USERS SATISFACTION OF RWANDA E-PROCUREMENT SYSTEM IN GOVERNMENT SERVICE DELIVERY. CASE OF RWANDA PUBLIC PROCUREMENT AUTHORITY (RPPA) 2020-2023.

TWISHIME Gilbert
PhD Candidate in Procurement and Contract Management
Brainae University

Telephone : +250 785 167 157

ABSTRACT:

This study is entitled users satisfaction of rwanda e-procurement system in government service delivery, case of rwanda public procurement authority (rppa) 2020-2023. The study was conducted to evaluate wether e-procurement system used by Rwandan public institutions has made user satisfied or not. The study was descriptive and correlative design. Both primary data were collected and used. Primary data were collected from RPPA employees where a sample of 80 staff were interviwed with a list of questions. Data were presented using descriptive statitics prameters and inferentials statistics prameters and functions. The study findings explain that, all setted null hypotheses were rejected in favor of alternative hypotheses. This was considered based on the analysis results in the current study. The study also has shown that, there is negative correlation between different varibales due to the level of use which is still ineficient in e-procurement system among public institutions in Rwanda. For each improvement is suggested. In other case, the e-procurement has made user satified, but the level is still less than 50% and this is not meeting government targets. Thus, there is a need for developing sufficient tools, decentralizing the e-procurement system, ensure that, the system is flexible to all procurement goods and services and the system is accessible to budget owner institutions and budget dependent instutions.

All in all, the study has achieved its goals, and the hypotheses were validetated and found not valid in favour of their alternative. In general way, there is a statistical signficance of e-procurement system use and user satisfaction in public instituions services delivery. However, the influence is still low and need further improvements.

Key words: *User satisfaction; E-procurement system; Service delivery.*

1. INTRODUCTION :

E-procurement is a system that involves automation of procurement functions so as to enable an organization increase efficiency in the procurement process and make the users satisfied [15]. On user's perspective, procurement functions involve delivery of goods and services to the organization for the purpose of achieving its goals. In developing countries, public procurement contributes to twenty percent of the GDP [22]. Rwanda in particular, public procurement consumes around 70% of the total budget [31]. This indicates that public procurement is an important area that needs to give significant effect on meeting user satisfaction in the government services

delivery [14]. It is in this context that many governments including Rwanda have decided to adopt e-procurement system technology as a lever that can improve efficiency and thus being able to meet user expectations [29].

This paper is structured with an abstract, introduction, empirical review, methodology which consisted by statement of the problem, objectives, hypotheses, reserch design, population, data collection tools, data analysis methods, then study results and conclusion and recommendations. At the end of the paper report will come up with references [9].

2. EMPIRICAL REVIEW

[5] the Public procurement in Rwanda is regulated by law n°62/2018 of 25/08/2018 governing public procurement. The Law regulates all public procurement of works, goods or supplies and consultancy or non-consultancy services ordered by the procuring entity [11]. According to the law, all public procurement must be done using the Umucyo e-procurement system. RPPA reserves the authority to approve conduct of public procurement proceedings without using the Umucyo e-procurement system. Such authorization is requested by the procuring entity, giving the grounds for not using Umucyo [7].

Umucyo was introduced by the government of Rwanda in 2016. It was initially piloted in 8 procuring entities and in 2017 was launched to all government institutions. Umucyo is currently being used by approximately 200 procuring entities and over 5,000 bidders/suppliers [21]. It is under this background that RPPA commissioned this survey to assess Umucyo users' satisfaction. The consultant implemented a nationally representative survey with focus on procuring entities and bidders/suppliers who use Umucyo e-procurement system for any Government procurement process. The survey employed the mixed method design which is the combination of qualitative and quantitative approach to collect, process and analyses data [25].

Respondents were selected among government procuring entities, bidders/suppliers, other stakeholders and non-users of Umucyo. Structured questionnaires, in-depth interview guides and focus group discussion guides were used for data collection. A sample of 802 Bidders/Suppliers users, 166 procuring entities users, 10 other stakeholders and 20 Non-users (from non-user procuring entities and bidders/suppliers) was selected. Due to COVID-19 control measures, most of the interviews were conducted telephonically [17].

