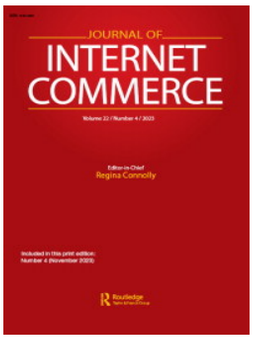

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Online Service Quality of State Organizations: A Study of Online Services of Ghana Revenue Authority

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ABSTRACT

The study examines the impact of e-government service quality (e-gov SQ) on user satisfaction (US) and perceived public value (PV). Structural equation modeling was employed to investigate the relationships between e-gov SQ, US, and PV. Five dimensions of e-gov SQ, namely efficiency, ease of completion, system availability, contact, and convenience were found to be significant and positive drivers of US. Again, the impact of five e-gov SQ dimensions namely efficiency, system availability, privacy and security, contact, and trust on PV were found to be significant. In addition, the study found that US mediates the relationship between all seven e-gov SQ dimensions and PV. For policy purposes, we recommend that state enterprises should invest more in improving e-gov SQ to drive US and PV and ultimately enhance the performance of state institutions. The findings reinforce the literature on the positive influence of e-gov SQ on US and PV.

KEYWORDS

E-government; Ghana; perceived public value; service quality; user satisfaction

Introduction

The world over the past two decades has experienced modernization of services provided by public sector organizations through the employment of the internet commonly referred to as electronic government (e-gov) to improve efficiency, transparency, user trust, and satisfaction, and reduce operational cost of users (Heeks 2002; Heeks and Standforth 2007; Margetts 2003; Bekkers and Homburg 2007). E-gov services developed and maintained by the state institutions or contracted third party organizations on behalf of the government are usually delivered through web portals that are meant to provide information and various functions, such as search engines, news (including financial news), and many different applications (Jiang and Ji 2014).

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The level and the degree of complexity of e-gov services however differ significantly among different state institutions within a country. It is suggested, in particular, that there are disparities in user requirements in terms of service types and service quality (SQ) based on differences in citizens' intended usage of e-gov web portals. As a result, the impact of a web portal's overall SQ on user satisfaction (US), perceived public value (PV) and continuous use may vary depending on which user category they belong to. Accordingly, different types of uses have been identified depending on the primary objectives of the web portal: for information inquiry, for information exchange, and for transaction.

The provision of e-gov services has been on the development agenda of countries all over the world. In recent times Sub-Saharan African (SSA) countries have put in place some development-related policies to meet the needs of the ever-increasing population through e-gov services. The Government of Ghana, for instance, adopted the electronic service delivery through the ICT for Accelerated Development Programme (ICT4AD) in 2003 (Kubuga, Ayoung, and Bekoe 2021). This approach was followed later by other e-gov strategies including the GeGov Project in 2008. State organizations have started providing e-gov services to the citizens by way of efficient and innovative electronic services through the digitization agenda of the Government of Ghana.

International organizations have supported economies, especially those in SSA in their quest for the adoption of internet or electronic technology to drive economic development (Holiday 2006, Brown and Thompson 2011). In 2006, the World Bank provided a US$40 million facility to support institutional capacity and to create an enabling environment for e-gov projects in Ghana (World Bank 2006). In addition, the Danish Government has assisted in the implementation of e-gov in Ghana by providing a US$38 million facility to finance the Eastern Corridor Fiber Optic Backbone Infrastructure project (MOCD 2008). The implementation of these projects was aimed at improving the SQ delivery of state organizations.

It is imperative to state that, the academic research community has paid close attention to electronic SQ (e-SQ) over the past two decades. However, the bulk of previous studies on user perception of e-SQ originating from SSA has focused on services delivered by the private sector, such as online shopping and electronic banking (see Narteh and Odoom 2015; Ayo et al. 2016; Tetteh 2022). Relatively limited attention has been given to e-SQ delivery of the public sector in SSA to determine their impact on US and PV despite the huge investments in e-gov infrastructure and services. A study on the impact of e-gov SQ on PV of users is therefore imperative. It provides vital information that is likely to provoke policy responses with

a particular focus on effective implementation of e-gov services in the ongoing reforms in state institutions in Ghana.

The GRA in 2014 officially launched the e-Tax Portal to enable taxpayers monitor their tax accounts, file returns more easily, request exemptions, apply for tax refunds online, and make tax payments using the new Ghana e-Payment Platform. However, currently, for both legal and logistical reasons, individuals and businesses in Ghana cannot be compelled to pay tax online using this portal, despite the heavy investments in the e-tax portal and nationwide education on online tax payment and filing of returns. The situation is further compounded by the comparatively low internet usage in Ghana. The success of such a system will therefore depend to a greater extent on its attractiveness in terms of the trustworthiness of the system, benefits to the tax payer, and the willingness to switch from face-to-face to online transactions. This study seeks to examine the impact of SQ delivery of e-tax employed by GRA on perceived US. In addition, this article deviates from most previous studies by incorporating empirical assessment of PV of e-gov service delivery from the perspective of users in a cultural setting different from the economies that have been studied by previous scholars.

The article is organized as follows: In the following section, the relevant literature in the subject area is reviewed followed by the methodology employed for the study. The findings of the study and discussions of findings are captured in the fourth section of the study. The final section draws the conclusion and provides implications of findings.

