# Information and Communication Technology (ICT) Adoption and Its Impact on Entrepreneurial Outcome in Rural China


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**Abstract:** *This study examines the compatibility of Information and Communication Technology adoption model in rural China including the impact of ICT adoption on entrepreneurial outcome. Sample size for this study composed of 350 observations and 19 Likert items. Impact of benefit of ICT and government initiation on technology adoption process is examined both directly as well as indirectly via mediating variables using structural equation modeling. Study uses exploratory factor analysis, confirmatory factor analysis, and structural equation modeling to reach the conclusion. Study reveals significant impact of benefit of ICT on technology adoption process whereas impact of government initiation on technology adoption process is insignificant. There is strong and positive association between technology and entrepreneurial outcome in China. Adoption of Information and Communication Technology in China highly depends on expected benefit of technology rather than on government initiatives to promote ICT.*



***Keywords:*** *Information and communication technology, structural equation, smart village, digital divide*

## Introduction

Since last few decades, digital tools have become inseparable part of business. Level of development of digital tools determines the economic performance and innovation capability of all nations. Rapid and continuous change in digital tools and technologies with new features not only transforming the competitive business environment but also imposing entrepreneurs to change their plan, procedure, strategies, and structure of the business. Digital tools like new mobile technologies, big data analytics, and social media are giving rise to new way of utilization of land, labor and capital and it also changes the way of involvement of entrepreneurs in the financing, investing, and operating activities of the business.

Before investigating the role or impact of digital tools on entrepreneurial outcome we must understand the term "digital entrepreneurs". Digital entrepreneurs are those entrepreneurs who hunt, discover, and use new business opportunities provided by new media and internet technologies and operates their business activities using digital tools rather than in traditional design. Digital entrepreneurs generally use Information and Communication Technology (ICT) to communicate with their partners and customers. Hence, this research will investigate the role that these digital tools have been playing to influence the entrepreneurial outcome in rural China.

Besides China, there is still wide gap between the groups of entrepreneurs in highly developed European nations. State of physical and digital ecosystem in Luxembourg, Denmark, Finland, Sweden, and Germany is far away better than that of another group of European countries such as France, Spain, Belgium, and Austria. As per the European Index of Digital Entrepreneur System (EIDES), former group has average index rate of 69 whereas later group has only average index rate of 52.2. From this index we can easily conclude that not only within the single nation but also among the nations within the common economic zone has digitally divided entrepreneurs. On the one hand only 20% people of the least developed countries has accessed to internet as compared to 80% people's access to internet in developed nation but on the other hand China and United States jointly occupies 75% of all patents related to block chain technologies, half of total global spending on Internet of Things (IoT), more than 75% of total cloud computing market and 90% of the market capitalization value of the world's 70 largest digital platforms. It is said that the current extension of fifth generation wireless technology in low demanded rural area of China will further increase the urban-rural digital gap. Now the second question is that do these digital tools have positive control on rural entrepreneurial outcome in such country (China) where the impact of data driven economy is uneven? Government in many nations has been conducting many projects and disseminating information about the benefits of adopting digital tools in business. Hence, this study examines the technology adoption process and impact of adopted technology on entrepreneurial outcome of rural China using Structural Equation Model (SEM). This broad and flexible multivariate analysis moves through factor and regression analysis and demonstrates interaction and interrelationship among the internal factors of technological attitudes and recommends the area of improvements through which we can enhance technology adoption process and also understand the magnitude and direction of impact of digital tools on entrepreneurial outcome in rural China.

## Literature Review and Hypotheses Construct

Researchers have already talked about the digitally divided society and concentration of digital tools within the two large economies (China and USA) of the world. Now, in this section researchers are going to review the role and benefit of the digital tools, government initiations to transform traditional society into digitized society, how rural entrepreneurs in China adapted to digital technology, and impact of technology adoption on entrepreneurial outcome. This study moves through two parts. Firstly, it analyses the ICT adoption process of rural Chinese

entrepreneurs and secondly, it explores the impact of technology adoption on entrepreneurial outcome or success. Conceptual model of this study is jointly based on Cognitive Learning Theory of Edward Tolman and Jean Piaget's theory of Cognitive Development. In fact, learning is the result of influence of behavioral, extrinsic, and intrinsic factors on human beings. According to Tolman (1886-1959) and Seel (2012), human learning process based on thought, feelings, beliefs, and attitudes rather than on single factor stimuli. He also explained that human being applies cognitive map or image formed in his/her mind from the influence of external environment to conduct particular events. Likewise, Jean Piaget's theory of Cognitive Development deals with nature of knowledge and according to him learning is the result of reorganization of information acquired from the environmental experiences and biological maturation(Piaget, 1964). His theory deals with those human processes allied with acquisition, construction, and usage of knowledge. In this study, the positive or negative evaluation of entrepreneurs towards the introduction of new kinds of technology in any environment will be measured through technological attitude. In addition, sensation and stimulus are two major psychological factors which jointly determine the technological attitude of the entrepreneurs. Likewise, stimulus cause entrepreneurs to respond by initiating, guiding, changing existing schemas and maintaining technology-oriented behaviors which finally result in adoption of new technology. Finally, technology adoption will be measured through entrepreneurial success criteria. Conceptual model of this study can be presented as under:

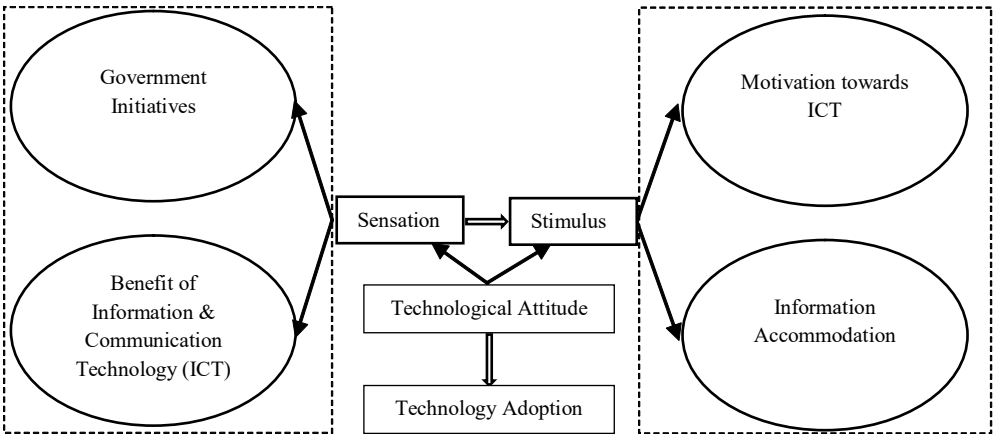


**Figure 1: Conceptual model of the study**

***Benefit of ICT and Technology Adoption***

Digital tools not only impact economic growth but also promote employment opportunities in the developing nations(de Mel et al., 2008).Quality digital infrastructure are very essential to build better relationship between local and global communities(Ashmore et al., 2017). It is expected that digitization of rural business will add additional $140 billion to US economy including creation of additional 360,000 full-time jobs in rural communities over the next three years(U.S. Chamber of Commerce, 2019). All sorts of digital tools and online services are very beneficial for small rural businesses to increase profitability and productivity. A survey conducted in rural Bay Saint Louis, Mississippi shows that nearly around 40 per cent small rural business owner are able to transact their business outside their home states and 16 per cent are able to sell their product internationally only due to help of digital tools(U.S. Chamber of Commerce, 2019).

In Europe, the term "Smart Village" is very popular term used to represent digital villages. Many

organizations, such as, NORTH-WESTERN KUHMO VILLAGE Optic Cooperation (Finland), LA WAB Digital Training Hub (France), Digital Villages (Germany), Superfast Cornwall Digital Hubs (UK), Tubbercurry Smart Community (Ireland), Zwit Smart Management Network (Spain), and many others all over the Europe working continuously to transform their traditional villages to smart villages (digitized villages) so that, they can enable them to contribute their national economy (European Network for Rural Development, 2019). Development of digital economy in developing nation can play vital role in poverty alleviation by minimizing information asymmetries between rural and urban workers (World Bank Group, n.d.).

Now Alibaba, Google, and Microsoft all are searching opportunities in Africa and two projects namely the Africa Netpreneur Prize and the Alibaba eFounders under Jack Ma Foundation are going to invest US$ 10 million to identify and provide 100 African entrepreneurs with training and mentorship within next 10 years (Costa, 2020). Google has opened Artificial Intelligence Lab (AI Lab) in Ghana with the objective of solving problems accompanying with education, health, agriculture, traditional entrepreneurship through development of new digital tools (Adeoye, 2019). Similarly, Microsoft has opened Africa Development Center (ADC) in Nigeria and Kenya to improve digital capacity, innovation and inter connectivity (Microsoft News Center, 2019).

As per the jointly issued guidelines by Communist party of China Central Committee and the State Council, to boost up rural economy, they are going to transform all traditional villages to digital villages by the end of 2020; fully minimize rural-urban digital gap by injecting high speed internet facilities, developing e-commerce and digital technologies by 2025; and digitized their rural agricultural sector by 2035 (Xinhua, 2019). Joint research conducted by World Bank & Alibaba Group shows that online retail sales in rural China has increased from RMB 180 billion to 1.24 trillion in between 2014 and 2017 and it represents compound annual growth rate of 91 per cent as compared to 35 per cent annual national growth (Luo, 2019). Same research also revealed that there was sharp rise in e-commerce trade volume of China from US$ 120.8 billion in 2004 to US$ 4.44 trillion in 2017 including around 15 times increment in number of Alibaba Taobao Villages in between 2014 and 2018, that is, 212 Taobao Villages to 3,202 Taobao Villages respectively. Contribution of cross border e-commerce to total export-import volume in China is expected to reach to 37.6% by the end of 2020 which was only 19.5 per cent in year 2015 (Ouyang et al., 2017). Mobile payment is very popular between both consumers and producers in China and it is considered as one of the most effective tools that expands the scope of financial services by reducing the cost of financial transactions (Xie et al., 2016). Mobile payment and entrepreneurship are attached components of business (Yin et al., 2019). Internet supports entrepreneurs to grab business opportunities and strongly demonstrates the existence of business through the exchange of information.

Digitalization drives innovation, creates new opportunities, increase productivity through innovation and firm-level efficiencies, and strengthen social and economic inclusion (European Commission, 2021). Digital tools provides easy access to market research, business network and data (Hair et al., 2012; Kollmann, 2006; Shoham et al., 2006; Jackson, 2019); reduces operating expenses (Hair et al., 2012; Jackson, 2019;Kollmann, 2006; Fairlie, 2006; Nambisan, 2017; Sussan & Acs, 2017; Hull et al., 2007) such as selling and distribution & general and administrative; improves relationship with customer (Hair et al., 2012; Nambisan, 2017; Fischer & Rebecca, 2014); upgrade available sales channel (Hair et al., 2012; Chandra & Coviello, 2010); creates new mechanism and medium for sales (Mahadevan, 2000); supports in transformation of existing platform and development of new platform (Nambisan, 2017; Chandra & Coviello, 2010; Mahadevan, 2000; Giones & Brem, 2017); impart strong basis to locate, contact, and expand reputation with

investors (Shoham et al., 2006; Chandra & Coviello, 2010); and improves production and reduces cost (economies of scale) (Nambisan, 2017; Sussan & Acs, 2017; Giones & Brem, 2017).

According to the theory of "diffusion of innovation" adoption of new technology depends on the time length of communication of innovations with the member of social system (Rogers, 1995). Diffusion of innovation influences beliefs and attitude of people and finally enable them to adopt technology (Räisänen &Tuovinen, 2020). Adoption of technology depends on its ability to improve quality, efficiency, and effectiveness of task (Goodhue & Thompson, 1995). Features and capability (in this study it is represented as benefit of ICT) of digital tools work as stimulus and it motivates people to respond towards the use of technology (Lai, 2016) which finally result in accommodation of technology, that is, mentally preparing for the use of technology.

