Determining e-Government Trust: An Information Systems Success Model Approach to the Philippines' Government Service Insurance System (GSIS), the Social Security System (SSS), and the Bureau of Internal Revenue (BIR)[1]

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Building trust in e-government is not easy, especially in a country that faces many contextual, technological, and social challenges. This discourse on Philippine e-government is an ongoing one, as many of these initiatives are piecemeal in the various branches and levels of government. This research particularly looks at three e-government platforms rendering some mandated financial services to the citizens: (1) social security services provided by the Government Service Insurance System (GSIS) and the Social Security System (SSS), and (2) tax services delivered by the Bureau of Internal Revenue (BIR). Employing a theoretical framework based on interpretations of the Information Systems Success Model and trust building towards e-government, data collected from a total of 668 respondents across the three government institutions are subjected to structural equation modeling to determine what factors influence trust in e-government. The results show that trust in technology and information quality perceptions are the most significant determinants of trust in e-government, while there are some concerns regarding system quality in building trust in e-government. Further implications and recommendations are also included in this research.

Keywords: e-government, trust, GSIS, SSS, BIR

1 Introduction

1.1 Rationale

The United Nations (UN) has defined e-government as *"the use of information and communication technologies (ICTs) and its application by the government for the provision of information and public services to the people."* It also agrees with other contemporary definitions that e-government is *"the government use of ICTs to offer for citizens and businesses the opportunity to interact and conduct business with government by using different electronic media such as telephone touch pad, fax, smart cards, self-service kiosks, e-mail, internet, and electronic data interchanges (EDI)."* The World Bank (WB) likewise states that e-government is *"government-owned or operated systems of ICTs that transform relations with citizens, the private sector and/or other government agencies so as to promote citizen empowerment, improve service delivery, strengthen accountability, increase transparency, or improve government efficiency."* It further adds that e-government is "*the pragmatic use of the most innovative ICTs, like the internet, to deliver efficient and cost-effective government services, information, and knowledge.*" Many academic researches and practical endeavors have grounded their efforts on e-government on these definitions. Additionally, these international efforts have also advocated that such researches and endeavors should be geared towards improving e-government in a more citizen-centric manner (Mpinganjira, 2015).

In a bid to adhere to the thrusts of these big multilateral organizations, and to garner favorable valuations, the Philippines has been increasingly pushing for more comprehensive e-government platforms, especially with open data features (Capili, 2015). Mandated by Republic Act (R.A.) 10844,

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the Department of Information and Communications Technology (DICT) is tasked to ensure that all ICT-based activities of the government adhere to both e-government objectives in particular, and national objectives in general (DICT, 2014; Republic of the Philippines, 2015). More and more sectors of government have been recognizing its importance in their respective functions (Capili, 2015; Gamboa, 2015; National Computer Center, 2012; National Statistical Coordination Board, 2009). In fact, there is an E-Government Master Plan in place, which is a blueprint for the integration of ICTs for the whole government (DICT, 2014). E-government enhances public services by reducing bureaucracies and improving customer orientations. This forces government institutions to increase citizen access, address process inefficiencies (Abu-Shanab, 2017; Karkin & Janssen, 2014; Mirchandani, Kathawala, Johnson, Hayes, & Chawla, 2018; Ramli, 2017; Razak, Bakar, & Abdullah, 2017; Suki & Ramayah, 2010; Venkatesh, Sykes, & Venkatraman, 2014), improve service strategies and evaluation measures (A. J. Chen, Pan, Zhang, Huang, & Zhu, 2009; Karunasena & Deng, 2012; Rokhman, 2011; Visser & Twinomurinzi, 2009), and be constantly conscious about citizen adoption, use and feedback (Al-Hujran, Al-Debei, Chatfield, & Migdadi, 2015; J. V. Chen, Jubilado, Capistrano, & Yen, 2015; Lallmahomed, Lallmahomed, & Lallmahomed, 2017; Sá, Rocha, & Cota, 2016; Veeramootoo, Nunkoo, & Dwivedi, 2018; Venkatesh, Chan, & Thong, 2012). Among other things, e-government initiatives should make transacting with the government less problematic, less prone to corruption, more transparent, and more hassle-free. In principle, since all of the processes and documentary requirements are published online, and are made available and transparent to the general public, there should be very little room for under-the-table deals to be made to shortcut the process or to cut corners in the requirements. Furthermore, e-government is expected to increase the effectiveness and efficiency of rendering and availing government services, at the convenience of citizens (Capili, 2015; DICT, 2014). The most significant and immediate benefits are the reductions in physical queues and processing times, effectively cutting the bureaucratic red tape with the computerization and automation of most of the preparatory work prior to personal appearances.

However, even before the DICT came into the picture, there were apprehensions about transacting with government. In the early 2000s, many were concerned with how the Philippine government bureaucracy, which was perceived to be a significant obstacle, could influence the introduction and performance of information technologies to their processes (Lallana, Pascual, & Soriano, 2002). Some of these concerns were the effects on sufficiency, accuracy, and usefulness of information provided (Siar, 2005).

Several years later, online versions of the same government services are still hounded with many infrastructural problems (Gamboa, 2015). In fact, the Philippines' e-government adoption and usage rates are still very volatile and unpredictable. The United Nations E-Government Knowledge Database shows that while the Philippines' ranking in e-government development rate has improved from 95th in 2014 to 71st in 2016, participation rate ranking declined from 51st to 67th. However, later assessments from the same UN organization in 2018 show that while readiness and resiliency remain low, declining in ranking from 71st in 2016 to 75th, participation ranking has significantly improved, jumping to 19th from 67th in 2016. Despite increasing ICT adoption in government services, many incidences of inefficiencies still occur, such as imposing bureaucratic requirements, poor records-keeping, and resorting to manual processes (J. V. Chen et al., 2015). This situation is not unique, as other developing countries instituting e-government have encountered similar problems, such as Indonesia (Mirchandani et al., 2018; Rokhman, 2011), Malaysia (Ramli, 2017; Razak et al., 2017; Suki & Ramayah, 2010), Thailand (Khayun, Ractham, & Firpo, 2012), Sri Lanka (Karunasena & Deng, 2012), India (Venkatesh et al., 2014), Jordan (Abu-Shanab, 2014, 2017; Alawneh, Al-Refai, & Batiha, 2013), and Turkey (Karkin & Janssen, 2014), to name a few.

These issues run contrary to what the ideal setting of e-government should be as pushed for by the likes of the UN and the WB, which is to successfully create an environment that promotes use of online government services by promoting a good understanding of factors that impact on such decisions (Mpinganjira, 2015). One of these factors that have been highly studied and advocated by both academics and practitioners is trust towards the system in question. There has been a long history and a wide array of academic discourses on trust that agree failure to properly develop trust towards information technologies and systems is a major contributor to declining system usage rates (Beldad, De Jong, & Steehouder, 2010).

A version of this trust towards the system is trust in e-government that previous researches have put forward (Belanger & Carter, 2008; Srivastava & Teo, 2009; Teo, Srivastava, & Jiang, 2008). Specifically defined for government applications of ICTs, trust in e-government has been widely touted to be an important consideration to get citizens online, and to start fully using the different functions and features to avail of government services. However, trust in e-government is difficult to achieve, especially in countries whose governments are rife with corruption and incompetence allegations, and whose government services and processes are hounded with inefficiencies and unnecessary bureaucracies (J. V. Chen et al., 2015). But building this trust is important, since the use of technologies in government services ultimately exposes citizens to greater risks (Lim, Tan, Cyr, Pan, & Xiao, 2012). The lack of trust even creates an even bigger barrier to an already-difficult challenge (Mpinganjira, 2015). Even when governments make it mandatory for citizens to use e-government platforms, it is still a necessity for citizen users to trust these systems, especially if these systems manage a significant amount of their personal information.

