Factors Influencing the Intention of University Students to Adopt and Use E-Government Services: An Empirical Evidence in China

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Abstract
This research article examines the intention of university students to adopt and use e-government services in China. The unified theory of acceptance and use of technology (UTAUT) was used as the theoretical framework for this study. A total of 369 valid responses were collected from Chinese citizens (college students) and used for the data analysis. The data analysis was conducted with SPSS. The results of this study have demonstrated that facilitating conditions, perceived service quality, trust in the government, and social influence were significant predictors of the intention of university students to adopt and use e-government services. Interestingly, performance expectancy, effort expectancy, and trust in the Internet were not significant determinants of the intention to use e-government services. Social influence was significant in determining the trust in the Internet but was not significant in predicting the trust in government. The implications of these findings for the implementation of e-government are discussed.

Keywords
E-government, e-government services, UTAUT, China

Introduction
The advent of information and communication technologies (ICTs) has provided government and public sector organizations the necessary tools to enhance the delivery of public services. The application of these ICTs such as the Internet in the public administration processes is known as e-government. According to the UN E-Government Survey (2014), e-government is the use of ICTs by government and its public sector agencies to provide improved access to information and public services. E-government is also considered as the combination of e-administration and e-democracy to achieve the objective of good governance (Bwalya, 2009; Coleman, 2006). It is also the strategies, organizational reforms, and process through the medium of information technology to improve the access to and delivery of government public services to citizens (Kefallinos, Lambrou, & Sykas, 2009). The phenomena of e-government could be divided into two major categories: supply side and demand side. The government’s effort in terms of provision of the required infrastructure for the adoption and implementation of e-government is known as the supply side of e-government, whereas the citizens’ decision to use services provided through e-government is termed as the demand side. Both the supply side and the demand side of e-government are critical for the success of e-government projects.

Although the provision of required infrastructure (supply side) for the implementation of e-government is very important, the success of e-government will be dependent on the extent to which citizens are willing to use services provided through e-government (Shareef, Kumar, Kumar, & Dwivedi, 2011). The inability to increase the demand side of e-government could hinder the realization of the potential benefits of e-government and render e-government initiatives unsuccessful (Ozkan & Kanat, 2011; Zhao, Shen, & Collier, 2014). Hence, studies seeking to understand the factors (from the demand side) determining the adoption of e-government services should be encouraged as it provides valuable inputs for policy makers and government to ensure the success of e-government projects.
The objective of this study is to examine the factors determining the intention of university students in the City of Harbin, China, to adopt and use e-government services. Students form an important segment or component of citizens of any country, and as they also stand to benefit from the government policy, programs, and activities such as e-government services, it thus imperative that studies examine issues from their perspective. Understanding issues from the perspective of citizens who are students and the youth as well the future leaders of any country and the world would offer government and policy makers the chance to inculcate their views and opinions into public policy formulation. Students as citizens are integral partners and thus play a key role in the development and deployment of e-government services (Stahl, 2005). From the domain of e-government, students have the opportunity to enjoy public services such as birth certificate, national ID cards, passports, household registration cards, driving licenses, health insurance cards, e-learning services, and national/local e-library services acquisitions, which are provided by the government through its sector agencies. E-government can also provide information services to educate and inform citizens (students) about governments’ activities, especially in terms of its budget and expenditure, and thus put students in a better position to hold government more accountable to its citizens. It can also serve as a tool and basis to empower students to demand greater openness and transparency of government and its sector agencies. This study is significant because knowing the factors influencing the adoption of e-government has the potential to increase the access and uptake of e-government services, which is cardinal for the success of e-government projects. It has been indicated that the success of e-government is based on the number of citizens who adopt it (Kurfah, Arifoğlu, Tokdemir, & Paçin, 2017). Therefore, this research will seek to explore the following two research questions:

**Research Question 1:** What factors determine the intention to use e-government services among university students?

**Research Question 2:** What are the significant relationships that exist between these predictors?

The rest of this research article is organized into the following sections: appropriate literature review, research theoretical framework, research model, research hypothesis development, data analysis, discussions, conclusions, and limitations of the study.

**Literature Review**

**E-Government Adoption**

E-government adoption studies continue to be a prominent issue for researchers and scholars around the world due to the challenging nature of technology and the changing attitudes of people who use these technology applications. The huge increase in the body of e-government knowledge and adoption research is significant and pivotal, as it reveals the needs or factors and demands of users/citizens, which provide insights for government and policy maker to develop e-government services that will be accepted and used (Rana, Dwivedi, & Williams, 2013; Susanto, 2013). Over the years, e-government adoption research has used the technology adoption theories or models, as its fundamental to understand citizens’ behavior toward the adoption of e-government and its related applications around the globe. Some of these recent studies based on specific countries are Rufin, Bélanger, Molina, Carter, and Figueroa (2018; Spain and the United States); Maestre, Astudillo, Concha, and Nieto (2018; Colombia), Verkijika and De Wet (2018; sub-Saharan Africa); Jung (2019; Gambia); Mansoori, Sarabdeen, and Tchantchane (2018; Emirates); Abdullah, Naser, and Fayez (2018; Kuwait); Meacham, Rath, Moharana, Phalp, and Park (2019; Korea); and Kose (2019; Turkey). These adoption studies are an indication of the culture or country-specific nature of e-government services and the factors determining its adoption.

**E-Government Adoption in China**

The development and deployment of e-government in China, according to Sodhi (2016), has contributed to improving the administration of state institutions and the delivery of public services to citizens. E-government projects and services are mainly driven by central information and communication technology (ICT) development plans by central government but are mostly implemented at the local level by provincial, municipal, and districts levels of government (Yang, 2017). The development of e-government in China was given a booster with the government’s introduction of “Internet Plus Strategy” in 2015, which attempts to provide citizen-centered public services through the enabling environment of ICT in areas such as online health care, citizen participation, public management, and so on (Yang, 2017).

Since the inception of e-government development in China, scholars have attempted to understand the factors encouraging the adoption of e-government services among Chinese citizens. For instance, in a recent study, it was revealed that Chinese citizens prefer to access e-government services via social networking sites (SNSs) such as WeChat and Weibo as they can easily access services through their smartphones (Yang, 2017). Also, SNSs are emerging as the most convenient outlet for e-government services due to its capacity to generate massive user base within a short time (Yang, 2017). Another study that examined the adoption of mobile government services indicated that factors such as perceived ease of use, near-term usefulness, long-term usefulness, integrity, benevolence, image, and social influence were positive determinants of the intention of Chinese citizens to use mobile government services (Liu et al., 2014). Another study demonstrated that e-government cloud adoption is...
influenced by technology driving, cloud provider support, environmental stimulus, organizational readings, and cloud trust (Liang, Qi, Wei, & Chen, 2017). In addition, psychological perceptions, user characteristics, service parameters of the government portals, and the government’s idea were found to be positive predictors of the continued intention to use Chinese government’s e-government services portals (Tang, Gong, Han, & Peng, 2018).

These e-government adoption studies provide insight from the Chinese citizens’ perspective and thus contribute to both the practical and theoretical development of e-government. It also provides the impetus that e-government implementation should be context or cultural related than a broader approach from developed economies. This context or culture-adapting nature of e-government adoption bolsters the continued interest in e-government adoption research as different perspectives are brought to bear on the implementation and adoption of e-government. Also, e-government adoption research offers government the opportunity to offer better citizen-centered services by assessing the real information and services needed by citizens; the technological capabilities of citizens; the information literacy in terms of understanding how users perceive government; the usability and functionality of websites, systems availability, and affordability; and finally the consistency of services delivered (Bertot & Jaeger, 2008).

Impact of E-Government

The application of ICTs has the potential to accelerate human developmental needs such as cultural, social economic, and political development. It has also transformed cultures, societies, and economies and eradicated poverty (United Nations Department of Economic and Social Affairs [UNDESA], 2016). ICT has been identified as one of the major means through which the United Nations 2030 Agenda for Sustainable Development Goals could be achieved (UNDESA, 2016). ICT and interconnectedness have a great capacity to accelerate human development and progress, to bridge the digital divide and to develop knowledge societies (UNDESA, 2016). The adoption of ICT to address these developmental challenges confronting countries around the globe has led to the term “ICT for Development” (ICT4D). ICT4D is the use of ICTs to accomplish economic and social and political developmental goals (Mariscal, 2010; Singh, Díaz Andrade, & Techataassanasoontorn, 2017). The ICT4D is based on the major assumption that the application of the right information and communication technologies in the developing process can contribute to the enhancement of the socioeconomic situations in developing countries (Mann, 2003; Sahay, 2001; Walsham, Robey, & Sahay, 2007).