On the ground of real situation, benefits of technology, and theory related to adoption of technology following hypotheses are constructed for this study:

**Hypotheses**

**Hypothesis 1 (H1).** *Benefits of ICT and technology adoption have a positive correlation.*

**Hypothesis 2 (H2).** *Motivation towards ICT is a mediator between benefit of ICT and information accommodation.*

***Government Initiations and Technology Adoption***

Many researchers have identified that lack of access to digital tools, unknown about usefulness of digital application in business, lack of digital skill and literacy are major factors influencing digital entrepreneurs(Costa, 2020; European Commission, 2021;Lekhanya, 2018; Satalkina& Steiner, 2020). Mobile connectivity, education and training, availability of high-speed internet, innovation incentives, and availability of digital talent are the major requirement for faster growth of entrepreneurship (U.S.Chamber of Commerce, 2019a, 2019b). In year 2017, percentage of workforce lacking basic digital skill in European Union is nearly around 37 per cent (European Commission, 2017). Level of education and skill in rural people are not enough to adopt digital technology (Salemink et al., 2017). Development of ICT in rural areas can minimize the digital divide only when rural people possess digital competence (Malecki, 2003). Digital skill and knowledge determine the capacity and capability of rural entrepreneurs to grab new technology (Alam et al., 2018). Only developing digital connectivity in rural areas does not support rural community and entrepreneurs to flourish in absence of proper skill and knowledge related to digital innovation (European Commission, 2017). Another sector that government policy should focus on is cost of usage of digital technology. Fast internet facilities implemented in rural areas are not accessible for rural people if the cost of usage is expensive and this will further accelerate the digital divide (Salemink et al., 2017; Townsend et al., 2013). Service provider and government (policy maker) should understand the exact digital requirement of rural people to make the technology more effective (Velaga et al., 2012). Offering web portals and online suggestions without considering human, economic and technological factors do not work if the area is rural (Räisänen &Tuovinen, 2020). Lack of ICT know-how and poor technological infrastructure are still supply-side (government side) issues whereas lack of proper information about the benefit of ICT and unable to feel the need of technology are demand-side issues in many nations (Galloway & Mochrie, 2005). Even though digital entrepreneurship in China is growing at fast pace, Chinese government is suffering from demand-side issues and still encouraging people to participate in innovation and entrepreneurship (Yin et al., 2019). Urban-rural digital divide in China is wide and this gap is constant since long (Statistics: China Internet Users, 2019). From the above literature, we can imagine that the government should have better policy to address connectivity gap, digital application gap, skill gap, awareness gap, and demand creation. On the ground of these

literature, we assume that government can provide solution to these issues by disseminating information about the ICT, bridging digital divide, providing technology-based training and skill, and reducing cost of ICT usage. These initiations of government act as driving forces which stimulate entrepreneurs to adopt digital technology. These activities fulfill the interest of entrepreneurs, increase the digital competence, and make them understand the usefulness of digital tools which finally motivate them to adopt digital technology or sometimes this information accommodated in their mind adapt them in the digital environment. On the basis of these information we have proposed the following hypotheses for this study:

**Hypothesis 3 (H3).** *Government initiations and motivation towards ICT have positive correlation.*

**Hypothesis 4 (H4).** *Government initiations and technology adoption have positive correlation.*

***Motivation towards ICT and Technology Adoption***

Motivation is a psychological force that empowers people to take desired action (Carver & Scheier, 1998; Festinger, 1962; Fishbein & Ajzen, 1974; Hull, 1932; Gollwitzer & Bargh, 1999; Lewin, 1935; Miller et al., 1960; Mischel et al.,1989). Direct measurement of motivation is not possible; therefore, measurement of motivation is based on cognitive, behavioral, affective, and psychological responses of the individuals. Our assumption in this study is that rate of technology adoption depends on entrepreneurs' motivation towards ICT. Features and capability of technology, usefulness, and easiness to use are major factors motivating people to adopt new technology (Lai, 2016). Technology adoption behavior of the people is influenced by his/her attitude perceived from usefulness and easiness of technology usage (Davis, 1986) it means that positive and negative feeling about technology determines the motivation level of people towards technology adoption. According to the Theory of Reasonable Action, behavioral intention to adopt technology depends on attitude (behavioral beliefs & outcome evaluation) and subjective norms (normative beliefs and motivation to comply) (Fishbein & Ajzen, 1975). Hence, if entrepreneurs understand the benefit of ICT and government solve the issues such as technology gap, skill gap, application gap etc. then that will motivate entrepreneurs to adopt technology and sometime strong motivation cause even very traditional entrepreneurs to accommodate this information which later on support them in technology adoption. These theories and information clearly explain that motivation and information accommodation are major factors in the process of technology adoption. Generally, level of motivation can be measured through individual's degree of perceived choice, felt tension and pressure, enjoyment and interest, achieved competence, value and usefulness(Ryan, 1982; Ryan et al., 1991). Thus, following hypotheses is planned for this study:

**Hypothesis 5 (H5).** *Motivation towards ICT and information accommodation have a positive correlation.*

***Information Accommodation and Technology Adoption***

It is extremely necessary to adopt new ideas and information in our mind before adopting new technology. It is very essential to accommodate available information and ideas to bring change or to adopt new technology. It is a part of adaptation process that involves alteration and modification of existing schemas on the ground of new information and experiences and it is related with acquisition, construction and usage of knowledge (Seel,2012; Tolman, 1886–1959). As accommodation of new knowledge has impact on technology adoption, another proposed hypothesisfor this study is:

**Hypothesis 6 (H6).** *Information accommodation and technology adoption have a positive correlation*

***Technology Adoption and Entrepreneurial Outcome***

One of the major aspects of this research is to measure impact of digital tools on entrepreneurial outcome, hence, we must understand what exactly entrepreneurial outcome is. In fact, entrepreneurial outcome can be seen both from economic or financial aspect as well as from psychological or entrepreneurs' level of satisfaction. Entrepreneurial success or outcome is generally associated with market expansion, economic growth or financial yield innovation, productivity and number of employees, sales expansion and improvement in nation's welfare. Indeed, economic or financial approach to measure entrepreneurial outcome is based on indicators or organizational performance such as return on investment, company survival, employee growth, profit, market share, and sales growth. Some variables used in economic approach do not measure the outcome of entrepreneurs. For instance, as per research 40 percent entrepreneurs do not consider company growth as entrepreneurial outcome. This verifies the insufficiency of economic approach to measure entrepreneurial outcome. Hence, the combination of economic and psychological approach can be the best way to measure the entrepreneurial outcome. In psychological approach we have to measure intangible factors such as entrepreneurs' personal goals, desire, and reason for involvement in the business. In psychological approach entrepreneurs evaluate themselves; therefore, in this approach entrepreneurs decide the level of his/her own success. In this approach, generally, entrepreneurs evaluate themselves on the ground of achievement of valued goals, work-life balance, level of satisfaction with the business performance, personal satisfaction (Fisher et al., 2014) and the likes. Besides profit generation and expansion entrepreneurs want to have personal initiatives, self-directed work, independence, high achievement and autonomy, work enjoyment, social recognition, relationship with customer and employees, continuity of firm through positive contribution to society (Gorgievski, 2011). Hence, we have constructed our structural equation model in such way that we measure the impact of technology adoption on these entrepreneurial outcomes. Section of model that measures the impact of technology adoption on entrepreneurial outcome can be presented as under:

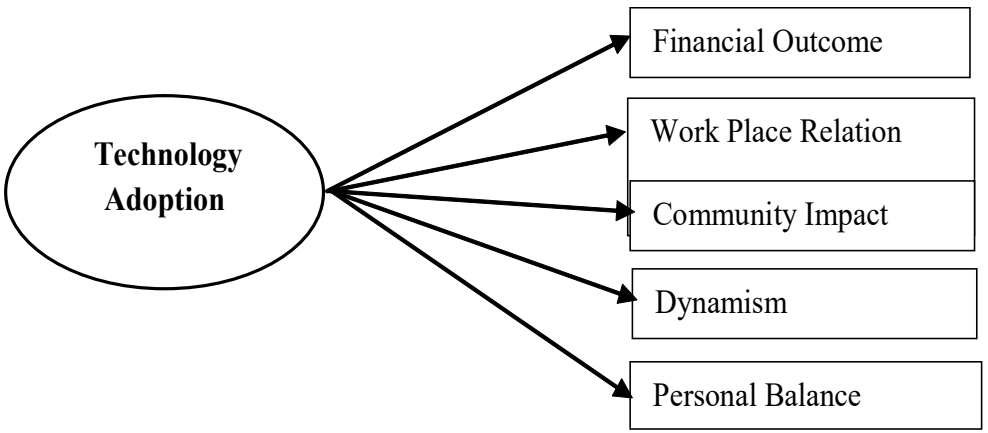


**Figure 2:** Entrepreneurial outcome measurement section of proposed model.

Internal mechanism model for technology adoption process is developed from the combination of the aforementioned hypotheses (Figure 3).On the ground of the planned model, laundry list of all factors influencing technology adoption process is prepared. Finally, adding these factors to the proposed model forms a path showing how government initiations, available benefits of technology, motivation towards technology, and information accommodation impacts technology adoption process. This model first examines the impact of benefits of ICT and government initiations on motivation towards technology and information accommodation and then it investigates the impact of motivation towards technology and information accommodation on technology adoption process. Final section of this model (Figure 2) inspects the effect of technology adoption from the entrepreneurial outcome point of view. Proposed model can be represented diagrammatically as under:

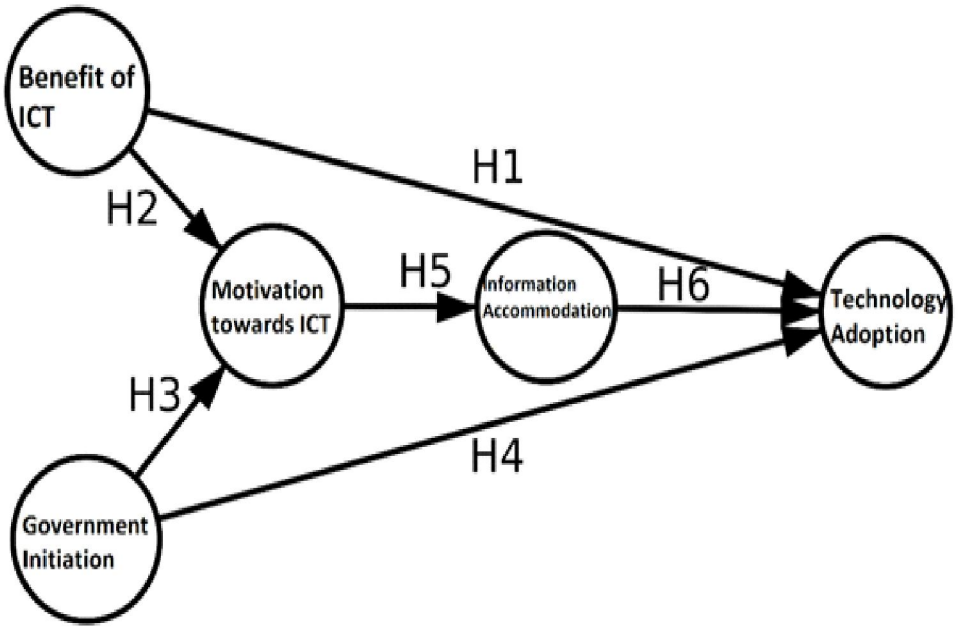


**Figure 3:** Internal mechanism model of technology adoption procedure.

## Method of Study

### *3.1. Scale Design*

For this study researchers have collected data from 352 respondents using 7-point Likert scale with 19 items. Minimum value of the Likert scale indicates strong disagreement of the respondents with the observed variables whereas maximum value specifies strong agreement of the respondents with the measurement variable. In fact, the range of points 1-7 measures the magnitude of feeling and opinion of the respondents in increasing order. 19 items or questions were used in questionnaire to measure the impact of benefits of ICT, government initiation, motivation towards ICT, and information accommodations on the technology adoption and finally technology adoption measures its impacts on entrepreneurial outcome. Questionnaire was prepared on the basis of extensive literature survey of related researchers and is shown in Table 1.

