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Evaluation of user satisfaction of e-government in Tanzania: Case Study of Tanzania Revenue Authority (TRA)

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Abstract

Evaluation of User Satisfaction of E-government in Tanzania: Case Study of Tanzania Revenue Authority (TRA)

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Worldwide, the wave of e-government is increasing rapidly due to the increased use of information and communications technology (ICT). The Tanzanian government has provided e-government services since 2002 by setting various policies and regulations to support the improvement of e-government services. The current problematic situation in developing countries is that the majority of e-government projects fail; meanwhile, Tanzania demonstrates rapid growth in the E-Government Development Index and the E-Government Participation Index. The success of e-government projects does not

depend solely on the technology offered through the service, but also on how users engage with and are satisfied by the services offered through different platforms; therefore, citizens' satisfaction plays a major role in achieving e-government success. The purpose of this study is to measure users' satisfaction of Tanzania e-government project, the study use the Tanzania Revenue Authority (TRA) services portal to identify the key factors that determine Tanzanians' e-satisfaction. This study employs the Information System (IS) success model based on DeLone and McLean (2003), as well as Seddon's (1997) models. The model constructs are: system quality, information quality, service quality, performance expectancy, intention to use and user satisfaction. Data are collected through an online survey in which 163 respondents answer the questionnaire. After the data screening, there were 136 valid responses; meanwhile, 27 responses were considered invalid due to lack of engagement with the questions. Data analysis was conducted by partial least squares structural equation modelling (PLS-SEM) using SmartPLS software to evaluate relationships between constructs, as well as testing the hypotheses. The results show that users of TRA platforms are satisfied with the services offered from TRA. The findings exhibit service quality, system quality and intention-to-use to be robust determinant factors affecting user satisfaction, while information quality and performance

expectancy did not show any significant effect on user satisfaction. This study contributes to the existing literature by testing and validating DeLone and McLean's (2003) updated IS success model with data from the TRA platform. Users also provide implications for government policy makers and managers by highlighting important factors to consider in decision-making.

Keywords: e-government, user satisfaction, information systems success model, Tanzania

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Chapter 1. Introduction

1.1 Background

As other countries in the world have adopted e-government in the early 2000's by establishing different policies to support the use of ICT in government agencies and departments, the Tanzania government released the Information and Communications Technology (ICT) Policy[1] in 2003 followed by the National E-government Strategy in 2009[2] to put effort toward e-government service establishment and implementation.

Tanzania government made efforts to establish an e-government agency (eGA) in 2012 and develop e-government strategies in 2013 to promote the use of ICT. An e-government agency is a public institution formed under the 2019 E-government Act No. 10 to coordinate, oversee and promote the government's efforts regarding implementation of e-government policies, laws, regulations, standards and guidelines across all other public institutions.

A full implementation of e-government infrastructure began in 2012 by developing and organising a fibre optic cable network known

[1] Tanzania National Information and Communication Technology Policy 2016

[2] National e-government Strategy 2013

as National ICT Broadband (NICTBB) for the nation and government office to connect all government institutions. With its sights set on achieving the country's ICT vision, fibre optic infrastructure enhances and improves ICT uses for economic development.

Despite the efforts taken by Tanzania starting in 2000 to establish and provide support for e-government adoption, developed countries such as South Korea have already moved forward from the implementation stage of e-government to intelligent government as a new e-government direction.[3] The new e-government employs intelligent information technologies to build a new ecosystem that will allow the government, businesses, civic groups and individuals to participate in innovation for better and sustainable development.

Comparable to Tanzania's situation in 2000, the Korean government in the early 1960's started by formulating various agencies to support the implementation of e-government. The first e-government policy to be implemented in 1978 was the five-year Basic Plan for Administrative Computerization (1978–1982), formulated under the Ministry of Government Administration (MOGA). From 1978 to date, Korea's e-government implementation stage was divided

[3] Korea e-Government for Sustainable Development, Ministry of the Interior and Safety (2017)

into four stages that are introductory stages, foundation establishment, full promotion and advanced stage (Lee, 2011).

i. Introductory stage (1978–1986): This is the first stage dealing with the development of the Basic Plan for Administrative Computerization, with the main goal of increasing inter-ministry work efficiency through computerisation. In Tanzania's case, the Tanzania government has already established different policy that supports the establishment and adoption of e-government.

ii. Foundation establishment stage (1987-1996): The second stage establishes a networking infrastructure that allows ministries to transfer data between one another and share information through the network. Similarly to other African countries, there are challenges regarding infrastructure and capital in Tanzania; however, the government has been responsible for connecting all government offices with fibre optic cables to facilitate internet access and inter-department communication for the government office since 2015.[4]

[4] http://www.nictbb.co.tz/index.php

iii. Full promotion stage (1996–2002): At this stage, a full integration of an administration network among the governmental agencies was completed, which involves two-way information exchange between the government and citizens, as well as online transactions. As a result of the connectivity between government offices, Tanzania is now proceeding with integrating all government services into one platform (known as the government portal) to allow citizens to access government services.[5] The integration is not yet complete, and paper-based work is still being used for other applications.

iv. Advanced stage (2003–2018): In this step, new strategies are implemented to support the transformation into an intelligent e-government, to develop all-digital zero-stop government services and to support the intelligent information based on demand for public services. At this stage, several governmental services can be offered to citizens and businesses seamlessly online without restriction of time.

The accomplishments of e-government in Korea are the result of long-term evolution. Today, Korea is ranked number one according to

[5] Government Portal, https://tanzania.go.tz/home/pages/68

the UN E-government Index, 2019. This is a model example for African countries such as Tanzania for following steps in the implementation of e-government, since the most important aspect is the development of policy and strategies which can support the implementation at each stage.

1.2 Motivation

The wave of e-government is increasing rapidly worldwide. Due to the increased use of information and communications technology (ICT), many governments are using this technology to supply administration services through different platforms to enhance service delivery to citizens and other non-governmental agencies.

The bad situation now present in developing countries the majority number of e-government projects fail; Although Tanzania demonstrates rapid growth in the E-Government Development Index and E-Government Participation Index, its E-Government Development Index is below world average but above the regional average (African region); meanwhile, Tanzania's E-Government Participation Index is above both regional and world averages.

Although ICT infrastructure is experienced as a problem in most African countries, the Tanzania government has developed and

organized a fibre optic cable network for the nation and government office known as National ICT Broadband (NICTBB) with sights set on achieving the country's ICT vision. Fibre optic infrastructure enhances and improves ICT uses for economic development.

Although the Tanzania government has made efforts in infrastructure development regarding the implementation of e-government services for their citizens, several previous studies have found that the success of e-government projects does not depend only on the support provided by government, but also on the readiness of users to adopt and use the service, which contributes to overall user satisfaction.

1.3 Description of the Problem

In the last decade, the field of public administration has changed around the world due to the influence of internet and uses of information and communications technology (ICT). Governments around the world are striving to implement advanced changes to broaden administration for their citizens and improve the effectiveness of open administration through e-government.

Over time, various studies on e-government have been conducted in which different models have been developed and tested, while

theories have been used to construct adoption and satisfaction model for e-government, considering factors that impact and influence e-government user satisfaction (Weerakkody, Irani, Lee, Hindi & Osman, 2014).

E-government has a high failure rate because of low rates of user adoption and expectation. Successful e-government deployment depends on user adoption and satisfaction with services. However, there is limited knowledge about e-government. The lack of theoretical and empirical models representing developing countries that demonstrate the factors that affect user satisfaction in these respective countries is a considerable problem during the implementation stage of e-government projects, which causes many to fail during the first stage of use since users are not willing to use the system because it does not meet their expectations. (Lai & Pires, 2010). For most African countries, there is a lack of theoretically-grounded and empirically-proven models to evaluate e-government adoption, effectiveness and user satisfaction, which indicates the need for research that measures the factors that influence user satisfaction (Abdel-Fattah & Ionas, 2014; Irani et al., 2012).

There is currently a wide gap in e-government research on developing countries, especially from the perspective of G2C adoption

as proposed by the studies conducted by Carter and Bélanger (2005) and Ndou (2004). In the case of Tanzania specifically, there are few studies on the area e-government. The extant studies focus on challenges that can appear in public sectors regarding the implementation of e-government, as well as models that can guide adoption factors; however, there is no study yet conducted on Tanzania that quantitatively examines the factors concerning user satisfaction in e-government projects.

1.4 Research Objectives

The purpose of this study is to measure users' satisfaction of Tanzania e-Government project, the study use the Tanzania Revenue Authority (TRA) services portal to identify the key factors that determine Tanzanians' e-satisfaction. These studies employ the Information System (IS) success model based on DeLone and McLean (2003) and Seddon's (1997) models. The model constructs include system quality, information quality, service quality, performance expectancy, intention to use and user satisfaction. By considering the problem statement and the research objectives of this study, two research questions have been formulated:

RQ1: Are users satisfied with the TRA services portal?

RQ2: What are the key determining factors in TRA service portal user satisfaction?