Considering the specified indicators; Saving time, Saving money, Increasing efficiency, Increasing effectiveness, Increasing

transparency, Increasing security of bids and documents, Reducing fraudulent practices, Reducing corruption loopholes, Information availability, Accuracy in reporting and statistics and Easy monitoring and Auditing, the average satisfaction level for procuring entities was determined to be 96.63% where the lowest level was on saving time 94.61% and highest level on increasing efficiency at 97.60%. On the other hand, the average satisfaction level for bidder/suppliers was determined to be 75.95% [2].

The lowest satisfaction level was observed on reducing corruption loopholes at 52.2% and the highest satisfaction was on Information availability at 88.0%. The overall Umucyo user satisfaction was determined to be 79.5% [1]. This is commendable as it exceeds the NST1 target of 79%. However, specific attention needs to be paid to a number of areas. These include but are not limited to enhanced training of users, enhanced sensitization of non-users (the public), simplifying the registration process, and Introducing Kinyarwanda version of Umucyo [20].

[1] Study proposes a conceptual framework that intends to assess user satisfaction and the net benefits of implementing e-procurement system in government-owned hospitals. The study uses DeLone and McLean IS Success model as the underpinning theory to examine the relationship between three independent variables (information quality, system quality and service quality) and the user satisfaction and net benefits of using an e- procurement system in government-owned hospitals. Predictably, the framework of the study is expected to provide a meaningful explanation on the degree of user satisfaction in using an e-procurement system in hospitals [14]. Also, the study tries to provide a theoretical background to examine the benefits that are being derived from the system, especially regarding cost saving, timeliness, accountability and transparency. Finally, the study suggested that empirical studies should be carried out to test the proposed model of [15] study.

[3] Study was aimed to assess the impact of electronic procurement on the performance of public institutions in Rwanda. This study was mainly carried out following the reports that emerged citing poor performance of Rwandan public institutions which was mostly been attributed to ineffective and inappropriate running of the public finance during procurement processes [13]. In order to reach the achievement of the research objectives, a combination of questionnaires, interviews, documentary reviews and analyzing reports were used to gather both primary and secondary data respectively from 42 respondents. Findings revealed that e-bidding offers a more efficient communication infrastructure with lower transaction costs [4]. This was followed by the finding that MINECOFIN has experienced an improvement in the efficiency of procurement indicated by the application of electronic procurement. Hence, e-procurement has improved the performance of the ministry since it reduced its expenses from 24.4 million in 2015 to 18.6 million in 2016. Lastly, from the Chi-square test, the researcher learnt that e-procurement in terms of electronic bidding, electronic supplier registration, electronic billing and electronic payment is significantly related to the performance in MINEFCOFIN [16].

Regarding functionality analysis by the top management should be looked into and made a culture by the responsible personnel at the ministry. The ministry was recommended to sensitize the general public on e-procurement system called "UMUCYO" [30].

3. RESEARCH METHOLOGY

This section describe the statement of the problem, objectives of the study, hypotheses, reserch design, data collection instrument and data analysis methods.