The contribution of ICT to the development process in countries around the world can be explained into two perspectives: First is the ICT growth and second ICT transfer/diffusion perspectives (Avgerou, 2010; Joseph, 2002). The ICT growth perspective refers to the output employment and export earning as a result of engaging in the production of ICT goods and services (Dedrick & Kraemer, 2001). The ICT diffusion perspective has to do with ICT-related activities that increase productivity, competitiveness, growth, and human welfare as a result of the use of ICT by various actors in the society and economy (Joseph, 2002). According to Avgerou (2010), the diffusion/transfer perspective is the transfer of technologies, which are adapted to the conditions of developing countries, from advanced countries and economies.

The applications of ICT4D cut across different sectors of national settings and fields such as agriculture, climate change, and environment, education, literacy, health and e-government and civic engagement. Electronic government (e-government), which is the resultant application of ICT4D initiatives, is the main focus of this current study. E-government is the application of ICTs such as wide area network, the Internet, and mobile computing by the government and its agencies to interact and transform relations with citizens, businesses, and other arms of government (World Bank, 2015). The use of these technologies ultimately could ensure better delivery of government services and information to citizens and improved interaction with businesses and industry (World Bank, 2015). E-government has the potential to increase transparency and reduce corruption (World Bank, 2015). E-government is also referred to as the strategic use of information and communication technologies to provide citizens and businesses with more convenient access to government information and services and optimized service delivery, and to encourage citizens’ participation in governance (Fang, 2002; Phang, Li, Sutanto, & Kankanhalli, 2005; Turban, King, Lee, & Viehland, 2002). It is also considered as the use of ICT in public administration to ensure organizational reforms and processes to improve the delivery of government public services to businesses, citizens, government workers, and within public sector agencies (Åkesson, Skålén, & Edvardsson, 2008; Kefallinos et al., 2009). The adoption of e-government can enhance democratic processes, provide public support for public policies, and make government more accessible, effective, and accountable (Åkesson et al., 2008; Chatfield & Alhujran, 2009; Wangpipatwong, Chutimaskul, & Papasatratorn, 2009).

The implementation of e-government has an impact on the economic, social, and governance settings of a nation (International Telecommunication Union [ITU], 2002). The expected impact of e-government on the social, economic, and governance processes is listed in Table 1.

Forms of E-Government (Approaches)

The adoption of e-government is meant to interact with three major stakeholders such as citizens, businesses, and government to government. These interactions have led to the development of different approaches/dimensions of e-government applications such as Government-to-Citizens
(G2C), Government-to-Business (G2B), and Government-to-Government (G2G) forms of e-government. The G2C form of e-government provides two-way communications/interaction from the government (public service delivery) to citizens. The G2B form of e-government provides services to the business community through e-government. The G2G form of e-government has to do with applications that exchange information and services among and between government public sector agencies. These three forms/approaches to e-government have an impact on the three main dimensions of policy objectives: economic, social, and governance dimensions (ITU, 2002). The economic, social, and governance impact/benefits of the three e-government approaches are shown in detail in Tables 2 to 4.

Research Theoretical Framework

The unified theory of acceptance and use of technology (UTAUT) developed by Venkatesh, Morris, Davis, and Davis (2003) will be used as the theoretical foundation for this study. The UTAUT proposed four major factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions as the predictor of the behavioral intention to adopt and use new technology (Venkatesh et al., 2003). These constructs are also moderated by gender, age, experience, and voluntariness of use (Venkatesh et al., 2003). The UTAUT is predicted to explain about 53% of the variance in the acceptance and intention to use technology-related applications (Venkatesh et al., 2003). According to Venkatesh et al. (2003), performance expectancy is when the user believes that the use of technology would enable him or her to accomplish a specific task or job performance. The performance expectancy is similar to the perceived usualness in the technology acceptance model (TAM; Davis, 1989). The effort expectancy is the user understanding that the use of particular technology-related applications would be easy to use (Venkatesh et al., 2003). According to Venkatesh et al. (2003), effort expectancy is similar to the perceived ease of use in the TAM model (Davis, 1989). Social influence is a situation whereby the user decides to use a particular technology which is influenced by friends and family as well as important persons in the society while the facilitating conditions is the user anticipation that there are available the required resources (organizational and technical infrastructure) to enable him or her use a particular technology (Venkatesh et al., 2003). The UTAUT is illustrated in Figure 1.

The UTAUT has been applied widely to understand the decision of users to engage in particular technology across several fields such as e-commerce, e-business, e-learning, m-government, and e-government. For instance, the UTUAT has been determined to impact the user intention to use e-commerce/e-business-related applications (Awigah, Kang, & Lim, 2016; Goswami & Dutta, 2017; Lim, Baharudin, & Low, 2016; Rajapakse, 2011), e-learning (Akbar, 2013; Marchewka & Kostiwa, 2007; Tan, 2013), and

Table 1. Impact of E-Government (International Telecommunication Union, 2002).

| Economic | Social | Governance |
|----------|--------|------------|
| - Alternative, more cost-effective delivery of services | - Increased gender equality | - Greater accountability and transparency in public administration |
| - Consolidation of common internal services | - IT literacy and reduction of the internal digital divide | - Better coordination and cooperation between government agencies |
| - Redeployment and rebalancing of the civil service | - Increased access to and quality of education | - Better coordination and cooperation between the different levels of government |
| - Reduction of transaction expenditures | - Improved education management capacity | - Alliances and partnerships with private sector and nongovernmental organizations |
| - Promotion of internal and foreign investments | - Better delivery of and access to health services | - Improved communications and public relations |
| - Increased international trade | - Improved health management capacity | - Increased awareness of rights of civil society and obligations of government |
| - Increased economic cooperation | - Improved social security | - Greater public participation in governments’ affairs |
| - Better financial management in place | - Improved social welfare | - Streamlined government structure and business processes |
| - Business planning processes in place for all major operations | - Integration and coordination of social and economic policy | - Decentralization and redefined role of local government |
| - Integrated development planning capacity linked to financial resource allocation processes | - Improved public safety and security | - Enabling legal infrastructure |
| - Increased capacity to manage natural resources in a sustainable manner | - Increased capacity for rational distribution of public funds (geographically and among population groups) | - Enabling policy and regulatory frameworks |
| - Improved revenue collection on taxes and service levies | - Move to development-oriented and people-centered service delivery culture | - Promotion, protection, and compliance of human rights |
| - Increase in employment | - Improved quality of the environment | - Promotion of regional integration of countries |
| - Economic growth | - Improved environmental management capacity | - Enhanced capacity to coordinate and cooperate at international level |
| | - Poverty reduction | |
Some of the specific empirical findings on the adoption of e-government services include a study that examined the impact of intermediaries on the adoption and diffusion of e-government services among Madinah City in Saudi Arabia (Weerakkody, El-Haddad, Al-Sobhi, Shareef, & Dwivedi, 2013). The results demonstrated that trust of intermediaries, effort expectancy, and effort expectancy are significant factors accounting for the diffusion and adoption of e-government services in Saudi Arabia (Weerakkody et al., 2013). In addition, another study examined the acceptance and use of open data technology as a means to achieve greater transparency, participation, and innovation (Zuiderwijk, Janssen, & Dwivedi, 2015) in e-government. This study indicated that performance expectancy, effort expectancy, social influence, facilitation conditions, and voluntariness to use accounted for about 45% of the variance in the intention to use open data technologies (Zuiderwijk et al., 2015). However, the study found that all these factors were significant predictors of the intention to use open data technologies, except facilitation condition (Zuiderwijk et al., 2015). Also, a study found that the outcome expectations, affect, anxiety, self-efficacy, and social influence are important factors determining the adoption of e-government services (Rana & Dwivedi, 2015). Furthermore, it was shown that performance expectancy, effort expectancy, perceived risk, anxiety, and social influence were predictors of attitude, whereas
attitude and facilitating conditions determine the behavioral intention to use e-government services (Dwivedi et al., 2017; Rana, Dwivedi, Lal, Williams, & Clement, 2017). These extensive applications of the UTAUT model are a clear indication that its robustness, validity, and reliability can be assured.

**Research Model**

The research model for this study is depicted in Figure 2. Performance expectancy, effort expectancy, facilitating condition, perceived service quality, trust in the Internet, social influence, and trust in government are considered as the independent variables. They are anticipated to have a significant direct impact on the intention to use e-government services. Social influence has a direct impact on the trust in both the government and the Internet.