Theoretically and practically, trust is defined and determined by scientifically scrutinizing real-world experiences, and therefore it should avoid vague approaches on how it can be developed and influenced (McKnight & Chervany, 2001). Therefore, this research captures and analyzes the experienced individuals' perceptions of transacting with some form of e-government service, positing that these experiences and perceptions can be utilized as significant antecedents to their trusting intentions towards e-government. Afterwards, these perceptions are subjected to scientific statistical analyses consistent with what both theory and practice dictates. Therefore, in light of these issues, this research poses the following research questions *(RQ):*

RQ1: Which factor weighs more towards cultivating trust in e-government?
RQ2: Are the perceptions in these factors common across different e-government platforms?

1.2   Context

E-government has been broadly defined in the Philippines as the "*use by government agencies of information and communication technologies (ICT) that have the ability to transform relations with citizens, businesses, government employees, and other arms of government in the delivery of services*" (Lallana et al., 2002, p. 2). In addition, e-government is supposed to create a digitally empowered and integrated bureaucracy that is able to provide responsive and transparent citizen-centric services, at par with global standards of government services (DICT, 2014). This research focuses on three e-government platforms, which were all part of the early stages of the Philippines' e-government initiatives (Lallana et al., 2002).

According to its mandate, the Government Service Insurance System (GSIS) provides life insurance, separation, retirement, and disability benefits for more than two million active government members, beneficiaries, and pensioners. It is directed to provide such services under R.A. 8291, (Government Service Insurance Act of 1997) (Republic of the Philippines, 1997a), and many other regulations thereafter. In addition, these regulations also impose that all government employees must have compulsory coverage to be facilitated by GSIS. Its 2018 assets are over PhP1.1 trillion (GSIS, 2019). Its Electronic GSIS Member Online (eGSISMO) allows members to view their profiles, loans, and claims, while its GSIS Wireless Automated Processing System (GW@PS), an Internet-connected kiosk, enables members to apply for loans, and check membership and loan statuses.

The Social Security System (SSS) provides similar services for its 35 million active members, beneficiaries, and pensioners currently and previously employed in private organizations. It is mandated to provide such services under R.A. 1161 (Social Security Act of 1954) (Republic of the Philippines, 1954), and other subsequent regulations. In addition, these same regulations also state that SSS coverage is compulsory to all employees and self-employed individuals. Its 2018 assets are over PhP511 billion (SSS, 2019). Its My.SSS provides online services to its members, including accounts and membership records management, selected SSS transactions, and appointments setting with a home branch (SSS, n.d.).

The Bureau of Internal Revenue (BIR) is one of the two major revenue collecting arms of the government. The BIR's functions and citizens' compliance are mandated by the National Internal Revenue Law, with the latest iterations found in R.A. No. 8424 (The Tax Reform Act of 1997) (Republic of the Philippines, 1997b). In charge of tax collection from various entities in the Philippines, its 2018

recorded total income, value-added, excise and other tax collections is over PhP1.9 trillion. Subsequent issuances from the BIR have also required for more and more taxpayers to file their returns online. BIR's eServices website is composed of five major services: (1) eReg (tax registration), (2) eFPS (electronic filing and payment), (3) eForms (an alternative channel to filing), (4) ePay (online payments), and (5) eTSPCert (certification facilities).

These three e-government platforms are chosen because they provide critical mandated personal financial services to citizens. But more importantly, these e-government platforms manage significant amounts of citizens' personal, personally-identifying and sensitive information (Floropoulos, Spathis, Halvatzis, & Tsipouridou, 2010; Lim et al., 2012; Mpinganjira, 2015). These two alone already can raise substantial trust-related issues, justifying the urgent calls to examine the quality of e-government systems vis-à-vis citizen trust perceptions.

2   Literature Review

Past researches have agreed that e-government quality and performance assessments can be based from similar perceptions of its offline versions (Sá et al., 2016), which is also based on citizens' previous experiences (Alawneh et al., 2013; Khayun et al., 2012; Kurfali, Arifoglu, Tokdemir, & Paçin, 2017; Sá et al., 2016). Hence, just as e-commerce success is best measured from customers' perspectives (DeLone & McLean, 2003, 2004), e-government success must heavily rely on citizen feedback.

Trust in the information systems (IS) domain is one of the most enduring academic and professional discourses, simply because of its multidimensionality (McKnight & Chervany, 2001). This means that there are many ways to define and theorize what trust is, and how it affects subsequent perceptions, attitudes, and behaviors. This research focuses on specifically building online trust, which still is subject to the same multidimensionality considerations as other forms of trust in the IS domain. It should be emphasized that trust building is an evolutionary development considering the processes, technology, and people (Karunasena & Deng, 2012; Khayun et al., 2012), and it has been argued to be an important factor influencing e-government endeavors (Abu-Shanab, 2014). This research translates this trust to trust in e-government.

2.1   Theoretical foundations
2.1.1   Trust theory in information systems and in e-government research

Trust has become a central issue in both online and offline information systems research because these technologies have completely changed the way people interact and do business with each other, and with organizations providing a product or a service (McKnight & Chervany, 2001). As a result, this has changed consumers' previous cues in developing and building trust, as the electronic environment becomes more uncertain (McKnight, Choudhury, & Kacmar, 2002). Over time, discussions on trust in this discipline have constantly evolved, with many previous works providing different perspectives on the antecedents of trust in the use of information technologies and systems (Alawneh et al., 2013; Beldad et al., 2010; Khayun et al., 2012; Kurfali et al., 2017; Sá et al., 2016).

Early discussions on trust declared that there are three broad conceptual domains on trust that serve as antecedents (McKnight & Chervany, 2001; McKnight et al., 2002). Interpersonal trust is where the user trusts the seller offering the product or service to be availed. This implies that the user is looking at certain contextual cues, such as characteristics, reputations, and images of the seller to decide on the level of its trustworthiness, and on the degree of trusting behavior to be exhibited (Alawneh et al., 2013; Khayun et al., 2012; Kurfali et al., 2017; Sá et al., 2016). Institutional trust is where the user makes decisions to trust based on the structure and the environment that the seller employs to facilitate the interactions necessary to conduct business (Alawneh et al., 2013; Khayun et al., 2012; Kurfali et al., 2017; Sá et al., 2016). Lastly, dispositional trust refers to the user's trust towards others in general (Alawneh et al., 2013; Khayun et al., 2012; Kurfali et al., 2017; Sá et al., 2016). This is an encompassing viewpoint on how trust can be formed and developed, entertaining the real possibility that there are other antecedents that are not easily captured in any given context. For the purposes of this research, concretizing and operationalizing how these conceptual domains of trust in the e-government context are done by arguing the appropriateness of some IS quality dimensions, and

how each dimension can influence trust (Alawneh et al., 2013; Khayun et al., 2012; Kurfali et al., 2017; Sá et al., 2016).

