Inf Syst E-Bus Manage
DOI 10.1007/s10257-014-0235-6

ORIGINAL ARTICLE

Acceptance of government-sponsored agricultural information systems in China: the role of government social power

Yunfan Lu · Yaobin Lu · Bin Wang · Zhao Pan · Hong Qin

Received: 23 August 2012 / Revised: 11 October 2013 / Accepted: 13 January 2014

Abstract Though many governments enthusiastically supported agricultural information systems, little is known about the role of governments in farmers' acceptance of such systems. The present study examines the influences of government social power on farmers' intention to use government-sponsored agricultural information systems. A research model reflecting the relationships among technology acceptance, government social power, and adoption intention was developed and tested using data collected from 1,504 subjects in the Jiangxi province of China. Our findings show that the role of government social power should not be ignored, as it produced a substantial improvement in the variance explained in intention to use (from 57.1 to 70.8 %). This work also analyzed the influences of gender on the acceptance intention. Based on empirical findings, we offer managerial suggestions for the adoption of agricultural information systems.

Keywords Agricultural information systems · Technology acceptance · Government · Social power

Yunfan Lu
College of Economics and Management, Huazhong Agricultural University, Wuhan 430070, China
e-mail: lyf2006@126.com

Yaobin Lu (✉) · Z. Pan
School of Management, Huazhong University of Science and Technology, Wuhan 430074, China
e-mail: luyb@mail.hust.edu.cn

Z. Pan
e-mail: victola@qq.com

B. Wang · H. Qin
College of Business Administration, University of Texas-Pan American, Edinburg, TX 78539, USA
e-mail: binwang@utpa.edu

H. Qin
e-mail: hqin@utpa.edu

Published online: 16 February 2014

1 Introduction

In China, the government has recognized informatization as one of the main driving forces of rural development. In the eleventh 5-year (2006–2011) program, the Chinese government regarded rural informatization as the crucial mechanism for achieving growth (Qiang and Hanna 2009). In 2006, the Chinese government upgraded the conventional access concept from telephone and television "village access projects" to the "village informatization program" to ensure "broadband to the village and information services to the household" (Xia 2010). Even though ubiquitous coverage has been achieved in Chinese rural areas, scholars believe it is only an initial stage of rural informatization (Warren 2007). In addition to providing broadband connectivity (Xia and Lu 2008), content issues are equally important. The Chinese government has started to build agricultural information systems to disseminate agricultural information to farmers (Liu 2012). These information systems can satisfy farmers' needs such as improving rural health care and providing library resources, social linkages, and government services (Abbott and Gregg 2000; Hipple and Ramsey 2000). These systems can also provide economic opportunities in rural areas by facilitating access to online education and training (LaRose et al. 2011) and by stimulating telecommuting and home businesses (Gregg et al. 2006). In addition, these systems will allow farmers to find jobs in urban enterprises while they reside in rural areas, depriving rural areas of valuable human resources (Katz and Suter 2009).

Many other governments have strategic programs to enhance rural informatization. In India, government organizations at both central and state levels have developed agricultural marketing information systems for the collection and dissemination of agricultural market information. Market information is important for all users of the systems including farmers, traders, and consumers (Suri and Sushil 2006). In the Republic of Kenya, National Farmers Information Service(NFIS) is a highly innovative agricultural information system developed by the Ministry of Agriculture and Ministry of Livestock Development. It enables farmers to get agricultural information by calling the service or browsing its website at http://www.nafis.go.ke. The idea of NFIS is that "farmers would be able to research any agricultural theme in the format most suitable for them, and even download multimedia content for later viewing or listening" (From the homepage of the website). Additionally, Jamaica (http://www.ja-mis.com/) and Nicaragua (http://www.simas.org.ni/) have developed similar government-sponsored agricultural information systems.

Governments support agricultural information systems as a means to reduce the "digital divide." The "digital divide" is defined as "the gap between individuals, households, businesses and geographic areas at different socioeconomic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities" (Joseph 2001). It includes both access and usage. The former refers to having access to information technology, whereas the latter means the usage patterns of the Internet and information equipment in order to achieve gratification. The digital

divide is not only a matter of access but of making people proficient computer users (Blignaut 2009).

Previous studies have examined the role of the government in closing the digital divide in rural areas. Some Chinese researchers stressed that the government should be responsible for agricultural informatization (Li et al. 2011). Rao (2007) argue that agricultural information system adoption requires government support including both public resources (e.g., climate, weather, soil information, and water sources) and national policy (e.g., labor laws, agricultural marketing, land ownership, and agricultural insurance). Others believe that it is a good idea for the government to promote the development of agricultural information systems to close the digital divide (Suri and Sushil 2006; Rao 2008; Hosman 2010). These studies research the role of the infrastructure (from the perspective of access) and content (from the perspective of usage) in reducing the digital divide. The focus is on the resources from the government. However, few studies have examined the digital divide from the users' perspective. This paper explores the influence of the government on users' adoption of agricultural information systems.

While governments enthusiastically supported agricultural information systems, little is known about the role of governments on farmers' acceptance of such systems. Several models such as the technology acceptance model (TAM) (Davis 1989) and the united theory of acceptance and use of technology (UTAUT) (Venkatesh and Morris 2003) have been developed to explain individual acceptance of information systems. In addition, prior research has proposed that social influence is a critical determinant of technology adoption (Venkatesh and Davis 2000). Social influence has mainly been regarded as an external pressure imposed by peers and superiors such that it influences a user's perceptions about system adoption (Sykes et al. 2009). Thus, prior research has not fully taken into account the influence of the government in the adoption of a government-sponsored agricultural information system. We suggest that a social power perspective will help us gain insight into the influence of the government in the acceptance of agricultural information systems (Kornberg and Perry 1966). The current work attempts to develop such a conceptualization and investigates the role of the government on the acceptance of government-sponsored agricultural information systems based on the technology acceptance model and the social power theory. Our research is helpful to the government in enhancing the adoption of agricultural information systems.

Our paper is organized as follows. In the next section, relevant literature is examined to introduce the theoretical background for studying users' information technology acceptance. This is followed by a presentation of our research model and associated hypotheses. Next, we discuss the research methodology and the results from the empirical study. Finally, the implications of the study are discussed.

2 Literature review

We first review theoretical and empirical work on the acceptance of agricultural information systems. Then we review the technology acceptance model and the social power theory, which together provide the theoretical foundation for our study.

2.1 Agricultural information systems

Advances in information technology can have both positive and negative consequences in rural areas (Cronin et al. 1995). The positive impacts are due to the fact that information technology can help farmers overcome the disadvantages of distance in rural areas. The negative impacts result from the lack of informatization in rural areas. In rural areas where the level of informatization is low, farmers are at a disadvantage (Flor 1993). Farmers' information needs include five aspects: agricultural inputs, extension education, agricultural technology, agricultural credit, and marketing (Ozowa 1995). To satisfy these needs, it is urgent to promote the development of agricultural information systems.

An agricultural information system is defined as "a system in which agricultural information is generated, transformed, transferred, consolidated, received and fed back in such a manner that these processes function synergistically to underpin knowledge utilization by agricultural producers" (Röling 1988). Prior research has identified users of agricultural information systems as government decision-makers, researchers, and farmers (Kizilaslan 2006).

