




Evaluating user satisfaction with the e-payment gateway system in Tanzania

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Background: The Government of Tanzania through the Ministry of Finance and Planning implemented the Government Electronic Payment Gateway (GePG) system to improve the whole cycle of revenue management. As of June 2020, the system has been implemented in 660 institutions, 28 commercial banks, and 6 mobile money operators. Whilst the initial acceptance of this system is positive, relatively no study has evaluated its effectiveness in meeting the expected benefits. Elsewhere, similar systems showed initial acceptance at the beginning, followed by failures after some years of use. Therefore, it is important to evaluate the effectiveness of GePG system to find out how effectively public money is spent.

Objective: The objective of this study was to evaluate the success of GePG system using users' satisfaction as a success measure.

Method: The study adapted the updated Delone and Mclean Information Systems success model whereby perceived usefulness and trust in system were added as new factors. The sequential explanatory design research design integrating quantitative and qualitative data within a single investigation was adopted. A total of 442 users from 271 institutions in 11 regions in Tanzania participated in the study.

Results: Trust in system, information quality, and perceived usefulness had a significant positive impact on users' satisfaction with GePG system, whilst service quality had a significant negative impact. In contrast, system quality did not have an effect.

Conclusion: The study shows that trust in system and perceived usefulness are important factors in the updated Delone and Mclean IS success model in evaluating user satisfaction with revenue collection systems. The findings from the open-ended questions and implications of the findings are discussed.

Keywords: user satisfaction; e-payment system; e-government in public; e-payment; developing countries; e-payment in Africa; employees satisfaction.

Introduction

The process of revenue collection in Tanzania faces several challenges. These challenges include: tax exemptions, administrative incapacity, corruption, and difficulties in estimating the number of registered taxpayers (McCluskey et al. 2017). Other challenges include: limited payment options, difficulties in performing reconciliation, and poor records keeping. In order to address these challenges, the Government of Tanzania through the Ministry of Finance and Planning developed the Government Electronic Payment Gateway (GePG) system to improve the whole cycle of revenue management. The system aimed to increase transparency in all stages of the revenue collection process within the Government and its institutions.

On the user side, the system has centralised payment of government services whereby citizens use control number to pay for the services. The system is integrated with all commercial banks, aggregators, and mobile money operators enabling control numbers to be settled in a wide range of payment options. That is to say, citizens can use mobile phones, banks, or bank agents to pay for the services once they generate control numbers. Once payment transaction is completed, the system generates an electronic receipt which is sent to the payer via SMS.

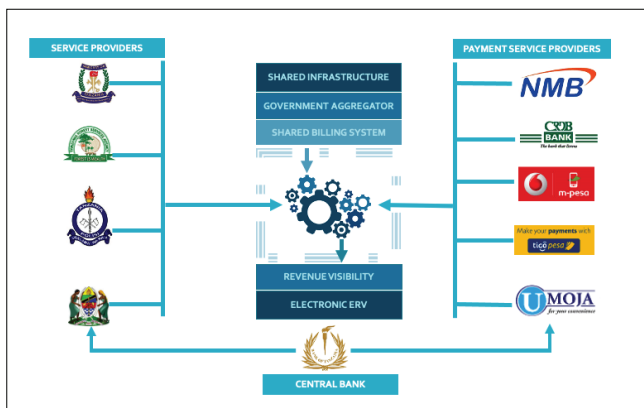
On the institution side, users from financial and account departments use the system to generate invoices and collect revenue based on the services they offer. The system has a dashboard that displays various information such as collection summary, collection targets, paid and pending bills, and list of service providers. In this case, the information about revenue collection can be seen and tracked in real-time. The system also enables the generation of revenue reports, performs

reconciliation, and facilitates timely transfer of the revenue to the central bank. Figure 1 shows the description of the implementation of the GePG system.

The government started to implement the system during the 2017 and 2018 fiscal year. As of June 2020 more than 660 institutions were using the system.

Whilst the initial acceptance of this system is positive, relatively no study has evaluated its effectiveness in meeting the expected benefits. It should be noted that many similar systems elsewhere such as in Rwanda, Kenya, Uganda, and Malawi showed initial acceptance at the beginning, followed by failures after some years of use (Combaz 2015; Gunawong & Gao 2017; Kamau & Wausi 2015). Therefore, it is imperative to evaluate the effectiveness of GePG system to identify how effectively public money is spent. Whilst other measures of information system success do exist, gathering the attitudes and perceptions of individuals who use the system is the most important success measure (Leclercq 2007). This is because, satisfied users engage in re-use of the system whilst dissatisfied users tend to discontinue using the system (Venkatesh et al. 2011). Consequently, the concept of satisfaction was considered as a measure of the effectiveness of the GePG system.