3.1. Statement of the problem

Although several studies have examined e-procurement in relation to procurement performance, in developing countries including Rwanda there is lack of clear understanding if, for real, e-procurement contributes to user satisfaction from the user/user perspective. From previous studies which indicate user dissatisfaction in service delivery in public organizations [23] and [12]. User dissatisfaction has got consequences such as increased complains, misunderstanding among employees, reputation damage, loss of best employees, loss of revenues, defections and increased stress level among employees [18]. Dissatisfaction is an unwanted feeling of an individual after evaluating a certain service offered to him [6]. The need to pay close attention to users is essential because when users are being offered with high quality services at the right time it will prevent complains and thus increasing user satisfaction in the organization [8] and [19]. According to Parasuraman et al. (1988), assessment of service quality and determining user satisfaction can be measured by using Servqual tool which contains five dimensions namely Tangibility, Responsiveness, Reliability, Assurance and Empathy. In addition, [24] et al. Concluded that there is a noteworthy relationship between these service quality dimensions and user satisfaction because users consider them as necessary for their development. This means that in service delivery, users expect high quality services at the right time with a high degree of care and fairness in solving their requirements or problems [10]. According to [16], user satisfaction can be 100% regarded by dimensions of service quality ie Tangibility, Responsiveness, Reliability, Assurance and Empathy and that, user needs and problems must be attended with a close attention and assistance. E-procurement is a tool that transforms the traditional non-value adding activities into more value-adding activities thus giving perception of improved service delivery from the internal user staff and the public at large. This indicates that the continuing use of e-procurement provides opportunities for improved business processes by linking the parties in the network hence ensuring efficient and responsive service delivery to users. This is also supported by [27] who argue that the use of e-procurement can enable an organization become more efficient and effective in service delivery to users.

Despites of much benefits of e-procurement in service delivery as reported by scholars from different countries, In Rwanda there is lack of clear understanding on the effect of e-procurement in service delivery particularly on part of user staff as beneficiaries of goods and services procured in the organization. This creates a question that remain unanswered in the world of literature, therefore, this study is an attempt to get an answer on this aspect by examining user' satisfaction on the e-procurement system in government services delivery, more specifically this study intends to be specific on the case of Rwanda Public Procurement Authority (RPPA) [15]. In other side also, while assessing the user satisfaction, the study intends to assess whether the government targets while introdcing e-procurement was achieved or not, costs of investments are equivalent to the role got from the system use [28].

3.2. Objectives of the study

This study has specificaly focused on general objective which is «to assess the level of user satisfaction of Rwanda e-procurement system in government services delivery. And specifically this study intends to assess five specific objectives such as :

1. To assess the effect of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on tangibility within RPPA services.
2. To assess the effect of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on responsiveness within RPPA services.
3. To assess the effect of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on reliability within RPPA services.

4. To assess the effect of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on assurance within RPPA services.

5. To assess the effect of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on empathy within RPPA services.

3.3. Hypotheses of the study

The study hypotheses are into five folds, as defined below:

H_{01}: There is no signficant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on tangibility within RPPA services.

H_{02}: There is no signficant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on responsiveness within RPPA services.

H_{03}: There is no signficant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on reliability within RPPA services.

H_{04}: There is no signficant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on assurance within RPPA services.

H_{05}: There is no signficant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on empathy within RPPA services.
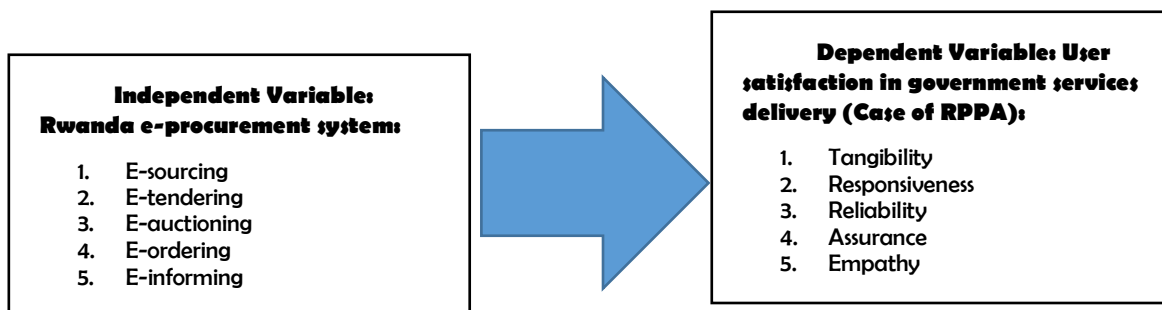
3.4. Research design

This study is descriptive and correlative design. It is descriptive as it assess the e-procurement system within RPPA services. The study is correlative as it assess the correlational effect of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on tangibility, responsiveness, reliability, assurance and empathy.