**Research Hypotheses Development**

This study will attempt to explore the following research hypotheses based on the research model illustrated in Figure 2.

**Performance Expectancy**

Performance expectancy, according to Venkatesh et al. (2003), is the perception of the user that the use of particular

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**Table 3. Impact/Benefits of E-Government Applications, Government to Business (International Telecommunication Union, 2002).**

| Interaction processes | Economic impact/benefits | Social impact/benefits | Governance impact/benefits |
|-----------------------|--------------------------|------------------------|----------------------------|
| **Government to Business: G2B** | | | |
| Customs declaration | • Lower transaction costs | • Ease of declaration, coupled with online help, lowers threshold for small-and medium-sized firms | • Transparency, accountability, rule of law, participation |
| | • Timely declarations | • Easier to participate in bidding for smaller firms | • Accountability and transparency |
| | | • Easier to comply with tax rules for smaller businesses | • Idem |
| E-procurement | • Savings and lower transaction costs | | |
| National revenue online | • Increased income through better coverage and timely payments | • Employment generation and economic diversification | • Transparent application of taxation |
| Social contribution for employees | • Reduced transaction costs | • Easier to comply with rules | • Transparent application with online support |
| | • Timely payments received electronically | | |
| | • Increased coverage | | |
| Information and knowledge sharing facility of doing business in the country | • Increased investment attractiveness and potential upside in income | • Transparency | |
| Access to sociodemographic and other government databases | • New business opportunities | • Greater use of information for planning and provision of services both public and private | • Transparency |
| | • New service opportunities for government | | |
| Land registration online | • Reduce transaction costs | • Easier transfer of properties and lower maintenance costs if project developers are requested to file their applications digitally | • Greater transparency in valuation/taxation/history of land |
| | • Online service may generate income (i.e., sale of maps) | • Greater standardization of geographic information, allowing more users to build their applications on this platform | | |
| | • Reduced maintenance costs if project developers are requested to file their applications digitally | | |
| Vehicle registration | • Reduced transaction costs | • Ease of registration and fleet management, leading to reduced costs for firms | • Transparency |
| Virtual job market | • New service with possible income stream | • Ease of posting jobs and search for candidates at substantially lower costs and reduced time frames | • Greater transparency in governmental job market |
| | | | • Posting vacancies in public and private sector in searchable system can imply higher exchange of personnel between both sectors |
technology will assist or enable him or her to accomplish a particular job performance. It has been established that performance expectancy is a determinant of the intention to use technology-related applications (Davis, 1989; Venkatesh et al., 2003). The individual’s perception that the use of e-government will provide some benefits may influence the behavioral intention to use e-government services. In terms of e-government, studies have demonstrated that performance expectancy has a significant positive impact on the intention to use e-government services (AlAwadhi & Morris, 2008; Bhasiri, Zo, Lee, & Ciganek, 2016; Kurfalı et al., 2017; Lallmahomed et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Zawaideh, 2016). H1 was therefore proposed:

**Hypothesis 1 (H1):** Performance expectancy has a significant direct impact on the intention to use e-government services.

**Effort Expectancy**

The effort expectancy is the extent to which a user believes that the use of particular technology would be free of challenges and will be easy to use (Venkatesh et al., 2003). Effort expectancy has an influence on the user acceptance of new technology (Davis, 1989; Venkatesh et al., 2003). Citizens who perceive and feel that the use of e-government does not require much effort would be attracted to use e-government services.

### Table 4. Impact/Benefits of E-Government Applications, Government to Citizens (International Telecommunication Union, 2002).

| Interaction processes | Economic impact/benefits | Social impact/benefits | Governance impact/benefits |
|-----------------------|--------------------------|------------------------|----------------------------|
| **Government to Citizens: G2C** | **Income through increased transactions and savings on costs** | **Effectiveness, coverage, and quality of services** | **Participation of citizens, democracy, transparency, accountability** |
| - National revenue online | - Reduced transaction costs | - Ease of payment and of applying for tax refunds | - Transparency |
| - Land registration | - Reduced transaction costs | - Easier to transfer property | - Rule of law, transparency |
| - Safety and security | - Reduced transaction costs | - Increased capacity to maintain order and fight crime | - Rule of law |
| - Telemedicine | - Reduced costs in epidemiological controls/ reference and counter-reference/supply management | - Increased capacity to address health issues through epidemiological control | - Human rights |
| - Employment opportunities | - Reduced advertisement cost and other communication costs | - Easier access to information about job opportunities at Government | - Openness, higher degree of fairness |
| - Less time lost between announcing post and contract extension | - Easier (standard) application | - Transparency |
| - Reduced transaction costs in comparison of applications | | | |
| - Social security contributions | - Reduced transaction costs | - Easier to receive benefits | - Democracy, inclusiveness |
| - E-voting, polling, and referenda | - Reduced costs in holding referenda and polling exercises | - Easier to participate in voting/polling and referenda irrespective of location | - Democracy, public participation, rule of law |
| - New shapes and forms of democracy (e-Ombudsman, E-town hall) | - Reduced costs in seeking public participation. | - Easier to be kept informed and participate in governance affairs | |
| | - The speedier process of public participation | | |
| - E-citizens | - Speedier collection and maintenance of information reducing transaction costs | - One-stop shop approach for applications and queries | - Democracy, participation privacy guarantees (?), secure transactions, |
| | - Better targeting of services possible | - Ease of use of tailor-made information services | - regulatory frameworks for electronic authentication, record keeping, and so on |
| | - New services could be provided (extension of smart cards) | - Reuse of data makes it easier to apply for services | - leading to increased citizen’s trust in e-government |
| | - Virtual job market | - Affordability in accessing services | - Participation of all stakeholders |
| | - New service that could generate new income | - Ease of finding job opportunities | |
| | | - Potentially better matching and lower unemployment | |

- Lallmahomed et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Zawaideh, 2016; AlAwadhi & Morris, 2008; Bhasiri, Zo, Lee, & Ciganek, 2016; Kurfalı et al., 2017; Lallmahomed et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Zawaideh, 2016).
services. Previous studies have shown that effort expectancy is a strong predictor of the intention to adopt and use e-government services (Kurfalı et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Zawaideh, 2016). Consequently, H2 was proposed:

**Hypothesis 2 (H2):** Effort expectancy has a significant direct impact on the intention to use e-government services.

**Facilitating Condition**

Facilitating conditions is the perception of the user that there is the availability of adequate technical and organizational infrastructure to enable the use of a particular technology (Venkatesh et al., 2003). Facilitating conditions has an impact on the user acceptance of a technology (Venkatesh et al., 2003). The provision of the required facilitation conditions such as proper ICT infrastructure, low cost of Internet
bundles, and reduced cost of connecting devices to e-government services will encourage the adoption of e-government services. Studies have indicated that facilitating conditions has a significant positive influence on the decision to adopt and use e-government services (Bhuasiri et al., 2016; Dwivedi et al., 2017; Kurfalı et al., 2017; Lallmahomed et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Zawaideh, 2016). H3 was therefore proposed:

**Hypothesis 3 (H3):** Facilitating conditions has a significant direct impact on the intention to use e-government services.

**Perceived Service Quality**

Electronic service is defined as the transformation of actions, efforts and performances through information technology (Wilson, Zeithaml, Bitner, & Gremler, 2012). Perceived service quality is considered as the provision of services to meet the needs and expected service standards of the user (Alanezi, Kamil, & Basri, 2010; Heidari, Mousakhani, & Rashidi, 2014). Service quality dimensions such as reliability, security, efficiency, and responsiveness have been demonstrated to have a positive influence on the willingness to use e-government services (Sharma, 2015). Studies have indicated that the perceived service quality of e-government services is a significant predictor of the intention to engage and use e-government services (Jiang & Ji, 2014; Mensah, 2017; Papadomichelaki & Mentzas, 2011; Weerakkody, Irani, Lee, Hindi, & Osman, 2016). Consequently, H4 was proposed:

**Hypothesis 4 (H4):** Perceived service quality has a significant direct influence on the intention to use e-government services.