The acceptance of agricultural information systems has attracted much scholarly attention. Alvarez and Nuthall (2006) argue that agricultural information systems should suit farmers' characteristics and their adoption is affected by farmers' age, education, operational skills, and personality. Gang and Ping (2012) find that farmers' intention to pay for agricultural information is influenced by farmers' characteristics such as education, age, and income. Mackrell et al. (2009) explore the roles of both human and technical aspects on the adoption of agricultural information technology in Australia. They find that information systems that achieved a high level of adoption are flexible in adapting to farmers' changing needs. The use of information technology to collect data, process information, and support decisions for agricultural production is defined as precision agriculture (Bongiovanni and Lowenberg-DeBoer 2004). Aubert et al. (2012) explore the adoption of precision agriculture in Canada based on theories of technology acceptance and diffusion of innovation. Their findings highlight the importance of compatibility among information technology components and farmers' expertise. Moga et al. (2012) identify factors such as reduced number of legal farmers, decreased investment potential, the lack of interest by information systems developers, and poor skills of farm managers and farmers that hamper the adoption of farm management information systems in Romania. Martin and Abbott (2011) find that efficient responses to economic opportunities or threats are the main driving force for the adoption of information technology in rural Uganda. Hosman (2010) emphasize that governments can promote the adoption of information technology by providing an initial incentive.

The above literature suggests that both human and technical aspects are important driving forces for the adoption of agricultural information systems. Although the role of the government is stressed, few studies empirically analyze the influence of the government on information technology adoption.

2.2 Beliefs regarding technology acceptance

TAM is often used to study the adoption of agricultural information systems (Aubert et al. 2012). Based on the theory of reasoned action (TRA), TAM was introduced by Davis (1989) to explain information technology usage behavior. TRA proposes that a person's actual behavior can be predicted by the person's intention, and that intention is influenced by the person's attitude toward the behavior (Fishbein and Ajzen 1975). A person's attitude means "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (Chang et al. 2001). It is largely determined by beliefs and evaluation about the consequences of the behavior (Fishbein and Ajzen 1975). TAM proposes that perceived usefulness and perceived ease of use are primary factors that determine the attitude toward information technology acceptance (Davis et al. 1989). Perceived usefulness is the "subjective probability" that using an information technology will increase one's performance within a certain context. In this paper, we investigate the impacts of perceived usefulness and perceived ease of use on farmers' attitude toward using agricultural information systems promoted by the government.

In addition to perceived usefulness and perceived ease of use, intrinsic motivation constructs have also been regarded as important factors in determining attitude toward acceptance (Davis et al. 1992; Teo and Pok 2003). Entertainment is a crucial hedonic motivation (Lin 1999). Entertainment means the extent to which the action of using the information system is "providing users a means to escape boredom and experience enjoyment" (Close and Kukar-Kinney 2010; Wolfinbarger and Gilly 2001). Since acceptance of information technology is a voluntary act, entertainment (an intrinsic motivation) would have as much of an impact as perceived usefulness (an extrinsic motivation). Therefore, perceived usefulness, perceived ease of use, and perceived entertainment are proposed as the main factors that affect a user's beliefs.

2.3 Beliefs regarding government social power

Power is defined as "the ability to evoke change in another's behavior, or cause someone to do something s/he would not have done otherwise" (Gaski 1984). The concept of social power was initially introduced by Lewin and Cartwright (1952), Cartwright (1959), French and Raven (2001), and Wolfe (1959). Social power is the ability of one person or group to cause another person or group to change in the direction intended by the influencer (Kornberg and Perry 1966). It has been widely used to study consumer behaviors. For example, Busch and Wilson (1976) studies social power's effectiveness in the buyer–seller relationship. Crosno et al. (2009) explores the influence of brand social power on brand evaluations. Goodrich and Mangleburg (2009) investigates parents and peers' influences on teen purchase behaviors using social power theory. The above-mentioned research indicates that social government can be applied to studies on the influence of one person or group.

As the government is an important influencing factor (Hosman 2010), we examine the relationship between government social power and the acceptance of

agricultural information systems. Extending the general definition of social power to a rural context, we define government social power as the ability of a government to influence farmers' behaviors. As power is the asymmetrical control over one's own and another person's outcomes (Fiske 2006), possessing social power means possessing the opportunity to shape one's situation in conformity with one's own interests and goals, whereas the downside of possessing low social power is that goal achievement is more likely to depend on others (Sassenberg et al. 2012). Hence, social power does not always imply opportunities and self-interest but will also bring about "heightened responsibility for the outcomes of others who depend on the self" (Zhong et al. 2006). Therefore, government social power over farmers also implies the influence of the government on farmers' adoption of agricultural information systems.

A social power base is the source of influence in a relationship (French Jr and Snyder 1959). French and Raven (2001) suggest that there are five types of social power bases: expert power, legitimate power, referent power, reward power, and coercive power. In this study, five bases of government social power are developed based on these five bases of social power. They include government expert power, government legitimate power, government referent power, government reward power, and government coercive power.

3 Research model and hypotheses

Figure 1 summarizes the research model. The model includes ten constructs that explain the roles of government social power and technology acceptance on farmers' intention to use agricultural information systems. Each of the hypotheses is detailed below.

3.1 TAM and the intention to use agricultural information systems

Based on TAM, perceived usefulness, perceived ease of use, and perceived entertainment are proposed as the main factors that influence a user's attitude. We define perceived usefulness as the level to which a farmer believes using agricultural information systems enhances his or her performance (e.g., weather information obtained through the Internet helps rural production; marketing information made available through the Internet helps promote the sale of rural products). Perceived ease of use is defined as the extent to which a farmer considers using agricultural information systems as free of effort. Perceived entertainment is defined as the extent to which a farmer perceives pleasure and satisfaction when using agricultural information systems. In this study, we research the roles of perceived usefulness, perceived ease of use, and perceived entertainment in affecting the user's attitude toward usage.

Farmers' perceptions of mixed economic benefits to system use (perceived usefulness) are significantly correlated with their actual use (Alvarez and Nuthall 2006). Cost-benefit considerations directly influence farmers' decision on technology adoption (Aubert et al. 2012). Agricultural information systems should deliver

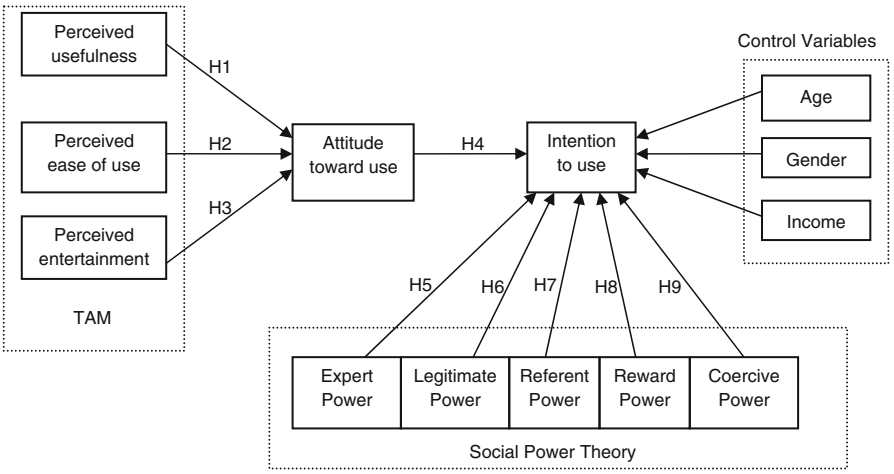

Fig. 1 The research model

valuable information to farmers (Heeks 2002). Thus, we posit that cost-benefit considerations apply to agricultural information systems:

H1 Perceived usefulness will have a positive effect on a farmer's attitude toward using an agricultural information system.

Perceived ease of use positively influences the adoption decision (Davis 1989). As farmers often have less time in the office, agricultural information systems should be suitable for farmers' needs (Alvarez and Nuthall 2006). They should not require difficult operational skills because a "prohibitively steep" learning curve will negatively affect the adoption of agricultural information systems (Aubert et al. 2012). Hence, we hypothesize:

H2 Perceived ease of use will have a positive effect on a farmer's attitude toward using an agricultural information system.