This study aimed to evaluate the success of GePG system by assessing users' satisfaction with the system by employing sequential explanatory design using 442 users from 271 institutions in 11 regions in Tanzania. The study adapted the updated Delone and Mclean Information Systems (D&M IS) success model whereby perceived usefulness and trust in system were added as new factors to suit the context of the study. The organisation of the article is as follows. User's satisfaction as an evaluation measure is discussed in the literature review section, followed by the development of research model and hypotheses. After that, methodology and the findings are provided. Finally, a discussion of the findings and the recommendations for future research are provided, followed by the conclusion.



Source: Sausi, J.M. & Mtebe, J.S., 2021, 'Revolutionization of revenue collection with government e-payment gateway system in Tanzania: A public value creation perspective', *East African Journal of Science, Technology and Innovation* 2(3), 1–17. <https://doi.org/10.37425/eajsti.v2i3.248>

FIGURE 1: Description of implementation of Government Electronic Payment Gateway system.

Literature review

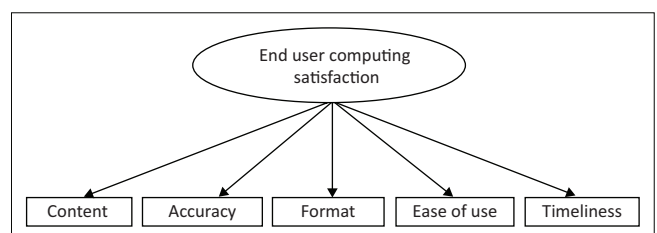
User satisfaction as a means of assessing IS success is probably the most widely used method (DeLone & McLean 2016). It is considered as a guarantee of the success of the system as it gathers the feelings and perceptions about the system from direct users of the system as opposed to other IS success measures (Leclercq 2007). That is to say, when the system is perceived as poor by users, regardless of any evaluation results, the system is indeed poor (Ives, Olson & Baroudi 1983). On the contrary, it would be difficult to deny the success of the system in case users appreciate it (Leclercq 2007). Studies have also shown that user satisfaction is a strong predictor of intention to continue using a system in the post-adoption stage (Teo, Srivastava & Jiang 2008). In summary, it is assumed that if users are fully satisfied with the system, that system is a success (DeLone & McLean 2016; Doll & Torkzadeh 1988; Tella 2012).

The early attempt to develop the instrument for measuring user satisfaction with IS was conducted by Ives et al. (1983). The authors developed the User Information Satisfaction (UIS) instrument consisting of 39 items. Later, Doll and Torkzadeh (1989) updated the UIS instrument by developing the End-User Computing Satisfaction (EUCS) consists of 12 items. The EUCS was divided into five components: content, accuracy, format, ease of use, and timeliness as shown in Figure 2.

The EUCS instrument was later reviewed by DeLone and McLean (2003) in the updated D&M IS success model and found that most of the items in the EUCS were related to 'system quality', 'information quality', and 'service quality'. The authors pointed out that user satisfaction can be evaluated via system quality, service quality, information quality, and intention to use/use as shown in Figure 3.

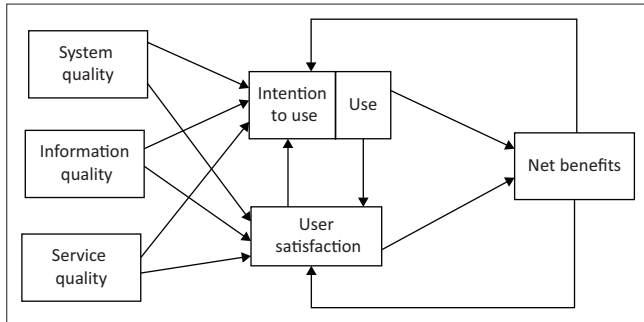
Research model and hypotheses development

As discussed previously, this study adapted an updated D&M IS success model to evaluate user satisfaction with the GePG system. The system quality, service quality, and information quality were adopted as independent variables. The perceived usefulness replaced the intention to use/use as suggested by Seddon and Kiew (1995). Seddon and Kiew (1995) pointed out that if the system does not help users to achieve their goals, there seems little chance that users will perceive the system as useful, no matter how well the system is designed. Based on



Source: Doll, W. & Torkzadeh, G., 1988, 'The measurement of end-user computing satisfaction', *MIS Quarterly* 12(2), 259–274. <https://doi.org/10.2307/248851>

FIGURE 2: The end-user satisfaction model of information system.