2.1.2 Information systems success model in e-government research

One major theoretical model that has been a cornerstone in explaining and predicting a website's performance and success can be determined by the three major factors of information quality, service quality, and system quality, collectively known as the Information Success Model (ISM) (DeLone & McLean, 2003, 2004). ISM also synthesizes several IS theoretical arguments into a more coherent body of analyzing IS success, outlining how to evaluate the interface design and the delivery of its promised content and functions at the individual customer level. Because of its effectiveness in explaining and predicting user feedback, ISM has been extended to e-government contexts as well, either in general (Teo et al., 2008), or in specific e-government systems such as online tax filing (C.-W. Chen, 2010; J. V. Chen et al., 2015; Floropoulos et al., 2010; Khayun et al., 2012; Veeramootoo et al., 2018). Furthermore, previous researches have explored the different effects of ISM dimensions on other measures of success, such as trust (Abu-Shanab, 2014, 2019; Lim et al., 2012; Smith, 2010). This research attempts to validate these newer approaches to discuss and analyze ISM dimensions in the Philippine context.

2.2 Trust in e-government considerations

Trust in e-government is defined as the belief that the e-government platform itself is trustworthy, honest, and truthful; this implies that a citizen is willing to depend on the e-government system to conduct his/her interactions and transactions with the government, and is recognizing that certain risks are being taken with the information that they provide to the system to facilitate the government transaction (Srivastava & Teo, 2009; Teo et al., 2008). This research therefore argues that this particular definition of trust in e-government adheres to the trusting intentions as defined by a user's willingness to depend on a system (McKnight & Chervany, 2001; McKnight et al., 2002). With this, there are increasingly pressing issues about designing e-government websites that exactly exhibit reliable indications of ability, benevolence, and integrity to induce trust among citizens (Tan, Benbasat, & Cenfetelli, 2008). This means that the formation of trust in e-government depends on how well the actual e-government platform performs towards its intended users. It is not only just about completing the transaction and rendering the service effectively and efficiently, but also protecting the citizens, the information stored in the system, and the overall integrity of the system through various safeguard measures.

However, how these IS quality dimensions influence trust in e-government, and how e-government's characteristics, perceptions, and functions affect the government's efforts to cultivate trust, are relatively new research ventures *(See Figure 1: Research Framework)*. As mentioned, there is a number of quantitative (Abu-Shanab, 2014, 2019), and qualitative (Lim et al., 2012; Smith, 2010) researches positing that certain IS quality dimensions, albeit defined a little differently from the ISM perspective, can predict not only adoption, use, and continued use of a system, but also trust, and in this case, trust in e-government.

Figure 1. Research Framework
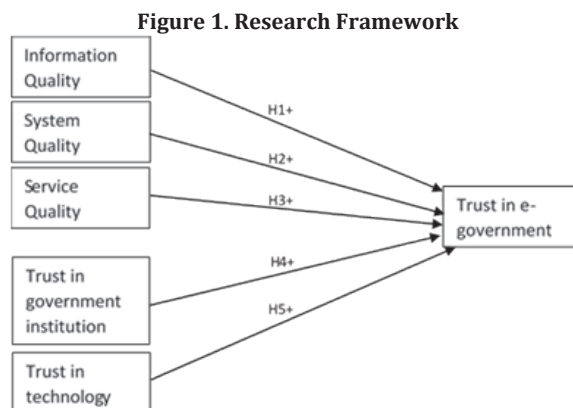
2.3   Effects of information quality

Information quality is defined as the integrity and usability of the information provided by the system (DeLone & McLean, 2003). This information is expected to be accurate, updated, relevant, sufficient to meet task requirements, readable, and understandable (DeLone & McLean, 2004). These considerations are also highlighted in the Philippine government's push for open government and open data (Capili, 2015; Gamboa, 2015). Based on these definitions, this research argues that information quality is a component of both institutional-based trust (McKnight & Chervany, 2001; McKnight et al., 2002), and expectations-based trust (Beldad et al., 2010), and therefore can serve as a factor influencing the trusting intention of trust in e-government.

Additionally, previous studies, in applying ISM to their respective research contexts, have observed that information quality perceptions can influence the level of trust in the organization's online platform (Abu-Shanab, 2014; Beldad et al., 2010; Beldad, van der Geest, de Jong, & Steehouder, 2012), and more specifically, for the purposes of this research, trust in e-government (Abu-Shanab, 2019; Lim et al., 2012).

H1: Information quality positively influences trust in e-government.

2.4   Effects of system quality

According to ISM, system quality is defined as the completeness and convenience of features and functions necessary for users to interact with the system (DeLone & McLean, 2003, 2004). This research employs the similar argument that this ISM-based definition of system quality is a significant component of institutional-based trust (McKnight & Chervany, 2001; McKnight et al., 2002), expectations-based trust, and website-based trust (Beldad et al., 2010). However, this is one of the biggest concerns hounding the progress of Philippine e-government, as there is currently comparatively poor infrastructure to support e-government initiatives (Gamboa, 2015).

Previous researches have also found that the views on system quality affect the level of trust in the organization's online platform (Beldad et al., 2010; Beldad et al., 2012), in which other studies have extended to trust in e-government (Abu-Shanab, 2014, 2019; Lim et al., 2012; Smith, 2010).

H2: System quality positively influences trust in e-government.

2.5   Effects of service quality

Service quality is defined as the technology-augmented organization's capabilities to better address customer needs (DeLone & McLean, 2003, 2004). The Philippine government has also recognized the need to be more competitive, effective, and efficient in their various modes and channels of service deliveries (DICT, 2014; Gamboa, 2015; National Computer Center, 2012). This research therefore argues that these considerations on service quality also describe institutional-based trust (McKnight & Chervany, 2001; McKnight et al., 2002), and expectations-based trust (Beldad et al., 2010), making this ISM quality dimension yet another interesting antecedent towards trust in e-government.

Additionally, it has been said that the quality of processes involved in rendering e-government services is an important consideration in building trust (Karunasena & Deng, 2012; Khayun et al., 2012). Further examinations of the effects of service quality have produced support for its influence of trust towards an online presence's capabilities (Tan et al., 2008), which has also been found in trust in e-government contexts (Abu-Shanab, 2019; Lim et al., 2012; Smith, 2010).

H3: Service quality positively influences trust in e-government.

2.6   Effects of trust in government institution

In many e-commerce and e-government contexts, there are other factors aside from what is posited thus far in this research that would prove to be influential towards trust in e-commerce and e-government. Therefore, aside from the technological characteristics of an e-government presence, perceptions of the actual government institution employing e-government can also affect trust-building. Trust in government institution is defined as the belief that the government institution competently and effectively meets its mandated obligations within the citizens' best interests (Belanger & Carter, 2008; Teo et al., 2008). This is measured by perceptions of confidence, integrity, and reliability (Srivastava & Teo, 2009). In other words, the reputation of the organization and its

people using an online presence affects how users in turn trust the same's online presence (Beldad et al., 2010; Karunasena & Deng, 2012; Khayun et al., 2012).

These arguments operationalize the concepts of dispositional trust (McKnight & Chervany, 2001; McKnight et al., 2002), organization-based trust, and trust as an individual feature (Beldad et al., 2010), where the trusting entity (the citizen) is looking for more relatable cues associated with the service provider (the government) that are separate from the infrastructure directly employed to render the service. These cues also serve as antecedents towards trusting intentions. Therefore, this research further posits that trust in e-government is further reinforced if users trust the government institution providing the e-government service (Abu-Shanab, 2014; Belanger & Carter, 2008; Mpinganjira, 2015; Smith, 2010; Srivastava & Teo, 2009).

H4: Trust in government institution positively influences trust in e-government.