**Trust in the Internet**

Trust in the Internet is the expectation of the user that the Internet technology been used has the potential to protect his or her personal information or data from being abused through disclosure to a third party. The potential of the Internet to protect individual security and privacy during interaction on the web is an important contributing factor toward determining trust in the Internet. The safeguarding of personal and transactional information on e-government service platform is crucial to promote the trust of citizens on the Internet. Studies have shown that user trust in the Internet has a positive impact on the intention to use e-government services (Alfalah et al., 2017; Carter, Weerakkody, Phillips, & Dwivedi, 2016; Kurfalı et al., 2017; Mensah, 2017). Hence, H5 was proposed:

**Hypothesis 5 (H5):** Trust in the Internet has a significant direct impact on the intention to use e-government services.

**Trust in Government**

Trust in Government is when the citizen believes that the government has the required capacity and commitment as well as the technological know-how to execute e-government projects to improve public service delivery. Citizen trust in government over the years has seen a decline and e-government is considered as one of the means to increase citizens’ confidence and trust in government (Tolbert & Mossberger, 2006). Trust in government has been found to have a significant influence on the intention to adopt and use e-government services (Alfalah et al., 2017; Kurfalı et al., 2017; Mensah, Jianing, & Durrani, 2017; Mpinganjira, 2015). Consequently, H6 was proposed:

**Hypothesis 6 (H6):** Trust in government has a significant direct influence on the intention to use e-government services.

**Social Influence**

Social influence is the extent to which the perceptions and opinions of friends, family, and important personalities do impact the user’s views toward the adoption of a particular technology (Al-Sobhi, Weerakkody, & El-Haddadeh, 2011; Chiu & Wang, 2008; Venkatesh et al., 2003; Venkatesh, Sykes, & Zhang, 2011). The communications from friends and family about e-government can either discourage or encourage the adoption of e-government services. Social influence with regard to e-government has been found to be a significant predictor of the intention to use e-government services (Bhuasiri et al., 2016; Kurfalı et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Zawaideh, 2016). H7 was therefore proposed:

**Hypothesis 7 (H7):** Social influence has a significant direct impact on the intention to use e-government services.

**Social influence and trust in the Internet.** The impact of social influence on the adoption of technology-related applications such as e-government has been established (Alshehri et al., 2013; Razak, Bakar, & Abdullah, 2017) but little research has examined the impact of social influence on the trust in the Internet. So it will be interesting to examine whether the influence of friends and family members can contribute to determining the extent of citizen trust in the Internet. Therefore, H8 was proposed:

**Hypothesis 8 (H8):** Social influence has a significant direct influence on the trust in the Internet.

**Social influence and trust in government.** Social influence is one of the critical factors determining the behavioral intention to use e-government services. Studies have empirically
provided support for the direct impact of social influence on the intention to use e-government services (Arif, Ameen, & Rafiq, 2018; Weerakkody et al., 2013). But few studies have examined the direct relationship between social influence and trust in government. The influence of friends, colleagues, family, and other important personalities in society may have the potential to affect the extent of trust that people may have in government. Accordingly, H9 was proposed.

**Hypothesis 9 (H9):** Social influence has a significant direct impact on the trust in Government.

### Research Methodology

The variables for this study were adapted from previous studies. Performance expectancy, effort expectancy, facilitating conditions, social influence, and the behavioral intention to use were adopted from Venkatesh et al. (2003) and Venkatesh, Thong, and Xu (2012). The trust in the Internet and in government was adapted from Bélanger and Carter (2008). Service quality also was adapted from Sharma (2015). The instruments were measured on a 5-point Likert-type scale (Hui & Triandis, 1989; Kim, Oh, Shin, & Chae, 2009) ranging from 1 = strongly disagree to 5 = strongly agree. Each of the variables contained five unique questions. The questionnaire instruments were pre-tested and piloted to have clarity and anticipated challenges eliminated before the actual instrument administration. Pretesting and piloting contribute to achieving acceptable validity and reliability, remove ambiguities and unclear statements/questions, and finally, add value and credibility to the entire research processes (Dikko, 2016; Tashakkori & Teddlie, 2010; van Wijk & Harrison, 2007). The constructive feedback received from the pretesting and piloting was instrumental in revising some portions of the instrument.

The instrument was then administered to 500 potential respondents who were university students at Harbin Institute of Technology, Harbin, China. A total of 387 questionnaire instruments were returned, which accounts for 77.4% of the questionnaires administered. Screening and checking of the questionnaires returned showed that 18 of the questionnaires were not complete due to missing information. These 18 questionnaires were not captured and hence were not used for the data analysis. Therefore, 369 questionnaire instruments were found to be suitable (73.8%) and hence were captured and used for the data analysis. The analysis was done with SPSS.

### Demographic Characteristics of the Sample

The demographic characteristic of the sample is shown in Table 5. The majority of respondents were male (51.8%) and female were 48.2%. The majority of the respondents were between the age ranges of 18 and 25 years (51.2%). The majority were undergraduate students (58.3%). This is followed by masters (27.1%) and PhD students (14.6%).

| Items          | Description | Frequency | %    |
|----------------|-------------|-----------|------|
| Gender         | Male        | 191       | 51.8 |
|                | Female      | 178       | 48.2 |
| Age distribution | 18-25      | 188       | 50.9 |
|                | 26-30       | 121       | 32.8 |
|                | 31+         | 60        | 16.2 |
| Education level | Undergraduate | 215     | 58.3 |
|                | Masters     | 100       | 27.1 |
|                | PhD         | 54        | 14.6 |

### Data Analysis

#### Reliability Analysis

The results of the reliability analysis conducted are shown in Table 6. Factor analysis was first conducted to examine the weight of the loading for each question item. The factor loadings of below 0.50 were deemed not suitable and hence were not included in the analysis. The factor loadings of PE-5 (0.433) under PE, EE-3 (0.338) under EE, FC-2 (0.456) under FC, and TI-4 (0.111) under TI were deleted and dropped because they had loadings less than 0.50. The second step was to check the internal consistency of the variables (i.e., the reliability of the questionnaire instrument). Cronbach’s alpha was conducted to determine the internal consistency of the constructs used in this study. Cronbach’s alpha values for each of the variables were as follows: performance expectancy (0.843), effort expectancy (0.724), facilitating conditions (0.852), perceived service quality (0.827), trust in the Internet (0.835), trust in government (0.869), social influence (0.887), and intention to use (0.753). Alpha is useful in measuring the internal consistency of survey instrument or scale and it is expressed to range between 0 and 1 (Cronbach, 1951). It is considered that the closer the Cronbach’s alpha coefficient is to 1.0, the greater the internal consistency of the survey instrument (Gliem & Gliem, 2003). It has been recommended that alpha values that fall between 0.8 and 0.9 as good/excellent, 0.5 and 0.7 as acceptable, and below 0.5 as not acceptable (George & Mallery, 2003). As shown in Table
The results of the correlation analysis are shown in Table 7. The mean and standard deviation are also illustrated. Performance expected correlated positively and significantly with both social influence ($r = 0.117, p > 0.05$) and trust in the Internet ($r = 0.174, p > 0.01$). Effort expectancy also correlated positively and significantly with both social influence ($r = 0.620, p > 0.01$) and trust in the Internet ($r = 0.606, p > 0.01$). Social influence correlated positively and significantly with trust in the Internet ($r = 0.663, p > 0.01$).

Facilitating conditions correlated positively and significantly with trust in government ($r = 0.412, p > 0.01$), perceived service quality ($r = 0.552, p > 0.01$), and intention to use ($r = 0.651, p > 0.01$). Facilitating conditions, however, correlated negatively with trust in the Internet but was significant ($r = -0.103, p > 0.05$). Trust in the Internet also correlated negatively with perceived service quality but was significant too ($r = -0.120, p > 0.05$). In addition, trust in government correlated positively and significantly with perceived service quality ($r = 0.722, p > 0.01$) and intention to use ($r = 0.592, p > 0.01$). Also perceived service quality correlated positively and significantly with the intention to use ($r = 0.647, p > 0.01$).

### Research Hypotheses Testing

The results of the hypotheses tested are shown in Table 8. The values determining the $r^2$ for the whole constructs investigated in this study are shown in Table 8. The $r^2$ for the seven variables (performance expectancy, effort expectancy, perceived service quality, trust in the Internet, trust in government, facilitating conditions, and social influence) is 0.576. This means that the constructs depicted in the research model contribute about 57.6% of the reasons explaining or determining the intention to use e-government services. The $r^2$ of 0.576 (57.6%) is quite an improvement to the UTAUT model as compared with the 53% of the original UTAUT model (Venkatesh et al., 2003). This further means that our current model can explain better and predict the behavioral intention to use a technology-related application such as e-government services.

