-led and involve pricing nature, while others involve putting environmental protection at the heart of policy	Open question 2: Average Profit Per Employee