2.7   Effects of trust in technology

Similar to the considerations on government institutions, perceptions on technology in general, especially on technology used to support e-government, must be managed as well in the course of building trust in e-government. Trust in technology is defined as the belief that the technology being employed operates in a user-friendly, safe, and secure environment (Belanger & Carter, 2008; Teo et al., 2008). This typically means that the technology used to facilitate e-government transactions is believed to be reliable and secure enough to ensure its integrity and secure citizen confidence in it. This also means that the quality of the technology being used is also a significant consideration in trust building efforts (Karunasena & Deng, 2012; Khayun et al., 2012). But more importantly, this implies that citizens recognize that they are taking a risk, and they are believing that the system, and the information being collected and used to facilitate the government transaction, is secured.

All in all, this research argues that trust in technology is yet another reflection of both institutional-based trust and dispositional trust (McKnight & Chervany, 2001; McKnight et al., 2002), and trust as an individual feature (Beldad et al., 2010), making further theoretical underpinnings that trust in technology can influence the trusting intention of trust in e-government. Previous researches have argued that trust in technology is yet another influence towards favorably building trust in e-government (Abu-Shanab, 2014; Belanger & Carter, 2008; Lim et al., 2012; Mpinganjira, 2015; Teo et al., 2008).

H5: Trust in technology positively influences trust in e-government.

3   Methods

Survey method was used to collect the data. The seven-point Likert scale questionnaire was developed in English and Filipino using reworded items from the IS quality dimensions (DeLone & McLean, 2004), and from previously employed measurements of trust in technology, trust in government, and trust in e-government (Srivastava & Teo, 2009). Using face-to-face interviews and convenience sampling, with no quotas set, a total of 668 respondents answered the paper-based survey questionnaire, with 199 e-GSIS users (29.79%), 241 e-SSS users (36.08%), and 228 e-BIR users (34.14%). All the respondents were individual users of their respective e-government systems. That is, they had direct interface and experience with interacting with these systems. Analysis using SPSS and AMOS statistical software was done afterwards to ensure the quality of the data, to test the research hypotheses, and to generate additional useful research insights.

4   Analyses and results

4.1   Respondent profiles

The following table *(See Table 1: Respondent profiles (N=668))* presents the profiles of the 668 respondents who participated in the survey, classified into users of the respective e-portals of GSIS, SSS, and BIR.

Table 1. Respondent profiles (N=668)

	Overall (N=668)		e-GSIS (N=199)		e-SSS (N=241)		e-BIR (N=228)	
	N	%	N	%	N	%	N	%
Gender								
Female	391	58.5	112	56.3	175	72.6	104	45.6
Male	277	41.5	87	43.7	66	27.4	124	54.4
Age (in years old)								
20 to 30	192	28.7	28	14.1	91	37.8	73	32.0
31 to 40	237	35.5	41	20.6	86	35.7	110	48.2
41 to 50	145	21.7	57	28.6	48	19.9	40	17.5
51 to 60	77	11.5	58	29.1	14	5.8	5	2.2
61 and above	17	2.5	15	7.5	2	0.8	--	--
Years using the website (in years)								
Less than 1	149	22.3	--	--	57	23.7	92	40.4
1 to 3	249	37.3	66	33.2	85	35.3	98	43.0
4 to 6	120	18.0	28	14.1	54	22.4	38	16.7
7 to 9	38	5.7	22	11.1	16	6.6	--	--
10 and above	112	16.8	83	41.7	29	12.0	--	--

Respondents are predominantly female. For GSIS, most respondents are between 41 to 60 years old. For SSS and BIR, respondents are mostly younger (20 to 40 years old). GSIS users have started using their e-GSIS website either early (at least 10 years) when it was still at the beginning stages, or late (one to three years). But for SSS and BIR users, most have been using their respective websites for a comparatively shorter period of time (less than one year to three years).

4.2   Descriptive, validity, and reliability statistics

Confirmatory factor analysis (CFA) was employed to determine the validity and reliability of the survey data. This was to ensure the quality of the collected data before the research hypotheses could be tested. Additionally, multigroup CFA was deployed to determine validity and reliability at the e-government contextual level. Following the standard rules-of-thumb on validity and reliability (Hair, Black, Babin, & Anderson, 2014), one item on information quality and five on system quality were deleted from the final set of data due to low standardized loadings (Stdload.>0.60). Afterwards, acceptable average variance extracted (AVE>0.50) and composite reliability (CR>0.70) were achieved. *(See Table 2: Descriptive, validity, and reliability statistics (Overall Model) and Table 3: Descriptive, validity, and reliability statistics (per e-government system)).*

Table 2. Descriptive, validity and reliability statistics (Overall Model)

			Overall		
	Mean	**Stdev.**	**Stdload.**	**AVE**	**CR**
Information Quality (IQ)	**5.124**			**0.785**	**0.948**
IQ02 Information provided by the online system of the government institution is up-to-date	4.962	1.392	0.859		
IQ03 Information provided by the online system of the government institution is relevant	5.247	1.294	0.887		
IQ04 Information provided by the online system of the government institution meet my needs	5.118	1.400	0.914		
IQ05 Information provided by the online system of the government institution is easy to read and understand	5.306	1.327	0.884		
IQ06 Information provided by the online system of the government institution is sufficient for the task at hand	4.985	1.365	0.884		
IQ01 Information provided by the online system of the government agency is accurate		Deleted			
System Quality (SQ)	**5.105**			**0.806**	**0.943**
SQ04 The online system of the government institution is easy to use	5.161	1.363	0.924		
SQ05 The online system of the government institution is well-organized	5.130	1.317	0.937		
SQ06 The online system of the government institution is easy to navigate and to finish my tasks	5.071	1.331	0.924		
SQ08 The online system of the government institution can be accessed immediately	5.056	1.435	0.799		
SQ01 The online system of the government agency provides the necessary forms to be downloaded					
SQ02 The online system of the government agency provides the necessary functions needed to be completed online					
SQ03 The online system of the government agency provides helpful instruction for performing my task		Deleted			
SQ07 The online system of the government agency requires a lot of effort to use					
SQ09 The online system of the government agency enables me to accomplish tasks quicker					
Service Quality (SEQ)	**5.029**			**0.887**	**0.959**
SEQ01 The service provided by the online system of the government institution responds quickly to my needs	5.038	1.394	0.936		
SEQ02 The service provided by the online system of the government institution is dependable	5.052	1.371	0.948		
SEQ03 The service provided by the online system of the government institution understands my needs	4.998	1.384	0.941		
Trust in Government Institution (TGI)	**4.855**			**0.821**	**0.948**
TGI01 I believe that the government institution acts in citizen's best interest	5.086	1.509	0.843		
TGI02 I believe that the government institution is truthful, honest and genuine in its dealings	4.681	1.622	0.882		
TGI03 I believe that the government institution is competent and effective	4.802	1.620	0.950		
TGI04 In general, the government institution is reliable to meet their obligations	4.853	1.552	0.946		

	Overall				
	Mean	Stdev.	Stdload.	AVE	CR
Trust in Technology (TRT)	**4.830**			**0.778**	**0.933**
TRT01 The Internet has enough safeguards to make me feel comfortable using it to transact with the government institution	4.992	1.420	0.807		
TRT02 I feel assured that legal and technological structures adequately protect me from problems on the Internet	4.839	1.357	0.952		
TRT03 I feel confident that encryption and other technological advances on the Internet make it safe for me to transact	4.878	1.396	0.952		
TRT04 In general, the Internet is now a robust and safe environment in which to make transactions	4.609	1.529	0.805		
Trust in E-Government (TRE)	**5.087**			**0.885**	**0.958**
TRE01 The online system of the government institution is trustworthy	5.101	1.323	0.944		
TRE02 The online system of the government institution is honest and truthful	5.109	1.350	0.956		
TRE03 The online system of the government institution is reliable	5.050	1.430	0.922		

The CFA results yielded acceptable model fit figures (CMIN/DF=3.759; GFI=0.906; AGFI=0.879; RMR=0.065; NFI=0.959; TLI=0.964; CFI=0.969; RMSEA=0.064), providing enough confidence to proceed with the interpretation of the results.