The results of the research hypotheses tested are shown in Table 9. Performance expectancy was not a significant predictor of the intention to use e-government services ($\beta = -0.054, p > 0.05$). H1 was not supported. Effort expectancy was not significant in influencing the intention to use e-government services ($\beta = -0.043, p > 0.05$). H2 was also not supported. Facilitating conditions was, however, found to be a significant predictor of the intention to use e-government services.
Table 7. Results of Correlation Analysis.

| Constructs | PE | EE | SI | FC | TI | TG | PSQ | IU |
|------------|----|----|----|----|----|----|-----|----|
| 1          |    |    |    |    |    |    |     |    |
| 2          | 0.074 |    |    |    |    |    |     |    |
| 3          | 0.117* | 0.620** |    |    |    |    |     |    |
| 4          | -0.093 | -0.092 | -0.074 |    |    |    |     |    |
| 5          | 0.174*** | 0.606** | 0.663** | -0.103* |    |    |     |    |
| 6          | -0.009 | -0.067 | -0.073 | 0.412*** | -0.098 |    |     |    |
| 7          | -0.059 | -0.086 | -0.083 | 0.552*** | -0.120* | 0.722*** |     |    |
| 8          | -0.093 | -0.092 | -0.066 | 0.651*** | -0.096 | 0.592*** | 0.647** |    |
| M          | 3.9003 | 3.4672 | 3.6130 | 3.4976 | 3.4602 | 3.9539 | 3.6466 | 3.7453 |
| SD         | 0.83225 | 0.71599 | 0.73650 | 0.88417 | 0.64350 | 0.76935 | 0.70633 | 0.64768 |

Note. PE = performance expectancy; EE = effort expectancy; SI = social influence; FC = facilitating conditions; TI = trust in the Internet; TG = trust in government; PSQ = perceived service quality; IU = intention to use.

*Correlation is significant at the 0.05 level (two-tailed). **Correlation is significant at the 0.01 level (two-tailed).

Table 8. Summary of Model.

| No. of constructs | R   | R²   | Adjusted R² | SD of the estimates |
|-------------------|-----|------|-------------|---------------------|
| 7                 | 0.759 | 0.576 | 0.588 | 0.42557             |

Table 9. Results of Hypotheses Tested.

| Hypotheses | Path   | β     | t      | Significance | Supported (yes/no) |
|------------|--------|-------|--------|--------------|-------------------|
| H1         | PE-IU  | -0.054 | -1.544 | 0.123        | No                |
| H2         | EE-IU  | -0.043 | -0.925 | 0.356        | No                |
| H3         | FC-IU  | 0.415  | 10.076 | 0.000        | Yes               |
| H4         | PSQ-IU | 0.232  | 4.275  | 0.000        | Yes               |
| H5         | TI-IU  | 0.014  | 0.288  | 0.773        | No                |
| H6         | TG-IU  | 0.253  | 5.102  | 0.000        | Yes               |
| H7         | SI-IU  | 0.027  | 0.528  | 0.598        | No                |
| H8         | SI-TI  | 0.663  | 16.976 | 0.000        | Yes               |
| H9         | SI-TG  | -0.073 | -1.402 | 0.162        | No                |

Note. PE = performance expectancy; IU = intention to use; EE = effort expectancy; FC = facilitating conditions; PSQ = perceived service quality; TI = trust in the Internet; TG = trust in government; SI = social influence.

The model of the path significant level is shown in Figure 3.

Discussion

This research article has examined the impact of predictors such as performance expectancy, effort expectancy, social influence, facilitating conditions, perceived service quality, trust in the Internet and in government on the intention of university students to adopt and use e-government services. The results have demonstrated that performance expectancy and effort expectancy were not significant predictors of the intention to use e-government services. These findings seem surprising and are inconsistent with the result findings that suggest that both performance expectancy and effort...
Performance Expectancy (PE)

Effort Expectancy (EE)

Facilitation Condition (FC)

Perceived Service Quality (PSQ)

Trust in the Internet (TI)

Intention to use e-government services

R² = .576

Trust in Government (TG)

Social Influence (SI)

Figure 3. Model with significant path.

*Significant. **Not significant.

Performance expectancy were significant predictors of the intention to adopt and use e-government services (Bhuasiri et al., 2016; Kurfalı et al., 2017; Lallmahomed et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Venkatesh et al., 2003; Zawaideh, 2016). But however, there are some studies that support the nonsignificant impact of effort expectancy on the behavioral intention to use e-government services (Geci, Prenaj, Zeqiri, & Sholla, 2017; Jacob & Darmawan, 2019; Kurfalı et al., 2017; Naranjo-Zolotov, Oliveira, & Casteleyn, 2019). These findings could mean that in the context of the sample studied, the performance expectancy and effort expectancy associated with the development of e-government services may not be an issue for them which will influence their intentions to use e-government services. Two possible reasons could be adduced for this: First, it may possibly mean that from the perspective of citizens (students) sampled, there is no conducive environment for them to appreciate or they are unaware of the enhancement of their job performance (benefits they stand to enjoy) through e-government, and second, overfamiliarity and conversant with the use of Internet-related web applications may account for reason why, in this case, the ease of use of e-government services is not an issue as they may rely on their previous experiences with using Internet web applications. This further could be an indication that as users get highly accustomed and familiarized with new technology over a certain period of time, then issues of ease of use of such technology do not seem to become a problem any longer. In this particular context, the students may have had many years of experience using the Internet web technology and its related applications and thus could possibly explain the nonsignificant impact of these factors on the intention to use e-government services. These views are shared by Verkijika and De Wet (2018) who indicated that as people become more technologically savvy, they find it easier to access e-government websites and thus the degree of ease of use associated with accessing government services is reduced.

Furthermore, facilitating conditions and perceived service quality were both found to be a significant predictor of the intention to use e-government services. The positive impact of the facilitation condition concurs with the findings that facilitating condition predicts the adoption of e-government services (Bhuasiri et al., 2016; Kurfalı et al., 2017; Lallmahomed et al., 2017; Lu & Nguyen, 2016; Rodrigues et al., 2016; Venkatesh et al., 2003; Zawaideh, 2016). This means that the provision of the right facilitation conditions such as technological and management infrastructure can have a positive impact on the adoption of e-government services. This is also an indication that the creating of enabling environment by the government will encourage and assist citizen’s adoption of e-government services. The significant impact of perceived service quality on the adoption of e-government services is in tandem with the result findings of Jiang and Ji (2014), Mensah (2017), Papadomichelaki and Mentzas (2011), and Weerakkody et al. (2016). It can be deduced that the service quality of e-government services that correspondents to the service expectations of citizens would ultimately drive them to use e-government services.
The improvement in the public service quality is one of the major factors for the introduction of e-government in the public administration and thus citizens would expect the transformation of public services through the provision of quality e-government services.

Interestingly, the results indicated that trust in the Internet is not a predictor of the intention to use e-government services. This finding is inconsistent with other studies which indicated that trust in the Internet is a significant predictor of the intention to use e-government services (Alfalah et al., 2017; Carter et al., 2016; Kurfalı et al., 2017; Mensah, 2017). It was, however, shown that trust in government is a positive predictor of the intention to use e-government services. This is in agreement with the findings that showed that trust in the government determines the intention to use (Alfalah et al., 2017; Kurfalı et al., 2017). E-government is largely based on government initiatives, drive, and support for its development and implementation and so the confidence/trust of citizens in government to judiciously use limited resources to implement e-government projects is vital. The level of trust that citizens exhibit in the government has the potential to translate into the adoption of e-government services. This invariably means that the absence or lack of citizen trust in government can have a negative effect on the adoption of e-government services.

In addition, social influence was also not a positive significant determinant of the intention to use e-government services. This is a departure from the findings which have shown that social influence is a significant predictor of the intention to use e-government services (Bhuasiri et al., 2016; Kurfalı et al., 2017; Lu & Nguyen, 2016; Venkatesh et al., 2003; Zawaideh, 2016). Our findings, however, support studies that showed that social influence does not determine the behavioral intention to use (Jacob & Darmawan, 2019; Mansoori et al., 2018; Naranjo-Zolotov et al., 2019). These contradictory findings on the impact of social influence on the behavioral intention to use as reported in the literature appear to suggest that the social influence (opinions/views/experiences) from friends and family may not necessarily lead to the adoption of e-government services. Also, while social influence was found to be a significant predictor of trust in the Internet, it, however, does not have a positive impact on the trust in government. What this means is that the views, experiences, and opinions of friends, close associates, and family about the Internet can influence the level of citizen trust in the Internet, but the views and experiences expressed by others about government actions or inactions will not, however, sway citizens to have confidence or trust in government.