Agricultural information systems provide farmers with valuable information and services that help them understand the market better, improve logistics, and enhance the effectiveness of agricultural activities (Martin and Abbott 2011). These information services will make farmers feel relaxed (e.g., reducing anxiety caused by the lack of information), and give them pleasure. Additionally, agricultural information systems often provide the latest news, which may be enjoyed by farmers. Previous research suggests that perceived enjoyment and perceived playfulness are important determinants of information systems adoption (Davis et al. 1992; Hsu et al. 2013). In addition, entertainment enhances the use of online shopping carts (Close and Kukar-Kinney 2010). Perceived entertainment used in our research is similar to perceived enjoyment and perceived playfulness used in previous studies. Thus, we hypothesize:

H3 Perceived entertainment will have a positive effect on a farmer's attitude toward using an agricultural information system.

According to TAM (Davis 1989), attitude will positively affect users' intention toward using information technology. Thus, we hypothesize:

H4 Attitude will have a positive effect on a farmer's intention to use an agricultural information system.

3.2 The influence of government social power on the intention to use an agricultural information system

Government social power bases include government expert power, government legitimate power, government referent power, government reward power, and government coercive power. The influences of the five power bases constitute the influence of government social power on the intention to use an agricultural information system (French Jr and Snyder 1959).

Government expert power means that farmers perceive government departments that promote adoption as having some beneficial expertise or knowledge about the agricultural information system. Stakeholders with expertise are perceived as trustworthy, which in turn strengthens the influence on farmers' usage intention (Biong et al. 2010). When farmers perceive the government as having expertise, they accept the government's suggestion because they believe that doing so will lead to a better decision, not owing to formal or informal obligations to comply (Kohli 1989). Therefore we hypothesize:

H5 Government expert power will have a positive effect on a farmer's intention to use an agricultural information system.

Government legitimate power refers to the perception that the stakeholder has the right to prescribe a particular behavior for other members (Mitchell et al. 1997). Therefore, legitimate power is rooted in a farmer's obligation to accept the government's influence because he or she believes the government has a legitimate right to influence his or her behavior (Erchul and Raven 1997). More specifically, the government has developed the information system with a mandate to promote adoption, to issue instructions, and thereby to impose decisions on farmers. Government legitimate power includes formal and informal dimensions (Trevino 1986). The formal dimension is based on the government's authority, while the informal dimension is the government's appeal to commonly held norms and values (Biong et al. 2010). Formal legitimate power implies an underlying threat that noncompliance by the farmers will entail sanctions (e.g., farmers who refuse the information technology will not receive relevant information from the government as such information will be delivered by the new technology). On the other hand, informal legitimate power depends on internal mental processes such as identification and internalization (John 1984). Ferrell and Skinner (1988) claim that subordinates obey authority because it is something they respect and they often

comply whether they agree with a superior or not. More specifically, farmers who respond to agricultural information systems may agree with the goal to decrease the digital divide. Based on the influences of formal and informal government legitimate power on a farmer's decision, we hypothesize:

H6 Government legitimate power will have a positive effect on a farmer's intention to use an agricultural information system.

Referent power means government identifies with the interests of the farmers. The government promotes agricultural information systems in order to provide information and services to farmers. When farmers find the information fits their needs, they will reasonably believe that the government is working for them. Thus, farmers will accept the information system from the social exchange perspective (Valentine 2009). That is, government referent power implies a potential extrinsic motivation for farmers to accept an information system. Thus we hypothesize:

H7 Government referent power will have a positive effect on a farmer's intention to use an agricultural information system.

Government reward power means that farmers perceive the government as having the ability to provide rewards to induce information system acceptance. More specifically, farmers who use an information system receive more rewards such as information services from the government and the marketplace. Therefore, the government can promote a culture in which farmers believe that they will be rewarded for using an information system by the reward power mechanism (Stevens et al. 2005). Based on the above analysis, we hypothesize:

H8 Government reward power will have a positive effect on a farmer's intention to use an agricultural information system.

Government coercive power refers to one's perception that the government has the ability to punish him or her. Farmers buy information services initiated by the government based on their individual needs. Gundlach and Cadotte (1994) finds that coercive power is associated with an imbalanced and conflicting buyer–seller relationship. Thus coercive power will negatively affect the buyer–seller relationship. We sum up the above discussion using the following hypothesis:

H9 Government coercive power will have a negative effect on a farmer's intention to use an agricultural information system.

3.3 Control variables

In order to eliminate the effects of confounding variables, we include in the research model additional control variables such as age, gender, and income. These variables are expected to influence a farmer's intention to use information technology, as individuals of different age, gender, and income may have different perceptions of information technology.

4 Methodology

4.1 Research design and sampling

In order to empirically test the research model, we used a structured questionnaire to collect the data from June to November 2011 in Jiangxi province in China. The questionnaire was administered personally to farmers.

About thirty provinces in China have developed and promoted agricultural information systems similar to "Information Village". Jiangxi provincial government initiated the "Information Village" program in 2006. The program is one of the best agricultural information systems in China (Telecom 2011) and was regarded as one of the most important informatization projects by the Jiangxi provincial government. "Information Village" is an information platform including "village hotline" (telephone number 11868), short messaging service (SMS), and online website. "Information Village" disseminates information about rural news, electronic government services, agricultural technology, electronic commerce, education, rural entertainment, and social insurance. There were about four hundred thousand registered users at the end of 2010. Jiangxi provincial government hoped about 70 % of rural users would recognize the "Information Village" brand by the end of 2015 (Telecom 2011).

Because the "Information Village" project had many users and was quickly growing, we selected Jiangxi farmers as research subjects. The data collection procedure employed in this study was similar to that used by Sánchez-García and Currás-Pérez (2011) and by Kaynak and Kara (2002). We conducted a pretest to ensure the quality of the measures. Ten agricultural information system researchers and ten farmers who had more than 2 years of experience with "Information Village" were asked to review the scales and verify the content validity. After revising the questionnaire based on their suggestions, we conducted a pilot test with a random sample of 200 farmers who had relevant experience with "Information Village." The pilot test indicated the instrument had good reliability and validity.

A total of 60 farmers who came from different rural communities in Jiangxi were hired as interviewers. Their participation was voluntary, and they had used "Information Village." These farmers were instructed and trained in a classroom on how to conduct the interview. Each person was asked to interview 30 acquaintances. Two filter questions were included at the beginning of the questionnaire in order to identify the sample prospects. The first question was "[h]ave you ever heard of 'Information Village'?" The second one was "[w]hen you plan to adopt an information service or technology, do you care whether the sponsor is government or not?"

Our sample size was 1,504. The sample demographics are listed in Table 1. The average age of the respondents was 22.7 years old. The sample was 61.8 % male and 38.2 % female. According to the 2009 Survey Report on Internet Development in Rural China by China Internet Network Information Center (CNNIC), 58.0 % of rural Internet users in China were male, and 42.0 % were female (CNNIC 2010). The difference between our sample and the CNNIC sample was insignificant ($\chi_1^2 = 0.333$, $p = 0.564$). About 95.9 % of our respondents had high school or

Table 1 Sample demographics (N = 1,504)

Measure	Item	Count	%
Gender	Male	930	61.8
	Female	574	38.2
Age	>18 and ≤24	1,134	75.4
	>25 and ≤30	287	19.1
	>31 and ≤35	21	1.4
	>36 and ≤40	62	4.1
Education	Below middle school	810	53.9
	Middle school	460	30.6
	High school	171	11.4
	Two-year college or above	63	4.1
Monthly income (yuan)	≤1,000	679	45.1
	>1,000 and ≤2,000	580	38.6
	>2,000 and ≤3,000	111	7.4
	>3,000	134	8.9

below education. According to CNNIC, 88.7 % of rural Internet users had high school or below education. The difference was insignificant ($\chi_1^2 = 3.33$, $p = 0.06$). About 83.7 % of our sample had a monthly income below 2000 yuan. When compared with the CNNIC report result where 89.8 % of rural Internet users had a monthly income below 2000 yuan, the difference was insignificant ($\chi_1^2 = 1.59$, $p = 0.207$). Hence, the subjects in this study were representative of rural Internet users in China.