For this section of the analysis, the mean scores represent user feedback based on their interactions with e-government systems. This means that these are the specific ISM-based and trust-based considerations that, at the time of this research, seem to work well with users. On the other hand, the standardized loadings provide some insight as to what is actually important to the users. This means that these are the ISM-based and trust-based considerations that users are looking for, and that they deem critical during their e-government interactions.

For information quality, the overall results show that providing easy to read and understand information scored the highest as far as user feedback is concerned. However, provided information actually meeting user needs is deemed to be the most important. For system quality, is the system being easy to use earn the highest feedback score. But users are actually looking for a well-organized online system. To reiterate, these two considerations depict some degree of mismatch between what e-government can ably provide vis-à-vis what users deemed as important.

Perceptions on service quality are found to be consistent, where dependability of the e-government system is both the highest in terms of user feedback, and in terms of its importance to the users. However, trust in government institution and trust in technology also show some degree of mismatch. In the former, beliefs on the government institution acting in the citizens' best interests score the highest for user feedback, but beliefs that the government institution is competent and effective are the most important to the users. In the latter, beliefs that the Internet has enough safeguards earn the most favorable user feedback, but users actually prefer feelings of confidence on the quality of encryption and other technological advances. Lastly, for trust in e-government, the system being honest and truthful consistently earns both the most favorable user feedback and user preferences.

Table 3. Descriptive, validity, and reliability statistics (per e-government system)

	e-GSIS					e-SSS					e-BIR				
	Mean	Stdev.	Stdload.	AVE	CR	Mean	Stdev.	Stdload.	AVE	CR	Mean	Stdev.	Stdload.	AVE	CR
Information Quality (IQ)	**5.102**			0.838	0.963	**5.123**			0.799	0.952	**5.145**			0.749	0.937
IQ02 Information provided by the online system of the government institution is up-to-date	4.950	1.388	0.905			5.004	1.386	0.843			4.930	1.409	0.841		
IQ03 Information provided by the online system of the government institution is relevant	5.121	1.320	0.914			5.290	1.254	0.882			5.311	1.312	0.873		
IQ04 Information provided by the online system of the government institution meet my needs	5.126	1.344	0.933			5.087	1.365	0.921			5.145	1.487	0.892		
IQ05 Information provided by the online system of the government institution is easy to read and understand	5.216	1.325	0.905			5.158	1.329	0.892			5.544	1.302	0.883		
IQ06 Information provided by the online system of the government institution is sufficient for the task at hand	5.095	1.258	0.920			5.075	1.415	0.930			4.794	1.388	0.838		
IQ01 Information provided by the online system of the government agency is accurate		Deleted					Deleted					Deleted			
System Quality (SQ)	**5.045**			0.812	0.945	**4.909**			0.775	0.932	**5.365**			0.847	0.957
SQ04 The online system of the government institution is easy to use	5.141	1.243	0.932			4.983	1.463	0.921			5.368	1.333	0.920		
SQ05 The online system of the government institution is well-organized	5.111	1.213	0.939			4.942	1.368	0.905			5.346	1.324	0.967		
SQ06 The online system of the government institution is easy to navigate and to finish my tasks	5.030	1.210	0.931			4.963	1.391	0.897			5.224	1.360	0.954		
SQ08 The online system of the government institution can be accessed immediately	4.899	1.303	0.794			4.747	1.625	0.793			5.522	1.200	0.835		
SQ01 The online system of the government agency provides the necessary forms to be downloaded		Deleted					Deleted					Deleted			
SQ02 The online system of the government agency provides the necessary functions needed to be completed online															
SQ03 The online system of the government agency provides helpful instruction for performing my task															
SQ07 The online system of the government agency requires a lot of effort to use															
SQ09 The online system of the government agency enables me to accomplish tasks quicker															

	e-GSIS					e-SSS					e-BIR				
	Mean	Stdev.	Stdload.	AVE	CR	Mean	Stdev.	Stdload.	AVE	CR	Mean	Stdev.	Stdload.	AVE	CR
Service Quality (SEQ)	**5.035**			0.838	0.939	**4.869**			0.904	0.966	**5.196**			0.904	0.966
SEQ01 The service provided by the online system of the government institution responds quickly to my needs	5.050	1.258	0.920			4.838	1.504	0.939			5.241	1.363	0.945		
SEQ02 The service provided by the online system of the government institution is dependable	5.070	1.241	0.918			4.867	1.457	0.964			5.232	1.368	0.947		
SEQ03 The service provided by the online system of the government institution understands my needs	4.985	1.257	0.908			4.900	1.420	0.949			5.114	1.450	0.960		
Trust in Government Institution (TGI)	**5.305**			0.797	0.940	**5.280**			0.806	0.943	**4.015**			0.786	0.936
TGI01 I believe that the government institution acts in citizen's best interest	5.457	1.250	0.786			5.448	1.381	0.891			4.382	1.598	0.790		
TGI02 I believe that the government institution is truthful, honest and genuine in its dealings	5.226	1.241	0.900			5.133	1.449	0.886			3.728	1.667	0.826		
TGI03 I believe that the government institution is competent and effective	5.211	1.245	0.939			5.270	1.457	0.917			3.952	1.736	0.956		
TGI04 In general, the government institution is reliable to meet their obligations	5.327	1.210	0.938			5.270	1.328	0.896			4.000	1.682	0.961		
Trust in Technology (TRT)	**4.989**			0.819	0.948	**4.902**			0.839	0.954	**4.615**			0.722	0.910
TRT01 The Internet has enough safeguards to make me feel comfortable using it to transact with the government institution	5.045	1.268	0.886			4.975	1.452	0.930			4.965	1.513	0.653		
TRT02 I feel assured that legal and technological structures adequately protect me from problems on the Internet	4.970	1.193	0.909			4.892	1.328	0.953			4.671	1.505	0.972		
TRT03 I feel confident that encryption and other technological advances on the Internet make it safe for me to transact	5.000	1.172	0.951			4.942	1.377	0.928			4.706	1.575	0.976		
TRT04 In general, the Internet is now a robust and safe environment in which to make transactions	4.940	1.233	0.872			4.801	1.415	0.849			4.118	1.748	0.752		
Trust in E-Government (TRE)	**5.075**			0.896	0.963	**4.981**			0.886	0.959	**5.211**			0.884	0.958
TRE01 The online system of the government institution is trustworthy	5.075	1.263	0.962			4.996	1.349	0.953			5.237	1.343	0.920		
TRE02 The online system of the government institution is honest and truthful	5.085	1.286	0.966			5.071	1.348	0.960			5.171	1.412	0.952		
TRE03 The online system of the government institution is reliable	5.065	1.330	0.910			4.876	1.498	0.910			5.224	1.426	0.949		

The CFA results present an interesting and diverse story. The following considers the statistical means for the question items analyzed. For feedback on information quality, both e-GSIS and e-BIR users share that their respective systems do best in providing information that are easy to read and understand. But e-SSS users say that their system does best in providing relevant information. For system quality, the system being easy to use garner the most favorable feedback from e-GSIS and e-SSS users, while immediate access is deemed the best by e-BIR users. Feedback on service quality is the most diverse. Service dependability rate highest for e-GSIS users, understanding their needs for e-SSS users, and quick response for e-BIR users. However, feedback on trust in government institution is the same, with all three groups giving the best rating to their belief that their respective institution is acting in their best interests. The same is found for trust in technology, where all three groups give their most favorable feedback towards feelings of comfort that the Internet has enough safeguards for transaction. Lastly, both e-GSIS and e-SSS users give the highest rating to their respective government institution's systems being honest and truthful, while e-BIR users point to their system being trustworthy.

