

Assessing the influence of system quality on the usefulness of ICT services provided to customers: A Case of TTCL in Arusha

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Abstract

The study has assessed the influence of system quality on the usefulness of ICT services provided to customers. The study used the explanatory research design and the quantitative approach. The sample size was 100 drawn. respondents comprised TTCL staff and customers. The study used both non-probability and probability sampling methods. Quantitative data was collected through questionnaires. The data were analysed by using descriptive statistics. Findings showed that flexibility of ICT service, perceived ease of use, response time, and system features have a significant influence on the usefulness of ICT services provided to customers by TTCL. It is concluded that the system quality, of ICT services provided by TTCL, significantly affects customers' perceived net benefit. It is recommended that public ICT service providers should take advantage of the national ICT backbone system to improve the quality of the ICT system, the quality of the information system the and quality of ICT services.

Keywords: System quality, flexibility, perceived ease of use, response time, system features

Introduction

Information and Communications Technology (ICT) is an umbrella term that embraces any communication device or application, such as television, radio, cellular phones, computer, satellite systems, network hardware, and software, as well as the numerous services and applications related to them. The integration of computers and communication technologies provides exceptional chances to coordinate, advance as well communicate with each other over extensive geographic areas and eloquently accomplish the desired objectives (Renukadevi, et al., 2018).

The DeLeon and Mclean Information System Success Model provides six interrelated dimensions of information system success, namely system quality, service quality, information quality, intention to use, user satisfaction, as well net benefits (Ojo, 2017). System quality is frequently measured by using characteristics such as perceived ease of use, response time, system features, and flexibility; *Information quality* is normally measured by examining the output of an information system in terms of accuracy, timeliness, reliability, and trustworthiness whereas *service quality* is measured with reference to the quality of support provided by the information system's developer (Ojo, 2017).

Masri, et al. (2019) suggested a model concerning the formation of the information system quality, relationship quality (trust and customer satisfaction), perceived value, and customers' intention to continue using ICT services in Taiwan. Whereas, an experience from India revealed that poor connectivity, self-enthusiasm, essential extra time, the incentive to integrate ICT tools in teaching, and certain ICT software are the most significant factors affecting the effective use of ICT in provision of services to various development activities (Renukadevi, et

al., 2018).

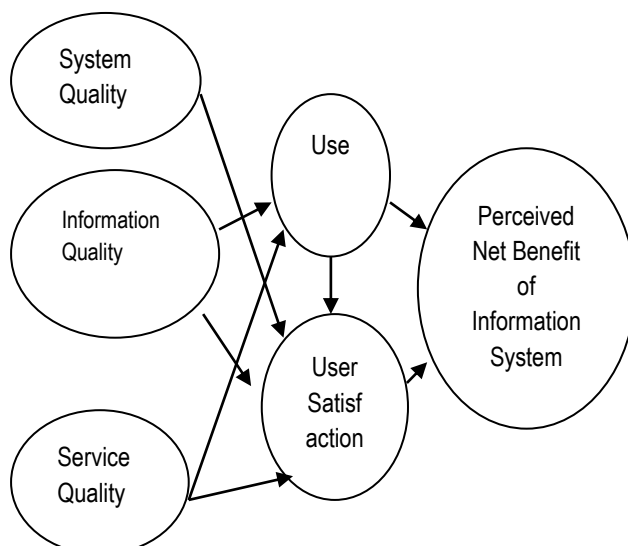
An experience from China shows that the concept of perceived net benefit value related to information and communication systems has continuously emerged from the different studies associated with customer behavior (Swanson, et al., 2017). Previous studies proposed that perceived value is a better predictor of repurchase intentions than trust, commitment, or satisfaction. Investigation of the influence the ICT integration on the quality-of-service delivery among government Ministries in Kenya recommends a need to invest more in ICT facilities and put in a place periodic maintenance schedule in order to improve the quality of ICT services. Continuous training to ensure staff acquires specialized skills to enable them to move with the dynamic changes in ICT technology is also essential (Thiga and Ndungu, 2021). Nevertheless, these studies did not look into the influence of system quality on the usefulness of ICT services provided to customers. As service providers want to enhance the efficiency and quality of ICT to reach more users to use these services, a leading challenge in evolving these services with high quality to meet users' expectations becomes a necessity. Quality plays a most important role to keep up a conviction between service providers and users (AlBalushi, 2021).