Measures employed in our research were adapted from the prior literature. We used seven-point bipolar semantic differential scales with agree/disagree for the measures. Table 2 outlines the questions used in the survey to measure the constructs.

4.2 Data analysis

PLS does not perform worse on statistical power or avoidance of false positives than other statistical estimation techniques such as LISREL or MPlus. These performance attributes are the most important for hypothesis testing. PLS is a convenient and powerful technique, which is more suitable for exploring the potential relationships among constructs (Goodhue et al. 2012). Thus, we used PLS-Graph 3.0 with bootstrapping to examine the model. First, we examined the measurement model and then tested the hypotheses.

4.2.1 Analysis of reliability and validity

Principal components factor (PCF) analysis is often used to examine the factorial convergent validity of the scales. The Barlett's Test of Sphericity generated a Kaiser–Meyer–Olkin (KMO) statistic of 0.910, which was significant at the 0.01

Table 2 Items measuring the constructs

Construct	Item	Sources
Perceived usefulness (PU)	Using Information Village enhances my rural productivity	Davis (1989), Henseler et al. (2009)
	I find Information Village useful in my rural activities	
	Using Information Village improves my rural performance	
Perceived ease of use (PEOU)	It is easy for me to become skillful in using Information Village	Davis (1989), Davis et al. (1989)
	I find it easy to use Information Village	
	Learning to operate Information Village is easy for me	
Perceived entertainment (PEN)	I use Information Village when I am bored	Close and Kukar-Kinney (2010)
	I find using Information Village enjoyable	
	I use Information Village for fun	
Attitude toward use (ATT)	For me, using Information Village within the last 3 months was a good idea	Henseler et al. (2009)
	For me, using Information Village within the last 3 months was desirable	
Intention to use (INT)	I intend to use Information Village in the near future	Gefen et al. (2003), Jarvenpaa and Todd (1996)
	I intend to invest my time and effort to learn how to use Information Village	
	I intend to use Information Village after I have mastered the use of Information Village	
Coercive Power (COE)	The government can harm me if I refuse to use Information Village	Biong et al. (2010), Swasy (1979)
	If I do not to use Information Village, then the government will punish me	
	The government might harm those who do not follow its policy	

Table 2 continued

Construct	Item	Sources
Reward power (REW)	The government has the ability to reward me if I use Information Village	Biong et al. (2010), Swasy (1979)
	I use Information Village only because of the good things the government will give me	
Referent Power (REF)	As a farmer, my attitude is similar to that of the government	Biong et al. (2010), Swasy (1979)
	I want to identify myself with the government to accept Information Village	
Expert power (EXP)	Because of the officer's expertise, it is more likely to be right	Biong et al. (2010), Swasy (1979)
	The officer has a lot of expertise and usually knows what is best for my agricultural production	
Legitimate Power (LEG)	It is my obligation to comply with the government to use Information Village	Biong et al. (2010), Swasy (1979)
	Because of the government's position, I should use Information Village	
	I am obliged to follow the government's informatization policy	

Table 3 Principal components factors analysis with varimax rotation

Factors	1	2	3	4	5	6	7	8	9	10
COE1	**0.831**	0.293	0.234	0.023	0.037	0.021	0.172	0.178	0.080	0.133
COE2	**0.841**	0.230	0.295	0.007	0.080	0.013	0.145	0.121	0.155	0.087
COE3	**0.830**	0.219	0.278	−0.022	0.070	0.026	0.136	0.095	0.220	0.135
REW1	0.429	0.253	0.229	0.003	0.068	0.006	0.203	0.168	**0.721**	0.133
REW2	0.486	0.194	0.347	−0.077	0.104	0.023	0.214	0.086	**0.616**	0.196
REF1	0.338	0.285	0.333	−0.063	0.041	−0.003	0.338	0.079	0.242	**0.622**
REF2	0.248	0.248	0.275	−0.027	0.022	−0.014	0.416	0.099	0.106	**0.722**
EXP1	0.172	0.216	0.139	0.049	0.021	0.058	**0.834**	0.122	0.097	0.268
EXP2	0.194	0.182	0.210	0.011	0.080	0.037	**0.882**	0.064	0.117	0.086
LEG1	−0.010	0.036	−0.056	0.154	**0.901**	0.095	0.087	0.034	−0.058	0.025
LEG2	0.158	0.010	0.093	0.076	**0.915**	0.105	0.006	−0.004	0.059	−0.006
LEG3	0.007	0.025	0.051	0.061	**0.928**	0.102	0.004	0.020	0.082	0.018
PU1	0.305	**0.819**	0.201	0.071	0.009	0.044	0.157	0.215	0.046	0.132
PU2	0.255	**0.854**	0.185	0.077	0.014	0.028	0.178	0.162	0.098	0.120
PU3	0.210	**0.753**	0.365	0.065	0.075	0.042	0.187	0.038	0.195	0.104
POE1	−0.003	0.137	−0.087	**0.896**	0.067	0.081	0.030	0.083	0.037	−0.043
POE2	0.000	0.045	−0.047	**0.938**	0.104	0.098	0.027	−0.004	−0.006	−0.015
POE3	−0.011	−0.045	−0.012	**0.897**	0.117	0.176	−0.018	−0.065	−0.062	0.019
PEN1	0.081	−0.043	0.020	0.193	0.087	**0.877**	0.018	0.025	−0.031	0.053
PEN2	0.026	0.056	0.046	0.113	0.125	**0.922**	0.021	0.032	0.002	0.005
PEN3	−0.056	0.067	−0.031	0.048	0.083	**0.896**	0.037	0.037	0.044	−0.055
ATT1	0.362	0.358	0.365	0.011	0.044	0.080	0.166	**0.703**	0.116	0.079
ATT2	0.275	0.329	0.452	0.026	0.048	0.128	0.170	**0.678**	0.158	0.107
INT1	0.368	0.278	**0.720**	−0.083	0.079	0.000	0.169	0.211	0.093	0.142
INT2	0.359	0.250	**0.760**	−0.098	0.047	0.014	0.177	0.146	0.101	0.141
INT3	0.279	0.264	**0.751**	−0.086	−0.007	0.007	0.169	0.167	0.191	0.155

level, indicating that it was suitable to use the principal components factor analysis on the dataset. We extracted ten factors with eigenvalues above 1, which together explained 88.61 % of the variance in the data. Table 3 displays the factor loadings of the items after Varimax rotation. The loadings of items on the expected factors were higher than 0.5, while loadings on other factors were lower than 0.5. Thus, convergent validity and discriminant validity were established.

Table 4 summarizes additional validity measures of the scales. The standard loadings of the items were mostly above 0.7. The average variance extracted (AVE) for each construct was above 0.7, indicating a good convergent validity (Bagozzi and Yi 1988). Composite reliabilities (CRs) were used to evaluate the internal consistency of the measurement model. As shown in Table 4, CRs were all above 0.8, indicating that the scales had good reliabilities. In addition, Cronbach's alpha

Table 4 Results of confirmatory factor analysis

Factor	Item	Standard loading	AVE	CR	Cronbach's alpha
Perceived usefulness (PU)	PU 1	0.944	0.869	0.952	0.923
	PU 2	0.951			
	PU 3	0.901			
Perceived ease of use (PEOU)	PEOU 1	0.986	0.711	0.878	0.917
	PEOU 2	0.854			
	PEOU 3	0.657			
Perceived entertainment (PEN)	PEN 1	0.903	0.833	0.937	0.900
	PEN 2	0.951			
	PEN 3	0.883			
Attitude toward use (ATT)	ATT 1	0.969	0.94	0.969	0.933
	ATT 2	0.970			
Intention to use (INT)	INT 1	0.926	0.851	0.945	0.912
	INT 2	0.927			
	INT 3	0.913			
Coercive power (COE)	COE 1	0.953	0.914	0.97	0.952
	COE 2	0.960			
	COE 3	0.956			
Reward power (REW)	REW 1	0.940	0.894	0.944	0.879
	REW 2	0.952			
Referent power (REF)	REF 1	0.951	0.891	0.942	0.875
	REF 2	0.937			
	REF 3				
Expert power (EXP)	EXP 1	0.946	0.899	0.947	0.888
	EXP 2	0.950			
Legitimate power (LEG)	LEG 1	0.832	0.839	0.939	0.888
	LEG 2	0.973			
	LEG 3	0.933			