Literature review

Website service quality

SQ has been studied by several scholars and it is therefore quite understandable that different definitions and explanations have been offered by different authors. However, most definitions tend to expound SQ as the difference between what the customer expects from the performance of the service before the service encounter and the perception of the customer after the service encounter (Parasuraman, Zeithaml, and Berry 1985; Asubonteng, MCcleary, and Swan 1996); Athanassopoulos, Gounaris, and Stathakopoulos 2001). The customer judges SQ to be either low or high depending on whether their perception exceeds their expectation or not

Likewise, e-SQ has been explored by several scholars. In the views of Zeithaml, Parasuraman, and Malhotra (2002), e-SQ is the extent to which a website facilitates efficient and effective shopping, purchasing, and delivery of products and services. In addition, Hoffman (2003) identified electronic-service as a service delivered through the internet that executes tasks, solves

problems, or performs transactions. E-SQ has generally been reported to have a considerable influence on customer perception of satisfaction and service value (Cristobal, Flavián, and Guinalíu 2007; Fassnacht and Köse 2007). E-SQ has been found to be one of the key factors that determine the success or failure of e-gov (Yang 2001; Santos 2003; Welch, Hinnant, and Moon 2004). Improved e-gov SQ has been found to facilitate the establishment and continued use of e-gov applications by citizens (Wangpipatwong, Chutimaskul, and Papasratorn 2009; Srivastava 2011).

E-government

What is it?

The term e-gov has been defined in a variety of ways, ranging from a simple description of service delivery by state institutions over the Internet to widespread use of information and communication technologies in the public sector (Janssen, Rotthier, and Snijkers 2005; EU 2015). DeBenedictis et al. (2002) define e-gov as the use of primarily Internet-based information technology to enhance the accountability and performance of government activities. In their views, these activities include activities, such as service delivery; processes and dissemination of government information; and the participation of individuals and institutions in governance. Prins (2001) describes e-gov as the delivery of online government services, which provides the opportunity to expand citizen access to government services, minimize government bureaucracy, boost citizen participation in democracy and improve agency responsiveness to citizens' needs. In addition, Homburg (2008) emphasizes that an important stimulus for e-gov is to bridge the gap between government and citizens. E-gov is therefore seen as a channel adopted by governments to establish a connection with the citizens.

The World Bank defines e-gov as "the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, business, and other arms of government" (World Bank 2015). These technologies may be used for several purposes, including improved service delivery to citizens, better relationships between governments and businesses, empowerment of the citizens through information access, and efficient administration of state institutions. It is therefore logical that e-gov is adopted as a mechanism to reduce corruption, enhance transparency and convenience, increase revenue, and reduce the cost of state institutions among others. Perhaps the most appropriate e-gov definition is the one from the Blackwell Dictionary of Management Information Systems, which identifies e-gov as the significant improvement and streamlining of a range

of governmental services, particularly document access and filing, as well as the payment of fees, such as taxes and licensing charges (Davis 2005). Many governments throughout the world have spent large public resources to establish various e-gov systems to reap the benefits of efficiency, citizen satisfaction, decreased bureaucracy, and national development (Grant and Chau 2005).

DeLone and McLean (2004) illustrate that the success of an information system depends on the relationship between quality constructs of system quality, information quality, service quality, use, user satisfaction, and net benefit. Employing the model for an information system in an e-gov context Wang and Liao (2008) found that e-gov service process fits well into the information system success model of DeLone and McLean (2004). The contributions of DeLone and McLean (2004) are perceived to provide some foundation for exploration into e-gov SQ by latter scholars, such as Veeramootoo, Nunkoo, and Dwivedi (2018) and Al-Sulami and Hashim (2018).

E-government service quality measuring scales

Several online SQ measuring scales for businesses have been introduced by different scholars showcasing different dimensions to the study of e-SQ. These e-SQ models include the 12-dimension WebQual scale of Loiacono, Watson, and Goodhue (2000), WebQual 650 by Barnes and Vidgen (2002), SITEQUAL scale of Yoo and Donthu (2001), and eTailQ of Wolfinbarger and Gilly (2003). Some of these tools have been employed for the study of state e-gov SQ delivery as a result of the virtual non-availability of e-gov SQ measuring scales (see Fassnacht and Koese 2006; Gummerus et al. 2004). This phenomenon has been criticized by some scholars, such as Parasuraman, Zeithaml, and Malhotra (2005) who argue about non-suitability of e-SQ measuring scales for e-gov SQ studies. In their view, the quality characteristics of state institutions are quite different from services delivered by business organizations. The nature, purposes, and proposed outcomes of public services serve to distinguish the task of government services evaluation from that of business organizations (Grimsley and Meehan 2007). According to Connolly, Bannister, and Kearney (2010) the distinctions between the private sector and public sector electronic services include the monopoly features exhibited by most state service delivery institutions, the legal requirement to undertake certain transactions, the obligation of the state to provide alternatives, the nature of the services provided and the nature of the data required to receive certain services. E-gov systems are distinguished from e-business by the integration of broader political and social strategic goals, such as trust in the services of state institutions, social inclusion, community regeneration, community

well-being, and sustainability which distinguish them from e-business systems (Grimsley and Meehan 2007).

It is imperative to state that in recent times, however, several studies have sprung up that focused specifically on e-SQ delivery of state institutions (Connolly, Bannister, and Kearney 2010; Al-Hubaishi, Ahmed and Hussain 2017; Hien 2014; Nulhusna et al. 2017; Ma and Zheng 2019). As a result, several e-gov measuring scales have been introduced by some of these studies, notably the 6 scale E-PS-QUAL of Connolly, Bannister, and Kearney (2010), and seven-factor model of website design, reliability, responsiveness, security/privacy, personalization, information, and ease to use introduced by Alanezi, Kamil, and Basri (2010). A scale based on website design, reliability, responsiveness, personalization, information quality, and system quality of a government portal has also been introduced by Sung et al. (2009). Some authors, notably Saha, Nath, and Salehi-Sangari (2010) have placed emphasis on the importance of the use of e-gov measuring scales for e-gov studies. They suggested that measuring the e-SQ of state institutions can help governments improve their SQ and determine how effectively public funds and other resources can be utilized to the satisfaction of the citizens. They proffer citizen satisfaction as a measure of e-SQ and the performance of state institutions.