1.5 Research Outline

The structure of the thesis is divided into five chapters. The first chapter consists of the introduction, which provides the research motivation, description of the problem, research question and an outline of the research. The second chapter discusses a literature review on e-government in Tanzania, related previous studies that discuss the effectiveness of e-government around the world, as well as theories and frameworks for the efficiency and effectiveness of e-government services. The third chapter provides a research methodology in which the framework and hypothesis are exposed. The fourth chapter discusses the results from a data analysis conducted by partial least squares structural equation modelling (PLS-SEM) using SmartPLS software to evaluate the relationships between the variables, as well as to test the research hypotheses. The final chapter consists of the conclusion, which discusses the study's findings, limitations and implications.

Chapter 2. Literature Review

2.1 E-government Definition and Characteristics

The World Bank defines e-government as “government-owned or operated systems of information and communications technologies (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” (World Bank, 2001).

UNESCO defines e-government as “public sector’s use of Information and Communications Technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective”.

While the OECD defines e-government as “the use of information and communications technologies (ICTs), and particularly the Internet, to achieve better government”, other scholars define e-government as a “technology mediated service that facilitates a transformation in the relationship between government and citizen” (Bannister & Connolly, 2012).

There are different definitions of e-government from various stakeholders around the world. In general, these definitions achieve the same meaning and are united by a common theme. E-government involves the transformation of the operation of government institutions through the horizontal and vertical integration of government systems to enable communication between different government entities and also to allow easier access of government services to their citizens and businesses entities in straightforward ways and avoid longer waiting times to receive services.

E-government itself can be understood as an open socio-technical system (STS) in which a variety of factors interact with respect to the following three factors: (i) e-government includes well-prepared environmental factors such as privacy, literacy and the digital divide. (ii) social and technical subsystems, in which e-government can function properly when social and technical subsystems interact with each other (social subsystems include organisational structure, people, physical resources, legal frameworks and regulations; meanwhile technical subsystems include hardware, software, applications and networks) (iii) E-government has a flow of inputs, conversion processes and outputs according to the system framework. E-government can thus be categorised into four form of interaction:

i. Government to Government (G2G)

ii. Government to Citizen (G2C)

iii. Government to Business (G2B)

iv. Government to Employee (G2E)

G2G and G2E include back-office transactions, with the goal of developing efficient and effective internal processes within and across the agency. G2C and G2B include front-office transactions between external customers and government officials, with the goal of enhancing the quality and quantity of administrative services for customers and businesses.

2.2 E-Government and Related Previous Studies

E-government is a common general term in information and communications technology (ICT) used as a fundamental element that enables users to access government services using the Internet and other modern platforms. ICT refers to “technologies that improve the operation of organization by offering modern services such as the Internet, Intranets, Extranets, and others that cover the spectrum from basic infrastructure implementation to technologies” (Gupta, Dasgupta & Gupta, 2008). Service delivery through ICT leads to public service

improvement and increases positive relationships between government and citizens (Verdegem & Verleye, 2009).

One of the goals of e-government is to bring government services closer to citizens, government and businesses (Fang, 2002) by making government policies more efficient and provide citizens with improved access to public information in a cost-effective manner. While e-government stakeholders include government agencies, business entities and citizens, the primary stakeholders of e-government projects are citizens, who play an important role in the success of e-government through citizen satisfaction. Although several IS models have been proposed by different scholars to assess and measure e-government success and user satisfaction levels (Osman et al., 2014), the updated DeLone and McLean IS success model is recommended as a comprehensive framework for measuring user satisfaction (Gupta et al., 2008; Lin, Fofanah & Liang, 2011).

E-government has many benefits that have already been described in prior literature. Gupta et al. (2008), Yonazi, (2010), Lin et al., (2011) and Chemutai (2018) have pointed out the benefit of e-governments, such as to facilitate government communication with their citizens, improve citizen participation in decision making, improve the quality of services offered by governments to their

citizens, as well as ensure government accountability and efficiency.

E-government is still a new area for the majority of developing countries, which are currently undergoing implementation stages with a slow rate of adoption, along with many other challenges (Twizeyimana & Andersson, 2019; Yonazi, 2010; Carter & Bélanger, 2005).

The success of e-government services mostly depends on whether users are satisfied with the services offered through different platforms. This success would not only depend on the technology offering that service, but also on how users employ the systems successfully without error and complexity, which affects the stages of users' adoption (Shim, Kim & Altmann, 2016). Higher government trust in their citizens enhances e-government users' belief that the service offered from such agencies will result in e-government systems to be more useful and successful. Furthermore, quality of service is one of the factors that impact users' decisions to adopt a new service (Haile & Altmann, 2016b).

Komba and Ngulube (2015) identify factors that influence the adoption of e-government among Tanzanian citizens using the DeLone and McLean model of information systems (IS) success. In their study, only one construct of system quality is measured, in which

the results show that “system quality significantly influences e-government adoption in Tanzania”. Other studies found that “Information Quality, System Quality, and Service Quality” are the most important factors that influence user satisfaction. Carter and Bélanger (2005) also discovered that “Perceived Usefulness, Trust of the Internet, Previous Use of an e-government Service, and Perceived Ease of Use have significant impacts on Intention to Use e-government”. According to this study, more research is required in Tanzania to identify the factors that influence user’s satisfaction with e-government in Tanzania using different e-government adoption models.

2.3 Theoretical and conceptual framework

2.3.1 Updated DeLone and McLean IS success mode

Relevant theoretical frameworks have been constructed in the area of technology that explain users' satisfaction with newly implemented technology. The updated DeLone and McLean IS success model provides basic concepts, understanding, performance and frameworks for measuring the user satisfaction of e-government applications (Floropoulos, Spathis, Halvatzis & Tsipouridou, 2010). The importance of the updated DeLone and McLean IS success model has been tested and validated in different studies and demonstrates the

positive results of its constructs on users' satisfaction; therefore, it is important to continue testing and validating the model (Khayun, Ractham & Firpo, 2012).

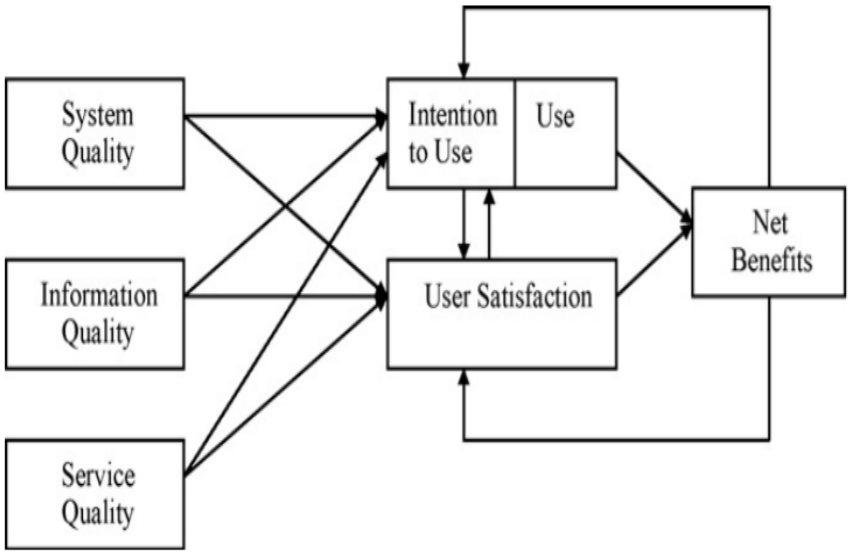

Figure 1: DeLone and McLean's (2003) updated IS success model

Before the updated DeLone and McLean (2003) IS success model, Seddon (1997) claimed that the DeLone and McLean (1992) model was confusing and vulnerable to misinterpretation due to the presence of two-way causality on user satisfaction and intention to use. The Seddon (1997) model was replaced by removing two-way causality on user satisfaction, while intention to use or use construct was replaced with the perceived usefulness construct, as shown in Figure 2.

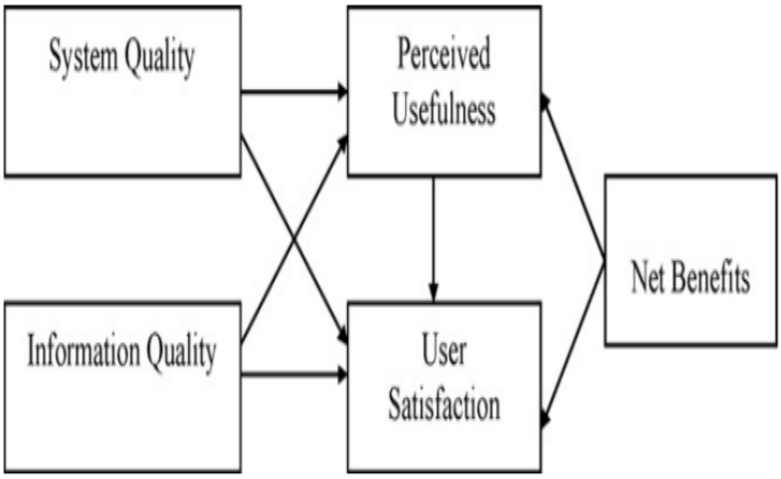

Figure 2: Seddon’s (1997) IS success sub-model.