Table 5 Correlation matrix and square roots of AVEs

	PU	PEOU	PEN	ATT	INT	COE	REW	REF	EXP	LEG
PU	**0.93**									
PEOU	0.19	**0.84**								
PEN	0.10	0.19	**0.91**							
ATT	0.69	0.10	0.17	**0.97**						
INT	0.66	−0.07	0.04	0.76	**0.92**					
COE	0.63	0.05	0.07	0.66	0.72	**0.96**				
REW	0.59	0.01	0.06	0.62	0.69	0.76	**0.95**			
REF	0.51	0.08	0.10	0.49	0.51	0.48	0.53	**0.94**		
EXP	0.12	0.14	0.23	0.15	0.14	0.19	0.20	0.12	**0.95**	
LEG	0.61	−0.01	0.03	0.57	0.69	0.63	0.67	0.70	0.11	**0.92**

values were above 0.7, indicating that the scales had a high reliability (Nunnally 1978).

In Table 5, we show the correlation matrix and the square roots of the AVEs. All square roots of the AVEs were larger than their corresponding correlation coefficients with other factors. This indicates that the scales had a good discriminant validity.

4.2.2 Hypothesis testing

The results of hypothesis testing are summarized in Fig. 2. Three relationships were found to be insignificant: the relationship between perceived ease of use and attitude toward use ($\beta = -0.049$, t value $= 1.46$), the relationship between government expert power and intention to use ($\beta = -0.043$, t value $= 0.03$), and the relationship between government legitimate power and intention to use

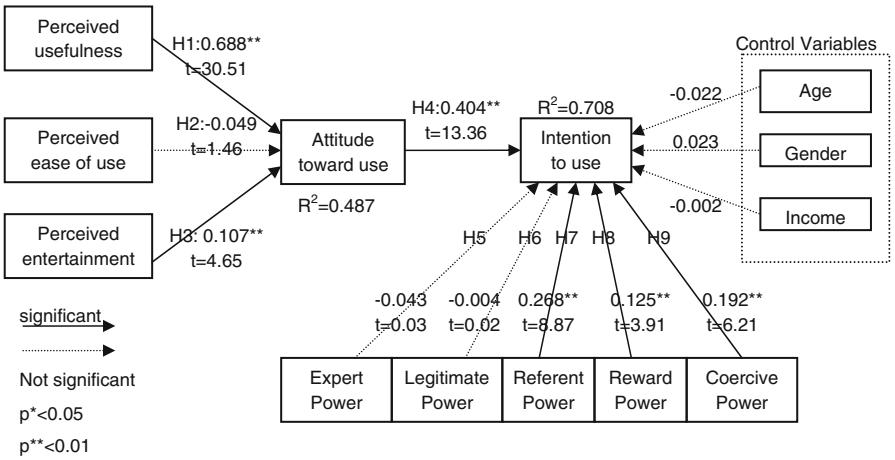

Fig. 2 Model testing results

($\beta = 0.004$, t value $= 0.02$). Government coercive power has a positive influence on the intention to use, which is not consistent with H9. Thus, H2, H5, H6, and H9 were not supported. The remaining hypotheses, including H1, H3, H4, H7, and H8, were all supported. The influences of three control variables on the intention to use were not significant, which were contrary to our hypotheses. The total variances explained were 48.7 % for attitude toward use and 70.8 % for intention to use.

Figure 3 shows how well technology acceptance factors explained intention to use. The model explained 48.7 % of the variance in attitude toward use and 57.1 % of the variance in intention to use. The influences of three control variables on intention to use were not significant.

4.2.3 Differences between men and women

Acceptance analysis for information technology often involves gender difference because, among all personality features, men and women have different views for measuring perceived usefulness and perceived entertainment (Lin and Lu 2011; Venkatesh and Morris 2000). This study used a multi-group analysis through PLS-Graph 3.0 to examine whether male and female subjects (930 male and 574 female) had differences in the path coefficients, following the same approach used in previous research in comparing path coefficients across subgroups (Lu and Hsiao 2010; Keil et al. 2000; Lin and Lu 2011). Figures 4 and 5 show the estimates of path coefficients between and variances explained (R^2) of the constructs. The results indicate that the two gender groups had significant differences in the path from perceived entertainment to attitude toward use. Among men, both perceived usefulness and perceived entertainment had direct influences on attitude toward use, while only perceived usefulness had a direct influence among women. Table 6 summarizes the results of the path analyses for the two genders.

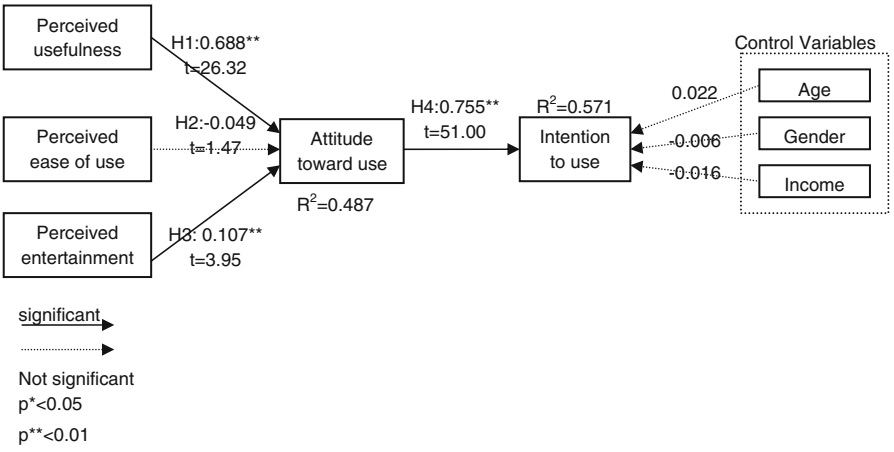

Fig. 3 Testing on technology acceptance

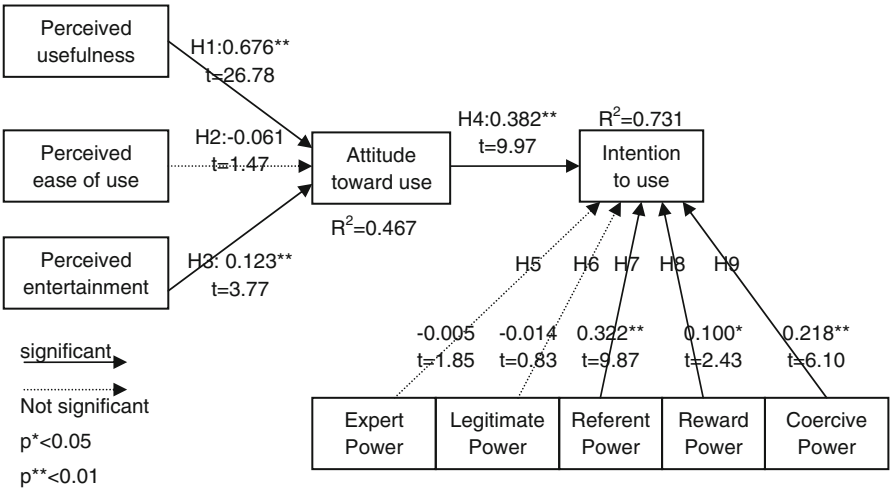

Fig. 4 Path analysis results for men ($n_1 = 930$)