Adoption and uses of e-government services

Some previous research on e-gov adoption categorized users based on the type of services they used or their objectives for electronic service usage (Howard 2001; Bélanger and Carter 2008). Some people may use e-gov web portals to obtain information for personal use. Others may use it for transactions, such as paying property taxes online or obtaining government services, such as vehicle license plate registration and renewal, whereas some individuals and organizational users may need government web portals to conduct business transactions (Jiang and Ji 2014). Similarly, Wang and Liao (2008) put the services provided by e-gov web portals into three categories based on the key goals of users: information acquisition, information exchange, and transaction processing.

E-gov services have been reported to be lowly patronized as compared with e-business services. The extant literature on e-gov suggests that the public is very much concerned about the possible government misuse of citizens' personal information. West (2004) for instance stresses that some people are hesitant to disclose their personal information to the government because of the fear that it may be used for purposes other than those for which it was acquired. West (2004) further revealed that as much as two-thirds of users of e-gov services feel "unsafe" conducting e-gov transactions. Again, empirical evidence suggests that poor management of security

and controls of public agencies over personal data has contributed to low patronage and interest in e-gov services (Connolly, Bannister, and Kearney 2010).

E-government service quality and user satisfaction

Bhattacherjee (2001) argued that customers' intention to continue using an online service is determined by their satisfaction with the service usage and perceived usefulness of the service. This assertion is reiterated by some scholars, such as Alawneh, Al-Refai, and Batiha (2013). US is seen to be a key factor that moderates the relationship between e-SQ and user behavior.

Other studies have suggested that to gain US, e-gov SQ should meet the needs of different user types, such as individuals and businesses or corporate bodies, and users in different geographical and demographical regions (Reddick and Roy 2013; Detlor et al. 2013; Hsieh, Huang, and Yen 2013). In addition, Hsieh, Huang, and Yen (2013) argued that in order to be more effective and efficient, e-gov SQ web portal design must take into account differences in population size, background of citizens, and usage levels.

Some researchers have linked US to e-gov SQ awareness and adoption. The relevance of e-gov website awareness in US is confirmed by researchers, such as Sipior, Ward, and Connolly (2013) and Rodrigues, Sarabdeen, and Balasubramanian (2016). This finding is in line with Charbaji and Mikdashi (2003), who discovered that awareness leads to positive feelings toward e-gov SQ, which in turn leads to engagement in e-gov. Knowledge of the availability of e-gov services was found to be a condition of actual usage by van Dijk, Peters, and Ebbers (2008). Again, Mellor (2006) discovered that citizens' low awareness of e-gov is correlated with low usage of e-gov SQ websites.

E-government and public value

Moore (1995) developed the concept of PV as a balancing of efficiency and effectiveness measures with advances in democratic and social values including engagement, participation, and trust in government. As observed in several nations, such as the United Kingdom and Australia, the PV strategy has become a mechanism for assessing the degree of success of public services (Kelly, Mulgan, and Muers 2002; Talbot 2008). In the citizen-government interaction, trust, legitimacy, and confidence in e-gov SQ are crucial for the development of public value.

In response to the challenge encountered by researchers on e-gov evaluation, Scott, Delone, and Golden (2016) proposed the use of PV as a theoretical framework for measuring efficiency, effectiveness, and social value in

understanding e-gov success. First articulated by Moore (1994, 1995), the PV approach is an alternative to previous public management approaches, which have been criticized for emphasizing narrow concepts of cost-efficiencies (O'Flynn 2007; Cordella and Bonina 2012). PV can be understood as the value or importance citizens who are the users of e-gov attribute to the outcome of e-gov policies and their experience of online public sector services (Moore 1994).

PV offers a new way of thinking about evaluating government performance and a new conceptualization of the public interest (Stoker 2006; O'Flynn 2007; Bryson, Crosby, and Bloomberg 2014). PV has therefore resulted in a growing corpus of theoretical development (Williams and Shearer 2011; Pang, Lee, and DeLone 2014), as well as the encouragement of an empirical study to apply PV to specific circumstances (Benington and Moore 2010).

Some authors have emphasized the need to distinguish perceived value that pertains in studies of SQ of businesses from PV is mainly a way of assessing the performance of state institutions. Connolly, Bannister, and Kearney (2010) for instance argued that perceived value, which is a deep-seated concept in the business world is a complex construct that incorporates several factors, such as price, delivery time, and guarantees, and has a divergent meaning in the public sector.

Hui and Hayllar (2010) emphasize the need to convince the citizens to participate in e-gov services to enhance their perception of PV. They argue that e-gov services can provide fresh opportunities and new ways for governments, the private sector, and citizens to collaborate together. The citizens' perception of PV is boosted by their pleasant experiences with e-gov SQ (O'Flynn 2007). Kearns (2004) adapting Kelly, Mulgan, and Muers (2002) major PV principles for the study of e-gov SQ emphasized that effective e-gov initiatives from the perspective of PV should be measured based on several critical criteria, including (i) the provision of widely utilized services, (ii) increased levels of US with services, (iii) increased information and choice available to service users, (iv) greater focus on the services that the public considers to be the most important, (v) lower service delivery costs, and (vi) a contribution to improved levels of trust between citizens and public organizations.

E-government service quality dimensions

This study examines the impact of e-gov SQ dimensions of efficiency, ease of completion, system availability, privacy and security, convenience, contact, and trust on US and PV. The association of these dimensions with PV was subsequently empirically tested and validated.