Performance expectancy is defined as “the extent to which an individual believes that using the system is a way to improve job performance” (Al-Khowaiter, Dwivedi & Williams, 2013). E-government users tend to believe that using the system can help them to perform their task more quickly than doing the same job manually. If the performance of the system meets user's expectations, users will consistently prefer using the system. Various earlier studies, such as Adamson and Shine (2003), Chan et al. (2010), Lee, Chang & Berry (2011) argue that performance expectancy positively affect intention to use, and that intention to use simultaneously influences user satisfaction.

2.3.2 Structural Equation Modelling

Structural equation modelling (SEM) is defined as a visualised representation of numbered structural equations that entail causal relationships from suggested constructs in the model (Hair Jr, Hult, Ringle & Sarstedt, 2016). SEM provides researchers the ability to identify the relationship between an observed and unobserved variable. SEM has emerged as an important statistical methodology that can also provide researchers the ability to test basic assumptions in order to validate their model hypotheses and predicted theories (Xiong et al., 2015).

SEM has become an important methodology due to its ability to measure the path analysis of unobserved variables based on their causality (Kline, 2011) and to conduct both path analysis and factor analysis simultaneously for observed variables compared to previous statistical tools that conduct multivariate regression and factor analysis (Xiong et al., 2015). Another additional feature of SEM is its ability to compare groups within a whole model for both simple and complex models.

SmartPLS is a statistical software that uses partial least squares (PLS) path modelling for structural equation modelling (SEM), developed by Ringle, Wende and Will (2005). The software has a user-

friendly interface that supports all versions of Windows and is a free license software that provides advanced reporting features to researchers. PLS-SEM has been recommended by Lowry and Gaskin (2014), Hair Jr, Hult, Ringle and Sarstedt (2016), Sarstedt, Ringle and Hair (2017), and Hair, Risher, Sarstedt, and Ringle (2019) as an effective methodology for estimating the path models of latent variables and their relationships. It is used in many disciplines, such as information technology, information science and behavioural science research. PLS-SEM allows researchers to make complex estimations by simultaneously conducting both path analysis and factor analysis for observed variables compared to previous statistical tools that conduct multivariate regression and factor analysis (Sarstedt et al., 2017; Xiong et al., 2015).

Chapter 3. Research Methodology

3.1 Research Model

This study adopts DeLone and McLean's (2003) updated IS success model, modified by one-way causality on user satisfaction as proposed by Seddon's (1997) IS success sub-model and incorporates one construct of performance expectancy, as proposed by Al-Khowaiter et al. (2013).

As DeLone and McLean (2003) suggested in their study, the construct of 'use' is an attitude that is difficult to measure. The construct of intention to use can be employed instead of the use construct. This study will therefore use intention to use to reduce complexity, as proposed by Khayun et al. (2012), and remove the two-way causality of intention to use with one-way causality, in which intention to use has a significant positive impact on user satisfaction. Since the intention of the study is to measure user satisfaction, the net benefit component has been removed in this research model.

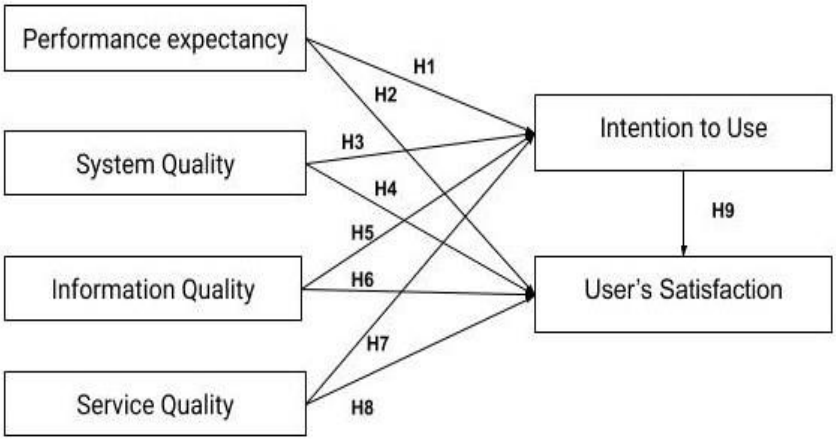

Figure 3: Research Model

3.2 Hypothesis

Performance expectancy (PE) is defined as “the degree to which the user expects that using the system will help him or her to attain gains in job performance” (Venkatesh, Morris, Davis & Davis, 2003). Researchers suggest that PE is an important measure of intention to use technology (Rehman, Kamal & Esichaikul, 2016; Venkatesh et al., 2003; Kijsanayotin, Pannarunothai & Speedie, 2009). Users tend to believe that certain systems can help them to perform their task more quickly than doing the same job manually if the performance of the system meets user expectations and will encourage them to use the system. Performance expectancy can be measured by factors such as recommendation, personal needs and past experience (Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012; Brown, Dennis & Venkatesh,

2010).

H1: Performance expectancy has a significant positive influence on intention to use TRA web portal services.

H2: Performance expectancy has a significant positive influence on the user's satisfaction of TRA web portal services.

System quality (SQ) refers to the situation in which users are satisfied with the performance and structure of the system in the Internet environment, and can be measured by the characteristics of the e-government system. Commonly measured characteristics of system quality are usability, reliability, availability, adaptability and response time (Barki, Rivard & Talbot, 2001; Barki & Hartwick, 2001; Doucet, 2004). Usability is the degree to which users do not need much effort to use an information system; therefore, the system must be flexible enough to allow users to use it. Reliability measures the degree to which information system users can trust the IS; the information system can be trusted if it functions well without error. Availability describes the ability of information systems to be available to users at a specific time interval. Response time refers to the time taken for the system to respond to a user's request; lower response time therefore results in a higher rate of user satisfaction. (Salem Al-Mamary د. ياسر حسن المعمري, Shamsuddin, & Aziati, 2014;

Petter, DeLone & McLean, 2008). For system quality, the following two hypotheses have been formulated:

H3: System quality will have a significant positive influence on intention to use TRA web portal services.

H4: System quality will have a significant positive influence on users' satisfaction of TRA web portal services.

Information quality (IQ) refers to the situation in which the information contained within the e-government system's content guarantees and meets context-specific quality requirements. Information quality factors are categorised into four groups: intrinsic, accessibility, contextual and representational (Strong, 2009; Illari, 2014; Floridi, 2013). Inherent information quality is the extent to which the accuracy of data reflects real-world situations. The information provided should therefore have an independent quality; a positive example of inherent information quality should include accuracy and believability. Accessibility of information quality refers to the situation in which information can be securely accessed by users without errors. The indicators for accessibility of information quality are privacy and security. Contextual information quality refers to context quality, in which the context should be relevancy, timeliness and completeness. The representational information quality deals with

format and presentation of the information, and is measured using factors such as interpretability, ease of understanding and concise and consistent representation.

The information quality of online content is measured according to availability, usability, understandability, completeness, relevance, format, consistency and security (T. S. Teo et al., 2008; Nicolaou & McKnight, 2006; Sasidharan, Santhanam, Brass & Sambamurthy, 2012). Information quality has a strong effect on user satisfaction and intention to use. According to Cresswell, Pardo, Canestraro, Dawes and Juraga (2005), accuracy, timeliness, completeness and security are the most important factors regarding information quality. The relationship of these factors thus increases the reliability of information. For information quality, the following two hypothesis have been formulated.

H5: Information quality has a significant positive influence on intention to use TRA web portal services.

H6: Information quality has a significant positive influence on users' satisfaction with TRA web portal services.

Service quality (SEQ) is the situation in which service delivery to users meets users' expectations and satisfaction, whereby the overall

support is provided by the service provider to their customers regardless of who provides that support. Common measures used for service quality are responsiveness (online support capability and support response time), reliability and tracking ability (Bradlow & Fitzsimons, 2001; Doucet, 2004; T. S. Teo et al., 2008). Responsiveness refers to situations in which service providers are willing to provide support to their customers. Information system responsiveness is measured by support capability and response time to users' complaints and special requests. Service reliability measures the extent to which a service is offered by a provider to their customers at any time, as service delivery quality contributes significantly to users' satisfaction (Petter, DeLone & McLean, 2008). Quality of service offered by providers is a key factor in driving product value to their customers; support and availability of services enhances the system's value to users and therefore also increases the number of users (Haile & Altmann, 2018). For service quality, the following two hypotheses have been formulated:

H7: Service quality will have a significant positive influence on intention to use TRA web portal services.

H8: Service quality will have a significant positive influence on users' satisfaction with TRA web portal services.

Intention to use (ITU) is a mental state in which users represent a commitment to use certain system to improve their job performance. However, because intention refers to an attitude, while use refers to a behaviour, it is difficult to measure them separately (Seddon, 1997). Instead, these two constructs can be linked together as 'intention to use', which can be measured by willingness, intentions and feelings that the user has towards using the system (Hu, Chau, Sheng & Tam, 1999; Bhattacherjee, 2001; Turel, Yuan & Connelly, 2008). Willingness is the situation in which users are willing to engage in risky behaviour in a certain environment. Willingness therefore contributes to users' intention to use a given information system. Therefore, intention is the condition in which users have the goal to use the system (Pomery, Gibbons, Reis-Bergan & Gerrard, 2009). For intention to use, the following two hypotheses are formulated:

H9: Intention to use TRA web portal services will have a significant positive influence on users' satisfaction.