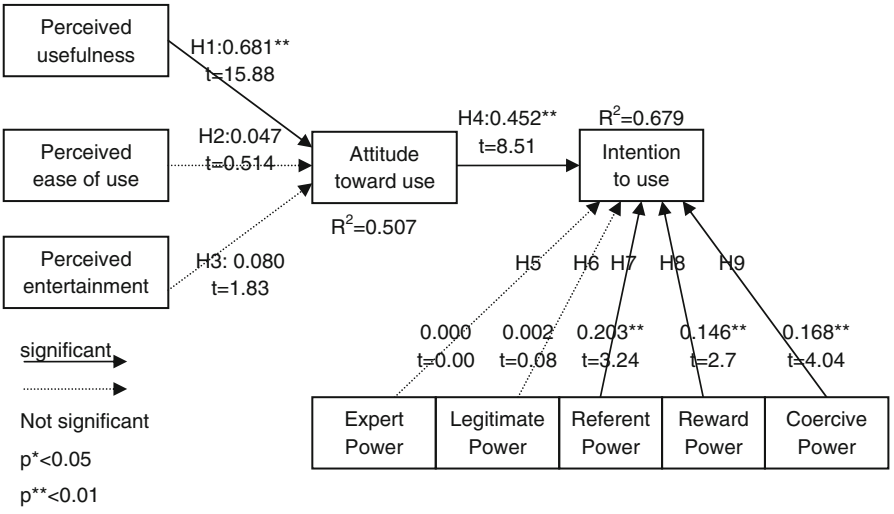

Fig. 5 Path analysis results for women ($n_2 = 574$)

5 Discussions

The present study examines the roles of government and technology acceptance factors in the adoption of government-sponsored agricultural information systems through the theoretical lenses of social power theory and the technology acceptance model. We will next discuss the main findings.

Table 6 Comparison of corresponding path coefficients

Path	Coefficient for men ($n_1 = 930$)	Coefficient for women ($n_2 = 574$)	Difference	
			t	Result
PU → ATT	0.676	0.681	−3.65*	Men < Women
PEN → ATT	0.123	0.080	21.85*	Men > Women
ATT → INT	0.382	0.452	−31.28*	Men < Women
REF → INT	0.322	0.203	51.40*	Men > Women
REW → INT	0.100	0.146	−19.75*	Men < Women
COE → INT	0.218	0.168	21.98*	Men > Women

t value (1-tailed) = 1.65. *n.s.* not significant

* Significant at the 0.05 level

5.1 The influence of technology acceptance factors on intention to use

We found that perceived usefulness and perceived entertainment have positive influences on attitude toward use, which in turn has a positive impact on intention to use. The influence of perceived ease of use on attitude toward use is not significant.

With a coefficient ($\beta = 0.678$) much higher than those of other constructs, perceived usefulness was found to be the most important factor influencing attitude toward using information technology. Perceived usefulness plays a crucial role in work-related environments (Moon and Kim 2001) and influences the adoption of agricultural information systems. Hence, it is important to provide useful features to farmers if the government wants to promote the adoption of such systems.

Perceived entertainment has a positive and significant influence on the attitude toward using agricultural information systems. This result shows that, even though agricultural information systems are mainly work-related, entertainment as an intrinsic motivation is still important. Hence, the government needs to add functions and features to agricultural information systems that increase the entertainment value in order to promote adoption.

Perceived ease of use had no effect on the attitude toward using information technology, contradicting results from previous research (Davis 1989). The mean of PEOU was 3.67, which indicated that agricultural information systems targeting farmers were not perceived as either too easy or too difficult to use. Moreover, perhaps regardless of whether they are easy to use or not, farmers will use such systems as they will provide farmers with some useful information (or farmers will be rewarded or escape from being punished when farmers use these system). Thus, ease of use is no longer a determinant of attitude.

As shown in Fig. 3, technology acceptance factors explained 57 % of the variance in intention to use. Thus, perceived usefulness and perceived entertainment are important factors that drive farmers' adoption of information technology.

5.2 The influence of government social power on intention to use

Government referent power, reward power, and coercive power have positive influences on intention to use, while the influences of government expert power and legitimate power are not significant.

With a coefficient ($\beta = 0.268$) much higher than those for other government social power constructs, government referent power has the most important influence on the intention to use agricultural information systems. If farmers believe that the government's interests are the same as theirs, they will be motivated to accept information systems promoted by the government. This result is consistent with that from a previous study (Valentine 2009). Government reward power has a positive impact on intention to use. Thus the government can use rewards and incentives to promote technology adoption by farmers. Government coercive power has a positive influence on intention to use. However, a previous study found that coercive power has a negative influence on intention to use (Biong et al. 2010). A possible explanation is the difference in context. The Chinese government has identified rural informatization as the key to realizing nationwide growth and enhancing farmers' capability in participating in new economic developments (Qiang and Hanna 2009). Thousands of websites have been set up to provide information to farmers (Liu 2012). More and more information is delivered by agricultural information systems. As a result, farmers have to adopt these systems to follow the directive of rural informatization from the government.

Government expert power and legitimate power are not significant. It is possible that Chinese farmers have confidence in government officers' knowledge and expertise. They view agricultural information systems as a new and high technology and believe that all the systems provided by the government are advanced and appropriate. They do not question the authority of the government officials. Moreover, we can't exclude farmers adopting information system as they are driven by coercion or social norm. Thus, government expert power was not a significant factor. In China, farmers are used to receiving directives from the government and they seldom question the legitimacy of government activities. Therefore, government legitimate power is not significant in predicting the intention to use agricultural information systems.

By comparing Figs. 2 and 3, we see that government social power constructs produced a substantial improvement in the variance explained in intention to use (from 57.1 to 70.8 %). In China's unique central-provincial institutional arrangement, the provincial government is not only the implementer of the central government's policies and projects but also the initiator of informatization programs specific to its territory (Liu 2012). Thus, the influence of government social power on the adoption of agricultural information systems is the strongest.

5.3 The influences of control variables

None of the control variables (age, gender, or monthly income) are significant determinants of users' behavioral intention. The result is consistent with those from a previous study (Lu and Hsiao 2010).

5.4 The influence of gender on attitude toward use and intention to use

Gender is a crucial factor in conducting agricultural productions. A gender division of labor is a key feature of agriculture (Leckie 1996). In China, the gender division of labor is that men do the work and make decisions about agricultural productions, while women act as domestic workers and agricultural helpers.

Perceived usefulness and perceived entertainment are important for information system adoption by male farmers, which is consistent with results from previous studies (Lin and Lu 2011; Venkatesh and Morris 2000). Male farmers are the main human resources in agriculture in China. They pay attention to the usefulness of agricultural information systems in enhancing production. The entertainment value of agricultural information systems is important, too. This can be due to two reasons. First, agricultural information systems provide male farmers with news that satisfy their curiosity, which may be considered a type of entertainment. Second, when information systems make male farmers' work more relaxed (e.g., timely and accurate market information allow them to optimize their work schedule and reduce anxiety caused by the lack of information), they will enjoy the systems.

For female farmers, perceived usefulness is a significant factor for adoption, but perceived entertainment is not. These results show that, when using agricultural information systems, female farmers pay more attention to the work-related benefits rather than hedonic values such as entertainment. As female farmers are not the main human resources, they have fewer opportunities to log into such work-related information systems. If they log into these systems, they just look for work-related benefits rather than entertainment. The impact of perceived usefulness on attitude to use is stronger for women than for men. Moreover, attitude to use's effect on intention to use is higher for women than for men. This may be because when men make decisions, they will balance their own attitude and other factors (e.g. the government' influence). However, when women make decisions, they may focus more on their own feelings.

Additionally, the effects of government referent and coercive powers on intention to use are higher for men than for women. A possible explanation is that male farmers are the decision-makers in their households. Even though female farmers value the importance of government referent power, they do to a lesser extent than male farmers as they may consult their spouses and consider other factors when making a decision (Martin and Abbott 2011). In contrast, government reward power's effect on intention to use is lower for men than for women. Men may focus more on the performance of information systems and less on the rewards from government. However, women may be the opposite.