Source: DeLone, W.H. & McLean, E.R., 2003, 'The DeLone and McLean model of information systems success: A ten-year update', *Management Information Systems* 19(4), 9–30. <https://doi.org/10.1080/07421222.2003.11045748>

FIGURE 3: The updated D&M IS success model.

this argument, it was important to include perceived usefulness as an important factor in the study.

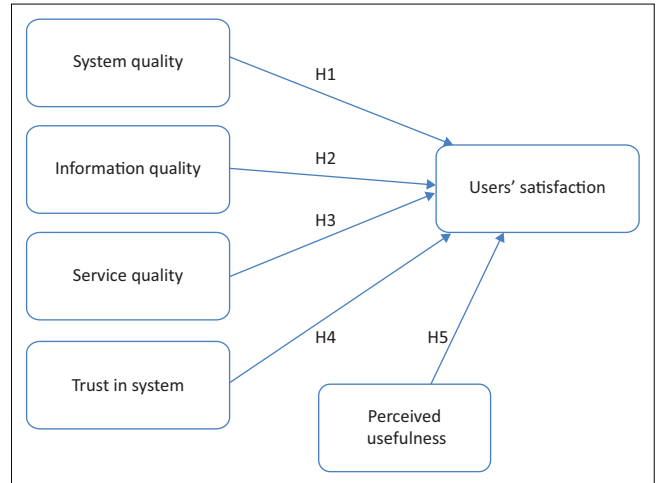
In addition, trust in system was included as a new construct. The inclusion of trust in system was because of a growing concern amongst users about exchanging personal information during the process of revenue collection. The GePG system requires users to provide personal particulars which may risk user privacy and security if they are not adequately protected. Therefore, if users do not trust in system, they will not be willing to use it (Venkatesh et al. 2016).

Finally, the net benefits were excluded as user satisfaction was adopted to be the success measure. In conclusion, user satisfaction with GePG system can be explained by system quality, information quality, service quality, trust in system, and perceived usefulness as illustrated in Figure 4. The description of each factor and the hypotheses are explained next.

System quality is concerned with whether the GePG system has adequate features to facilitate the process of revenue collection. In addition, it is concerned with features that have direct impact on how users use the system such as ease of use, ease of learning, and user-friendliness (DeLone & McLean 2016). Generally, if the users perceive the system to be easy to use, they need less effort to use it, thereby contributing to overall satisfaction with the system (DeLone & McLean 2003). Conversely, if the system is perceived to be complicated, users would find it difficult to use thus reducing institutions' capacities in collecting revenue. System quality was found to have impact on user satisfaction with similar systems in Uganda (Sakwa & Maiga 2018) and Mauritius (Veeramootoo, Nunkoo & Dwivedi 2018). The hypothesis of this factor is as follows:

H1: System quality has an effect on users' satisfaction with the system.

Information quality is concerned with the timeliness, accuracy, relevance, and format of information generated by the system (DeLone & McLean 2003). In this study, information quality was measured on how users perceived the quality of data and information generated by the GePG



Source: Doll, W. & Torkzadeh, G., 1988, 'The measurement of end-user computing satisfaction', *MIS Quarterly* 12(2), 259–274. <https://doi.org/10.2307/248851>

FIGURE 4: The proposed research model.

system. The quality of information in the system can enable users in preparing better reports for decision making (DeLone & McLean 2016). Information quality was found to be the main factor towards user satisfaction with the taxation system in Tunisia (Mellouli, Bouaziz & Bentahar 2020), e-government services in Algeria (Idoughi & Abdelhakim 2018), and Integrated Financial Management Information System (IFMIS) in Uganda (Sakwa & Maiga 2018). This shows that information quality is a key predictor towards user satisfaction with payment and revenue collection systems. The hypothesis of this factor is as follows:

H2: Information quality has an effect on users' satisfaction with the system.

Service quality was considered as an important factor for this study. It measures the quality of support services users receive from the Information Technology department or IT support personnel (DeLone & McLean 2016). In this context, it refers to the extent to which users perceive to have received effective and reliable help from GePG help desk team. Studies have shown that support quality had an impact on user satisfaction with various payment and revenue collection such as the taxation system (Mellouli et al. 2020), and the e-fill system (Idoughi & Abdelhakim 2018). Therefore, it was important to include service quality as a key factor in this study. The proposed hypothesis is as follows:

H3: Service quality has an effect on users' satisfaction with the system.