User satisfaction (US): satisfaction refers to the state of fulfilment of a requested service by a user from a provider. Customer satisfaction requires a user’s experience of service to measure the value of service from customers' behaviours and opinions of the e-government system. Satisfaction is described as an outcome of trust; many studies discuss

a positive correlation between trust and satisfaction. The success of e-government services mostly depends on the extent to which users are satisfied with the services offered through different platforms. A higher rate of user satisfaction thus increases the rate of e-government adoption (Lai & Pires, 2010). In the environment of modern Internet services, user satisfaction can be judged based on services provided over the Internet and measured by factors such as loyalty measures, recommendation and overall satisfaction (Nadkarni & Gupta, 2007; T. S. Teo et al., 2008; Au, Ngai & Cheng, 2008).

3.3 Data collection

The study used a survey questionnaire method for the data collection process, since it is an efficient method of collecting data that provides greater number of respondents and is one of the most effective tools used in technology adoption research (Alshehri, Drew & AlGhamdi, 2013).

In this study, the questionnaire was divided into two types: closed-ended and open-ended questions. A five-point 'Likert scale' with a 1 to 5 measurement was used for the closed-ended questionnaire, which is a widely used scale for this kind of research. Whereby 1 is the same as (=) strongly disagree; 2 is the same as (=) disagree; 3 is the same as (=) neutral; 4 is the same as (=) agree; and 5 is the same as (=)

strongly agree. An open-ended questionnaire at the end of the study was used to collect citizens' ideas and suggestions for the services provided by the TRA platform including barriers; their contributions are included in the conclusion and recommendation section at the end of this study. The questionnaire collected two sets of data; the first section collects the personal information of respondents and their status of using TRA web portal services; the second part collected information about their satisfaction with services offered by the TRA web portal.

Respondents are required to answer all questions clearly according to their understanding. The questionnaire was conducted online by using Google forms. The link to the questionnaire was sent to 350 taxpayers through their mobile phone number using the WhatsApp application, which has been a common social media used in Tanzania between March and April 2020. By the end of the data collection period, 163 responses were collected, which formed 46.6% of the respondent rate. After data screening, 136 responses were used for analysis of this study, while 27 responses were considered invalid due to being unengaged responses. Tables 1 and 2 demonstrate the constructs and measures used in this study.

Table 1: Definition of Variables

Construct	Measurement Indicator	Sources
Performance Expectancy (PE)	Usefulness, Personal Need, Past Experience	(Venkatesh et al., 2003), (Brown et al., 2010), (Venkatesh et al., 2012)
Information Quality (IQ)	Availability, Usability, Understandability, Relevance, Format, Conciseness, Secure, Complete, Easy to Understand	(T. S. Teo et al., 2008), (Nicolaou & McKnight, 2006), (Sasidharan et al., 2012)
System Quality (SQ)	Reliability, Usability, Availability, Response Time, Adaptability	(Barki et al., 2001), (Barki & Hartwick, 2001), (Doucet, 2004), (T. S. Teo et al., 2008)
Service Quality (SEQ)	Online Support Capabilities, Reliability, Support Response Time, Effectiveness	(Bradlow & Fitzsimons, 2001), (Doucet, 2004), (T. S. Teo et al., 2008)
Intention to Use (ITU)	Willing, Intention, Feelings	(Hu et al., 1999), (Bhattacherjee, 2001), (Turel et al., 2008),
User Satisfaction (US)	Desire, Pleasure, Overall Satisfaction, Recommendation to Others	(Nadkarni & Gupta, 2007), (T. S. Teo et al., 2008), (Au et al., 2008).

Table 2: Constructs and Measures

Construct	Measures	
Performance Expectancy (PE)	**PE1**	I found the Tanzania Revenue Authority (TRA) services portal to be useful for my business purposes.
	PE2	Using the TRA services portal enables me to register my tax payment more quickly.
	PE3	Using the TRA services portal enables me to accomplish my tax payment more quickly.
Information Quality (IQ)	**IQ1**	Through the TRA services portal, I get the information I need on time.
	IQ2	I am satisfied with the accuracy of the TRA services portal.
	IQ3	Information provided by the TRA portal meets my needs.
	IQ4	Information provided by the TRA services portal is in a useful format.
	IQ5	Information provided by the TRA services portal is clear.
	IQ6	Information provided by the TRA services portal is accurate.
	IQ7	Information provided by the TRA services portal is up to date.
	IQ8	Information provided by the TRA services portal is reliable.

Construct	Measures	
	IQ9	Information provided by the TRA services portal is secure.
System Quality (SQ)	**SQ1**	The output information produced by the TRA portal is reliable.
	SQ2	The output information produced by the TRA portal is complete.
	SQ3	The TRA services portal is easy to use.
	SQ4	The output information produced by the TRA services portal is up to date.
	SQ5	The output information produced by the TRA portal is useful.
Service Quality (SEQ)	**SEQ1**	The TRA services portal provides online support for customers.
	SEQ2	Employees of the TRA are always willing to help customers.
	SEQ3	Employees of TRA are too busy to respond to customer requests promptly.
	SEQ4	I feel safe in your transactions with the TRA services portal.
	SEQ5	The TRA services portal is designed to satisfy business needs for citizens.

Construct	Measures	
Intention to Use (ITU)	**ITU1**	I am willing to use the TRA services portal as a tool to find information on my annual tax bill.
	ITU2	My intention is to continue using the TRA services portal rather than visiting the TRA office to find out my annual tax bill.
	ITU3	I am willing to use the TRA services portal as an aid to help me pay my taxes on time.
	ITU4	I feel comfortable using the TRA services portal to complete my tax transactions.
User Satisfaction (US)	**US1**	The system provides the precise information I need.
	US2	I am very pleased with the information in the TRA services portal.
	US3	After using the TRA services portal, I will recommend it to my friends.
	US4	Overall, I am very satisfied with the TRA services portal

Chapter 4. Analysis Results

First, a statistical tool package was used for data cleaning. This tool is used to remove any rows where there is missing data for any variable, to input missing data and remove inconsistent data input. Data analysis was conducted by partial least squares structural equation modelling (PLS-SEM) using SmartPLS software to evaluate construct relationships, as well as test the hypotheses.

4.1 Demographic Characteristics of the Respondents

The demographic characteristics explain respondents' ages, gender, education level and status of TRA platform use. The questionnaire form consists of the option to fill out all questions in the form in the case that users have already used the TRA platform at least once before. Otherwise, the form will not allow respondents to answer the questions, since all questions require the experience of users. Demographic characteristics of the respondents ware summarized in Table 3.

Table 3: Demographic Characteristics of the Respondents

Measures	**Items**	**Count**	**%**
Gender	Male	59	38.2%
	Female	104	63.8%
Age	18 – 24	30	18.4%
	25 – 34	63	38.7%
	35 – 44	46	28.2%
	45 – 54	18	11%
	55 – 64	4	2.5%
	65 or over	2	1.2%
Education Level	Below Secondary Education	4	2.5%
	Secondary Education/Diploma	66	40.5%
	Bachelor's Degree	75	46%
	Master's Degree	15	9.2%
	Higher Than Master's Degree	7	4.3%
Status of Platform Use	Yes	136	16.6%
	No	27	83.4%

Demographic information demonstrates that males make up the majority of respondents. Most of the respondents are between the ages of 25–34, followed by the ages 35–44, ages 45–54, ages 18–24 and ages 45–54, respectively. The fewest respondents fell within the age group of 55–64 and over the age of 65. The ages of respondents portrays the real-world situation of Tanzania regarding working ages,

in which over 55 years old is a voluntary retirement age, while 60 years old is mandatory retirement age. For the education level category, most respondents hold a graduate level of learning, followed by undergraduate, college, post-graduate, secondary level and, finally, primary level education.

4.2 Descriptive Statistics

A descriptive statistics analysis was executed using SmartPLS. Table 6 displays the descriptive statistics of each indicator.

Table 4. Descriptive Statistics

Construct	**Indicator**	**Mean**	**S.D**
Performance Expectancy (PE)	PE1	0.869	0.031
	PE2	0.904	0.028
	PE3	0.871	0.031
Information Quality (IQ)	IQ1	0.743	0.052
	IQ2	0.601	0.061
	IQ3	0.577	0.053
	IQ4	0.750	0.039
	IQ5	0.839	0.029
	IQ6	0.834	0.035
	IQ7	0.574	0.042
	IQ8	0.748	0.061
	IQ9	0.809	0.036
System Quality (SQ)	SQ1	0.811	0.035
	SQ2	0.822	0.043
	SQ3	0.782	0.051
	SQ4	0.695	0.065
	SQ5	0.702	0.082
Service Quality (SEQ)	SEQ1	0.858	0.032
	SEQ2	0.815	0.037
	SEQ3	0.623	0.068
	SEQ4	0.682	0.049
	SEQ5	0.703	0.064

Construct	Indicator	Mean	S.D
Intention to Use (ITU)	ITU1	0.862	0.026
	ITU2	0.822	0.075
	ITU3	0.920	0.013
	ITU4	0.870	0.029
User Satisfaction (US)	US1	0.801	0.045
	US2	0.912	0.015
	US3	0.749	0.060
	US4	0.860	0.027

4.3 **Measurement Model Analysis**

Measurement models were conducted using SmartPLS software to evaluate internal consistency and reliability of individual indicators then performing convergent and discriminant validity of constructs.