Despite the effort of the Tanzania government to construct the national backbone broadband system to close the digital gap and promote sustainable socio-economic development through the usage of ICT, the study conducted by Pazi and Shimba (2020) exposed that the last mile connectivity plan has not been addressed effectively and the backbone is operating at less than 10% of its designed capacity. In addition, a significant digital divide continues in the country, with at least three million people living in areas without any mobile signal, and more than 18 million people lacking internet data coverage (GSMA, 2020). This study has assessed the influence of system quality on the usefulness of ICT services proved to customers by TTCL in Arusha.

2 Literature Review

The study was guided by the Information System Success Model that was introduced by Deleon and Mclean in 1992. The Deleon and Mclean Information System Success Model provides six interrelated dimensions of information system success, namely system quality, service quality, information quality, intention to use, user satisfaction, as well perceived net benefits (Delone and McLean, 2013); Ojo, 2017). The theoretical model is as presented in Figure1:

Figure 1: Information system success model



Source: Adopted from Delone and McLean (2013)

The constructs and operationalization of the six dimensions of the Deleon and Mclean Information System Success Model are explained as follows:

System quality: This measures the desirable characteristics of an information system. Numerous information system studies have measured system quality by using characteristics such as perceived ease of use, response time, system features, and flexibility (Urbach and Muller, 2012). The study operationalized system quality in terms of flexibility of ICT service, perceived ease of use, response time, and system features through the ICT services provided by TTCL in Arusha.

Information quality: This concerns content issues as well as characteristics of the output of the information systems. It is normally measured by examining the output of an information system in terms of accuracy, timeliness, reliability, and trustworthiness (Urbach and Muller, 2012)

Service quality: This dimension of the ICT system is measured with reference to the quality of support provided by the information system's developer. Specifically, service quality is normally assessed by using service quality dimensions, such as assurance as well responsiveness by the systems support department (Urbach and Muller, 2012). In the study, service quality was measured by examining the technical support put in place by public ICT service providers, the existing network infrastructure, as well the reliability of the ICT system.

Intention to use/Use: This is focused on assessing the way in which the information system is used. This ICT dimension has frequently been measured by examining the actual usage of an ICT system or occasionally, the frequency of intention to use an ICT system (Urbach and Muller, 2012). The study assessed the use/intention to use from the angle of perceived usefulness of ICT services provided by public ICT service providers.

User satisfaction: This dimension of the information system is viewed as one of the most imperative measures of the success of an ICT system. User satisfaction is habitually measured through overall user satisfaction (Delone and McLean, 2013; Urbach and Muller, 2012). This dimension was also measured in the study to capture the overall satisfaction of users on the quality of ICT services from TTCL (a public ICT service provider).

Perceived Net benefits: This dimension of the information system is as well viewed as one of the most significant measures of information system success. The dimension constitutes the scope to which an information system contributes to the success of many stakeholders, whether positively or negatively. It has been measured by occasionally evaluating individual impact or organizational impact (Urbach and Muller, 2012). The study examined the net benefits of ICT service provision by public ICT service providers as customers' perceived net benefits since primary users of the ICT services were surveyed.

Renukadevi, et al. (2018) deployed the explanatory research design to study factors towards the usage of ICT tools in education and learning in India. The findings of this study identified that poor connectivity, self-enthusiasm, essential extra time, an incentive to integrate ICT tools in teaching, and certain ICT software are the most significant factors affecting the use of ICT in education and learning. This study had not assessed the influence of system quality on the usefulness of ICT services provided to customers.

Momoh and Egbunu (2019) deployed the survey research design to investigate factors influencing the utilization of ICT for service delivery in special libraries in Abuja, Nigeria. The study collected data by using a questionnaire from 76 respondents. Pearson Products Moment

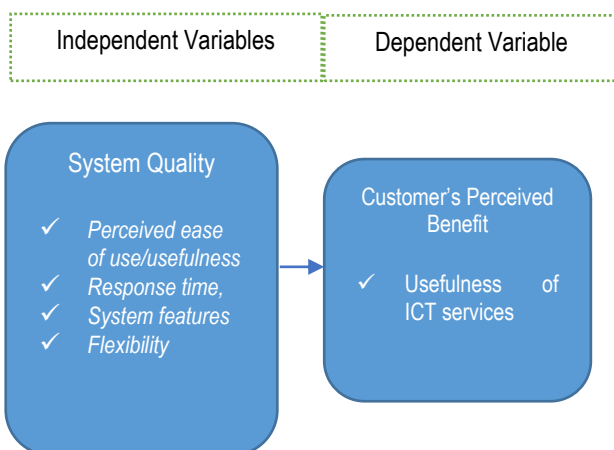
Correlation was deployed to test the hypotheses. The study findings showed that perceived usefulness as well as the attitude and the intention to use ICT has a significant influence on the utilization of ICT for service delivery in the research. However, the study did not endeavor to assess the influence of system quality on the usefulness of ICT services provided to customers by public ICT service providers on customers' perceived net benefit, which is a knowledge gap that was addressed in the study.