Efficiency

Efficiency in this context refers to the ability of public sector agencies to reduce the cost of operations in service delivery by focusing on mission-critical areas and using electronic means to manage routine activities (Reddick 2009). In connection with this, e-gov SQ aims at providing citizens with quicker and better access to public information and the ability to use services in a more personal and cost-effective manner (Bekkers and Zouridis 1999; Prins 2001). Given that one of the basic aims of e-gov SQ is to make government efficient, the quality of public service can be said to have improved if the means through which public services are delivered are efficient.

Osei-Kojo (2016) affirms that e-gov SQ has the potential to improve public service delivery by increasing efficiency, reducing the cost of operations, expanding access to services, and achieving customer satisfaction. Based on the above review of literature, the following hypothesis is proposed for the study:

H1: Efficiency of e-gov service positively affects perceived public value.

Ease of completion

To enable the user to effortlessly perform information gathering and/or electronic transactions, the e-gov solution must be quick, user-friendly, and simple to use. Users should be able to quickly and easily begin and complete the use of e-gov SQ websites and execute tasks with little or no difficulty. The e-service should be standardized so that the user is acquainted with the method regardless of where the solution is utilized. Users should have access to guidance at all times, whether through call centers, publicity, or physical presence. Some studies have placed more emphasis on ease of completion (or usage) in e-SQ studies (Zeithaml, Parasuraman, and Malhotra 2002; Yang 2001; Fassnacht and Koese 2006). Similarly, Connolly, Bannister, and Kearney (2010) established a strong positive association between ease of completion and PV.

Based on the above reasoning, this study proposes that:

H2: Ease of completion as a dimension of e-gov SQ positively effects perceived public value.

System availability

System availability is the probability that a system or component will perform its required function at a given point in time or over a stated period of time (Ebeling 1997). It refers to a system or website that is available within a given time and does not encounter disruptions when users need

it. It indicates that the website will operate without experiencing any downtime and will perform as needed during the duration of use.

System availability in e-gov allows users to always access online services provided by state institutions and can assist users to form a positive impression of those organizations. If users experience problems using e-gov services, they will have an unfavorable impression of the institution's e-gov SQ and may choose to participate in face-to-face interactions thereby negating the purpose of establishing the e-gov. In light of the possibility that system availability has an influence on e-gov service utilization, this study proposes that:

H3: System availability of e-gov services positively affects perceived public value.

Privacy and security

The degree to which the website is safe and user information is adequately protected is referred to in this study as privacy and security. In the world of e-service, this component is crucial. Users perceive considerable dangers in the virtual world of e-services as a result of the likelihood of their financial and confidential data being misused. Users' perceptions of how safe and secure their personal information is kept on the website are measured in the privacy and security dimension. The citizen's trust and confidence in using e-gov service portals for business and personal transactions is bolstered by the assurance that e-gov SQ is entirely secure.

E-gov service users are required to give some personal and corporate information (Ranganathan and Ganapathy 2002). The perception of a lack of security is a barrier to using e-services (Udo, Bagchi, and Kirs 2010). Citizens feel confident disclosing personal information when they have a strong feeling or belief that their information is protected on e-gov SQ portals, according to Shareef et al. (2009). Again, privacy invasions have a negative effect on affect trust and satisfaction (Alawneh, Al-Refai, and Batiha 2013). As a result of the review of literature, this research suggests that:

H4: Privacy and security of e-gov services positively affects perceived public value.

Contact

Contact is defined as the availability of assistance throughout the use of the website. The contact dimension provides contacts, such as telephone numbers and email addresses or availability of customer service representatives. It also implies the ability to speak to a live person if a user encounters

challenges in the usage of e-gov websites (Connolly, Bannister, and Kearney 2010).

Based on the foregoing reasoning, this study proposes the following hypothesis:

H5: Contact availability of e-gov services positively affects perceived public value.

Convenience

The service convenience dimension, as conceptualized by Berry, Seiders, and Grewal (2002), is described as the consumers' time and effort perceptions related to buying or utilizing a service. It can be viewed as a way to improve service delivery by reducing the amount of time and effort users must devote to using e-gov service (Colwell et al. 2008).

Users who prioritize convenience aim to complete tasks in the shortest amount of time with the least amount of energy and effort (Morganosky 1986). The idea of service convenience has been interpreted as everything that can be done with ease and minimum effort.

Individuals' ability to readily access information and services is a key component of the convenience dimension (Szymanski and Hise 2000; Zhu, Wymer, and Chen 2002; Chan et al. 2010). The Internet offers more accessible and available services than traditional channels, as typically online services can be accessed regardless of location and time (Gilbert, Balestrini, and Littleboy 2004; Norris and Reddick 2013).

The following hypothesis is proposed based on the preceding review of literature:

H6: Convenience of e-gov services positively affects perceived public value.

Trust

Trust is described as users' confidence in the reliability and integrity of an e-service (Morgan and Hunt 1994) and the expectation that it would deliver on its promises (Sirdeshmukh, Singh, and Sabol 2002).

Furthermore, trust, when evaluated as a dimension of the technology acceptance model, has the potential to have a significant impact on user willingness to engage in online financial transactions and personal sensitive information (Wang et al. 2003; Wang and Emurian 2005)

As a result, perceived ease of use and usefulness may not accurately represent customers' intentions to utilize online services (Eriksson, Kerem, and Nilsson 2005; Wang et al. 2003). Extant research suggests that satisfaction may not be enough to secure long-term loyalty to a service provider (e.g.,

Ranaweera and Prabhu 2003, Alkraiji and Ameen 2022). Instead, additional factors that promote retention, like trust, may need to be considered in addition to satisfaction (Hart and Johnson 1999). It has been established that organizations often look beyond satisfaction to developing trust to ensure economically viable, and stable long-term relationships with users (e.g., Morgan and Hunt 1994). In addition, Alkraiji and Ameen (2022) emphasize that trust in government has a significant influence on citizen loyalty to e-gov services. As a result, trust is seen as a critical e-gov SQ dimension in the process of building and maintaining relationships between government and citizens. It is thus hypothesized that:

H7: Trust of e-gov services positively affects perceived public value.