5.5 Possible negative consequences from the government

Though government programs are often laden with positive outcomes, negative results can also occur and should not be ignored. First, as far as government coercive power is concerned, those who adopt agricultural information systems receive more information, whereas those who do not adopt such systems may face detrimental consequences due to the lack of information or disciplinary actions by

the government. Hence, if not used properly, government coercive power may decrease farmers' cooperation and increase the conflict between farmers and the government (Biong et al. 2010). Second, even though government social power may enhance the initial technology adoption, it does not guarantee the long-term success of the technology. Many information systems experience "sustainability failure" with initial success but abandonment after about a year (Heeks 2002). In such cases, government social power may have contributed to the early adoption of an inferior system and led to the waste of resources.

6 Implications

6.1 Theoretical implications

This study makes three contributions to theory. First, by studying the influence of government social power on behavioral intention, this study complements existing research on the role of the government in promoting agricultural information system adoption. The study shows that government social power can enhance technology adoption. Specifically, government coercive power, reward power, and referent power affect intention to use, while government expert power and legitimate power do not. More importantly, government social power produced a substantial improvement in the variance explained in intention to use (from 57.1 to 70.8 %).

Next, this research found that technology acceptance factors play a major role in farmers' acceptance of information technology. Specifically, perceived usefulness and perceived entertainment are important aspects that drive farmers' acceptance of government-sponsored agricultural information systems.

Third, the influences of different factors on attitude toward use vary due to gender differences. Perceived usefulness is important for both male and female farmers. Thus the ability to enhance job performance is critical for promoting adoption. Perceived entertainment is only significant for male farmers, which indicates that intrinsic motivations are crucial for male farmers' adoption. Additionally, government referent power has more influence on intention to use in men. As Chinese farmers are predominantly male, it is important to enhance their perception of government referent power in order to promote technology adoption.

6.2 Practical implications

Our research results can help the government promote the adoption of agricultural information systems. Although more research is needed, this study posits that the government can promote informatization by providing rewards for farmers who use information systems. In addition, government referent power is important, especially for men. The government should make farmers believe that it has the same interests as them. Finally, it is surprising that government coercive power can promote farmers' acceptance of information systems. This means the government can facilitate information system adoption by increasing farmers' pressure of acceptance.

Moreover, information systems targeting rural areas should be relevant for farmers. Perceived entertainment is an important factor affecting male farmers' acceptance behavior, indicating that the purpose of their information system usage is not just for production.

We also recommend that the government develop different applications for farmers. For instance, entertainment shall be enhanced for male farmers; enhancing usefulness can also attract more female famers. Moreover, we recommend that the government enhance its referent power to attract more male farmers to accept information systems.

7 Limitations and future research

The study has two main limitations. First, the sample might be biased since all respondents came from Jiangxi province in China and most respondents were male. Second, this research focuses exclusively on the effect of technology acceptance and government social power. Other relational constructs could also affect intention to use. Future study can examine the influence of government social power on post-acceptance behavioral intention. We can also look into other factors such as cloud service that may influence farmers' usage intention (Demirkan and Goul 2013; Kridel and Dolk 2013). Additionally, government programs may lead to both positive and negative outcomes. Thus, negative effects should be studied in the future.

Acknowledgments This work was supported by the grants from the NSFC (71332001, 71061160505) and the Specialised Research Fund for the Doctoral Program of Higher Education (20120142110042). This work was also supported by the TD-SCDMA Joint Innovation Lab, Hubei Mobile Co., China Mobile Group and the Fundamental Research Funds for the Central Universities, 52902-0900206134.

References

Abbott E, Gregg J (2000) What happens when information technologies are forced on rural community organizations? The case of Iowa State University extension. Having all the right connections: telecommunications and rural viability, pp 229–256

Alvarez J, Nuthall P (2006) Adoption of computer based information systems: the case of dairy farmers in Canterbury, NZ, and Florida, Uruguay. Comput Electron Agric 50(1):48–60

Aubert BA, Schroeder A, Grimaudo J (2012) IT as enabler of sustainable farming: an empirical analysis of farmers' adoption decision of precision agriculture technology. Decis Support Syst 54(1):510–520

Bagozzi R, Yi Y (1988) On the evaluation of structural equation models. J Acad Mark Sci 16(1):74–94

Biong H, Nygaard A, Silkoset R (2010) The influence of retail management's use of social power on corporate ethical values, employee commitment, and performance. J Bus Ethics 97(3):341–363

Blignaut P (2009) A bilateral perspective on the digital divide in South Africa. Perspect Global Dev Technol 8(4):581–601

Bongiovanni R, Lowenberg-DeBoer J (2004) Precision agriculture and sustainability. Precis Agric 5(4):359–387

Busch P, Wilson DT (1976) An experimental analysis of a salesman's expert and referent bases of social power in the buyer-seller dyad. J Mark Res 13(1):3–11

Cartwright D (1959) A field theoretical conception of power. In: Cartwright D (ed) Studies in social power. University of Michigan, Ann Anbor

Chang L, Hau KT, Guo AM (2001) The effect of self-consciousness on the expression of gender views 1. J Appl Soc Psychol 31(2):340–351
Close AG, Kukar-Kinney M (2010) Beyond buying: motivations behind consumers' online shopping cart use. J Bus Res 63(9–10):986–992
CNNIC (2010) The 2009 Survey Report on Internet Development in Rural China
Cronin FJ, McGovern PM, Miller MR, Parker EB (1995) The rural economic development implications of telecommunications: evidence from Pennsylvania. Telecommun Policy 19(7):545–559
Crosno JL, Freling TH, Skinner SJ (2009) Does brand social power mean market might? Exploring the influence of brand social power on brand evaluations. Psychol Mark 26:91–121
Davis FD (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Q 13(3):319–340
Davis FD, Bagozzi RP, Warshaw PR (1989) User acceptance of computer technology: a comparison of two theoretical models. Manag Sci 35(8):982–1003
Davis FD, Bagozzi RP, Warshaw PR (1992) Extrinsic and intrinsic motivation to use computers in the workplace 1. J Appl Soc Psychol 22(14):1111–1132
Demirkan H, Goul M (2013) Taking value-networks to the cloud services: security services, semantics and service level agreements. Inf Syst e-Bus Manag 11(1):51–91
Erchul WP, Raven BH (1997) Social power in school consultation: a contemporary view of French and Raven's bases of power model. J Sch Psychol 35(2):137–171
Ferrell OC, Skinner SJ (1988) Ethical behavior and bureaucratic structure in marketing research organizations. J Mark Res 25(1):103–109
Fishbein M, Ajzen I (1975) Belief, attitude, intention, and behavior: an introduction to theory and research. Addison-Wesley, Reading, MA
Fiske STB (2006) Social psychology: handbook of basic principles, 2nd edn. Guilford Press, New York, pp 678–692
Flor AG (1993) The informatization of agriculture 1. Asian J Commun 3(2):94–103
French JRP, Raven B (2001) The bases of social power. In: Modern classics of leadership, vol 2, pp 309–326
French JRP Jr, Snyder R (1959) Leadership and interpersonal power. In: Cartwright D (ed) Studies in social power. University of Michigan, Ann Arbor
Gang F, Ping Z (2012) The characteristics of farmers and paying willingness for information. J Agric Sci 4(4):163–170
Gaski JF (1984) The theory of power and conflict in channels of distribution. J Mark 48(3):9–29
Gefen D, Karahanna E, Straub DW (2003) Inexperience and experience with online stores: the importance of TAM and trust. IEEE Trans Eng Manag 50(3):307–321
Goodhue DL, Lewis W, Thompson R (2012) Does PLS have advantages for small sample size or non-normal data? MIS Q 36(3):891–1001
Goodrich K, Mangleburg TF (2009) Adolescent perceptions of parent and peer influences on teen purchase: an application of social power theory. J Bus Res 63(12):1328–1335
Gregg J, LaRose R, Strover S, Straubhaar J (2006) Understanding the broadband gap in rural America. International Communication Association, Dresden
Gundlach GT, Cadotte ER (1994) Exchange interdependence and interfirm interaction: research in a simulated channel setting. J Mark Res 31(4):516–532
Heeks R (2002) Information systems and developing countries: failure, success, and local improvisations. Inf Soc 18(2):101–112
Henseler J, Ringle CM, Sinkovics RR (2009) The use of partial least squares path modeling in international marketing. Adv Int Mark 20:277–319
Hipple P, Ramsey M (2000) Telecommunications: a complex prescription for rural health care providers. In: Korsching PF, Hipple PC, Abbott EA (eds) Having all the right connections: telecommunications and rural viability, pp 173–200
Hosman L (2010) Policies, partnerships, and pragmatism: lessons from an ICT-in-education project in rural Uganda. Inf Technol Int Dev 6(1):48–64
Hsu C-L, Chang K-C, Chen M-C (2013) The impact of website quality on customer satisfaction and purchase intention: perceived playfulness and perceived flow as mediators. Inf Syst e-Bus Manag 10(4):549–570
Jarvenpaa SL, Todd PA (1996) Consumer reactions to electronic shopping on the world wide web. Int J Electron Commer 1(2):59–88