Practical Implication

The absence of adequate awareness creation concerning e-government development and implementation to the citizens who are the major targets of these projects may lead to citizens becoming short-sighted about the benefits of e-government which will, in turn, affect negatively their perceived usefulness of e-government services. This negative impact of lack of proper awareness on the citizens’ perceptions of the usefulness of e-government will have a corresponding negative effect on their intentions to use e-government services. This lack of awareness is buttressed by the findings among the Philippines that showed that 35% of the people surveyed indicated that they were aware of e-government websites, whereas 65% had indicated that they are unaware of e-government websites (Urbina & Abe, 2017). Another study also indicated that awareness of e-government among Jordanian citizens (students) was limited and not adequate (Al-Jaghoub, Al-Yaseen, & Al-Hourani, 2010). To avoid this lack of e-government awareness among the citizenry, it is imperative that the government and its sector agencies devise a strategy to promote and create the needed awareness about e-government projects to the citizens. This can be done through traditional and electronic media to disseminate information concerning e-government projects and services. Attaining a higher level of exposure and awareness of e-government will not only influence citizens’ perception positively toward the usefulness of e-government services but also ultimately drive the intention to use e-government services.

In addition, putting in place proper facilitation conditions to encourage the adoption of e-government is a major implication of this study. E-government development and diffusion are hampered around the world, particularly in developing countries due to the lack of adequate facilitation conditions in these countries. One of the major facilitation conditions is the poor or lack of adequate ICT infrastructure, which is considered as a critical barrier to the implementation of e-government projects. Government agencies and departments are often challenged with lack of proper ICT network infrastructure, which discourages them to implement e-government. Other facilitation conditions include the high cost of computers and other connecting devices, the high cost of Internet bundle, and an unsecured power source (electricity), especially in developing countries. The government must engage the private sector in a public–private partnership to secure the needed funding for the huge ICT infrastructure investment required for the development of e-government projects. This public–private partnership would bring not only the required funds for the development of e-government but also the needed skilled labor and expertise from the private sector. Also, the government must put in measures to reduce the high cost of Internet bundles and computers to encourage them to use e-government services. Also providing sustainable and uninterrupted power supply can facilitate the adoption of e-government services as computers and other connecting devices require a reliable power source to work. Tackling these organizational and technical infrastructures contributes positively to the adoption of e-government services.
Another implication is that e-government service quality is an important determinant of the intention to use e-government services. The improvement in the quality of public services delivered by government agencies is one of the major reasons for the introduction of e-government. The provision of public services through e-government that meets the expectations of citizens’ standard of service quality would encourage them to use e-government services. To influence the citizens’ intention and encourage the uptake of e-government services, implementers and policy makers of e-government development and implementation must work assiduously to continue to improve the standard of service quality provided to citizens through e-government. Anything short of this will have a negative effect on the adoption of e-government services and putting the huge investment in e-government to go waste. In other words, a gap in citizens’ perceptions and expectations of e-government service quality could discourage the intention to use e-government services. Hence, e-government service quality dimensions such as reliability of services, responsiveness (agencies readiness to help citizens and provide immediate services), assurance in terms of the potential of the e-government website to provide security and privacy for users), tangibility issues like appearances of the website, navigations and search engines) and empathy in terms of the ability of websites to offer greater user recognition and customization of services are crucial in driving the adoption of e-government services.

Furthermore, trust in government has an implication for the adoption of e-government. Citizen trust in government is often affected by the activities and programs of the government, its officials, and state agencies. These activities of government, either through policy or comments and if knowingly or unknowingly, have the potential to impair citizens’ level of trust in government, thus causing citizens to redraw or limit their engagement or participation in government programs, policies and events. For instance, the extent of government tolerance to freedom of expression and for discerning views on issues concerning government and governance, openness, transparency, and accountability on the part of government can have either positive or negative effect/perceptions on the citizens’ trust in government. The positive perceptions may lead to higher levels of trust and use, and will encourage citizens to participate in government programs and policy initiative such as e-government services. The negative perspectives will obviously lead to low levels of trust in government and hence citizens may redraw their active participation in the government programs and activities like the adoption of e-government services. To avoid the impact low levels of citizens’ trust in government could have on the uptake of e-government services, government and its agencies must engage and actions and policy programs that build stronger citizen support and trust in government. This can be done by timely dissemination of quality public information, being open, and accountable to citizens and ensuring transparency in its activities and programs. These actions will not only build stronger citizens’ trust in government but also lead to the higher adoption of e-government services.

Finally, the nature of communications from e-government service users, friends, and colleagues can influence the extent of citizen trust in the Internet. These communications may be based on experiences with the use of Internet, which can either be positive or negative, and thus have the potential to influence the decisions of people to either trust in the Internet or not. The users who are influenced by positive communications from social networks/environment will be attracted to exhibit greater trust in the Internet. People are often influenced negatively not to trust in the Internet because of the bad experiences of others on the Internet such as scam, duping, fraud, and theft, which may result in loss of huge amount of money or other injuries/damages. To encourage citizens to have trust in the Internet, the government must implement the needed policy and regulatory framework to protect users on the Internet. This will provide safe environment for citizens to use the Internet and thus will create positive experiences for people. The sharing of these positive experiences via their social networks will have a subsequent influence on the citizens’ trust in the Internet.

**Theoretical Implication**

The findings of this study also have some theoretical implications. First, performance expectancy, effort expectancy, trust in the Internet, and social influence do not determine the intention to use e-government services. Second, social influence does not have a significant impact on trust in government. The major contribution of this study is that according to the author, this is the first study that has explored the impact of social influence on trust in both the Internet and the government. Second, this study has shown that the current research model can explain better about 57.6% of the reason determining the intention to use. This is an improvement of the original UTAUT model which predicted about 53% of the intention to use (Venkatesh et al., 2003).

**Conclusion**

This study has demonstrated that factors such as facilitation condition, perceived service quality, and trust in government are positive and significant predictors of the intention of university students to adopt e-government services. This study has also shown that social influence is a significant predictor of students’ trust in the Internet. Surprisingly, performance expectancy, effort expectancy, trust in the Internet, and social influence do not impact the student’s intention to use e-government services. These findings have practical implications for the implementation of e-government and e-government service providers. First, the availability of the necessary technological and managerial infrastructure to enhance the
adoption and use of e-government services is vital. Second, service quality dimension such as reliability, efficiency, security, and responsiveness of e-government services are important for the citizens’ uptake of e-government services. Third, government’s actions and inactions in terms of governance should stimulate and increase the trust of citizens toward government officials. The citizens should trust that government and its public sector agencies have the capacity and the resources to implement e-government initiatives. Also, citizens should trust that the government would put state resources to judicious use. High trust in government will increase the usage of e-government services as this study has illustrated that trust in government is a predictor of the intention to use.

This study has contributed to enriching the e-government adoption literature by demonstrating that significant predictors of e-government adoption explored have the potential to increase the uptake of e-government services and hence contribute to achieving the economic, social, and governance dimensions of implementing e-government. The success of e-government projects has a simultaneous ultimate impact on driving the success of ICT4D programs in developing countries.

Limitation and Future Study

First, the model used in this study only considered one city of China; thus, the results may be consistent or inconsistent for other cities of the country. Second, it is not suitable to generalize the result findings of this study as the sample involves only 369. Third, there could be other predictors of e-government service adoption that may not have been examined in this study. Hence, future study will seek to explore other factors such as electronic word of communications on the adoption of e-government services.

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References

Abdullah, A., Naser, K., & Fayez, F. (2018). Obstacles toward adopting electronic government in an emerging economy: Evidence from Kuwait. *Asian Economic and Financial Review*, 8, 832-842.

Akbar, F. (2013). *What affects students’ acceptance and use of technology?* Retrieved from https://pdfs.semanticscholar.org/1ab8/0a44a26e2d09ae0dc3729be409730a782910.pdf

Åkesson, M., Skålén, P., & Edvardsson, B. (2008). E-government and service orientation: Gaps between theory and practice. *International Journal of Public Sector Management*, 21, 74-92.

Alanezi, M. A., Kamil, A., & Basri, S. (2010). A proposed instrument dimensions for measuring e-government service quality. *International Journal of u- and e-Service, Science and Technology*, 3(4), 1-18.

AlAwadhi, S., & Morris, A. (2008, January 7-10). *The use of the UTAUT model in the adoption of e-government services in Kuwait*. Paper presented at the Proceedings of the 41st Annual Hawaii International Conference on System Sciences, Waikoloa.