User satisfaction—mediating role and impact on public value

The continued use intention of e-gov services is thought to be a factor of US and perceived usefulness. Furthermore, Veeramootoo, Nunkoo, and Dwivedi (2018) argue that the user's intention to use the device indefinitely is impacted by the intended purpose. People's motivation to continue utilizing the e-gov system is shown to be influenced by factors, such as perceived usefulness and the US.

It has also been observed that perceived usefulness of e-system has an impact on PV. For instance, according to Connolly, Bannister, and Kearney (2010), the US of e-SQ dimensions has a substantial influence on users' perceptions of e-gov value. Efficiency and ease of completion dimensions were found to be more valuable in terms of their power to explain differences in users' perception of value.

Kumar et al. (2021) and Jiang and Ji (2014) discovered that a web portal's SQ promotes user adoption and continuing use intention, and that the effect changes according to the kind of user group. Furthermore, Jiang and Ji (2014) found that the dimensions of e-gov SQ, comprising efficiency, trust, reliability, and citizen support, have an impact on e-gov user value, namely: functional, economic, social, and emotional values, which in turn influences e-gov adoption intention.

The overall quality of an e-gov SQ may have a variable influence on the US and PV depending on the level of use and what users seek to use online service for. As a result, it is critical to examine users' primary goals as well as the degree of service provided in e-gov service delivery (Seo and Myeong 2021). In light of the above discussions, the following hypotheses are proposed:

H8: User satisfaction with e-gov SQ has a positive effect on perceived public value.

H9: User satisfaction with e-gov SQ mediates the positive relationship between convenience of e-gov SQ and perceived public value.

H10: User satisfaction with e-gov SQ mediates the positive relationship between ease of completion of e-gov SQ and perceived public value.

Materials and methods

Data mining

This study used a quantitative survey method to gather data from respondents (tax payers) to test the research model used for this study. The first part of the questionnaire collected personal information on age, gender, level of education, among others (Table 1). The second segment of the questionnaire sought to obtain information on taxpayers' perception of e-gov SQ, US, and PV using a seven dimension e-gov SQ model (efficiency, ease of completion, system availability, privacy and security, contact, convenience, and trust) (Table 2). The constructs were used to determine whether the current online services offered by the GRA have a positive

Table 1. Demographic information of respondents.

Variable	Frequency	Percent
Gender		
Male	106	61.3
Female	67	38.7
Age group		
30 years and below	18	10.4
31–40 years	60	34.7
41–50 years	42	24.3
51–60 years	48	27.7
61 years and above	5	2.9
Nationality		
Ghanaian	160	92.5
Non-Ghanaian	13	7.5
Educational level		
Pre-University qualification, e.g., JHS, SHS, O Level, A Level, Certificate.	16	9.2
University qualification, e.g., Diploma/Degree/Post Graduate Degree	118	68.2
Professional qualification, e.g., ICA, CIB, CIM	39	22.5
Qualification (for university qualification holders)		
Business	67	38.7
Financial services	35	20.2
Computer science/information technology	18	10.4
Technology related (e.g., engineering)	16	9.2
Education	9	5.2
Humanities	12	6.9
Not applicable	16	9.2
Level of ICT knowledge		
I possess some level of computer skills	91	52.6
I possess good computer skills	82	47.4
The capacity in which you use gra.gov.gh		
Personal	52	30.1
Business	107	61.8
Practitioner	14	8.1
Total	173	100.0

Table 2. Item loadings.

Construct	Loading	*t*-Values
Efficiency		
Gra.gov.gh make it easy to get anywhere on the site.	0.834	34.963
Gra.gov.gh has comprehensive FAQs (frequently asked questions)	0.661	10.329
Gra.gov.gh is easy to use	0.708	10.890
Gra.gov.gh enables me to get on to it quickly	0.690	8.824
Ease of completion		
Gra.gov.gh enables me to complete my tax returns easily.	0.953	5.214
Gra.gov.gh enables me to file my tax returns quickly.	0.890	5.098
Gra.gov.gh enables me to pay my tax easily	0.650	3.290
System availability		
Gra.gov.gh is always available for business.	0.865	23.006
This website lunches and runs the right way.	0.780	22.311
Pages at this website do not freeze after I sign and submit.	0.805	22.245
Privacy and security		
This website does not share my personal information with other sites	0.920	60.465
Gra.gov.gh protects information about my tax returns.	0.960	131.914
Gra.gov.gh protects information about my tax payments	0.898	38.029
Contact		
Gra.gov.gh provides a telephone number for problems.	0.744	9.488
This site has service representative available on-line. Customer	0.819	19.498
This website offers the ability to speak to a live person if there is a problem.	0.848	26.689
Convenience		
The Gra.gov.gh website readily meets my needs	0.700	3.460
My personal safety of usage of this website is facilities assured	0.649	2.789
The Gra.gov.gh website is properly designed to aid navigation	0.866	7.042
Trust		
The reliability of this website (e.g., It hardly crashes or freezes) increases my trust in Gra.gov.gh.	0.819	18.468
The ease of use of the Gra.gov.gh website increases my trust in the Gra.gov.gh.	0.842	16.974
Knowing that the privacy of my personal information is protected on Gra.gov.gh increases my trust in the Gra.gov.gh.	0.901	43.591
User satisfaction		
I find the service quality of this website to be very satisfactory.	0.957	41.755
I would describe the service quality of this website as very satisfactory.	0.726	8.962
In terms of service quality, the Gra.gov.gh website is very satisfactory.	0.725	8.214
Perceived public value		
The Gra.gov.gh gives you a feeling of being in control.	0.715	13.256
I am likely to consider Gra.gov.gh as my first choice for future transactions with GRA.	0.824	16.310
I am likely to use Gra.gov.gh from now on for filing my tax returns.	0.933	60.073
I am likely to use Gra.gov.gh from now on for tax payments.	0.897	33.423