Isote (2013) adopted a case study research design and used data collected from 62 respondents to assess the impact of Information Communication Technology on the performance of Tanzania Posts Corporation. The findings of the study showed that there was a statistically insignificant increase in performance before as well as after the adoption of ICT. This study has not assessed the influence of system quality on the usefulness of ICT services provided to customers by TTCL in Arusha.

Conceptual Framework

The conceptual framework in Figure 2.2 depicts the relationship between the independent variables and the dependent variable of the study. The framework is constructed on the basis of the Information System Success Model (Delone and McLean, 2013; Ojo, 2017). Accordingly, it is conceptualized that *system quality*, measured by using characteristics such as perceived ease of use, response time, system features, and flexibility (Urbach and Muller, 2012), influence the usefulness of ICT services provided to customers by TTCL in Arusha.

Figure 2: Conceptual framework on impact of quality of ICT service provision



Source: Adopted from Information System Success Model (Delone and McLean, 2013; Ojo, 2017)

Methodology

The study used the explanatory research design and adopted the survey strategy. The approach used was quantitative. Explanatory design enables the establishment of a causal relationship between variables (Saunders, et al., 2019). In the study, explanatory design enabled the establishment and explain the causal relationship between the dimensions of information system quality (system quality, information quality, and service quality) and their impact on customers' perceived net benefit of ICT service provision by public ICT service providers.

The study was conducted at TTCL offices in Arusha city. TTCL is a major public ICT service provider whole owned by the government of the United Republic of Tanzania, with 3.4% of the market share (in terms of telecom subscriptions) in the ICT industry. TTCL provides several ICT services including a mobile network (TCRA, 2022). The reason for the selection was due to

the nature of activities of TTCL which conform with the objectives of the study as well as convenience and cost reduction to conduct and complete the study. The population for this study takes in all 1,873,354 TTCL subscribers in Tanzania (TCRA, 2022).

Since the population for the study was finite, sample size was determined through a sample size formula developed by Yamane in 1967. Accordingly, a sample of 100 respondents was suitable for the study as shown in Equation 1.

$$n = \frac{N}{1+N(e)^2} \dots\dots\dots 1$$

Where:

e (margin of error) = 0.1 (10%)

n = sample size

N = total number of target population = 1,873,354

Therefore, the minimum sample size is given by:

$$n = \frac{1,873,354}{1+1,873,354(0.1)^2} = 100$$

The sample for the study was distributed as indicated in Table 1. The study involved TTCL employees and customers in Arusha. The proportion of the two categories in the sample distribution has been judiciously selected to ensure a good mix of TTCL customers and employees (management and operational staff) who participated in the study.

Category	Sample	Percent of Sample
TTCL Management Staff	5	5%
TTCL Operational Staff	20	20%
TTCL Customers	75	75%
Total	100	100%

The study used both non-probability and probability sampling methods. The purposive sampling was used to select TTCL as the study area because it is a major public ICT service provider owned by the government of the United Republic of Tanzania. Purposive sampling was also utilized to pick management staff from TTCL in Arusha who were interviewed to offer qualitative data. Convenient sampling was used to get respondents from among the TTCL customers. The researcher conveniently requested customers who visit TTCL offices as well as TTCL vendor outlets to fill out the questionnaire. This sampling technique facilitated the quick collection of data and also minimized the cost of collecting data.

Systematic random sampling was used to get TTCL employees who took part in the study. All TTCL employees in Arusha were listed alphabetically and the researcher picked every second listed employee starting from the first listed until the desired sample was picked. Probability sampling was employed because it allowed unprejudiced representation of the population, it is also cost-effective, simple, and straightforward, and accordingly led to obtaining findings of high quality.