Alfalah, A., Choudrie, J., & Spencer, N. (2017). *Older adults adoption, use and diffusion of e-government services in Saudi Arabia, Hail City: A quantitative study*. Retrieved from http://researchprofiles.herts.ac.uk/portal/en/publications/older-adults-adoption-use-and-diffusion-of-e-government-services-in-saudi-arabia-hail-city(0bf8c0a5-96a6-4fc2-af05-6945273df166).html

Al-Jehoulb, S., Al-Yasecn, H., & Al-Hourni, M. (2010). Evaluation of awareness and acceptability of using e-government services in developing countries: The case of Jordan. *The Electronic Journal Information Systems Evaluation*, 13(1), 1-8.

Alshehri, M., Drew, S., & AlGhamdi, R. (2013). Analysis of citizens acceptance for e-government services: Applying the UTAUT model. *arXiv preprint arXiv:1304.3157*.

Al-Sobhi, F., Weerakkody, V., & El-Haddadeh, R. (2011). The relative importance of intermediaries in eGovernment adoption: A study of Saudi Arabia. In M. Janssen, H. J. Scholl, M. A. Wimmer, & Y.-h. Tan (Eds.), *Electronic government* (pp. 62-74). Cham, Switzerland: Springer.

Arif, M., Ameen, K., & Rafiq, M. (2018). Factors affecting student use of web-based services: Application of UTAUT in the Pakistani context. *The Electronic Library*, 36, 518-534.

Avergou, C. (2010). Discourses on ICT and development. *Information Technologies & International Development*, 6(3), 1-18.

Awiajah, R., Kang, J., & Lim, J. I. (2016). Factors affecting e-commerce adoption among SMEs in Ghana. *Information Development*, 32, 815-836.

Bélanger, F., & Carter, L. (2008). Trust and risk in e-government adoption. *The Journal of Strategic Information Systems*, 17, 165-176.

Bertot, J. C., & Jaeger, P. T. (2008). The e-government paradox: Better customer service doesn’t necessarily cost less. *Government Information Quarterly*, 25, 149-154.

Bhussiri, W., Zo, H., Lee, H., & Ciganek, A. P. (2016). User acceptance of e-government services: Examining an e-tax filing and payment system in Thailand. *Information Technology for Development*, 22, 672-695.

Bwalya, K. J. (2009). Factors affecting adoption of e-government in Zambia. *The Electronic Journal of Information Systems Evaluation*, 13(1), 1-8.

Carter, L., Weerakkody, V., Phillips, B., & Dwivedi, Y. K. (2016). Citizen adoption of e-government Services: Exploring citizen perceptions of online services in the United States and United Kingdom. *Information Systems Management*, 33, 124-140.

Chatfield, A. T., & Alhujran, O. (2009). A cross-country comparative analysis of e-government service delivery among...
Arab countries. *Information Technology for Development*, 15, 151-170.

Chiu, C.-M., & Wang, E. T. (2008). Understanding web-based learning continuance intention: The role of subjective task value. *Information & Management*, 45, 194-201.

Coleman, S. (2006). African e-governance—Opportunities and challenges. Oxford, UK: Oxford University Press.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-334.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13, 319-340.

Dedrick, J., & Kraemer, K. L. (2001). *The productivity paradox: Is it resolved? Is there a new one? What does it all mean for managers?* Center for Research on Information Technology and Organizations. Retrieved from https://escholarship.org/uc/item/4gs825bg

Dikko, M. (2016). Establishing construct validity and reliability: Pilot testing of a qualitative interview for research in takaful (Islamic insurance). *The Qualitative Report*, 21, 521-528.

Dwivedi, Y. K., Rana, N. P., Janssen, M., Lal, B., Williams, M. D., & Clement, M. (2017). An empirical validation of a unified model of electronic government adoption (UMEGA). *Government Information Quarterly*, 34, 211-230.

Fang, Z. (2002). E-government in digital era: Concept, practice, and development. *International Journal of the Computer, the Internet and Management*, 10(2), 1-22.

Geci, M., Prenaj, B., Zeqiri, A., & Sholla, B. (2017). Adoption, diffusion and use of e-government services in Kosovo. Retrieved from https://www.researchgate.net/publication/321487194_Adoption_Diffusion_and_Use_of_E-Government_Services_in_Kosovo

George, D., & Mallery, M. (2003). *Using SPSS for windows step by step: A simple guide and reference*. Boston, MA: Allyn & Bacon.

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach’s alpha reliability coefficient for Likert-type scales. Retrieved from https://scholarworks.iupui.edu/handle/1805/344

Goswami, A., & Dutta, S. (2017). E-commerce adoption by women entrepreneurs in India: An application of the UTAUT model. *Business and Economic Research*, 6, 440-454.

Heidari, H., Mousakhani, M., & Rashidi, H. (2014). The impact of traditional and electronic service quality on customer satisfaction, trust and loyalty in banking industry. *International Journal of Scientific Management and Development*, 2, 614-620.

Hui, C. H., & Triandis, H. C. (1989). Effects of culture and response format on extreme response style. *Journal of Cross-cultural Psychology*, 20, 296-309.

International Telecommunication Union. (2002). *Plan of action e-government for development*. Retrieved from https://www.itu.int/ITU-D/ict/app/docs/e-gov_for_dev_countries-report.pdf

Jacob, D. W., & Darmawan, I. (2019, March). *Extending the UTAUT model to understand the citizens’ acceptance and use of electronic government in developing country: A structural equation modeling approach*. Paper presented at the 2018 International Conference on Industrial Enterprise and System Engineering (IcoIESE 2018), Yogyakarta, Indonesia.

Jiang, X., & Ji, S. (2014). E-government web portal adoption: The effects of service quality. *e-Service Journal*, 9(3), 43-60.

Joseph, K. (2002). *Growth of ICT and ICT for development: Realities of the myths of the Indian experience* (WIDER Discussion Papers). Helsinki, Finland: United Nations University World Institute for Development Economics Research.

Jung, D. (2019). “Assessing citizen adoption of e-government initiatives in Gambia: A validation of the technology acceptance model in information systems success.” A critical article review, with questions to its publishers. *Government Information Quarterly*, 36(1), 5-7.

Kefallinos, D., Lambrou, M. A., & Sykas, E. (2009). An extended risk assessment model for secure e-government projects. *International Journal of Electronic Government Research*, 5(2), 72-92.

Kim, C., Oh, E., Shin, N., & Chae, M. (2009). An empirical investigation of factors affecting ubiquitous computing use and U-business value. *International Journal of Information Management*, 29, 436-448.

Kose, T. (2019). Gender and use of e-government services in Turkey: E-government in Turkey. In I. Williams, O. Millward, & R. Layton (Eds.), *Gender gaps and the social inclusion movement in ICT* (pp. 130-146). Hershey, PA: IGI Global.

Kurbanli, M., Arifoğlu, A., Tokdemir, G., & Paçin, Y. (2017). Adoption of e-government services in Turkey. *Computers in Human Behavior*, 66, 168-178.

Lallmahomed, M. Z., Lallmahomed, N., & Lallmahomed, G. M. (2017). Factors influencing the adoption of e-Government services in Mauritius. *Telematics and Informatics*, 34(4), 57-72.

Liang, Y., Qi, G., Wei, K., & Chen, J. (2017). Exploring the determinant and influence mechanism of e-Government cloud adoption in government agencies in China. *Government Information Quarterly*, 34, 481-495.

Lim, S. C., Baharudin, A. S., & Low, R. Q. (2016). E-commerce adoption in Peninsular Malaysia: Perceived strategic value as moderator in the relationship between perceived barriers, organization readiness and competitor pressure. *Journal of Theoretical and Applied Information Technology*, 91, 228-237.

Liu, Y., Li, H., Kostakos, V., Goncalves, J., Hosio, S., & Hu, F. (2014). An empirical investigation of mobile government adoption in rural China: A case study in Zhejiang province. *Government Information Quarterly*, 31, 432-442.

Lu, N. L., & Nguyen, V. T. (2016). Online tax filing—e-government service adoption case of Vietnam. *Modern Economy*, 7, 1498-1504.

Maestre, G., Astudillo, H., Concha, G., & Nieto, W. (2018, April 4-6). *Empirical evidence of Colombian national e-government programs’ impact on local Smart City-Adoption*. Paper presented at the Proceedings of the 11th International Conference on Theory and Practice of Electronic Governance, Galway, Ireland.