Note. All bootstrap *t*-values are significant at 0.01 level of significance.

impact on US and PV. The basic constructs of e-gov SQ, US, and PV were adapted from the 6-scale E-PS-QUAL of Connolly, Bannister, and Kearney (2010) to suit the economy of Ghana.

Respondents were requested to rate the extent to which they agreed (or disagreed) with the statements anchored on a Likert Scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Sampling technique used

A convenience sampling method was used to select online taxpayers for the study with the assistance of GRA branch managers. The authors contacted the management of GRA branches through a written request briefing them of their intention to carry out the survey. The managers sent an online request to their taxpayers and those who demonstrated interest and gave their consent received the questionnaire online. This category of respondents forms the majority. This procedure was adopted because of the need to get a large number of online taxpayers as respondents for the study. Again, this approach was adopted as a result of the spread of the COVID-19 pandemic. A limited number of the respondents however gave the authors permission to administer the questionnaire to them physically in their offices.

Questionnaire administration

The authors conducted a pre-test of the survey questionnaire using a small number of respondents (teaching assistants) and thereafter modified the questions to ensure high internal consistency of the measures. The modified questionnaire was administered to online taxpayers in Accra and Kumasi of the Greater Accra and Ashanti Regions, respectively. Four research assistants were contracted and trained to administer the hard copy questionnaires.

A total of 186 online taxpayers in both Greater Accra Region and Ashanti Region of Ghana were surveyed. Out of the total number of questionnaires distributed, 173 (93%) were properly answered and therefore usable. Data collection spanned May 1, 2021 to September 15, 2021.

The low number of respondents is not surprising. In addition to the general problem of low computer literacy and skill of taxpayers in Ghana, e-gov services have been reported to be lowly patronized as compared to e-business services. The e-gov literature suggests that the public has a high level of concern about the government's misuse of personal data (West 2004). Taxpayers were, therefore, reluctant to take part in the survey or give personal information for the study because they had the fear that such information may be used for purposes other than those for which it was collected.

Background information

Gender

Slightly above 61% of the respondents were males whereas about 39% were females. This indicates that the majority of the respondents are male taxpayers.

Age group

Almost 35% of respondents were between the ages of 31 and 40 years, followed by those who were between the ages of 51 and 60 years (28%), 41 years and 50 years (24%), and 30 years and below (10%) in that order. The findings showed that a majority of the respondents were between 31 and 60 years (86.7%).

Educational level

About 68% of the respondents were holders of university qualification (Diploma, First Degree, and post graduate qualifications). The rest of the respondents had professional qualification (∼23%) and pre-university qualification (9%). The findings showed that all the respondents were educated and knowledgeable enough to comment on the online services they receive from GRA.

Level of ICT knowledge

About 47% possess good computer skills, while 53% of the respondents possess some level of computer skills.

Background information obtained from respondents are captured in Table 1.

Data analysis

In the analysis of data, partial least squares (PLS) were used (SmartPLS Release: 3.2.7 (Ringle, da Silva, and Bido 2014). PLS is neither affected by sample size nor distribution of data (Hair, Ringle, and Sarstedt 2011). The significance of each path was tested using PLS procedure of bootstrap *t*-values (5,000 sub-samples) (Tortosa, Moliner, and Sanchez 2009).

Results

The antecedents of e-gov SQ, US, and PV were all measured reflectively since the items under each construct were interchangeable and highly correlated. In line with recommendations by Hair et al. (2016) the model was validated by testing for convergent and discriminant validity. The item loadings and bootstrap *t*-values (5,000 sub-samples) (Tortosa, Moliner, and Sanchez 2009) following the application of the PLS software are presented in Table 2. From Table 3, the minimum Cronbach's alpha obtained among the nine constructs was 0.674 which meets the threshold for exploratory research (Hair et al. 2016). Also, all the composite reliabilities of the nine constructs were above 0.708 and the average variance extracted estimates were above 0.50. Therefore, reliability and convergent validity requirements have been adequately met (Hair et al. 2016). Discriminant validity is met

Table 3. Summary convergence and discriminant validity.

	Convergence validity			Heterotrait-Monotrait Ratio (HTMT) 0.85 criterion								
Construct	A	C.R	AVE	1	2	3	4	5	6	7	8	9
1. Efficiency	0.712	0.816	0.528									
2. Ease of completion	0.822	0.877	0.708	0.480								
3. System availability	0.759	0.858	0.668	0.683	0.213							
4. Privacy and security	0.917	0.948	0.859	0.721	0.093	0.590						
5. Contact	0.740	0.846	0.648	0.613	0.577	0.481	0.316					
6. Convenience	0.674	0.785	0.553	0.341	0.236	0.407	0.145	0.333				
7. Trust	0.817	0.890	0.731	0.755	0.596	0.564	0.465	0.656	0.233			
8. User satisfaction	0.816	0.849	0.656	0.296	0.362	0.550	0.162	0.422	0.685	0.391		
9. Perceived public value	0.864	0.909	0.717	0.633	0.258	0.408	0.711	0.469	0.243	0.609	0.322	

Table 4. Predictive accuracy (R^2), predictive relevance (Q^2), and effect sizes (f^2).