## Table 1.Variable design

| Exogenous Latent Variables | Observed Variables | Source |
|---|---|---|
| Benefits of ICT (BI) | I have been expanding relationship with the people from other business due to internet (Business Network) **[BI1]** | (Hair et al., 2012) (Kollmann, 2006) (Shoham et al., 2006) (Jackson, 2019) |
| | I am using internet to gather information about the consumers' needs and preferences (Market Research) **[BI2]** | (Hair et al., 2012) (Kollmann, 2006) (Shoham et al., 2006) (Jackson, 2019) |
| | Not only ICT improves my sales channel but also it provides me new ways to distribute my products and services to the market (Improvement and Creation of New Sales Channel) **[BI3]** | (Hair et al., 2012) (Chandra &Coviello, 2010) (Mahadevan, 2000) |
| | ICT makes me easier to locate, contact, and develop reputation with investor (Investor Identification & Reputation) **[BI4]** | (Shoham et al., 2006) (Chandra &Coviello, 2010) |
| Government Initiation (GI) | Government should disseminate enough information about ICT to motivate rural entrepreneurs towards the use of digital tools in China (Dissemination of ICT Information) **[GI1]** | (Galloway & Mochrie, 2005) |
| | Chinese government should provide high speed internet facilities to increase the number of ICT using entrepreneurs in rural China (Digital Divide) **[GI2]** | (Malecki, 2003) |
| | ICT based training and skill should be imparted from the government level to enable rural entrepreneurs to adopt ICT in their business (Training and Skill Development) **[GI3]** | (Costa, 2020) European Commission (2021) (Lekhanya, 2018) (Satalkina& Steiner, 2020) (Alam et al., 2018) (Galloway & Mochrie, 2005) |
| | Reduction in the cost of internet usage motivates rural entrepreneurs in China to adopt ICT in their business (Cost of ICT Usage) **[GI4]** | (Salemink et al., 2017) (Townsend et al., 2013) |
| Motivation towards ICT (MI) | I want to yield more benefit from the ICT (Interest) **[MI1]** | (Ryan, 1982) (Ryan et al., 1991) |
| | I am qualified for using digital tools in my business (Competence) **[MI2]** | (Lai, 2016) (Davis, 1986) (Ryan, 1982) (Ryan et al., 1991) |
| | Digital tools are practical and cost effective (Usefulness) **[MI3]** | (Lai, 2016) |
| Information Accommodations (IA) | If government disseminate information about the benefit of digital tools and develop infrastructure in the rural area then it will enable rural entrepreneur to include technology in their entrepreneurial activities (Adaptation) **[IA1]** | (Räisänen&Tuovinen, 2020) (Goodhue & Thompson, 1995) (Lai, 2016) (Piaget, 1964) |
| | Continuous government support enables rural entrepreneurs to improve their entrepreneurial activities using new digital technologies (Intervention) **[IA2]** | (Räisänen&Tuovinen, 2020) (Goodhue & Thompson, 1995) (Lai, 2016) (Piaget, 1964) |
| | Government support and information about benefit of ICT plays vital role to develop confidence in rural entrepreneurs (Self-efficacy) **[IA3]** | (Räisänen&Tuovinen, 2020) (Goodhue & Thompson, 1995) (Lai, 2016) Piaget, 1964) |
| Technology Adoption (TA) | Profit of your organization has been increasing continuously after the adoption of digital tools (Financial Outcome) **[TA1]** | (Carree&Thurik, 2010) (Baron & Markman, 2003) (Crane &Sohl, 2004) (Steffens et al., 2009) (Unger et al., 2009) |
| | Digital tools have been supporting me to improve positive relationship with my customer and employees (Workplace Relationship) **[TA2]** | (Gorgievski, 2011) |
| | Digital tools have been supporting me in helping community by providing environment friendly product and services (Community Impact) **[TA3]** | (Gorgievski, 2011) |
| | Using ICT I am able to expand the market share of my business along with the increment in the number of customers (Dynamism and Growth) **[TA4]** | (Littunen, 2000) (Steffens et al., 2009) (Florin et al., 2003) (Zhou et al., 2007) (Achtenhagen at al., 2010) |
| | Due to digital tools I am able to manage more time for my family and friends (Personal and Work-life Balance) **[TA5]** | (Buttner& Moore, 1997) (Fisher et al., 2014) |

### *3.2. Data Analysis*

Data analysis procedure implemented during this research can be categorized into four parts and are as under:

#### *3.2.1. Descriptive Analysis*

Beijing, Guangdong, Hebei, Henan, Jiangsu, Jiangxi, Liaoning, and Shaanxi were the major selected locations for this study to collect data. Collected data composed of 19 variables and 352 observations: Beijing (1 observation), Guangdong (2 observations), Hebei (11 observations), Henan (17 observations), Jiangsu (8 observations), Jiangxi (311 observations), Liaoning (1 observation), and Shaanxi (1 observation). Most of the respondents were male (72.16%) and aged between 36 to 50 years (40.63%) with education level of senior high school degree (34.66%). Highest academic degree in the family of the majority of the respondents was undergraduate degree (40.91%) and most of them were from ordinary farmer's groups (38.92%). All the respondents have participated in at least one entrepreneurial activities and most of them have been participating in breeding industry (39.20%). Even though advance information and communication technology have been developing in China, 59.94% entrepreneurs have been running offline businesses. 73.30% respondents have possessed 1-10 enterprises and average annual start up earning of 33.81% respondents is ranging between RMB 50 -100 thousands. 321 out of 352 respondents were familiar with ICT and 350 respondents of total have applied at least some means of ICT during the process of starting business.