4.3.1 Individual Indicator Reliability

Construct outer loading are recommended to be higher than 0.708. This acceptable item reliability value indicate that more than 50% of indicators are the correct measure of the construct (Hair et al., 2019). Results from Table 5 observed that all indicator outer loading used for this study is greater than the minimum acceptable value (0.708), except for five indicators (IQ2, IQ3, IQ7, SEQ3, SEQ4), which were omitted for subsequent analysis.

Table 5: Individual Indicator Reliability

	IQ	ITU	PE	SEQ	SQ	US
IQ1	**0.748**					
IQ4	**0.650**					
IQ3	**0.598**					
IQ4	**0.750**					
IQ5	**0.842**					
IQ6	**0.835**					
IQ7	**0.527**					
IQ8	**0.753**					
IQ9	**0.812**					
ITU1		**0.863**				
ITU2		**0.827**				
ITU3		**0.921**				
ITU4		**0.873**				
PE1			**0.873**			
PE2			**0.908**			
PE3			**0.874**			
SEQ1				**0.860**		
SEQ2				**0.818**		
SEQ3				**0.692**		
SEQ4				**0.634**		
SEQ5				**0.704**		
SQ1					**0.809**	
SQ2					**0.826**	
SQ3					**0.789**	
SQ4					**0.702**	
SQ5					**0.705**	
US1						**0.802**
US2						**0.914**
US3						**0.759**
US4						**0.859**

4.3.2 Internal Consistency Reliability

Internal consistency refers to a degree based on the relationships between different items on the same test, which measures the scores of

constructs from their several items (indicators). Cronbach's alpha and composite reliability are common measure used to measure the reliability of construct, (Peterson & Kim, 2013). Composite reliability has a more precise measurement compared to Cronbach's because the composite reliability are measured based on the weight of each individual indicators, that why for this study only composite reliability used to measure reliability of the construct.

According to Hair et al. (2019), reliability value of greater than 0.60 are acceptable for exploratory research and value of 0.70 or higher for confirmatory research. A higher reliability coefficient indicates a higher level of reliability. The composite reliability value shown in Table 6 and Figure 4 are above 0.60 for all constructs that demonstrated high levels of internal consistency reliability for all six constructs in the model.

Table 6: Composite Reliability

	Composite Reliability
IQ	**0.909**
ITU	**0.927**
PE	**0.916**
SEQ	**0.838**
SQ	**0.877**
US	**0.902**

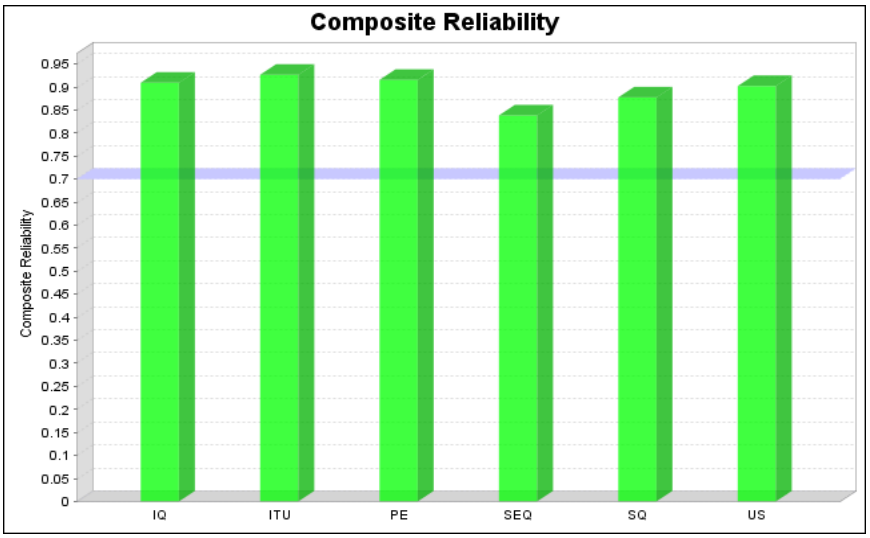

Figure 4: Composite Reliability of Reflective Constructs

4.3.3 Convergent Validity

Convergent validity refers to the extent to which the construct converges to explain the variance of its items, its measured by using the average variance extracted (AVE).

AVE is calculated by computing the mean value of the square of construct indicator loading. Values greater than 0.50 are recommended and accepted for AVE value, which shows that the construct explains at least 50% of its item variance.

Table 7 and Figure 5 show the AVE value of the study. All values are above the 0.50 range, between 0.590 and 0.783, which indicates that convergent validity has been achieved for all constructs.

Table 7: Average Variance Extracted (AVE).

	Average Variance Extracted (AVE)
IQ	**0.626**
ITU	**0.759**
PE	**0.783**
SEQ	**0.635**
SQ	**0.590**
US	**0.698**

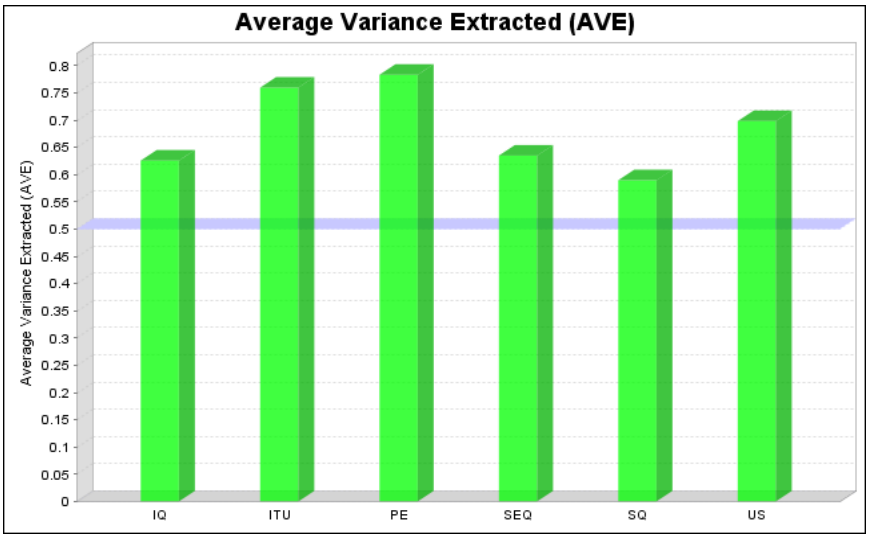

Figure 5: Average Variance Extracted (AVE)

4.3.4 Discriminant Validity

Discriminant validity measures the degree of differences between overlapping constructs. It determines how a construct empirically differentiates itself from other constructs in the model. The Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT) are used to verify the discriminant validity of the construct.

Fornell-Larcker Criterion

The Fornell-Larcker criterion is a measure of discriminant validity. The square root of AVE must be greater than within construct correlation. Table 8 shows that once discriminant validity has been achieved, all diagonal values are greater than other construct correlations.

Table 8: Fornell-Larcker Criterion

	IQ	ITU	PE	SEQ	SQ	US
IQ	**0.791**					
ITU	**0.506**	**0.871**				
PE	**0.568**	**0.594**	**0.885**			
SEQ	**0.637**	**0.580**	**0.579**	**0.797**		
SQ	**0.795**	**0.481**	**0.492**	**0.613**	**0.768**	
US	**0.602**	**0.540**	**0.451**	**0.632**	**0.695**	**0.836**

Henseler, Hubona and Ray (2016) and Shmueli et al. (2019) found that the Fornell-Larcker criterion is not suitable for the assessment of discriminant validity, especially when construct indicator loadings differ slightly. In this case, since the Fornell-Larcker criterion does not perform well, Henseler et al. (2016) and Hair et al (2019) recommend the Heterotrait-Monotrait Ratio (HTMT) as the most effective way to measure discriminant validity.

Heterotrait-Monotrait Ratio (HTMT)

HTMT is defined as the 'mean value of the item correlations across constructs relative to the (geometric) mean of the average correlations for the items measuring the same construct'. HTMT values are suggested not to exceed 0.90 (HTNT< 0.9). By assessing the HTMT ratio, Table 9 shows that our constructs achieve the HTMT, while only the SQ→IQ relationship has been shown not to achieve discriminant validity.

Table 9: Heterotrait-Monotrait Ratio (HTMT)

	IQ	ITU	PE	SEQ	SQ	US
IQ						
ITU	**0.547**					
PE	**0.648**	**0.656**				
SEQ	**0.802**	**0.707**	**0.725**			
SQ	**0.921**	**0.531**	**0.564**	**0.788**		
US	**0.686**	**0.604**	**0.519**	**0.809**	**0.815**	

4.4 Structure Model Analysis

The previous measurement assessment shows that the model has no issues regarding reliability and validity, thus the model was satisfactory for the next step of the structural model assessment. PLS analysis has been conducted using bootstrapping techniques with 5000-times iteration (Chin, Peterson & Brown, 2008) to investigate the structural model and the t-values for corresponding path

coefficients.