Constructs	R^2	Q^2	f^2 (User satisfaction)	f^2 (Perceived public value)
1. Efficiency	_	_	0.02 (Small)	0.02 (Small)
2. Ease of completion			0.04 (Small)	0.01 (None)
3. System availability			0.19 (Medium)	0.08 (Small)
4. Privacy and security			0.02 (Small)	0.39 (Large)
5. Contact			0.03 (Small)	0.02 (Small)
6. Convenience			0.25 (Medium)	0.01 (None)
7. Trust			0.01 (None)	0.04 (Small)
8. User satisfaction	0.511	0.407		0.11 (Small)
9. Perceived public value	0.559	0.452	_	_

by the fact that the heterotrait-monotrait ratio of correlations presented in Table 3 were all below 0.85 ($HTMT_{0.85}$) (Henseler, Ringle, and Sarstedt 2015). This shows that each construct is distinct and differs from the other measurement constructs in the model. As a result, the nine-construct model demonstrates discriminant validity.

Structural model analysis

A structural model was built by examining the interrelationships between the dimensions of e-gov SQ, US, and PV. An examination of the predictive accuracy (R^2) of the structural model showed a large explanatory power for the endogenous constructs-US (51%) and perceived public value (56%) (Hair et al. 2016; Cohen 1988). Also, Q^2-values of 0.407 and 0.452 were obtained for US and PV, both of which are >0, showing predictive relevance (Hair et al. 2016). The effect sizes (f^2) computed for the independent variables showed that system availability and convenience had medium effect sizes on US whereas privacy and security had large effect size on PV (Cohen 1988). The details of the predictive accuracy (R^2), predictive relevance (Q^2) test, and effect sizes (f^2) results are presented in Table 4.

Hypothesis testing

The results of the hypotheses test are presented in Figure 1 and Table 5. The study supports six of the first eight hypotheses. Except for ease of completion

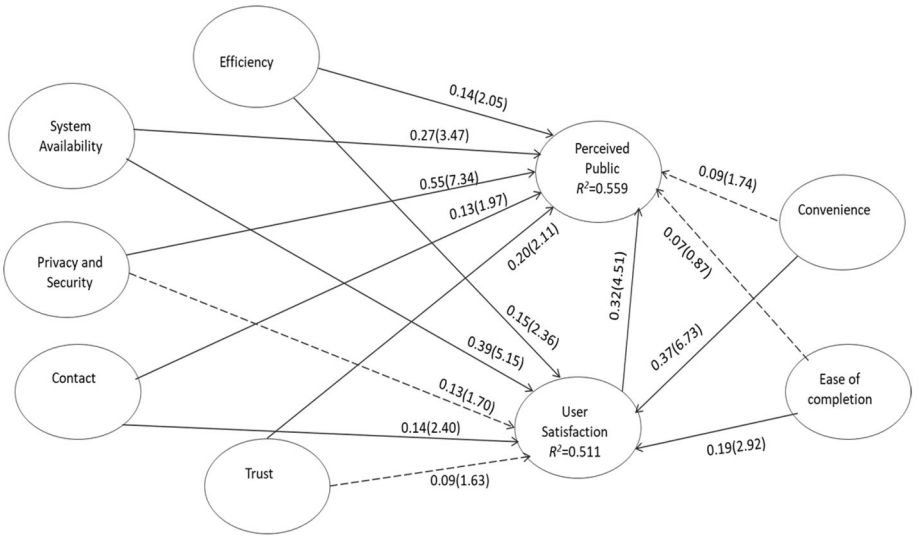

Figure 1. Structural path diagram for the dimensions of e-gov SQ, US, and PV showing the regression weights and *t*-values.

Table 5. Structural path results.

Hypothesis	Structural path	Path coefficient	*t*-Value (bootstrap)	Hypothesis results
H1	Efficiency → perceived public value	0.138*	2.052	Supported
H2	Ease of completion → perceived public value	0.074	0.867	Not Supported
H3	System availability → perceived public value	0.269**	3.470	Supported
H4	Privacy and security → perceived public value	0.554***	7.336	Supported
H5	Contact → perceived public value	0.129*	1.969	Supported
H6	Convenience → perceived public value	0.090	1.736	Not Supported
H7	Trust → perceived public value	0.195*	2.112	Supported
H8	User satisfaction → perceived public value	0.315***	4.507	Supported

***$p < .001$; **$p < .01$; *$p < .05$.

and convenience, all the other dimensions of electronic service quality including efficiency, system availability, privacy and security, and contact, had a positive effect on perceived PV. Again, five of the seven e-gov SQ dimensions, namely efficiency, system availability, contact, ease of completion, and convenience had a significant and positive effect on US. In addition, US had significant positive effects on perceived PV. These results reiterate the findings of Connolly, Bannister, and Kearney (2010) and Jiang and Ji (2014).

Mediation role of user satisfaction on ease of completion and convenience

The indirect effects of the ease of completion and convenience on PV were tested using the mediation test recommendations by Nitzl, Roldan, and Cepeda (2016). From Table 6, US fully mediates ease of completion and perceived public value, and convenience and PV. Therefore, hypotheses nine and ten were supported in the present context.

Table 6. Mediation test results.

Mediation paths	Path coefficient "a"	Path coefficient "b"	Path coefficient "c"	Indirect effect (a*b)	*SD* (ai*bi)	*t*	Mediation type
Convenience > US > PPV	0.374***	0.315**	0.09	0.118	0.012	9.547	Full
Ease of completion > US > PPV	0.186*	0.315**	0.074	0.059	0.021	2.789	Full

***$p < .001$; **$p < .01$; *$p < .05$; US: user satisfaction; PPV: perceived public value; "a": path between exogenous variable and mediator; "b": path between mediator and endogenous variable; "c": direct path between exogenous variable and endogenous variable.