3.5. Study population sampling

Study population is consisted by people or objects which contain infromation needed in the study. Here the target population is 159 staff of RPPA by May 2023. As population

seems to be large, the study use sloven formula to get the sample (n=N/(1+(N*e^2))) = 159/(1+(159*0.0788^2)))=80 Thus, the sample is 80 staff of RPPA to replace 159 total RPPA staff.

3.6. Data collection instruments

This study, used both quantitative and qualitative data. It used also primary and secondary data. Primary data both qualitative and quantitative were collected using a list of questions. Closed and open ended questions were designed and assessed from the RPPA sampled staff. Open questions were used to verify the accuracy of responses on closed questions. Secondary data as described in literature review was assessed using documentation and from internet and RPPA office library [30].

3.7. Data analysis method

The study outputs are presented in form of descriptive statistics using descriptive prameters such as minimum, maxmum, mean, standard deviation, and comment. The descriptive prameters were optained from codes, assigned to the respondents perceptions such as Strongly Agree (SA) coded 5, Agree (A) coded 4, Not Sure (NS) coded 3, Disagree (D) coded 2 and Strongly Disagree (SD) coded 1. The mean classification was made into 3 categories such as strong mean (3.50-5.00), moderate mean (2.50-3.49) and weak mean (1.00-2.49). For stndard deviation, was classified into two categories less or equal to 0.5 means homogeneity stndard deviation and the heterogeneity for the oposit (Greater than 0.5) [11].

The correlation analysis was made using bivariate correlation analysis and linear regression model. The linear equation is described here below: With the equation below, Y 1 to Y 5 explain the indicators on the dependent variable side which are Tangibility, Responsiveness, Reliability, Assurance and Empathy and X1 to X5 is consisted by the indicators for measuring the independent variable such as e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing [18].

$$Y_{1;2;3;4\,\&\,5} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

3.8 Conceptual framework of the study

Independent Variable:
Rwanda e-procurement system:

1. E-sourcing
2. E-tendering
3. E-auctioning
4. E-ordering
5. E-informing

Dependent Variable: User satisfaction in government services delivery (Case of RPPA):

1. Tangibility
2. Responsiveness
3. Reliability
4. Assurance
5. Empathy

4. STUDY RESULTS

This section gives details on study findings as an outcome of questionnaire used to RPPA employees for answering a series of questions. The results were presented using descriptive statistitics (mean, mean standard error and stndard deviation as well as comment. The comment is consisted by the categor of mean with a combination to the category of standard deviation. The mean was made into 3 categories such as weak mean (1.00-2.49), moderate mean (2.50-3.49) and strong mean (3.50-5.00) while the standard deviation is into 2 categories such as homogeneity standard deviation (less or equal 0.5) and heterogeneity standard

deviation (greater than 0.5). The mean and stndard deviation due to the coding attributed to the perception of respondents on each item assessed such as Strongly Agree (SA) coded 5, Agree (A) coded 4, Not Sure (NS) coded 3, Disagree (D) coded 2 and Strogly Disagree (SD) coded 1. Analysis also was made using bivariate correlation analysis and linear regression model.

4.1. Descriptive statistics

In this section as explained above, the study was present perception of respondents on each item assessed under main variables (independent vs dependent variable). And here below are findings:

Table 1: Effective use of e-procurement in Rwanda public institutions by RPPA supervision