Trust in system was added as a new factor in the study. It refers to the extent to which the GePG system enables the collection of revenue in a consistent manner whilst protecting users' personal information (Venkatesh et al. 2016). When users perceive that the system lacks security and privacy features, they tend to discontinue from using it (Kassim et al. 2012). For instance, the lack of trust was a key factor in user satisfaction with various information systems implemented in various countries in Africa such as in Rwanda (Mukamurenzi, Grönlund & Islam 2019), South Africa (Bayaga & Ophoff 2019),

Namibia (Frohlich, Nieminen & Pinomaa 2020), and Kenya (Otieno & Omwenga 2015). Therefore, it was important to include trust in system as a key factor in this study. The proposed hypothesis is as follows:

H4: Trust in system has an effect on users' satisfaction with the system.

Finally, perceived usefulness was included as a new factor in this study. It defined as the degree to which users believe that using the system will enhance job performance or organisation performance (Davis, Warshaw & Bagozzi 1989). In this study, perceived usefulness relates to the degree to which users believe that using the GePG system will improve their ability to collect revenue effectively and efficiently. That is to say, if the system does not help users to achieve their goals, there is little chance that they will perceive the system as useful (Seddon & Kiew 1995). Prior studies show that perceived usefulness has significant impacts on user satisfaction in various information systems (Santhanamery & Ramayah 2014; Sigwejo & Pather 2016; Tella 2012). The proposed hypothesis is as follows:

H5: Perceived usefulness has an effect on users' satisfaction with the system.

Methodology

Study design

The study employed a sequential explanatory design integrating quantitative and qualitative data within a single investigation. In these designs, quantitative data are collected and analysed, followed by qualitative data whilst data analysis is connected, and integration occurs at the data interpretation stage (Hanson et al. 2005). Precisely, each open-ended questions were used to clarify or complement the questionnaire results, thus creating a more comprehensive understanding of the users' satisfaction with the system.

Sample size

The respondents were accountants working in the financial department for each selected institution. The majority of these respondents have been using the system for more than two years. It should be noted that at most five staff use the system per each institution. Therefore, a convenient sampling technique was adopted. In order to estimate the minimum sample size, a formula proposed by Green (1991) was used. The formula states that $N > 50 + 8m$ where m is the number of variables (factors). Based on the research model in Figure 2, the sample size can be calculated as $50 + 8 \times 6 = 98$ given the fact that there are six factors. In this study, 442 respondents completed usable questionnaires from 271 institutions in 11 regions in Tanzania. Therefore, the sample size met the required number of respondents as per Green (1991) formula. The distribution of respondents per each region is shown in Figure 5.

Questionnaire

The questionnaire used a 5-Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) with an open-

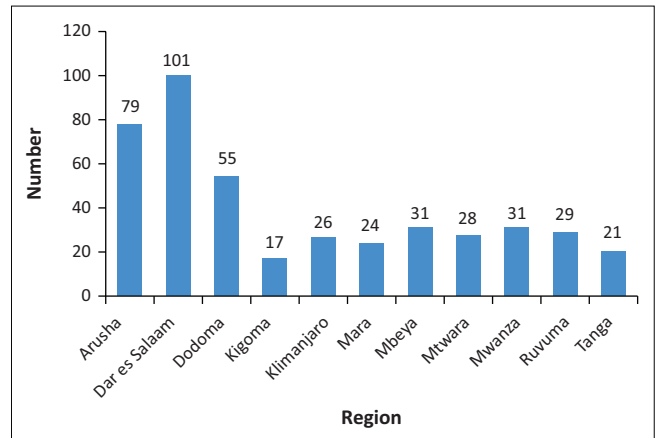


FIGURE 5: Distribution of users per region.

ended question after each factor. The questionnaire was adapted from the validated instruments developed in the updated D&M IS success model (DeLone & McLean 2003) and other relevant studies (DeLone & McLean 2016; Petter, DeLone & McLean 2008; Seddon & Kiew 1995; Teo et al. 2008). Nonetheless, the items were modified through rewording some items to suit the context of the system under investigation. The items in the instrument are presented in Table 1.

Findings

Reliability and validity

Cronbach's alpha was used to measure the instruments' reliability, and it was found to be 0.924 for 25 items. The instrument was reliable as the value of Cronbach's Alpha was above 0.5 (Hair et al. 2006). The value of Cronbach's alpha for each factor is shown in Table 2.

Identifying the factor structure

Factor analysis was performed using the principal component analysis extraction method on 23 items using Direct Oblimin rotation with Kaiser normalisation. The factor analysis aimed to show whether the related items were clustered under the same construct or not. The minimum factor loadings should be 0.300 (Hair et al. 2006). The loadings per each item are shown in Table 3 with IQ1 and SeQ5 removed as they did not meet the minimum loadings.