Mann, C. L. (2003). Information technologies and international development: Conceptual clarity in the search for commonality and diversity. *Information Technologies & International Development*, 1(2), 67-79.

Mansoori, K. A. A., Sarabdeen, J., & Tchantchane, A. L. (2018). Investigating Emirati citizens’ adoption of e-government services in Abu Dhabi using modified UTAUT model. *Information Technology & People*, 31, 455-481.
Marchewka, J. T., & Kostiwa, K. (2007). An application of the UTAUT model for understanding student perceptions using course management software. *Communications of the IIMA*, 7(2), 10.

Mariscal, J. (2010). Mobiles for development: The case of M-banking. In E. Ferro, Y. Dwivedi, J. Gil-Garcia, & M. Williams (Eds.), *Handbook of research on overcoming digital divides: Constructing an equitable and competitive information society* (pp. 467-487). Hershey, PA: IGI Global. doi:10.4018/978-1-60566-699-0.ch025

Meacham, S., Rath, P., Moharana, P., Phalp, K. T., & Park, M. S. (2019). One-stop shop e-government solution for South-Korean government multi-ministry virtual employment-welfare plus center system. Retrieved from https://www.iaria.org/conferences2019/filesICDS19/SofiaMeacham_ICDS2019_Presentation.pdf

Mensah, I. K. (2017). Citizens’ readiness to adopt and use e-government services in the city of Harbin, China. *International Journal of Public Administration*, 41, 297-307.

Mensah, I. K., Jianing, M., & Durrani, D. K. (2017). Factors influencing citizens’ intention to use e-government services: A case study of South Korean students in China. *International Journal of Electronic Government Research*, 13(1), 14-32.

Mpinganjira, M. (2015). Use of e-government services: The role of trust. *International Journal of Emerging Markets*, 10, 622-633.

Naranjo-Zolotov, M., Oliveira, T., & Casteleyn, S. (2019). Citizens’ adoption of an e-government system: Towards a unified view. *Information Systems Frontiers*, 19, 549-568.

Razak, F. Z. B. A., Bakar, A. A., & Abdullah, W. S. W. (2017). How perceived effort expectancy and social influence affects the continuance of intention to use e-government. A study of a Malaysian government service. *Electronic Government, an International Journal*, 13, 69-80.

Rodrigues, G., Sarabdeen, J., & Balasubramanian, S. (2016). Factors that influence consumer adoption of e-government services in the UAE: A UTAUT model perspective. *Journal of Internet Commerce*, 15(1), 18-39.

Rufin, R., Bélanger, F., Molina, C. M., Carter, L., & Figueroa, J. C. S. (2018). A cross-cultural comparison of electronic government adoption in Spain and the USA. In M. Khosrow-Pour (Ed.), *Technology adoption and social issues: Concepts, methodologies, tools, and applications* (pp. 476-493). Hershey, PA: IGI Global.

Sahay, S. (2001). Special issue on “IT and health care in developing countries.” *The Electronic Journal of Information Systems in Developing Countries*, 5, 1-6.

Shareef, M. A., Kumar, V., Kumar, U., & Dwivedi, Y. K. (2011). e-Government Adoption Model (GAM): Differing service maturity levels. *Government Information Quarterly*, 28, 17-35.

Sharma, S. K. (2015). Adoption of e-government services: The role of service quality dimensions and demographic variables. *Transforming Government: People, Process and Policy*, 9, 207-222.

Singh, H., Díaz Andrade, A., & Techatassanasoontorn, A. A. (2017). The practice of ICT-enabled development. *Information Technology for Development*, 24, 37-62.

Sodhi, I. S. (2016). E-government in China: Status, challenges, and progress. In I. S. Sodhi (Ed.), *Trends, prospects, and challenges in Asian e-governance* (pp. 36-54). Hershey, PA: IGI Global.

Stahl, B. C. (2005). The paradigm of e-commerce in e-government and e-democracy. In W. Huang, K. Siau, & K. K. Wei (Eds.), *Electronic government strategies and implementation* (pp. 1-19). Hershey, PA: IGI Global.

Susanto, T. D. (2013, November). *Individual acceptance of e-government: A literature review*. Paper presented at the Second International Conference on Informatics Engineering & Information Science, Kuala Lumpur, Malaysia.

Tan, P. J. B. (2013). Applying the UTAUT to understand factors affecting the use of English e-learning websites in Taiwan. *SAGE Open*, 3(4).

Tang, Z., Gong, Z., Han, X., & Peng, X. (2018). Public interest in continued use of Chinese government portals: A mixed methods study. *Telematics and Informatics*, 35, 2312-2325.

Tashakkori, A., & Teddlie, C. (2010). *SAGE handbook of mixed methodologies, tools, and applications* (pp. 476-493). Hershey, PA: IGI Global.

Thao, V. T. T. (2017). *The effect of power distance on e-government adoption in Vietnam: Empirical investigation using UTAUT model*. Retrieved from http://ijiset.com/vol4/v4s5/IJiset_V4_I05_40.pdf

Tolbert, C. J., & Mossberger, K. (2006). The effects of e-government on trust and confidence in government. *Public Administration Review*, 66, 354-369.

Turban, E., King, D., Lee, J., & Viehland, D. (2002). *Electronic commerce 2002: A managerial perspective*. Upper Saddle River, NJ: Prentice Hall.
United Nations Department of Economic and Social Affairs. (2016). *Innovation and ICT*. Retrieved from https://publicadministration.un.org/en/ict4d

UN E-Government Survey. (2014). *E-government for the future we want*. Retrieved from unpan3.un.org/egovkb/Portals/egovkb/ Documents/un2014-Survey/E-Gov_Complete_Survey-2014.pdf

Urbija, A. U., & Abe, N. (2017). Citizen-centric perspective on the adoption of e-government in the Philippines. *Electronic Journal of e-Government*, 15(2), 63-68.

van Wijk, E., & Harrison, T. (2013). Managing ethical problems in qualitative research involving vulnerable populations, using a pilot study. *International Journal of Qualitative Methods*, 12, 570-586.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27, 425-478.

Venkatesh, V., Sykes, T. A., & Zhang, X. (2011, January 4-7). “Just what the doctor ordered”: A revised UTAUT for EMR system adoption and use by doctors. Paper presented 44th Hawaii International Conference on System Sciences, Kauai, HI.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36, 157-178.

Verkijika, S. F., & De Wet, L. (2018). E-government adoption in sub-Saharan Africa. *Electronic Commerce Research and Applications*, 30, 83-93.

Walsham, G., Robey, D., & Sahay, S. (2007). Foreword: Special issue on information systems in developing countries. *MIS Quarterly*, 31, 317-326.

Wangpipatwong, S., Chutimaskul, W., & Papasratorn, B. (2009). Quality enhancing the continued use of e-government websites: Evidence from e-citizens of Thailand. *International Journal of Electronic Government Research*, 5(1), 19-35.

Watson, R., Atkinson, I., & Rose, K. (2007). Pilot studies: To publish or not? *Journal of Clinical Nursing*, 16, 619-620.

Weerakkody, V., El-Haddadeh, R., Al-Sobhi, F., Shareef, M. A., & Dwivedi, Y. K. (2013). Examining the influence of intermediaries in facilitating e-government adoption: An empirical investigation. *International Journal of Information Management*, 33, 716-725. doi:10.1016/j.ijinfomgt.2013.05.001

Weerakkody, V., Irani, Z., Lee, H., Hindi, N., & Osman, I. (2016). Are UK citizens satisfied with e-government services? Identifying and testing antecedents of satisfaction. *Information Systems Management*, 33, 331-343.

Wilson, A., Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2012). *Services marketing: Integrating customer focus across the firm*. New York, NY: McGraw-Hill.

World Bank. (2015). *E-government*. Retrieved from http://www.worldbank.org/en/topic/ict/brief/e-government

Yang, Y. (2017). Towards a new digital era: Observing local e-government services adoption in a Chinese municipality. *Future Internet*, 9(3), 53.

Zawai deh, F. H. (2016). *Acceptance of e-government services among Jordanian citizen*. Retrieved from https://www.ijramr.com/issue/acceptance-e-government-services-among-jordanian-citizen

Zhao, F., Shen, K. N., & Collier, A. (2014). Effects of national culture on e-government diffusion—A global study of 55 countries. *Information & Management*, 51, 1005-1016.

Zuiderwijk, A., Janssen, M., & Dwivedi, Y. K. (2015). Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology. *Government Information Quarterly*, 32, 429-440.

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