E-procurement system in public institutions	N	Mean		Std. Deviation	Comment
	Statistic	Statistic	Std. Error	Statistic	
E-sourcing					
In Rwanda all public institutions has fully (100%) adopted e-sourcing use in procurement process.	80	4.08	.081	.725	Strong Heterogeneity
RPPA has ensured that all public institutions are using e-sourcing software for sourcing strategy from negotiations to contract lifecycle management.	80	3.93	.043	.382	Strong Homogeneity
E-tendering					
All Rwandan public institutions send bid tenders using online procurement platforms.	80	4.14	.066	.590	Strong Heterogeneity
All Rwandan public institutions receive bid tenders using online procurement platforms.	80	4.44	.056	.499	Strong Homogeneity
E-auctioning					
RPPA has made all Rwandan public institutions using e-auctioning to assess competitiveness of supplier products.	80	3.94	.048	.431	Strong Homogeneity
RPPA has made all Rwandan public institutions using e-auctioning to assess among suppliers who can offer lowest prices.	80	3.79	.061	.544	Strong Heterogeneity
E-ordering					
RPPA has made all Rwandan public institutions using online ordering while there is a need from the supplier.	80	3.90	.090	.805	Strong Heterogeneity
RPPA has made all Rwandan public institutions using e-ordering to track sales, orders, inventory and fulfillment with suppliers.	80	4.00	.078	.694	Strong Heterogeneity
E-informing					
All public institutions in Rwanda use online system for sending procurement related information to bidders.	80	3.85	.064	.576	Strong Heterogeneity
Rwandan Public institutions ensure that, all communication with suppliers is made online or request of bids.	80	4.16	.042	.371	Strong Homogeneity
Valid N (listwise)/ Average	**80**	**4.02**	**.063**	**.562**	**Strong Heterogeneity**

As seen from the table 1, the study agree that Rwanda public institutions effectively use e-sourcing system in procurement process. This was confirmed by RPPA staff that in Rwanda all public institutions has fully (100%) adopted e-sourcing use in procurement process (4.08 mean, 0.081 mean standard error, 0.725 standard deviation and strong heterogeneity) and RPPA has ensured that all public institutions are using e-sourcing software for sourcing strategy from negotiations to contract lifecycle management (3.93 mean, 0.043 mean standard error, 0.382 standard deviation and strong homogeneity).

The study agree that Rwanda public institutions effectively use e-tendering system in procurement process. This was confirmed by RPPA staff that all Rwandan public institutions send bid tenders using online procurement platforms (4.14 mean, 0.066 mean standard error, 0.590 standard deviation and strong heterogeneity) and all Rwandan public institutions receive bid tenders using online procurement platforms (4.44 mean, 0.056 mean standard error, 0.499 standard deviation and strong homogeneity).

The study agree that Rwanda public institutions effectively use e-auctioning system in procurement process. This was confirmed by RPPA has made all Rwandan public institutions using e-auctioning to assess competitiveness of supplier products (3.94 mean, 0.048 mean standard error, 0.431 standard deviation and strong homogeneity) and RPPA has made all Rwandan public institutions using e-auctioning to assess among suppliers who can offer lowest prices (3.79 mean, 0.0616 mean standard error, 0.544 standard deviation and strong heterogeneity).

The study agree that Rwanda public institutions effectively use e-odering system in procurement process. This was confirmed by RPPA has made all Rwandan public institutions using online odering while there is a need from the supplier (3.90 mean, 0.090 mean standard error, 0.805 standard deviation and strong homogeneity) and RPPA has made all Rwandan public institutions using e-odering to track sales, orders, inventory and fulfillment with suppliers (4.00 mean, 0.078 mean standard error, 0.694 standard deviation and strong heterogeneity).

The study agree that Rwanda public institutions effectively use e-informing system in procurement process. This was confirmed by all public institutions in Rwanda use online system for sending procurement related information to biders. (3.85 mean, 0.064 mean standard error, 0.576 standard deviation and strong heterogeneity) and Rwandan Public institutions ensure that, all communication with suppliers is made online or request of bids (4.16 mean, 0.042 mean standard error, 0.371 standard deviation and strong homogeneity).

Generally the e-procurement system is ensured by Rwanda public institutions in support or management of Rwanda Public Procurement Authority (RPPA) at effective level however some improvements are still needed to make the system 100% fully accepted and utulized. The study results show the 4.02 mean, 0.063 standard error of the mean and 5.62 standard deviation. As the standard error of the mean is greater than 0.05 and the standard deviation greater than 0.5 means that there is a deviation of respondents perception from the mean. The statement is not fully accepted however the majority agreed or strongly agreed.