Research model summary

The regression equation $E(y) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \epsilon$ was put in the context of this study. Specifically, $E(\text{users satisfaction}) = \beta_0 + \beta_1(\text{system quality}) + \beta_2(\text{information quality}) + \beta_3(\text{service quality}) + \beta_4(\text{perceived usefulness}) + \beta_5(\text{trust in system}) + \epsilon$.

The five factors were subjected to multiple linear regression analysis to measure the model's success and predict the causal relationship between the identified independent factors and user's satisfaction. Using enter method, a

TABLE 1: The items for each factor.

Factor	Code	Item
System quality	SQ1	The system is easy to use.
	SQ2	The system is user-friendly.
	SQ3	The system has the necessary features and functions to enable your organisation to collect revenue of various kinds.
	SQ4	The system is easy to learn.
	SQ5	The system is accessible from any type of device (e.g. desktop, tablet, mobile phone).
Information quality	IQ1	Through the GePG system, I can obtain information that is correct and free of errors.
	IQ2	Through the GePG system, I can obtain up-to-date data for generating reports for my work at hand.
	IQ3	Information from the GePG system is useful in preparing your organisational reports.
	IQ4	Through the GePG system, I can obtain information within a reasonable amount of time.
	IQ5	Information from the GePG system appears readable, clear, and well-formatted.
Service quality	SeQ1	The GePG support team provides prompt support through various communication means, such as e-mail, telephone, and chat.
	SeQ2	The training provided by the GePG support team has enhanced my ability to use the system.
	SeQ3	The GePG support team is competent with the system.
	SeQ4	The GePG support team has adequate knowledge to help me if I experience any problems with the system.
	SeQ5	The GePG support team are always available.
Perceived usefulness	PU1	I find the system useful in the process of revenue collection.
	PU2	Using the system enables me to process payments and collect revenue more quickly.
	PU3	Using the system enhances my effectiveness in the whole process of revenue collection.
	PU4	Using the system makes it easier to process payments and collect revenue.
Trust in system	TS1	I perceive that using the system to collect revenue from various sources is secure and safe.
	TS2	I always feel confident that I can rely on this system when collecting revenue from various sources.
	TS3	Use of the system may cause customer information to be accessible by an unauthorised user or stolen.
Users' satisfaction	US1	I am pleased with the system.
	US2	I am very satisfied with the system.
	US3	Overall, my interaction with the system is very satisfying.

GePG, Government Electronic Payment Gateway.

Scale labels: 1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree.

TABLE 2: Cronbach's alpha coefficients for construct reliability measurement.

Number	Construct	Cronbach's alpha
1	System quality	0.578
2	Information quality	0.842
3	Service quality	0.838
4	Perceived usefulness	0.770
5	Trust in system	0.858
6	Users' satisfaction	0.874

significant model emerged: $F(5,435) = 51.987, p < 0.0005$. The model explains 36.7% of users' satisfaction variance (adjusted $R^2 = 0.367$) with the GePG system as shown in Table 4.

Individual factor contribution

The results show that trust in system, information quality, and perceived usefulness had a significant positive impact (i.e. their beta values were positive, at p -values less than 0.05). In contrast, service quality had a significant negative impact (i.e. their beta values were negative, at p -values less than 0.05). The system quality was found to have no

TABLE 3: Factor loadings on the items with Oblimin rotation.

Factor	Items in Direct Oblimin rotation	Loadings
System quality	SQ1	0.847
	SQ2	0.895
	SQ3	0.810
	SQ4	0.653
	SQ5	0.516
Information quality	IQ2	0.779
	IQ3	0.818
	IQ4	0.826
	IQ5	0.816
Service quality	SeQ1	0.907
	SeQ2	0.888
	SeQ3	0.526
	SeQ4	0.752
Perceived usefulness	PU1	0.827
	PU2	0.881
	PU3	0.792
	PU4	0.337
Trust in system	TS1	0.663
	TS2	0.846
	TS3	0.690
Users' satisfaction	US1	0.829
	US2	0.928
	US3	0.895

TABLE 4: Summary showing the success of the research model.

Model	R	R^2	Adjusted R^2	s.e.
	0.612	0.374	0.367	0.796

s.e., standard error of the estimate.

TABLE 5: Unstandardised and standardised regression coefficients for the factors.

Construct	B	s.e.	β	t	p
Perceived usefulness	0.232	0.042	0.232	5.582	0.000
System quality	-0.012	0.039	-0.012	-0.301	0.764
Information quality	0.156	0.042	0.156	3.754	0.000
Service quality	-0.153	0.044	-0.153	-3.465	0.001
Trust in system	0.307	0.048	0.307	6.386	0.000

s.e., standard error of the estimate.

significant effect, as its p -value was not less than 0.05. Table 5 summarises the predictive factors regarding beta values for each hypothesis obtained from the regression analysis.