Discussion

The objective of the study was to examine the influence of e-gov SQ on US and PV by taxpayers in the Greater Accra and Ashanti Regions of Ghana. Structural equation modeling—Smart-PLS was employed to investigate the relationships among the dimensions of e-gov SQ, US, and PV. In addition, the study tested for convergent and discriminant validity (Hair et al. 2016; Tortosa, Moliner, and Sanchez 2009).

The findings of the study confirmed that the hypotheses of the study are generally consistent with the findings of Connolly, Bannister, and Kearney (2010). The findings indicate a strong impact of e-gov SQ on PV irrespective of the different cultural settings in which it is implemented.

The results again show that US partially mediates the relationship between e-gov SQ namely efficiency, ease of completion, system availability, contact, and convenience and PV. The structural model employed indicated that five of the seven dimensions of e-gov SQ, namely: efficiency, ease of completion, system availability, contact availability, and convenience have a positive and significant influence on US as indicated in Figure 1 and Table 5. Privacy and security, and trust were found to have direct positive effects on PV but no effect on US.

This implies that taxpayers are likely to have positive value on e-gov SQ without necessarily being satisfied as long as the e-gov SQ provides privacy and security, and trust. This result means taxpayers view privacy and security, and trust as core e-gov SQ dimensions of GRA and not necessarily as e-gov SQ dimensions to boost their satisfaction as compared to the five other dimensions. The two e-gov SQ dimensions, therefore, serve as a hygiene factor and necessary connection toward creating positive PV such that without them, the other e-gov SQ dimensions are likely to lose their emphasis so far as US and PV are concerned. US fully mediates the relationship between convenience, and ease of completion and PV (Figure 1 and Table 6). The results for ease of completion and convenience dimensions depict that the tax payer will have significant value on e-gov SQ only if he/she is satisfied. Again, the indirect effect of ease of completion on US was not surprising taking into consideration the significant number of respondents with limited computer knowledge. Computer literacy constraints could limit a tax payer's willingness to opt for online tax payment and filing of tax returns.

This result indicates that the privacy and security dimension is perceived by taxpayers to be an important driver of US. This finding is consistent with that of previous studies undertaken in other markets (Jiang and Ji 2014; Connolly, Bannister, and Kearney 2010).

Conclusion

The study reiterates the importance of e-gov SQ dimensions as a significant driver of US. E-gov SQ dimensions of efficiency, ease of completion, system availability, contact availability, and convenience were all found to have a positive influence on US. In addition, US mediates either fully or partially e-gov SQ and PV. The strong predictive power of ease of use and affordability dimensions on US indicates that the success of e-gov depends to a greater extent on these two SQ dimensions. The importance of tax revenue and the dependence of GRA on taxpayers' funds make it imperative that e-gov SQ be accorded the highest premium possible. Employing efficient e-gov SQ to create US is therefore very essential for the GRA and the growth of the economy in general. In addition, online taxpayers' perception of e-gov service delivery was found to be significantly positive, especially in the aspect of efficiency, ease of completion, system availability, contact availability, and convenience of e-gov SQ.

The research again emphasizes the reliability and relative adaptability of the 6-scale E-PS-QUAL of Connolly, Bannister, and Kearney (2010) in evaluating country-specific e-gov SQ. By employing such surveys to obtain feedback on e-gov SQ delivery, organizations are likely to gain significant insight toward improving e-gov SQ delivery.

E-gov services contribute to improving the flow of information from citizens to government, the government to citizens, and within state institutions. Finally, this study unravels the benefits of e-gov (e-tax) services in the modernization of administrative operations, promotion of transparency and accountability, reduction cost of tax collection on the part of GRA, and facilitation of tax payments and returns on the part of e-gov service users (electronic tax payers).

Implications

Theoretically, this research supports the assertion by previous scholars that e-gov SQ has a significant influence on US and PV (Hien 2014; Nulhusna et al. 2017; Al-Hubaishi, Ahmed and Hussain 2017; Ma and Zheng 2019). This study incorporated country-specific e-gov SQ dimensions to establish their influence on US and PV. It, therefore, reinforces the assertion of some scholars of the need to modify SQ measurement scales before using them for their studies (see Schneider and White 2004). The study also emphasizes that e-gov service has a significant positive effect on PV irrespective of the economy in which it is developed and implemented.

The results also highlight areas requiring critical attention for effective strategies to be implemented by the management of GRA to improve e-gov SQ to make them responsive to the needs of taxpayers. Tax authorities

should improve e-gov SQ dimensions of efficiency, ease of completion, system availability, contact availability, and convenience since they have been found to positively influence US.

Developing and offering simple and friendly website designs that enhance understanding and ease of completion undoubtedly will enhance US and PV. Again, e-gov services and websites should be provided in simple English language. This has the propensity to enhance US, PV, and the revenue mobilization drive of GRA. In addition, e-gov service facilities and services should be readily accessed online. Encountering challenges in online tax transactions will not only discourage taxpayers from registering to use online services but will certainly create a negative PV for the online services of GRA. The positive significant effect of the privacy and security dimension of e-gov on PV suggests that taxpayers place a high premium on the confidentiality of their personal information and tax transactions, and they will engage in electronic tax transactions if they are assured of no seepage of personal information. In addition, extensive taxpayer education on the usage of e-gov services is imperative for access and patronage of services. Developing e-gov websites to reduce the cost of operation and improve revenue mobilization can be achieved only when there is an increase in patronage of electronic tax transactions in an emerging economy like Ghana. Meeting the needs and expectations of taxpayers is paramount in this regard.

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