#### *3.2.2. Exploratory Factor Analysis (EFA)*

Major focus of this study is to test the series of relationship among benefit of ICT, government initiation, motivation, information accommodation, and technology adoption. All the statistical test in this study were conducted using "psych", "GPArotation", and "lavaan" packages available in R-Studio. At the first stage, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were conducted to assess the factorability. The overall KMO measure of sampling adequacy was 0.93 and, the Bartlett's value of the spherical *p* test was 0.000, meaning that EFA can be applied on the collected data set (Kaiser, 1974). In order to extract new factor structure and to measure the construct validity EFA was conducted with the collected data set. Factors were rotated by varimax rotation and extracted by maximum likelihood method. Cross loaded items were managed and items which have factor loading less than 0.4 for all factors were removed. Finally, five factor model was extracted and cumulative variance explained by this final factor model was 0.61.

#### *3.2.3. Confirmatory Factor Analysis (CFA)*

After conducting EFA, we conducted CFA to examine the various aspects of measurement model. Generally, researchers conduct CFA to examine the relationship between manifest variable and latent factor by comparing population covariance matrix with observed sample covariance matrix (Schreiber et al., 2006). Overall result of CFA is shown in Table 2.

**Table 2.Overall result of CFA**

| OV | λ | $r^2$ | CR (α) | AVE |
|---|---|---|---|---|
| BI1 | 0.61 | 0.40 | 0.804 (BI) | 0.511 (BI) |
| BI2 | 0.62 | 0.40 | | |
| BI3 | 0.80 | 0.65 | | |
| BI4 | 0.80 | 0.63 | | |
| GI1 | 0.82 | 0.68 | 0.884 (GI) | 0.658 (GI) |
| GI2 | 0.87 | 0.76 | | |
| GI3 | 0.83 | 0.69 | | |
| GI4 | 0.71 | 0.51 | | |
| MI1 | 0.73 | 0.53 | 0.767 (MI) | 0.524 (MI) |
| MI2 | 0.67 | 0.44 | | |
| MI3 | 0.77 | 0.60 | | |
| IA1 | 0.85 | 0.72 | 0.875 (IA) | 0.701 (IA) |
| IA2 | 0.86 | 0.74 | | |
| IA3 | 0.80 | 0.64 | | |
| TA1 | 0.74 | 0.55 | 0.867 (TA) | 0.567 (TA) |
| TA2 | 0.74 | 0.54 | | |
| TA3 | 0.79 | 0.63 | | |
| TA4 | 0.81 | 0.66 | | |
| TA5 | 0.68 | 0.46 | | |

**Discriminant Validity Test Using Correlation Matrix (ψ)**

| | BI | GI | MI | IA | TA |
|---|---|---|---|---|---|
| **BI** | ***0.751**** | | | | |
| **GI** | 0.545 | ***0.828**** | | | |
| **MI** | 0.541 | 0.809 | ***0.837**** | | |
| **IA** | 0.635 | 0.828 | 0.841 | ***0.724**** | |
| **TA** | 0.737 | 0.634 | 0.679 | 0.761 | ***0.753**** |

***: are square root of AVE and other are inter construct correlation coefficient**

**Summary Model Fit Indices Developed from Hair et al. (1998,2010),Byrne (2001, 2010), and Ernest et al. (2008)**

| Indices | Cut-off Values | Summary Fit Indices |
|---|---|---|
| CMIN/DF | ≤ 2-5 | 2.39 |
| SRMR | < 0.08 | 0.04 |
| RMSEA | < 0.08 | 0.06 |
| CFI | ≥ 0.95 | 0.95 |
| TLI | 0.90 - 0.95+ | 0.94 |
| GFI | ≥ 0.90 | 0.91 |
| AGFI | ≥ 0.90 | 0.90 |
| NFI | 0.90-0.95+ | 0.92 |

***OV:***Observed Variables
***AVE***: Average Variance Extracted

***ë:*** *Factor Loadings*
***CR:*** Construct Reliability

***r²:*** *Coefficient of Determination*
**Source:** Own Computation

Factor loading (**ë)** for all observed variable are > 0.50 and coefficient of determination ($r^2$) for all observed variable are > 0.40 and it shows that all observed variables have better correlation with their respective latent variables. Practically significant level of factor loading is e 0.50(Hair et al., 2010).Therefore, all items and factors selected for this study were practically significant. Second ambition beyond conducting CFA was to check validity and reliability of the construct. Many scholars including (Hair et al., 2010) identified three major criteria for the establishment of convergent validity and are: (1) the standardized factor loading (***ë)***e 0.50; (2) the Composite Reliability (CR) e 0.70; and (3) the AVE e 0.5. According to the mentioned criteria, it is concluded that there is good convergent validity and items used to measure latent factors are considered to be valid tool for this study. Computed output in this study fulfill all the above-mentioned criteria required for convergent validity. In case of discriminant validity different researchers have established different criteria. According to Hair et al. (2010), if correlation value among the construct is less than 0.85 then discriminant validity is established. But according toFornell&Larcker (1981) discriminant validity exists if square root of AVE is > inter construct correlation or if AVE is < shared variance. Fornell&Larcker's (1981) criteria for discriminant validity is not fulfilled by our output but correlation value among the construct in our output is less than 0.85 which fulfill the discriminant validity criteria of (Hair et al., 2010). Minor disputes between AVE and inter construct correlation coefficient can be ignored (Rahim & Magner, 1996). Hence, these evidences support the establishment of discriminant validity between the constructs for this measurement model. Computed value of Cronbach's alpha (á)for all five latent variables is >0.70 as well. Extracted model fit indices were compared with summary cut-off values summarized from the existing literature of Hair et al. (2010), and Byrne (2001) and it reveals that CMIN/df = 2.29, SRMR = 0.04, RMSEA = 0.06, CFI = 0.95, TLI = 0.94, GFI = 0.91, AGFI = 0.90, and NFI = 0.92. All values in model fit indices fulfill the criteria of cut-off values. These model fit indices along with validity and reliability parameters verifies that the sample collected for this study is acceptable fit for five factor model and we can move forward for structural equation modeling. Overall CFA can be represented graphically as under:

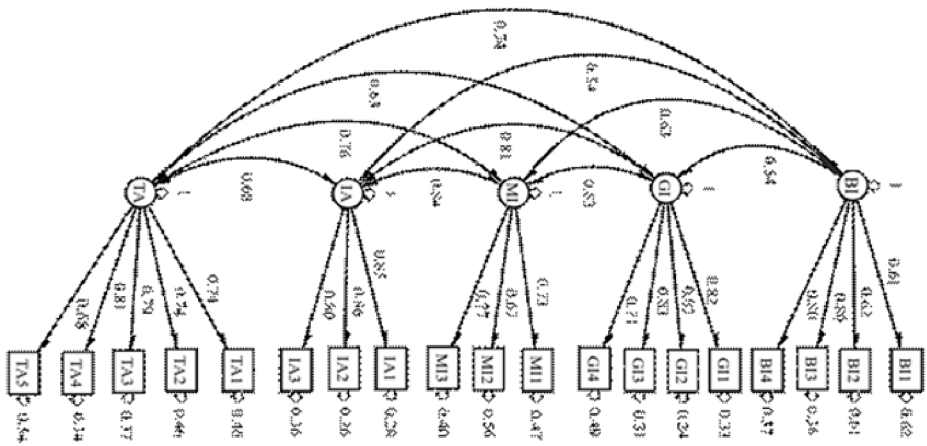


**Figure 4:** Graphical presentation of CFA

### *3.2.4. Structural Equation Modeling*

After conducting EFA & CFA, this study established the SEM path with the combination of measurement model and structural model as proposed in the conceptual model in Figure 1. "lavaan" package available in R-Studio was used as analysis tool to analyze relationship among the latent factors. Goodness of fit indices and estimates related to path are shown in Table 3 and Table 4 respectively. Revised path model was established by removing the insignificant paths. SEM result revealed that hypotheses H1, H2, H3, H5, and H6 were significant and H4 was insignificant. Revised path model with its standardized solution path coefficient are shown below in Figure 5.

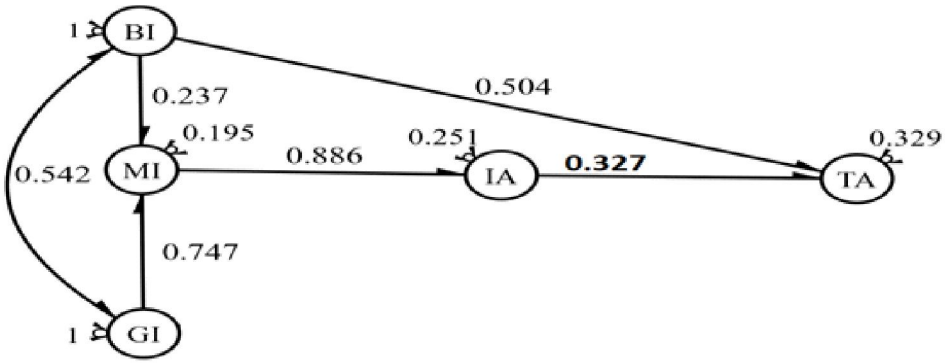


**Figure 5.** Path diagram of revised Structural Equation Model (SEM)

After sketching the revised model, goodness of fit indices of new model were computed. As per the result CMIN/DF<5, SRMR<0.08, RMSEA<0.08, CFI=0.95, TLI>0.90, GFI>0.90 and NFI>0.90. This verifies that revised model is based on the collected samples. Overall goodness of fit indices and cut-off values are presented below in Table 3. Similarly, SEM path estimates are presented in Table 4.

**Table 3.Goodness of fit indices for revised model**

| Summary Model Fit Indices Developed from Hair et al. (1998,2010),Byrne (2001, 2010), and Ernest etl. (2008) | | |
|---|---|---|
| **Indices** | **Cut-off Values** | **Summary Fit Indices** |
| CMIN/DF | ≤ 25 | 2.46 |
| SRMR | < 0.08 | 0.044 |
| RMSEA | < 0.08 | 0.065 |
| CFI | ≥ 0.95 | 0.95 |
| TLI | 0.90 - 0.95+ | 0.935 |
| GFI | ≥ 0.90 | 0.91 |
| NFI | 0.90-0.95+ | 0.92 |

**Table 4: SEM path checking**

| H | Path | | | Estimate | SE | p value | Standardized Estimate | Pass or Not |
|---|---|---|---|---|---|---|---|---|
| H1 | Technology Adoption | ← | Benefit of ICT | **0.514** | **0.097** | **0** | **0.504** | **Yes** |
| H2 | Motivation towards ICT | ← | Benefit of ICT | **0.25** | **0.065** | **0** | **0.237** | **Yes** |
| H3 | Motivation towards ICT | ← | Government Initiation | **0.693** | **0.072** | **0** | **0.747** | **Yes** |
| H4 | Technology Adoption | ← | Government Initiation | **0.096** | **0.103** | **0.352** | **0.107** | **No** |
| H5 | Information Accommodation | ← | Motivation towards ICT | **0.96** | **0.097** | **0** | **0.886** | **Yes** |
| H6 | Technology Adoption | ← | Information Accommodation | **0.292** | **0.108** | **0.007** | **0.327** | **Yes** |