The conclusion of each hypothesis is summarised in Table 6. Four hypotheses – H2, H3, H4, and H5 – were found to be significant at values of $p < 0.05$ or $p < 0.001$, whilst H1 was not significant.

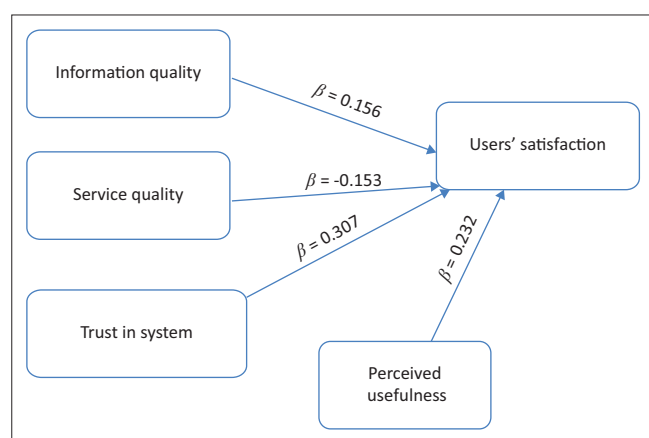
Based on these findings, the final model is shown in Figure 6. System quality was excluded as it was found to be insignificant.

As explained earlier, each close-ended question in a questionnaire was supplemented by an open-ended question to gain more insight into the factors influencing user satisfaction with the GePG system. For each of the significant factor, the analysis of the qualitative data follows next.

TABLE 6: Summary of results hypothesis testing.

Hypothesis	Results	Conclusion
Hypothesis 1		
System quality has an effect on users' satisfaction with the system.	$\beta = -0.012, p < 0.764$	Not supported
Hypothesis 2		
Information quality has an effect on users' satisfaction with the system.	$\beta = 0.156, p < 0.000$	Supported
Hypothesis 3		
Service quality has an effect on users' satisfaction with the system.	$\beta = -0.153, p < 0.001$	Supported
Hypothesis 4		
Trust in system has an effect on users' satisfaction with the system.	$\beta = 0.307, p < 0.000$	Supported
Hypothesis 5		
Perceived usefulness has an effect on users' satisfaction with the system.	$\beta = 0.232, p < 0.000$	Supported

Note: Statistically significant values at $p < 0.05$ or $p < 0.001$.

**FIGURE 6:** The final research model.

Hypothesis 2: Information quality has an effect on users' satisfaction with the system

Table 6 shows that information quality positively influences users' satisfaction ($\beta = 0.156, p < 0.000$). This finding implies that the system provides better quality data and information compared to the situation before. For instance, respondents at Baraza la Sanaa la Taifa, Geological Survey of Tanzania, and Arusha District Council indicated that the system enabled them to generate reports easily and identify defaulters than before.

Despite these findings, the respondent suggested that the GePG system should be integrated with the institution billing systems to ensure that the data generated from the system can help prepare institutional reports. In many institutions where the GePG system was not integrated with the institutional billing system, users had to use GePG system and institution billing system to prepare reports, adding more workload and attracting potential errors. Some comments are indicated hereunder:

'We can't use the data from the system to generate reports indicating statements of financial performance showing collection target, the amount collected and balance. This information is very important for our organization.' (Respondent 2, Accountant I, Mbeya)

'Some information is missing, for example, for how long (time duration) a control number has not been paid or expire date.' (Respondent 5, Cashier I, Tanga)

Hypothesis 3: Service quality has an effect on users' satisfaction with the system

Table 6 shows that service quality has a negative influence on the users' satisfaction ($\beta = -0.153, p < 0.001$). Data from open-ended questions show that the GePG support team does not provide prompt support services to user requests. For example, respondents from the Tengeru Institute of Community Development and Kariakoo Market Corporation indicated that at first, the support team was very cooperative but eventually became worse as they continued using the system. Respondents from Watumishi Housing Company, National Irrigation Commission, Government Chemist Laboratory Authority, and the Road Fund complained about the delays in responding to e-mails whilst phone calls were not answered. Some of the comments from the respondents are:

'They normally tell us to wait so that they can contact others to address the reported issue. Then we keep on waiting, and yet sometimes they do not come back with the solution.' (Respondent 1, Accountant I, Dar es Salaam)

'Not all reported cases about the GePG system that we requested for help were solved.' (Respondent 2, Cashier III, Arusha)

Hypothesis 4: Trust in system has an effect on users' satisfaction with the system

Table 6 shows that trust in system has strongest positive influence on the users' satisfaction ($\beta = 0.307, p < 0.000$). This finding shows that users perceive that the system has necessary features that enhances security and privacy of the personal information. In addition, the use of the system has increased trust between the government, citizens and employees who were responsible for collecting revenue. In the open-ended questions, the respondents claimed that citizens are confident that the money they are paying for services is paid directly to the Government when they receive a notification message via mobile devices. This was reported by the respondents in Mbeya University of Science and Technology, Mount Meru Regional Referral Hospital, and Dar es Salaam City Council.