The following discussion details what the standardized loadings say. For information quality, e-GSIS and e-BIR users both think that it is about the provided information meeting their needs. For e-SSS users, what is important is that the provided information is sufficient for the task at hand. For considerations on system quality, both e-GSIS and e-BIR users think that it is about the system being well-organized. But e-SSS users think that the system being easy to use is the most important. As to perceptions on service quality, for e-GSIS users, quick response to their needs is the most vital, e-SSS users service dependability, and e-BIR users understanding their needs. For trust in government institution, both e-GSIS and e-SSS users believe that competency and effectiveness best describe what this should be, while e-BIR users deem that this is about reliability in meeting obligations. Looking at trust in technology, both e-GSIS and e-BIR users perceive that encryption and other technological advances are the most critical, while e-SSS users are more assured if legal and technological structures provide adequate protection. Lastly, all three groups of e-government users believe that their respective systems being honest and truthful is the most crucial in cultivating trust in e-government.

Correlation, with the square root of the AVE at the diagonal, is also performed to further determine the validity of the responses. *(See Table 4: Correlation matrix (Overall), Table 5: Correlation matrix (e-GSIS), Table 6: Correlation matrix (e-SSS), and Table 7: Correlation matrix (e-BIR)).* The results yield slight discriminant validity issues between information quality and system quality, and information quality and service quality. Some of the correlations between these variables are higher than the square root in the diagonal. This, however, may be caused by the respondents' natural perceptions that in order for them to acquire good information, there must be a good system and good service conveying that information. In other words, the quality of the information searched for may be contingent on the quality of the system managing that information. Overall, there is enough acceptable discriminant validity to proceed with the rest of the statistical analyses and interpretation.

Table 4. Correlation matrix (Overall)

	TRT	IQ	SQ	SERQ	TGI	TRE
TRT	0.882					
IQ	0.601	0.886				
SQ	0.575	0.865	0.898			
SERQ	0.572	0.909	0.903	0.942		
TGI	0.513	0.518	0.447	0.466	0.906	
TRE	0.752	0.811	0.746	0.776	0.489	0.941

Table 5. Correlation matrix (e-GSIS)

	TRT	IQ	SQ	SERQ	TGI	TRE
TRT	0.905					
IQ	0.801	0.915				
SQ	0.772	0.805	0.901			
SERQ	0.793	0.890	0.870	0.915		
TGI	0.656	0.733	0.661	0.688	0.893	
TRE	0.840	0.865	0.791	0.849	0.706	0.946

Table 6. Correlation matrix (e-SSS)

	TRT	IQ	SQ	SERQ	TGI	TRE
TRT	0.916					
IQ	0.662	0.894				
SQ	0.716	0.879	0.880			
SERQ	0.672	0.926	0.911	0.951		
TGI	0.740	0.626	0.635	0.628	0.898	
TRE	0.786	0.857	0.810	0.811	0.679	0.941

Table 7. Correlation matrix (e-BIR)

	TRT	IQ	SQ	SERQ	TGI	TRE
TRT	0.850					
IQ	0.429	0.866				
SQ	0.380	0.912	0.920			
SERQ	0.395	0.920	0.913	0.951		
TGI	0.287	0.444	0.424	0.427	0.887	
TRE	0.700	0.694	0.626	0.658	0.390	0.940

4.3   Structural equation modeling (SEM)

SEM was employed to test the research hypotheses. Furthermore, SEM multigroup analysis was employed to test the research hypotheses at the contextual level. (*See Table 8: SEM results* for each of the three case scenarios).

Table 8. SEM results

	Overall	GSIS	SSS	BIR
R² values (>0.100)	0.687	0.720	0.741	0.603
Hypothesis	**Std.β**	**Std.β**	**Std.β**	**Std.β**
H1: Information quality --> Trust in e-government	0.488***; Supported	0.371***; Supported	0.742***; Supported	0.440*; Supported
H2: System quality-->Trust in e-government	0.023(n.s.); Not supported	0.053(n.s.); Not supported	0.076(n.s.); Not supported	-0.101(n.s.); Not supported
H3: Service quality-->Trust in e-government	0.176*; Supported	0.286*; Supported	-0.099(n.s.); Not supported	0.184(n.s.); Not supported
H4: Trust in government institution -->Trust in e-government	-0.013(n.s.); Not supported	0.116*; Supported	0.057(n.s.); Not supported	0.051(n.s.); Not supported
H5: Trust in technology-->Trust in e-government	0.489***; Supported	0.418***; Supported	0.430***; Supported	0.559***; Supported

***=p-value<0.001; **=p-value<0.01; *=p-value<0.05; n.s.=not significant
Overall model fit: CMIN/DF=4.968; GFI=0.888; 0.859; RMR=0.570; NFI=0.944; TLI=0.948; CFI=0.955; RMSEA=0.077

Following standard rules of thumb for evaluating and interpreting the resulting numbers, the resulting structural model yield good explanatory power, with all R^2 values significantly above the minimum threshold of 0.10. It also produces acceptable model fit figures, again providing confidence to proceed with the interpretation. Based on the results, trust in technology is the most consistent overall, and amongst the three scenarios, exerting positive and very significant influence towards trust in e-government. This is followed by information quality. On the other hand, it is also consistently seen that system quality produces very weak influence towards trust in e-government, both in the overall model and in the individual e-government contexts as well.

However, individually, only in the case of GSIS and BIR does trust in technology have the most significant positive influence. For SSS, the most significant positive influence is information quality. Furthermore, information quality exerts the most favorable influence towards trust in e-government amongst the three IS quality dimensions. In fact, the results show that it is the only IS quality dimension that exerts the most notable influence towards trust in e-government. This raises some initial concerns involving system and service quality dimensions' influence towards trust in e-government. System quality, across all three scenarios, does not significantly influence trust in e-government. What is surprising, however, in these results is the negative, albeit not significant, influence of service quality in the SSS context, and of system quality in the BIR scenario.

On the other hand, trust in technology exerts more favorable influence than trust in government. Except for the GSIS scenario, trust in government institution exerts a positive, but not significant, effect towards trust in e-government. Even then, the influence of trust in government institution for the GSIS setting is not that significant.

4.4   Post hoc Analysis

Additional analyses are done to determine the degree of statistical differences amongst the three e-government case scenarios of this research. This adheres to one of the research arguments that building and developing trust is context-specific. The first post hoc analysis determines the statistical differences in the mean scores of each research variable between each e-government context, calculating t-values via comparison of means. *(See Table 9: Mean score comparisons (t-values))*

Table 9. Mean score comparisons (t-values)

Research variable	e-GSIS vs. e-SSS	e-GSIS vs. e-BIR	e-SSS vs. e-BIR
Information quality	-0.180(n.s.)	-0.361(n.s.)	-0.192(n.s.)
System quality	1.141(n.s.)	-2.771**	-3.864***
Service quality	1.324(n.s.)	-1.301(n.s.)	-2.565*
Trust in government institution	0.214(n.s.)	9.766***	9.667***
Trust in technology	0.733(n.s.)	3.017**	2.308*
Trust in e-government	0.762(n.s.)	-1.075(n.s.)	-1.857(n.s.)