### *3.2.4.1. Intermediary Effect Analysis*

At the final stage of our study we tested the mediating effect in the model. In our model all paths are significant except dependency of technology adoption on government initiation. Here, we have tested significant relationship between dependent, mediating, and independent variables. As per out result there is significant relationship between benefit of ICT and motivation towards ICT (â=0.846, p=0.000<0.05), there is positive and strong relationship between motivation towards ICT and information accommodation (â=0.912, p=0.000<0.05), there is positive but weak relationship between information accommodation and technology adoption (â=0.242, p=0.000<0.05), and there is positive but moderate relationship between benefit of ICT and technology adoption (â=0.660, p=0.000<0.05). When benefit of ICT, motivation towards ICT, and information accommodation interact resulting technology adoption, the direct effect (â=0.660, p=0.000<0.05), indirect effect (â=0.187, p=0.000<0.05), and total effect (â=0.847, p=0.000<0.05) all becomes significant. Here, we can say that benefit of ICT is the main cause of technology adoption in China. Motivation towards ICT and information accommodation have small effect on the mediation of benefit of ICT and technology adoption.Similarly, there is significant relationship between government initiation and motivation towards ICT (â=0.829, p=0.000<0.05), there is significant relationship between motivation towards ICT and information accommodation (â=0.967, p=0.000<0.05), and information accommodation and technology adoption(â=0.371, p=0.000<0.05). Mediation effect of motivation toward ICT and information accommodation on government initiation and technology adoption is small (â=0.297, p=0.000<0.05) whereas direct effect of government initiation on technology adoption is quite larger than its indirect impact (â=0.305, p=0.000<0.05). Overall direct, indirect, and total effect of mediating variables used in our model is presented below:

**Table 5.Direct, indirect, and total effect**

| Direct, Indirect, and Total Effect | | | | Ratio | |
|---|---|---|---|---|---|
| Relation | Direct Effect | Indirect Effect | Total Effect | Indirect to Total | Indirect to Direct |
| BI→TA | 0.660 | | | | |
| BI→MI→IA→TA | | 0.187 | 0.847 | 0.221 | 0.283 |
| GI→TA | 0.305 | | | | |
| GI→MI→IA→TA | | 0.297 | 0.602 | 0.493 | 0.974 |

**Source:** Self Computed

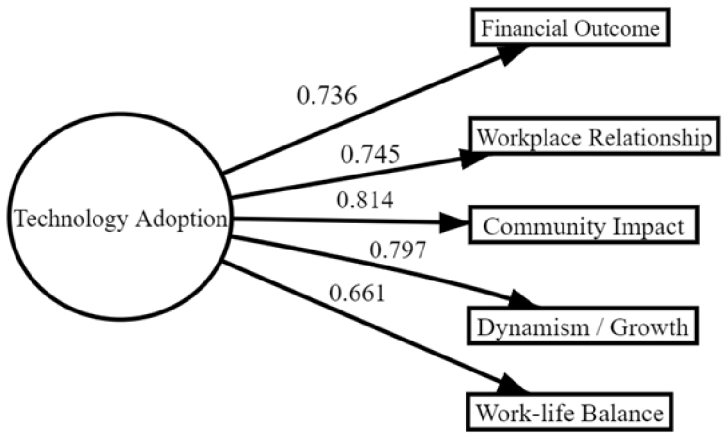


**Figure 6:** Correlation between technology and entrepreneurial outcome

### *3.2.5. Technology Adoption and Entrepreneurial Outcome*

Another objective of this study is to map the impact of technology adoption on various entrepreneurial outcome such as financial outcome, workplace relation, community impact, dynamism, and personal balance. To analyze the relationship between the adopted technology and entrepreneurial outcome we have used factor loadings computed during structural equation modeling which are presented below in Figure 3. From the above statistics we can conclude that implementation of ICT has positive correlation with all the five entrepreneurial outcome. Usage of ICT in the business is highly supportive to create community impact (ë=0.841). Adoption of technology is not strongly supportive for managing work-life balance (ë=0.661). Technology adoption is helpful in achieving financial outcome (ë=0.736), establishing workplace relationship (ë=0.745), and maintaining business growth (ë=0.797).

## 4. Discussion

This study is mainly focused on ICT adoption process in China and small part of this study is also dealt with the impact of ICT on various entrepreneurial outcomes. Many researchers have already developed technology adoption models and theories related to them. Many technology adoption models and theories were developed in between 1960 and 2008. Innovation and adoption occurred after several stages including understanding, persuasion, decision, implementation, and confirmation. Good fit between task and technology increases the performance which results in technology adoption. It included behavioral beliefs, outcome evaluation, normative beliefs and motivation as exogenous variables, attitude, subjective norms and behavioral intention as mediating variables and behavior. Performance expectancy, effort expectancy, and social influence creates behavioral intention and behavioral intention result in technology adoption behavior. In Davis's model, facilitating condition has direct relationship with technology usage behavior. He also considered gender, age, experience and voluntariness of technology usage in his study. All these models provide different variables and methods regarding technology adoption. After reviewing all these models and theories, we have decided to test the technology adoption model in China. We are not developing a new model; we have just tested the already developed model by using our own measurement variables. We have created our structural model by extracting different variables from already developed model and we developed our own observed variable to measure them. SEM is not used to develop new model but it is used to test models based on already developed theories. All the computed statistics verifies that tested model is fit in China. Chinese entrepreneurs generally seek benefit and usefulness of technology before adopting them. Benefit of technology has strong impact on technology adoption process in China. As per our analysis government initiations such as dissemination of information about ICT, attempt to bridge digital divide, training and skill development program, and cost reduction policies has insignificant impact on technology adoption process. Our SEM test shows insignificant path between government initiation and technology adoption process. But analysis of direct and indirect effect shows that direct impact of government initiation on technology adoption as well as its indirect impact via mediating variable both are moderate in magnitude. Likewise, direct effect of benefits of ICT on technology adoption is moderate and its indirect impact through motivation towards ICT and information accommodation is insignificant as it is below 0.2. We have already talked about the role, benefits, and impact of ICT on entrepreneurial outcome in the literature section of this study.

## 5. Conclusion

Our study reveals that ICT has positive impact on entrepreneurial outcome in the context of Chinese entrepreneurs. Study reveals positive relationship between ICT and work-life balance, workplace relationship, financial outcome,

community impact, and business growth. Lastly, we can conclude that the proposed model fits in China and ICT has positive impact on entrepreneurial outcome. Insignificant relationship between government initiation and technology adoption does not instruct Chinese government to withdraw their ICT related initiatives but it recommends them to work more aggressively to make their effort significant.

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