4.4.1 Collinearity Issue

Before testing the structure model, researchers must test collinearity between the predictor constructs (Sarstedt et al., 2014). Collinearity is a condition in which some of the independent variables are related to other variables in the model. The collinearity statistics of structural model (Inner VIFs) values must be less than five (VIF < 5). Table 10 shows that there is no collinearity issue present between the variables.

Table 10: Collinearity Value of Structural Model (Inner VIFs)

	IQ	ITU	PE	SEQ	SQ	US
IQ		**3.189**				**3.193**
ITU						**1.805**
PE		**1.672**				**1.901**
SEQ		**1.999**				**2.147**
SQ		**2.862**				**2.877**
US						

4.4.2 Coefficient of Determination (R^2)

Coefficient of determination (R^2) is defined as the proportion of the variance in the dependent variable predicted from independent variable(s). Table 11 shows the R^2 value for endogenous variable Intension to Use and User Satisfaction. PE, SQ, IQ and SEQ explains

44.6% of variance in Intention to Use (R^2 = 0.446), while ITU, PE, SQ, IQ and SEQ explain 57.2% of variance in User Satisfaction (R^2 = 0.572). The R^2 values of the endogenous variable are higher than the 0.26 (as in Table 11) value, which Cohen (2013) suggests would indicate a substantial model.

Table 11: Coefficient of Determination (R^2)

	R Square	**R Square Adjusted**
ITU	**0.446**	**0.429**
US	**0.572**	**0.555**

4.4.3 Significance and Relevance of Path Coefficients

After testing collinearity and the coefficient of determination (R^2), this step evaluates the significance of each path in the model and decisions for hypothesis. Table 12 demonstrates that the path is significant to the hypothesis decisions for all constructs. We observe from Table 12, all paths are significant except for two paths of IQ -> US and PE -> US. Five out of nine paths appeared to be statistically significant; SQ -> US has the largest path coefficient (0.474) followed by PE -> ITU (0.356), SEQ -> ITU (0.286) and SEQ -> US (0.264), which indicates that H1, H4, H7, H8 and H9 are supported. In detail, Service Quality (path coefficients: 0.286, p**<0.005) and Performance Expectancy (path coefficients: 0.356, p***<0.001)

influences Intention to Use. While Intention to Use (path coefficients: 0.191, p*<0.05), Service Quality (path coefficients: 0.264, p**<0.005) and System Quality (path coefficients: 0.474, p***<0.001) have positive influences on User Satisfaction. Two of the hypotheses were found to have negative significance to Intention to Use (SQ->ITU, IQ->ITU) and two hypotheses have negative significance to Customer Satisfaction (PE-> US, IQ->US). All four hypotheses were rejected. The IQ of the Tanzania government system has been discussed by Mtebe and Kondoro (2017) in a study that evaluated the accessibility and usability of government systems. The results show that the government's systems have many issues regarding accessibility and usability that hinder citizens from using them. This is the reason why the IQ construct is rejected in Tanzania's case.

Table 12: Structural Estimates (Hypotheses Testing)

HP	Relationship	Path Coefficient	T Statistics	P Values	Decision
H1	**PE -> ITU**	0.356	3.628	***	**Supported**
H2	**PE -> US**	-0.039	0.455	**0.649**	**Rejected**
H3	**SQ -> ITU**	0.092	0.836	**0.404**	**Rejected**
H4	**SQ -> US**	0.474	3.509	***	**Supported**
H5	**IQ -> ITU**	0.048	0.386	**0.700**	**Rejected**
H6	**IQ -> US**	-0.017	0.113	**0.910**	**Rejected**
H6	**SEQ -> ITU**	0.286	3.032	**	**Supported**
H7	**SEQ -> US**	0.264	3.031	**	**Supported**
H3	**ITU -> US**	0.191	2.166	*	**Supported**

Significance level at *** <0.001, ** < 0.005, *< 0.010.

4.4.4 Importance Performance Map Analysis (IPMA)

IPMA is a useful analysis method that extends the standard report of path coefficient analysis by providing the latent variable score from the average score of performance as well as the importance of its constructs to the latent variable. The goal of IPMA is to identify predecessors that have a strong total effect (importance) and relatively low performance. Table 13 and Figure 6 shows the Importance–Performance Map Analysis results.

Table 13: Importance Performance

	Performance	**Importance**
IQ	71.95	-0.01
ITU	84.17	0.03
PE	80.44	0.19
SEQ	70.85	0.32
SQ	70.59	0.49
Mean Average	75.60	0.20

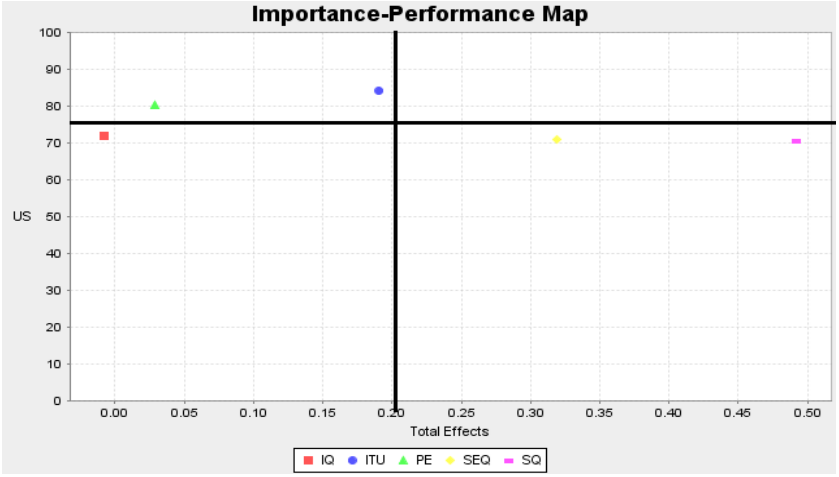

Figure 6: Importance–Performance Map

Figure 6 shows that the average performance of all constructs is 75.60 while average importance is 0.20. SQ and SEQ appear to be more important constructs to be considered for increasing the value of user satisfaction because they are located below the average performance and above the average importance quadrant. SQ and SEQ have performance values of 70.60 and 70.58, respectively. The importance of these two constructs is particularly high. A one unit increase of the SQ performance indicator will increase user satisfaction by 0.49 units from 70.60 to 71.09, while a one unit increase of SEQ performance will increase user satisfaction by 0.32 units from 70.85 to 71.17.

PE and IQ have relatively low importance for user satisfaction, although the average performance of PE is above the mean value. This implies that even when performance is high, these two constructs have

no importance for user satisfaction among TRA platform users.

Chapter 5. Conclusion

5.1 Discussion

The main objective of this study was to measure users' satisfaction with the Tanzania Revenue Authority (TRA) platform. Descriptive statistic results demonstrate that the overall satisfaction rate from the respondents is 83.4%. This implies that users of TRA platforms are satisfied with the services offered from TRA.

The second goal of this research was to determine the factors influencing the user satisfaction of e-government applications in Tanzania. The study shows that system quality has a strong influence on user satisfaction for Tanzanian citizens. The reliability and availability of the system as shown by other studies are very important indicators for e-government intention to use and user satisfaction. Service quality shows a moderate effect on the user satisfaction of e-government services. Users require substantial support while using e-government services. Therefore, support response time and effective service contribute significantly to satisfaction with the Tanzania e-government service. This implies that system reliability, usability, availability, adaptability and online support needs to be considered in the early stages of implementation.

5.2 Theoretical Implications

This study contributes to the existing literature by testing and validating DeLone and McLean's (2003) updated IS success model with data from TRA platform users. Furthermore, the study adopts one component of performance expectancy as a construct to measure user satisfaction and intention to use, although the results show that performance expectancy has no direct impact on user satisfaction and does not perform well. However, it also shows higher importance and strongly positive relationships with intention to use. The study results contribute to the growing literature on determinant factors regarding e-government, in which the study shows that system quality and service quality are the most important factors to be considered for e-government project implementation.

Based on the importance–performance map analysis in Figure 6, SQ and SEQ have performance levels below the mean average of 75.60, in which each indicator has a performance of 70.60 and 70.58, respectively. The importance of these two constructs is particularly high. A one-unit increase of SQ performance indicators will increase user satisfaction by 0.49 units from 70.60 to 71.09, while a one-unit increase of SEQ performance will increase user satisfaction by 0.32 units from 70.85 to 71.17. This suggests that managers should give

priority to increasing the performance of SQ and SEQ in order to increase user satisfaction. Therefore, because this construct has higher importance and below average performance, an increase of performance for this construct will increase the overall user satisfaction of TRA.

5.3 Policy Implications

Based on the results of the study, system quality and service quality strongly affect user satisfaction. Therefore, the Tanzanian government should give more attention to factors that affect user satisfaction in the early stages of implementation of new projects to increase the rate of e-government user satisfaction.

The study shows that information quality has a negative impact on users' satisfaction with the TRA service portal, which means that the unavailability of information reduces user satisfaction. Therefore, there is importance in establishing policy that can support information availability because availability of information is one of the factors used for making decisions among users of whether to adopt new technology. The policy should thus consider all factors involving information quality in order to reduce the negative impact of information quality on user satisfaction and enable the e-government project to be more successful.