***=p-value<0.001; **=p-value<0.01; *=p-value<0.05; n.s.=not significant

As shown, there are no statistically significant difference across all of the research variables' mean scores between e-GSIS and e-SSS. This is expected, since both contexts offer very similar financial services to their respective users. Between e-GSIS and e-BIR, the trust dimensions on the government institution and technology prove to be statistically significant in favor of e-GSIS. This means that users currently have higher trusting perceptions in the e-GSIS context over the e-BIR one. However, users also perceive that e-BIR is doing better in terms of system quality compared to e-GSIS. But the greatest number of differences is found between e-SSS and e-BIR. In terms of the ISM quality dimensions, e-BIR earns statistically better scores compared to e-SSS, but e-SSS is statistically more trustworthy compared to e-BIR.

The second post hoc analysis is the SEM group comparisons. Multigroup statistical analysis generating Z-scores produces interesting insights as to the degree of differences between and amongst the three research contexts. *(See Table 10: SEM group comparisons (Z-scores)).*

Table 10. SEM group comparisons (Z-scores)

Hypothesis	e-GSIS vs. e-SSS	e-GSIS vs. e-BIR	e-SSS vs. e-BIR
H1: Information quality --> Trust in e-government	2.553**	0.633(n.s)	-1.211(n.s)
H2: System quality-->Trust in e-government	0.128(n.s)	-0.841(n.s)	-0.915(n.s)
H3: Service quality-->Trust in e-government	-1.898*	-0.451(n.s)	1.280(n.s)
H4: Trust in government institution -->Trust in e-government	-0.284(n.s)	2.882***	3.177***
H5: Trust in technology-->Trust in e-government	-0.815(n.s)	-0.984(n.s)	-0.089(n.s)

***=p-value<0.001; **=p-value<0.01; *=p-value<0.05; n.s.=not significant

Based on the results, there are a few statistically significant differences found in this research. The most considerable of these differences is on the influence of trust in government institution towards trust in e-government. The e-BIR context is statistically inferior compared to e-GSIS and e-SSS. The e-SSS context fares better than e-GSIS, but not so much. On the other hand, no statistically significant differences are found in the effects of system quality and trust in technology. Still, for the effects of system quality, e-GSIS fares better than e-SSS, but e-BIR fares better than e-GSIS and e-SSS. For the effects of trust in technology, e-SSS does better than e-GSIS, and e-BIR does better than e-GSIS and e-SSS.

5   Conclusions

5.1   Discussions

Reviewing the definitions and objectives of e-government as outlined by the UN, the WB, and the Philippine government, initial impressions on the ongoing performance of these selected Philippine e-government platforms point to good information quality considerations, adhering to a significant objective of e-government in general. However, there are some concerns regarding system quality, with the common observation being that there is great room for improvement. Furthermore, pushing to improve government service delivery and efficiency is somewhat problematic as well. Overall, these raise some concerns regarding the sustainability of these initiatives, if not addressed properly.

RQ1: Which factor weighs more towards cultivating trust in e-government?

Based on the results, the consistently notable strength found across these three examples is the attention towards information quality. Indeed, providing legitimate, up-to-date, and accurate information is vital in cultivating trust. Therefore, it is only necessary that these practices of providing good quality information be sustained and, in adherence to the Philippine government's commitment to freer access to information, be further enhanced. This also means that there must be improvements in the information dissemination practices as well.

Another notable result here is the significant effect of trust in technology towards trust in e-government. Government agencies should employ technologies in ways users expect them to do so, and in ways these technologies are supposed to be used. In other words, citizens are already aware of what ICTs can do when applied to government transactions. Furthermore, securing these systems and ensuring that there are enough technological and legal structures in place, safeguarding the information provided by the citizens, and protecting all e-government users is another very important consideration that this research emphasizes.

System quality weakly influences trust in e-government. This is the most difficult to achieve, given the current state of the Internet infrastructure of the Philippines. However, the continuing implementation of the national broadband project, while still in its early stages, is a promising development. But in the meantime, both government institutions wanting to opt for e-government and its citizen users are left to deal with these Internet-based issues on their own.

However, the negative influences found in this research are causes for concern. Based on the results, there are service issues that make users less trusting of e-SSS, and there are system issues that hinder taxpayers to trust e-BIR. This is also a significant concern, since expected improvements in services and systems are important key performance indicators for the application of ICTs in Philippine government services.

Trust in government institution is a positive influence on trust in e-government, albeit not statistically significant. This is a good sign, but there is obviously room for improvement. Providing

good and satisfactory e-government functions and services is simply the first step. To maximize and sustain such services, trust must be earned. Citizens must trust e-government, and for them to do so means that they should trust the government institution employing the e-government.

RQ2: Are the perceptions in these factors common across different e-government platforms?

For the most part, there are common perceptions on e-government and on trust across the three different e-government platforms. The results show a similar picture across the three e-government platforms in this research, where, firstly, trust in technology is exhibited to be a very significant driver towards trust in e-government. The respective degrees of influence of information quality and system quality towards e-government are also similar. These similarities should be expected, as the selected e-government platforms render comparable services and facilitate similar information exchanges.

What is also common among these three scenarios is the perceptions on the characteristics of their respective e-government platforms. Based on the mean scores earned in each of the quality dimensions, it is clear that there are positive and favorable trends, considering when these systems were first implemented. However, it is also clear that there are still much room for improvement.

What is striking here is that in terms of the mean scores of ISM-related factors, e-BIR seems to be doing a better job compared to the other two e-government systems, earning better feedback from the users. However, e-GSIS and e-SSS are perceived to be more trustworthy compared to e-BIR, earning better feedback on trust in technology and trust in government institution. Gauging from the regression results in this research context, e-GSIS has the least number of concerns from the point of view of their members, while the other two, e-SSS and e-BIR, have the greatest number of concerns expressed by their users. As highlighted, the influences of service quality and trust in government institution towards e-government are very weak for e-SSS and e-BIR compared to e-GSIS, where these influences are significantly favorable.

However, what needs to be pointed out is that although trust in technology exerts a strong and positive influence over trust in e-government, general perceptions of it are actually low. Therefore, there should be more efforts to make trust in technology more consistent and more favorable, especially on efforts towards making the Internet-based environment safe and robust to facilitate transactions.

5.2   Theoretical implications

While this research presents yet another application of the well-established IS theory of ISM and trust on e-government contexts, the more critical theoretical implication here is the broader context of e-government applications in not only a developing country, but also in government institutions that are mandated to provide some form of financial services to its citizens. The insistence of including trust as an important component in the research model stems from the fact that these particular government institutions providing social security and income tax services manage vast amounts of personal and personally identifiable citizen information (Floropoulos et al., 2010; Lim et al., 2012; Mpinganjira, 2015). The research results show that it is empirically possible to propose, and test a model to reflect these realities that pose as major challenges to the management of e-government platforms.

This research also provides further empirical support for the robustness of ISM quality dimensions in influencing the success of an online platform, regardless of the proposed and hypothesized measure of success that this research presents thus far. It also lends additional theoretical credence on suggesting different measures of IS success, such as trust in the actual IS platform, and therefore offering alternative lenses to the posited influences of ISM quality dimensions. Additionally, this research also provides a venue to test the predictive power of some trust-based variables, in this case, trust in technology and trust in government institution, alongside empirically proven ISM quality dimensions, in the context of studying how to develop, sustain, and enhance trust in e-government.