In addition, the use of digital receipts in the form of SMS has reduced the forgery of receipts or bank cheques which was very common before. The respondents at Water Institute, University of Dodoma, and Adult Education pointed out that some students used to bring forged bank receipts before the system. Similar views were echoed in the Centre for Education Development in Health and College of Social Work.

Hypothesis 5: Perceived usefulness has an effect on users' satisfaction with the system

Table 6 shows that perceived usefulness has a positive influence on users' satisfaction ($\beta = 0.232, p < 0.000$). In the open-ended questions, the respondents indicated that the use of GePG system had improved transparency for revenue collection process.

For instance, the respondents from the Ministry of Livestock Development claimed that the revenue collected from each point of collection, for example, livestock auctions, could be viewed in real-time, unlike before. The respondents from Arusha Urban Water Supply and Sanitation Authority, National Development Corporation, and Higher Education Loans Board also noted that it was impossible to know the amount of revenue collected in real-time unless they made a follow-up. Comments from some institutions are shown hereunder:

'It is easy to know who did not pay service levy; hence it is easy to track and check it, for example, tourist revenue is easy to get as IT department embedded this functionality, and we were able to collect revenue.' (Respondent 4, Cashier I, Mara)

'We used to run various accounts in different banks in each of the nine zones in the country. When one customer pays for the service, we need to know which bank and zone the money has been deposited to trace the payment. With the GePG system, all zones use a single account in each bank and deposit the amount collected in one account in Bank of Tanzania, making management, control, and tracing of various payments much easier.' (Respondent 3, Accountant I, Dodoma)

Despite these findings, the lack of a self-service facility was a concern in some of the surveyed institutions. Many users suggested that the system allows users to generate invoices without interacting with staff or physically visiting government offices. In some institutions, the self-service facility was not integrated with the GePG system thus forcing users to physically visit offices to obtain invoices.

Discussion

This study aimed to evaluate the effectiveness of the GePG system by assessing users' satisfaction by employing a sequential explanatory design using 442 users from 271 institutions in 11 regions in Tanzania. The adapted independent factors such as system quality, information quality, perceived usefulness, trust in system, and service quality were subjected to linear regression analysis to determine the causal relationship with users' satisfaction as a dependent variable. The study found that trust in system, information quality, and perceived usefulness had a significant positive impact whilst service quality had a significant negative impact. In contrast, system quality did not have an effect.

Interestingly, trust in system was found to be the strongest factor ($\beta = 0.307, p < 0.000$) contributing to 30% of overall

users' satisfaction variance. It implies that users perceive the system to have features that enhances security and privacy of their data. This finding was in line with other studies conducted in South Africa (Bayaga & Ophoff 2019), Namibia (Frohlich et al. 2020), Kenya (Otieno & Omwenga 2015), and Rwanda (Mukamurenzi et al. 2019). In Rwanda, for instance, the lack of trust affected the success of the electronic government system (Mukamurenzi et al. 2019). In this study, it was found that some users were worried that IT technicians may be bypassing the authentication process and making changes to the information. In Namibia, users preferred to walk into a government office instead of accessing governmental services via mobile applications because of worries of trust in system (Frohlich et al. 2020). As the GePG system requires users to provide personal details, it is important for the ministry to take necessary technical and procedural measures to ensure that the system is secured and data cannot be accessed by unauthorised users.

The study also found that perceived usefulness was the second strongest factors ($\beta = 0.232, p < 0.000$) contributing to 23% of satisfaction variance. The finding implies that users believe that using the system enhances their ability to collect revenue more quickly and efficiently. In many institutions, it was found that the use of the system reduced time to offer services to citizens whilst increasing transparency and traceability of the revenue process.

Nonetheless, the lack of integration with self-service facility in some institutions was found to be a drawback towards the success. The self-service would have alleviated the tedious face-to-face interactions between citizens and staff whilst enabling staff to be useful in other activities rather than attending citizens (Meuter et al. 2000). The self-service would also have saved users' time and increased personal control of the service they want to access (Chan et al. 2010; Meuter et al. 2000).