5.4 Limitations and Future Research

The study has two major limitations. First, the study employs an online questionnaire. This data collection method is effective since many people can access and provide their opinions. Furthermore, researchers can save time and money for the data collection process. However, the method has resulted in considerable errors in the data attributable to unacceptable responses and multiple submissions (Schmidt 1997). Second, this research cannot be generalised since the sample collected only included taxpayers and the survey responses were collected from one specific application of TRA; thus, the respondents may have different attitudes and perceptions towards using the system and user satisfaction may differ on different applications.

Bibliography

Abdel-Fattah, M. A.-K., & Ionas, A. (2014). *Factors influencing adoption and diffusion of e-government services.* Paper presented at the 14th European Conference on eGovernment.

Adamson, I., & Shine, J. (2003). Extending TAM to measure end user computer satisfaction in a mandatory environment: A bank's treasury. *Technology Analysis and Strategic Management Journal, 15*(4), 441-454.

Al-Khowaiter, W., Dwivedi, Y. K., & Williams, M. D. (2013). *Conceptual Model For Examining The Adoption And Success Of Human Resource Information Systems In Public Sector Organisations In Saudi Arabia.* Paper presented at the UKAIS.

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

Au, N., Ngai, E. W., & Cheng, T. E. (2008). Extending the understanding of end user information systems satisfaction formation: An equitable needs fulfillment model approach. *MIS Quarterly*, 43-66.

Bañares, J. Á., & Altmann, J. (2018). Economics behind ICT infrastructure

management. *Electronic Markets*, 28(1), 7-9.

Bannister, F., & Connolly, R. (2012). Defining e-governance. *e-Service Journal: A Journal of Electronic Services in the Public and Private Sectors, 8*(2), 3-25.

Barki, H., & Hartwick, J. (2001). Interpersonal conflict and its management in information system development. *MIS Quarterly*, 195-228.

Barki, H., Rivard, S., & Talbot, J. (2001). An integrative contingency model of software project risk management. *Journal of Management Information Systems, 17*(4), 37-69.

Bhattacherjee, A. (2001). Understanding information systems continuance: an expectation-confirmation model. *MIS Quarterly*, 351-370.

Bradlow, E. T., & Fitzsimons, G. J. (2001). Subscale distance and item clustering effects in self-administered surveys: A new metric. In: SAGE Publications Sage CA: Los Angeles, CA.

Brown, S. A., Dennis, A. R., & Venkatesh, V. (2010). Predicting collaboration technology use: Integrating technology adoption and collaboration research. *Journal of Management Information Systems, 27*(2), 9-54.

Carter, L., & Bélanger, F. (2005). The utilization of e-government services:

citizen trust, innovation and acceptance factors. *Information systems journal, 15*(1), 5-25.

Chan, F. K., Thong, J. Y., Venkatesh, V., Brown, S. A., Hu, P. J., & Tam, K. Y. (2010). Modeling citizen satisfaction with mandatory adoption of an e-government technology. *Journal of the Association for Information Systems, 11*(10), 519-549.

Chemutai, J. (2018). *(A) Study on the Determinant Factors in mGovernment Adoption : Case of Kenya / Chemutai Joyce.* 서울 : 서울대학교 대학원, 서울.

Chin, W. W., Peterson, R. A., & Brown, S. P. (2008). Structural equation modeling in marketing: Some practical reminders. *Journal of marketing theory and practice, 16*(4), 287-298.

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*: Academic press.

Cresswell, A. M., Pardo, T. A., Canestraro, D. S., Dawes, S. S., & Juraga, D. (2005). Sharing justice information: A capability assessment toolkit. *Center for Technology in Government, University at Albany*.

Doucet, L. (2004). Service provider hostility and service quality. *Academy of Management Journal, 47*(5), 761-771.

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

Floridi, L. (2013). Information Quality. *Philosophy & Technology*, 26. doi:10.1007/s13347-013-0101-3

Floropoulos, J., Spathis, C., Halvatzis, D., & Tsipouridou, M. (2010). Measuring the success of the Greek taxation information system. *International Journal of Information Management, 30*(1), 47-56.

Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government organization in a developing country: An empirical study. *The Journal of Strategic Information Systems, 17*(2), 140-154.

Haile, N., & Altmann, J. (2016a). Structural analysis of value creation in software service platforms. *Electronic Markets*, 26(2), 129-142. doi:10.1007/s12525-015-0208-8

Haile, N., & Altmann, J. (2016b). Value creation in software service platforms. *Future Generation Computer Systems*, 55, 495-509.

Haile, N., & Altmann, J. (2018). Evaluating investments in portability and interoperability between software service platforms. *Future Generation Computer Systems*, 78, 224-241.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). A primer on partial least squares structural equation modeling (PLS-SEM): *Sage publications.*

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*.

Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems, 16*(2), 91-112.

Illari, P. (2014). IQ: Purpose and dimensions. *In The Philosophy of Information Quality* (pp. 281-301): Springer.

Irani, Z., Weerakkody, V., Kamal, M., Hindi, N. M., Osman, I. H., Anouze, A. L., . . . Al-Ayoubi, B. (2012). An analysis of methodologies utilised in e-government research: A user satisfaction perspective. *Journal of Enterprise Information Management, 25*(3), 298-313. doi:10.1108/17410391211224417

Khayun, V., Ractham, P., & Firpo, D. (2012). Assessing e-excise sucess with Delone and Mclean's model. *Journal of Computer Information Systems, 52*(3), 31-40.

Kijsanayotin, B., Pannarunothai, S., & Speedie, S. M. (2009). Factors influencing health information technology adoption in Thailand's community health centers: Applying the UTAUT model. *International journal of medical informatics, 78*(6), 404-416.

Komba, M. M., & Ngulube, P. (2015). An empirical application of the DeLone and McLean model to examine factors for e-government adoption in the selected districts of Tanzania. In *Emerging Issues and Prospects in African E-Government* (pp. 118-129): IGI Global.

Ministry of the Interior and Safety. (2017). Korea e-Government for Sustainable Development. *National Information Society Agency(NIA).*

Lai, C. S. K., & Pires, G. (2010). Testing of a model evaluating e-government portal acceptance and satisfaction. *Electronic Journal of Information Systems Evaluation, 13*(1), 35.

Lee, C. p., Chang, K., & Berry, F. S. (2011). Testing the development and diffusion of e-government and e-democracy: A global perspective. *Public Administration Review, 71*(3), 444-454.

Lee, Y. (2011). Modularization of Korea's Development Experience: The Introduction of E-Government in Korea. Korea Development Institute (KDI) School of Public Policy and Management research paper.

Lin, F., Fofanah, S. S., & Liang, D. (2011). Assessing citizen adoption of e-Government initiatives in Gambia: A validation of the technology acceptance model in information systems success. *Government Information Quarterly, 28*(2), 271-279.

Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE transactions on professional communication, 57*(2), 123-146.

Nadkarni, S., & Gupta, R. (2007). A task-based model of perceived website complexity. *MIS Quarterly*, 501-524.

National e-government Strategy. (2013). Accessed from http://www.ega.go.tz/uploads/publications/130d4c2a171b40465b9af331bb58cce5.pdf

Ndou, V. (2004). E–Government for developing countries: opportunities and challenges. *The electronic journal of information systems in developing countries, 18*(1), 1-24.

Nicolaou, A. I., & McKnight, D. H. (2006). Perceived information quality in data exchanges: Effects on risk, trust, and intention to use. *Information systems research, 17*(4), 332-351.

Osman, I. H., Anouze, A. L., Irani, Z., Al-Ayoubi, B., Lee, H., Balc, A., . . . Weerakkody, V. (2014). COBRA framework to evaluate e-government services: A citizen-centric perspective. *Government Information Quarterly, 31*(2), 243-256. doi:10.1016/j.giq.2013.10.009

Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European journal of information systems,* 17(3), 236-263.

Peterson, R. A., & Kim, Y. (2013). On the relationship between coefficient alpha and composite reliability. *Journal of Applied Psychology, 98*(1), 194.

Pomery, E. A., Gibbons, F. X., Reis-Bergan, M., & Gerrard, M. (2009). From willingness to intention: Experience moderates the shift from reactive to reasoned behavior. *Personality and Social Psychology Bulletin,* 35(7), 894-908.

Rehman, M., Kamal, M. M., & Esichaikul, V. (2016). Adoption of E-

government Services in Pakistan: a comparative study between online and offline users. *Information systems management, 33*(3), 248-267.

Salem Al-Mamary د. ياسر حسن المعمري, Y. H., Shamsuddin, A., & Aziati, A. (2014). The Relationship between System Quality, *Information Quality, and Organizational Performance. International Journal of Knowledge and Research in Management & E-Commerce*, 4, 7-10.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial least squares structural equation modeling. *Handbook of market research, 26*, 1-40.

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair Jr, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy, 5*(1), 105-115.

Sasidharan, S., Santhanam, R., Brass, D. J., & Sambamurthy, V. (2012). The effects of social network structure on enterprise systems success: A longitudinal multilevel analysis. *Information systems research, 23*(3-part-1), 658-678.

Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information systems research, 8*(3),

240-253.