Questionnaires were employed for the collection of quantitative data from the TTCL operational staff and customers. The questionnaire encompassed closed-ended questions on a five-point Likert scale. Respondents were requested to provide their opinions amongst the alternative choices that consist of: strongly disagree (1), disagree (2); neither agree nor disagree (3), agree (4), and strongly agree. The quantitative data were analyzed by using descriptive and

inferential statistics with mean, standard deviation, frequencies, and percentages. STATA SE 11.2 software was used to analyze the data.

4. Findings

Influence of System Quality on Usefulness of ICT services Provided to Customers

The study has examined the influence of system quality on the usefulness of ICT services provided by TTCL. Specifically, the study has examined influences of Perceived ease of use, Flexibility of ICT services provided by TTCL; Response time on ICT services provided by TTCL; and System features of ICT services provided by TTCL, respectively, on the usefulness of ICT services to customers by TTCL. Respondents were asked to respond to questions based on a five-point Likert scale with strongly agree = 5, agree = 4, not sure = 3, disagree = 2, and strongly disagree = 1. The findings are as follows:

Influence of Flexibility on the Usefulness of ICT Services

The study has examined the influence of the flexibility of ICT services on the usefulness of ICT services provided to customers by TTCL. The findings in Table 2 indicate that 50% of the respondents agree and 44% strongly agree that the flexibility of ICT services influences the usefulness of ICT services provided by TTCL to customers. However, 6% of the respondents were not sure if the flexibility of ICT services by TTCL influences the usefulness of ICT services to customers.

Table.2: Influence of flexibility on the usefulness of ICT services to customers.

Tabulation of influence of flexibility of ICT services by TTCL on the usefulness of ICT services to customers.		
Level of Measurement	Frequency	Percent
Not sure (3)	6	6%
Agree (4)	50	50%
Strongly agree (5)	44	44%
Total	100	100%

(Source: Field data, 2022)

Influence of Perceived Ease of Use on Usefulness of ICT Services

The study has examined the influence of perceived ease of use of ICT services on the usefulness of ICT services provided by TTCL to customers. The findings in Table 3 indicate that 51% of the respondents agree and 40% strongly agree that the perceived ease of use of ICT services by TTCL influences the usefulness of ICT services. However, 9% of the respondents were not sure if the perceived ease of use of ICT services by TTCL influences the usefulness of ICT services.

Table 3: Influence of perceived ease of use on the usefulness of ICT services

Tabulation of influence of perceived ease of use of ICT services by TTCL on the usefulness of ICT services		
Level of Measurement	Frequency	Percent
Not sure (3)	9	9%
Agree (4)	51	51%
Strongly agree (5)	40	40%
Total	100	100%

(Source: Field data, 2022)

Influence of Response Time on Usefulness of ICT Services

The study has examined the influence of response time on ICT services provided by TTCL on the usefulness of ICT services to customers. The findings in Table 4 indicate that 52% of the respondents agree and 43% strongly agree that response time on ICT services provided by TTCL influences the usefulness of ICT services provided by TTCL to customers. However, 5%

of the respondents were not sure if response time on ICT services provided by TTCL influences the usefulness of ICT services to customers.

Table 4: Influence of response time on the usefulness of ICT services

Tabulation of influence of response time of ICT services by TTCL on the usefulness of ICT services		
Level of Measurement	Frequency	Percent
Not sure (3)	5	5%
Agree (4)	52	52%
Strongly agree (5)	43	43%
Total	100	100%

(Source: Field data, 2022)

Influence of System Features on the Usefulness of ICT Services

The study has examined the influence of system features of ICT services by TTCL on the usefulness of ICT services to customers. The findings in Table 5 indicate that 62% of the respondents agree and 33% strongly agree that system features of ICT services by TTCL influences the usefulness of ICT services to customers. However, 5% of the respondents were not sure if the system features of ICT services by TTCL influences the usefulness of ICT services to customers.

Table 5: Influence of system features on the usefulness of ICT services

Tabulation of influence of system features of ICT services by TTCL on the usefulness of ICT services		
Level of Measurement	Frequency	Percent
Not sure (3)	5	5%
Agree (4)	62	62%
Strongly agree (5)	33	33%
Total	100	100%

(Source: Field data, 2022)

Descriptive Statistics on the Influence of System Quality on the Usefulness of ICT Services

The detailed outcome of descriptive statistics on the influence of system quality on the usefulness of ICT services provided to customers by TTCL constitute of mean and standard deviation are presented in Table 4.6. The variables were studied on a measurement scale of 1 to 5 with a mid-value of 3. The finding discloses that the mean value of all of the four variables measured (viz. flexibility of ICT service, perceived ease of use, response time, and system features) exceeded 3 indicating that they have a significant influence on the usefulness of ICT services provided by TTCL to customers.