John G (1984) An empirical investigation of some antecedents of opportunism in a marketing channel. J Mark Res 21(3):278–289
Joseph R (2001) Understanding the digital divide. Prometheus 19(4):333–336
Katz R, Suter S (2009) Estimating the economic impact of the broadband stimulus plan. Columbia institute for tele-information working paper
Kaynak E, Kara A (2002) Consumer perceptions of foreign products: an analysis of product-country images and ethnocentrism. Eur J Mark 36(7/8):928–949
Keil M, Tan BC, Wei K–K, Saarinen T, Tuunainen V, Wassenaar A (2000) A cross-cultural study on escalation of commitment behavior in software projects. MIS Q 24(2):299–325
Kizilaslan N (2006) Agricultural information systems: a national case study. Libr Rev 55(8):497–507
Kohli AK (1989) Effects of supervisory behavior: the role of individual differences among salespeople. J Mark 53(4):40–50
Kornberg A, Perry SD (1966) Conceptual models of power and their applicability to empirical research in politics. Polit Sci 18(1):52–70
Kridel D, Dolk D (2013) Automated self-service modeling: predictive analytics as a service. Inf Syst e-Bus Manag 11(1):119–140
LaRose R, Strover S, Gregg JL, Straubhaar J (2011) The impact of rural broadband development: lessons from a natural field experiment. Gov Inf Q 28(1):91–100
Leckie GJ (1996) Female farmers and the social construction of access to agricultural information. Libr Inf Sci Res 18(4):297–321
Lewin K, Cartwright D (1952) Field theory in social science: selected theoretical papers. Tavistock, London
Li J, Zhao C, Qin X, Liu G (2011) Study on the demands for agricultural and rural informationization in china and its strategic options. Comput Comput Technol Agric IV:580–591
Lin CA (1999) Online-service adoption likelihood. J Advert Res 39(2):79–89
Lin K-Y, Lu H-P (2011) Why people use social networking sites: an empirical study integrating network externalities and motivation theory. Comput Hum Behav 27(3):1152–1161
Liu C (2012) The myth of informatization in rural areas: the case of China's Sichuan Province. Gov Inf Q 29(1):85–97
Lu H-P, Hsiao K-L (2010) The influence of extro/introversion on the intention to pay for social networking sites. Inf Manag 47(3):150–157
Mackrell D, Kerr D, von Hellens L (2009) A qualitative case study of the adoption and use of an agricultural decision support system in the Australian cotton industry: the socio-technical view. Decis Support Syst 47(2):143–153
Martin BL, Abbott E (2011) Mobile phones and rural livelihoods: diffusion, uses, and perceived impacts among farmers in rural Uganda. Inf Technol Int Dev 7(4):17–34
Mitchell RK, Agle BR, Wood DJ (1997) Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts. Acad Manag Rev 22(4):853–886
Moga LM, Constantin DL, Antohi VM (2012) A regional approach of the information technology adoption in the Romanian agricultural farms. Informatica 16(4):29–36
Moon JW, Kim YG (2001) Extending the TAM for a world-wide-web context. Inf Manag 38(4):217–230
Nunnally J (1978) Psychometric theory. McGrew-Hill, New York
Ozowa VN (1995) The nature of agricultural information needs of small scale farmers in Africa: the Nigerian example. Q Bull Int Assoc Agric Inf Special 40(1):15–20
Qiang CZW, Hanna NK (2009) Rural informatization in China. World Bank Publications, Washington
Rao N (2007) A framework for implementing information and communication technologies in agricultural development in India. Technol Forecast Soc Chang 74(4):491–518
Rao SS (2008) Social development in Indian rural communities: adoption of telecentres. Int J Inf Manag 28(6):474–482
Röling NG (1988) Extension science: information system in agricultural development. CUP, Cambridge
Sánchez-García I, Currás-Pérez R (2011) Effects of dissatisfaction in tourist services: the role of anger and regret. Tour Manag 32(6):1397–1406
Sassenberg K, Ellemers N, Scheepers D (2012) The attraction of social power: the influence of construing power as opportunity versus responsibility. J Exp Soc Psychol 48(2):550–555
Stevens JM, Kevin Steensma H, Harrison DA, Cochran PL (2005) Symbolic or substantive document? The influence of ethics codes on financial executives' decisions. Strateg Manag J 26(2):181–195

Suri PK, Sushil (2006) E-governance through Strategic alliances—a case of agricultural marketing information system in India (Indian Institute of Management Bangalore). IIMB Manag Rev 18(4):389–401

Swasy JL (1979) Measuring the bases of social power. Adv Consum Res 6(1):340–346

Sykes TA, Venkatesh V, Gosain S (2009) Model of acceptance with peer support: a social network perspective to understand employees' system use. MIS Q 33(2):371–393

Telecom J (2011) Information village (main page). http://www.xxty.cn/gyxxty/gsjshao/index.html

Teo TSH, Pok SH (2003) Adoption of WAP-enabled mobile phones among internet users. Omega 31(6):483–498

Trevino LK (1986) Ethical decision making in organizations: a person-situation interactionist model. Acad Manag Rev 11(3):601–617

Valentine S (2009) Ethics training, ethical context, and sales and marketing professionals' satisfaction with supervisors and coworkers. J Pers Sell Sales Manag 29(3):227–242

Venkatesh V, Davis FD (2000) A theoretical extension of the technology acceptance model: four longitudinal field studies. Manag Sci 46(2):186–204

Venkatesh V, Morris MG (2000) Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. MIS Q 24(1):115–139

Venkatesh V, Morris M (2003) User acceptance of information technology: toward a unified view. Manag Inf Syst Q 27(1):425–478

Warren M (2007) The digital vicious cycle: links between social disadvantage and digital exclusion in rural areas. Telecommun Policy 31(6–7):374–388

Wolfe DM (1959) Power and authority in the family. Studies in social power. University of Michigan Press, Ann Arbor, pp 99–117

Wolfinbarger M, Gilly MC (2001) Shopping online for freedom, control, and fun. Calif Manag Rev 43(2):34–55

Xia J (2010) Linking ICTs to rural development: China's rural information policy. Gov Inf Q 27(2):187–195

Xia J, Lu TJ (2008) Bridging the digital divide for rural communities: the case of China. Telecommun Policy 32(9–10):686–696

Zhong C-B, Magee JC, Maddux WW, Galinsky AD (2006) Power, culture, and action: considerations in the expression and enactment of power in East Asian and Western societies. Research on managing groups and teams, vol 9. Elsevier Science, Greenwich, pp 53–73