The information quality was found to have a significant positive effect ($\beta = 0.156, p < 0.000$), contributing to 15.6% of satisfaction variance. The finding shows that users perceived that the system had quality data and information for preparing reports. This finding conforms with the fact that providing accurate and relevant information with an appropriate level of details and disseminating them timely is vital for enhancing user satisfaction (Deng, Karunasena & Xu 2018). The information quality was found to be a significant factor towards the success of systems in Uganda (Sakwa & Maiga 2018) and Rwanda (Mukamurenzi et al. 2019). In Uganda, for instance, the data from IFMIS enabled users to produce reports in the form of charts and graphs which enhanced user satisfaction.

However, the lack of integration between GePG system and billing systems in some institutions reduced user satisfaction. The lack of integration meant that users had to use multiple systems to process the same data, attracting potential errors.

It was also found that support quality had a significant negative effect ($\beta = -0.152, p < 0.000$). This finding suggests that poor support quality reduces the user's satisfaction, and therefore some improvement needs to be done.

This finding corroborates with other studies conducted to investigate user satisfaction with taxation system, (Mellouli et al. 2020) e-fill system (Idoughi & Abdelhakim 2018), and IFMIS (Sakwa & Maiga 2018). For instance, lack of user training affected the success of IFMIS in Uganda, whereby users could not use the system properly (Sakwa & Maiga 2018). Therefore, it is recommended that additional support services should be sought to ensure that users use the GePG system effectively and efficiently. Some of the support services that can be considered to complement the existing channels include interactive demos, inquiry hotlines, virtual assistant video facilities, and click to call (Chan et al. 2020).

With these findings in mind, this study has made several contributions. The study has incorporated trust in system as a new factor in the D&M IS success model to evaluate user satisfaction. Trust in system, which involves some elements of security and privacy (Kassim et al. 2012) is part of system quality in the D&M IS success model (DeLone & McLean 2003). In this study, trust in system was treated as a new factor and was found to be an important factor towards user satisfaction with revenue collection system. It is important to include trust in system as a factor in evaluating the success of systems that require users to provide sensitive personal information such as e-voting, e-tax, e-health, and e-banking,

In practice, the proposed model and its instrument are accessible and can be used to evaluate user satisfaction of payment and revenue collection systems in developing countries. Unlike D&M IS success model which is a generic model, the proposed model has been tailored for evaluating user satisfaction in the context of revenue collection systems.

Limitations and recommendations for future research

This study has some limitations that must be acknowledged. Firstly, this study was based on a single revenue collection system, namely the GePG system, in a particular context. Therefore, the model can be further tested and validated in other contexts. Secondly, the data were based on a non-probability sampling technique which may limit the generalisability of the results whilst the use of self-administrated survey may affect the external validity. Another limitation of this study is that the data was collected from employees. It is therefore recommended that future studies to be conducted to evaluate the success of the system using citizens as respondents.

Finally, the proposed model accounted for 36.7% (adjusted $R^2 = 0.367$) of users' satisfaction variance. It is clear that other factors contributing to user's satisfaction with the GePG system were not included. Future research can include more

factors to explain the user's satisfaction with the system. Some of these factors may include perceiving enjoyment (Tella 2012), efficiency, responsiveness (Saha, Nath & Salehi-Sangari 2010), and facilitating conditions (Sigwejo & Pather 2016). Despite these limitations, the findings from this study show that examining user satisfaction with e-government systems is essential to find strategies that helps to ensure that they meet users' needs.

Conclusion

This study evaluated users' satisfaction with the GePG system by employing a sequential explanatory design using 442 users from 271 institutions in 11 regions in Tanzania. The adapted independent factors, namely system quality, information quality, perceived usefulness, trust in system, and service quality were subjected to linear regression analysis to determine the causal relationship with users' satisfaction as a dependent variable. The study found that trust in system, information quality, and perceived usefulness had a significant positive impact whilst service quality had a significant negative impact. In contrast, system quality did not have an effect. The study shows that trust in system and perceived usefulness are important factors in the updated D&M IS success model in evaluating user satisfaction with revenue collection systems.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

J.M.S. (idea creation, data collection, data analysis, first draft writing, wrote final document), J.S.M. (supervised the whole work, proof reading, reviewing, data validation), J.M. (proof read the document, data analysis and validation, data collection).

Ethical considerations

All procedures performed in the study involving human participants were in accordance with the ethical standards of the University of Dar es Salaam and/or Tanzania national research committee. Informed consent was obtained from all individual participants involved in the study from the selected regions in Tanzania.

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Data availability

All data are available from the corresponding author, J.S.M., upon reasonable request.

Disclaimer

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