The thorough results of descriptive statistics on the influence of flexibility of ICT services by TTCL on the usefulness of ICT services to customers were above three signifying that flexibility of ICT service by TTCL has a significant influence on the usefulness of ICT services.

Similarly, the detailed results of descriptive statistics on the influence of perceived ease of use of ICT services by TTCL on the usefulness of ICT services to customers were above three signifying that perceived ease of use of ICT services by TTCL has a significant influence on the usefulness of ICT services.

Table 6: Descriptive statistics on the Influence of System Quality.

Variable	Obs.	Mean	Std. Dev.	Min	Max
The flexibility of ICT services by TTL	100	4.38	0.5993	3	5
Perceived ease of use of ICT services by TTL	100	4.31	0.6308	3	5
Response time of ICT services by TTL	100	4.38	0.5822	3	5
System features of ICT services by TTL	100	4.28	0.5519	3	5

(Source: Field data, 2022)

Correspondingly, the detailed results of descriptive statistics on the influence of response time on ICT services provided by TTCL on the usefulness of ICT services to customers were above three signifying that response time on ICT services provided by TTCL has a significant influence on the usefulness of ICT services.

Congruently, the detailed results of descriptive statistics on the system features of ICT services provided by TTCL on the usefulness of ICT services to customers were above three signifying that the system features of ICT services provided by TTCL have a significant influence on the usefulness of ICT services provided by TTCL to customers.

5. Discussion of Findings

Influence of System Quality on Customers' Perceived Net Benefit of ICT Service Provision

Based on the detailed findings of the descriptive statistic, the mean values of all of the four variables measured (viz. flexibility of ICT service, perceived ease of use, response time, and system features) indicate that flexibility of ICT service, perceived ease of use, response time, and system features have a significant influence on customers' perceived net benefit. In addition, based on the regression analysis outcomes, it was established that system quality significantly influences customers' perceived net benefit of ICT services provided by TTCL. These findings imply that TTCL should put emphasis on ensuring that it optimizes the quality of the ICT system in order to enhance customers' perceived net benefit attained through ICT service provision by TTCL.

These findings are in line with the previous finding reported by Renukadevi, et al. (2018) who deployed the explanatory research design to study factors towards the usage of ICT tools in education and learning in India. The findings of this study identified that poor connectivity, self-enthusiasm, essential extra time, the incentive to integrate ICT tools in teaching, and certain ICT software are the most significant factors affecting the use of ICT in education and learning.

The present findings are also in line with those reported by Pazi and Shimba (2020) who examined last-mile connectivity issues relating to the National ICT backbone system and revealed that last-mile connectivity is completely dependent on the quality of international connections as well the National ICT backbone connections.

Along the same line, current findings are also agreeing with previous findings reported by Msangawale, et al. (2011) when presenting a conference paper based on a case study of SEACOM Submarine Fibre Optic with a focus on identification, discussion, and examination of

the conceivable theoretical issues towards effective utilization of fiber optic communication. The study identified the unavailability of a national backbone network made of fiber optic cable, unaffordability of last mile connectivity, lack of backhaul connectivity as well as unfavorable infrastructure for operators to connect to SEACOM as six issues towards the utilization of fiber optic communication in Tanzania.

6. Conclusion

Based on the findings of the study with regard to the Influence of system quality on the usefulness of ICT services provided by TTCL, it is specifically concluded that flexibility of ICT service, perceived ease of use, response time, and system features have a significant influence on the usefulness of ICT services provided to customers by TTCL. Accordingly, it is thus generally concluded that system quality has a significant influence on customers' perceived net benefit realized through the ICT services provision by TTCL.

7. Recommendation

- i. TTCL and other public ICT service providers should take advantage of the national ICT backbone system to improve the quality of the ICT system by upgrading its system features and response time with an aim to optimize the usefulness of the ICT services provided to customers.
- ii. TTCL and other public ICT service providers should focus on improvements in information quality by ensuring timeliness, reliability, accuracy, and trustworthiness of information so as to enhance customers' success through the use of ICT services.
- iii. TTCL and other public ICT service providers should strategies to enhance ICT service quality with a focus on improvement in service delivery and consequently enhance customer satisfaction of its existing customers and attract additional customers.

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