5.3   Managerial implications

It is clear that despite numerous, varied, and repeated pronouncements, commitments and efforts of the Philippines in various branches and levels of government, much is yet to be done to completely encapsulate the essence of what effective e-government should be (Gamboa, 2015). The three case scenarios of this research should serve as lessons to other current and future e-government ventures,

especially if these platforms facilitate a mandated service to the citizens. Overall, all dimensions covered in this research have much room for improvement. The statistical tests show that while there is a general direction towards favorable perceptions, the numbers are still comparatively low.

Also, very significant attention should be focused on the mismatches between what the e-government platforms provide vis-à-vis what their users expect that these e-government platforms would do for them. Those in charge of the development and management of e-government platforms should always be conscious of where to focus their efforts, adhering to what their users are looking for. Given the results of this research, government institutions managing their e-government presences should keep on striving to completely fulfill the objectives of open data as put forth by the national government. There is a general concern regarding the accuracy of the information posted in the three e-government platforms covered in this research. In other words, all three agencies should ensure that whatever information and other content posted in their respective e-government platforms, and other online presences for that matter, should help their clients complete their transactions. They should avoid instances wherein problems would occur, especially when a client goes to a physical branch or office, because there were some things that were not mentioned or were not made available in their websites. Furthermore, e-GSIS and e-SSS should also take a look into some concerns, regarding how up to date such information is, while e-BIR should take a second look into the sufficiency of such information provided. Any updates made to any of the processes and requirements must be summarized and disseminated not only in their websites, but in all other online presences as well, such as social media.

Issues and concerns regarding perceptions on system quality should take primacy. It is imperative that the technology infrastructure be improved. The fact is citizen users only perceive a few system quality considerations in defining system quality, and therefore weakening its overall impact towards trust in e-government. Therefore, more efforts should be made to improve on specific areas, such as providing all the necessary and the most updated downloadable forms that are compatible with existing programs and applications, and all the necessary functions needed to complete a process or a transaction. Furthermore, citizen users have also pointed out that there are insufficient instructions that would have lessen the effort on using and navigating their way through the e-government platform, and that would have made it quicker to accomplish tasks and activities to complete a process or a transaction. This is an obvious area for improvement, where user-friendly instructional material in the form of in-website step-by-step tutorials, glossaries and frequently asked questions, and even social media-based tutorial videos, can be developed and be made available to the general public. Furthermore, e-GSIS and e-SSS should improve immediate access, while e-BIR should improve the ease of navigation through their platform.

As for service quality, there is a general concern regarding how much should citizens understand the relationship between service quality offline versus service quality online. As for e-GSIS, this means a better appreciation on how this system better understands its members' needs. The e-GSIS system must be able to exhibit some form of personalized attention in the interface while clients transact online. For e-SSS, this means improvements in response times, while e-BIR needs to improve on perceptions of service dependability. For both agencies, this means that their respective systems must be able to keep up with the level of efficiency and effectiveness that their clients expect from a computerized, automated, and online system. This means reducing lag times in loading website pages and incidences of system downtimes, and improving on response times to any client queries and feedback times to any transaction completed.

As mentioned, there are other factors influencing building trust in e-government outside the domains of the actual e-government platform itself, and these should also be managed well by their respective government institutions. On managing trust towards government institutions, e-GSIS users expect improvements in perceptions of competence and effectiveness, while both e-SSS and e-BIR users expect improvements in their respective institutions' being honest and genuine towards them. These can serve as the basis for developing these respective system's key performance indicators to evaluate current performances, and determine future areas for improvement. Furthermore, once these considerations are met, and later on exceeded, these can also be used for image-building to further promote the use of these e-government services, and hereby for attempting to increase adoption and usage rates.

The strong and favorable results on trust in technology influencing trust in e-government are yet another indication of the imperative to get the ICT infrastructure enhanced and improved considerably. Improvements in technology should lead to better perceptions of the Internet, which is the single biggest technological support for e-government, being more robust and safer to make transactions, especially in such platforms that facilitate a significant amount of personal and personally identifiable information. Furthermore, there should also be much work done on the part of e-GSIS and e-SSS to make their platforms more reliable, and on the part of e-BIR to improve perceptions of honesty and truthfulness. Along the way, they should be able to actively participate at the national level, communicating to the national government, through the DICT, their respective technological needs and requirements in order to further improve their e-government presences.

5.4 Limitations and directions for future research

A significant limitation of this research is the adherence to one perspective of trust. While this particular perspective of trust is considered seminal in IS research, there are others that have been developed along the way. Recognizing that trust is multidimensional (McKnight & Chervany, 2001; McKnight et al., 2002), future research must be able to make valuable discourses of trust from new and other perspectives, especially as the technology to render e-government services constantly evolves as well. In addition, analyzing e-government contexts can also be done through other theoretical models fundamental in IS research, such as the Technology Acceptance Model (TAM), Task-Technology Fit (TTF), Unified Theory of Acceptance, and Use of Technology (UTAUT), and their respective iterations. Therefore, future research should also employ these models to provide a more holistic discourse on the user perspectives of e-government and to a greater population. Furthermore, those who had prior experience using their respective e-government systems are surveyed in this research. For the purposes of aiding efforts in expanding e-government adoption and use, future research should also take into consideration those who have not used such e-services, and how such efforts can encourage trust as well.

There are two significant differences present in the context of this research. The first is the perceived punishments of not complying with the processes of the government institution, especially when there are deadlines that are involved. The BIR has imposed deadlines on when to file tax returns, with corresponding punishments if not complied with. Moreover, these punishments are more often directed towards the individual taxpayers. The second significant difference is the nature and frequency of transactions done with these government institutions. In this context, individual transactions with SSS and GSIS are done as needed and to the benefit of the member, whereas individual BIR transactions are on a strict timetable and not to the personal benefit of the member.

These can be assumed as reasons why e-BIR users are comparatively more unforgiving in their feedback of the IS quality dimensions. Any hindrances against them completing their transactions online may be perceived as added negative pressure on them, which may be perceived as heavier compared to e-SSS or e-GSIS contexts. Therefore, future studies can consider accounting for these differences as they further explore the Philippine e-government dynamics of measuring success vis-à-vis cultivating trust.

Another area for future research is the influence of mandates, both on the development and the use of e-government platforms. There are many other existing laws that directly and indirectly provide some form of guidance, support or even further mandate for establishing e-government presences, such as R.A. 8792 (Electronic Commerce Act of 2000) (Republic of the Philippines, 2000), R.A. 10173 (Data Privacy Act of 2012) (Republic of the Philippines, 2012), R.A. 10844 (Department of Information and Communications Technology Act of 2015) (Republic of the Philippines, 2015), and R.A. 11032 (Ease of Doing Business and Efficient Government Service Delivery Act of 2018) (Republic of the Philippines, 2018). Further research on how these laws can help to further enhance present strengths and to address current weaknesses as pointed out in this research is something to be considered as well.

Author's Note

At the time of this research, the context was that of a normal environment. However, at the time of the review and publication of this article, the environment has changed due to the COVID 19 pandemic. Therefore, as an additional area of research, especially heeding calls for the increased and enhanced use of IT at this time, the use of e-government platforms should also be considered vis-à-vis this particular backdrop. As such, future research must also be able to accommodate extraordinary increases in demand for access, and incidences of stress-testing current infrastructure amidst environments similar to this pandemic.

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