Shim, D., Kim, J. G., & Altmann, J. (2016). Identifying key drivers and bottlenecks in the adoption of E-book readers in Korea. *Telematics and Informatics,* 33(3), 860-871.

Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J.-H., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. *European Journal of Marketing*.

Sinkovics, R. R., Henseler, J., Ringle, C. M., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International marketing review*.

Strong, D. M. (2009). Information Quality: Managing Information as a Product. In L. Liu & M. T. ÖZsu (Eds.), *Encyclopedia of Database Systems* (pp. 1502-1508). Boston, MA: Springer US.

Teo, T. S., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems, 25*(3), 99-132.

Teo, T. S. H., Srivastava, S. C., & Jiang, L. (2008). Trust and Electronic Government Success: An Empirical Study. *Journal of Management Information Systems, 25*(3), 99-132. doi:10.2753/MIS0742-

1222250303

Turel, O., Yuan, Y., & Connelly, C. E. (2008). In justice we trust: predicting user acceptance of e-customer services. *Journal of Management Information Systems, 24*(4), 123-151.

United Nation. (2018). e-government knowledgebase, *UN E-Government Survey* accessed from https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2018.

Tanzania National Information and Communication Technology (ICT) Policy (2016). accessed from https://tanzict.files.wordpress.com/2016/05/national-ict-policy-proofed-final-nic-review-2.pdf.

Twizeyimana, J. D., & Andersson, A. (2019). The public value of E-Government – A literature review. *Government Information Quarterly, 36*(2), 167-178. doi:10.1016/j.giq.2019.01.001

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

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of

acceptance and use of technology. *MIS Quarterly*, 157-178.

Verdegem, P., & Verleye, G. (2009). User-centered E-Government in practice: A comprehensive model for measuring user satisfaction. *Government Information Quarterly, 26*(3), 487-497.

Weerakkody, V., Irani, Z., Lee, H., Hindi, N., & Osman, I. (2014). A review of the factors affecting user satisfaction in electronic government services. *International Journal of Electronic Government Research (IJEGR), 10*(4), 21-56.

Yonazi, J. J. (2010). *Enhancing adoption of e-government initiatives in Tanzania*: Citeseer.

Appendix 1: English Questionnaire

This questionnaire will provide input into this research helps us to measure and understand factors that enhance the uses of Tanzania Revenue Authority (TRA) web portal services. Our main objectives in this study is to measure the user's satisfaction of TRA web portal services. The results of this study will broader understand the key factors for user satisfaction, which can help implementation of other similar e-government projects. Please answer all questions honestly and return it to us any information obtained in connection with study that can be identified by you will remain confidential.

PART I: PERSONAL INFORMATION. (CHECK [√] THE CORRECT ANSWER).

NOTE:

1 = strong disagree, 2 = disagree, 3= neutral, 4 = agree, 5 = strongly agree

1. Choose your gender
    i. [ ] Male
    ii. [ ] Female

2. What is your age?

i. [ ] 18 – 24

ii. [ ] 25 – 34

iii. [ ] 35 – 44

iv. [ ] 45 – 54

v. [ ] 55 – 64

vi. [ ] 65 or over.

3. Education Level

i. [ ] Below Secondary education

ii. [ ] Secondary education/Diploma

iii. [ ] Bachelor’s Degree

iv. [ ] Master’s degree

v. [ ] Higher than master’s degree

4. Have you ever used TRA web portal for tax payment process

i. [ ] Yes

ii. [ ] No

PART II: TANZANIA REVENUE AUTHORITY (TRA) WEB PORTAL SERVICES

5. Performance expectancy: the degree to which the user expects that using the system will help him or her to attain gains in his/her job performance, please rate the extent to which you agree for performance expectancy of TRA services portal in each statement below.

	5	4	3	2	1
I found Tanzania Revenue Authority (TRA) services portal is useful in my business purposes.					
Using the TRA services portal enables me to register my tax payment more quickly.					
Using the TRA services portal enables me to accomplish tax payment more quickly.					

6. Information quality: measure the quality of information contained in Web content, the system should be personalized, complete, relevant, easy to understand, and secure, please rate the extent to which you agree for Information quality of TRA services portal in each statement below.

	5	4	3	2	1
Through TRA services portal, I get the information I need on time.					
I am satisfied with the accuracy of TRA services portal.					
Information provided by TRA services portal meets my needs					
Information provided by TRA services portal is in a useful format.					
Information provided by TRA services portal is clear.					
Information provided by TRA services portal is accurate.					
Information provided by TRA services portal is up-to-date.					
Information provided by TRA services portal is reliable.					
Information provided by TRA services portal is secure.					

7. System quality: measures the desired characteristics of an e-government system Usability, availability, reliability, adaptability, and

response time, please rate the extent to which you agree for system quality of TRA service portal in each statement below.

	5	4	3	2	1
The output information produced by TRA services portal is reliable.					
The output information produced by TRA services portal is complete.					
TRA services portal is easy to use.					
The output information produced by TRA services portal is up to date.					
The output information produced by TRA services portal is useful.					

8. Service quality measure the overall support delivered by the service provider to their customers, please rate the extent to which you agree for service quality of TRA portal service in each statement below.

	5	4	3	2	1
TRA services portal provide online support for					

customers.					
Employees of TRA are always willing to help customers.					
Employees of TRA are too busy to respond to customer requests promptly.					
You feel safe in your transactions with TRA services portal.					
This TRA services portal designed to satisfy business need for citizen.					

9. Intention to use is the strength of one's intention to perform a specified behavior, please rate the extent to which your intention to use TRA portal service in each statement

	5	4	3	2	1
I am willing to use this TRA services portal as a tool to know my annually tax bill.					
My intentions are to continue using TRA services portal than visiting TRA office to know my annually tax bill.					

I am willing to use this TRA services portal as an aid to help me paying tax in time.					
I feel comfortable using this TRA services portal to complete my tax transaction.					

10. User satisfaction is defined as a measurement that determines how happy users are with a services offered by providers, please rate the extent to your satisfaction to TRA portal services in each statement below

	5	4	3	2	1
The system provides the precise information I need.					
I am very pleased with the information in TRA services portal.					
After using TRA services portal, I will recommend it to my friends.					
Overall, I am very satisfied with TRA services portal					

11. Your opinion toward Tanzania Revenue Authority services portal (if

any)

_____

_____

_____

_____

12. Thank you for your participation.

Abstract (Korean)

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세계적으로 정보통신기술(ICT)의 활용이 증가하면서 전자정부의 물결이 빠르게 증가하고 있다. 탄자니아 정부는 2002년부터 전자정부 서비스 개선을 지원하기 위해 각종 정책과 규정을 제정해 전자정부 서비스를 제공하고 있다. 개발 도상국의 현재 문제되는 상황은 전자정부 프로젝트의 대다수가 실패하는 반면 탄자니아는 전자정부 개발지수와 전자정부 참여지수의 급속한 성장을 보여주고 있다. 전자정부 프로젝트의 성공은 서비스를 통해 제공되는 기술에만 의존하는 것이 아니라, 사용자가 서로 다른 플랫폼을 통해 제공되는 서비스에 어떻게 관여하고 만족하느냐에 따라 달라지기 때문에, 시민의 만족도가 전자정부 성공을 달성하는 데 큰 역할을 한다. 본 연구의 목적은 탄자니아 전자정부 프로젝트에 대한 사용자 만족도를 측정하기 위한 것으로 탄자니아인의 전자 만족도를 결정하는 주요 요인을 파악하기 위해 탄자니아 수입국(TRA) 서비스 포털을 이용한다. 본 연구는 Seddon의 (1997) 모델뿐만 아니라 DeLone과 McLean (2003)에 기초한 정보 시스템 (IS) 성공 모델을 채택하고 있다. 모델 구성은 시스템 품질, 정보 품질, 서비스 품질, 성능 기대 성능, 사용 의향 및 사용자 만족도 등이다. 163명의 응답자가 설문지에 답하는 온라인 설문조사를 통해 데이터를 수집한다. 데이터 심사 후,

136개의 유효한 답변이 있었다. 한편, 27개의 답변은 질문에 대한 참여 부족으로 인해 무효로 간주되었다. 데이터 분석은 SmartPLS 소프트웨어를 사용하여 가설 간의 관계를 평가하는 부분 최소 제곱 구조 방정식 모델링(PLS-SEM)과 가설 테스트에 의해 수행되었다. 결과는 TRA 플랫폼 사용자들이 TRA에서 제공하는 서비스에 만족하고 있음을 보여준다. 이 연구 결과는 서비스 품질, 시스템 품질 및 사용 의사가 사용자 만족도에 영향을 미치는 강력한 결정 요인이라는 것을 보여주는 반면 정보 품질과 성능 기대치는 사용자 만족도에 큰 영향을 미치지 않았다. 본 연구는 TRA 플랫폼의 데이터로 DeLone과 McLean(2003)의 업데이트된 IS 성공 모델을 테스트하고 검증함으로써 기존 문헌에 기여한다. 사용자들은 또한 의사결정에서 고려해야 할 중요한 요소들을 강조함으로써 정부 정책 입안자와 관리자들에게 시사점을 제공한다.

주요어 : 전자정부, 사용자 만족도, 정보시스템 성공모델, 탄자니아

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