Table 2: Efficient user satisfaction in public institutions as an outcome of e-procurement system use in service delivery.

User satisfaction in government services delivery (Case of RPPA)	N	Mean	Std. Deviation		Comment
	Statistic	Statistic	Std. Error	Statistic	
Tangibility					
Due to the use of e-procurement system in Rwandan public institutions both suppliers and institutions are happy.	80	3.89	.071	.636	Strong Heterogeneity
Due to the use of e-procurement system in Rwandan public institutions materials are available as needed.	80	4.09	.032	.284	Strong Homogeneity
Responsiveness					
Due to the use of e-procurement system in Rwandan public institutions it is way for all users to react on any activity initiated.	80	4.09	.032	.284	Strong Homogeneity
Due to the use of e-procurement system in Rwandan public institutions it is a way for all users to demonstrate the positive way per each activity.	80	4.51	.056	.503	Strong Heterogeneity
Reliability					
Due to the use of e-procurement system in Rwandan public institutions the trust was increased on both side supply and demand.	80	3.90	.079	.704	Strong Heterogeneity
Due to the use of e-procurement system in Rwandan public institutions the consistency in delivery was achieved.	80	4.18	.058	.522	Strong Heterogeneity
Assurance					
Due to the use of e-procurement system in Rwandan public institutions respect promises from suppliers and vice versa.	80	4.10	.034	.302	Strong Homogeneity
Due to the use of e-procurement system in Rwandan public institutions both sides are confidents on the agreement or contract signed.	80	4.15	.040	.359	Strong Homogeneity
Empathy					
Due to the use of e-procurement system in Rwandan public institutions both sides can understand each other either supplier and institutions.	80	3.96	.065	.583	Strong Homogeneity
Due to the use of e-procurement system in Rwandan public institutions, system provide common information without separation for any bidder or any supplier or another.	80	3.80	.068	.604	Strong Heterogeneity
Valid N (listwise)/ Average	**80**	**4.07**	**.053**	**.478**	**Strong Homogeneity**

User satisfaction as an outcome of e-procurement system use in Rwandan public institutions was efficiently explained by the RPPA employees and areas need improvements are clear. The findings from the study show that, due to the use of e-procurement system user has sufficiently appreciate tangibility in services delivery where RPPA employees confirm that, due to the use of e-procurement system in Rwandan public institutions both suppliers and institutions are happy (3.89 mean, 0.071 standard error of the mean, 0.636 standard deviation, and strong heterogeneity standard deviation) and due to the use of e-procurement system in Rwandan public institutions materials are available as needed (4.09 mean, 0.032 standard error of the mean, 0.284 standard deviation, and strong homogeneity standard deviation).

The findings from the study show that, due to the use of e-procurement system in Rwandan public institutions it is way for all users to react on any activity initiated (4.09 mean, 0.032 standard error of the mean, 0.284 standard deviation, and strong homogeneity standard deviation) and due to the use of e-procurement system in Rwandan public institutions it is a way for all users to demonstrate the positive way per each activity (4.51 mean, 0.056 standard error of the mean, 0.503 standard deviation, and strong heterogeneity standard deviation).

The findings from the study show that, due to the use of e-procurement system user has sufficiently appreciate reliability in services delivery where RPPA employees confirm that, due to the use of e-procurement system in Rwandan public institutions the trust was increased on both side suuply and demand (3.90 mean, 0.079 standard error of the mean, 0.704 standard deviation, and strong heterogeneity standard deviation) and due to the use of e-procurement system in Rwandan public institutions the consistency in delivery was achieved (4.18 mean, 0.058 standard error of the mean, 0.522 standard deviation, and strong heterogeneity standard deviation).

The findings from the study show that, due to the use of e-procurement system user has sufficiently appreciate assurance in services delivery where RPPA employees confirm that, due to the use of e-procurement system in Rwandan public institutions respect promises from suppliers and vice versa (4.10 mean, 0.034 standard error of the mean, 0.302 standard deviation, and strong homogeneity standard deviation) and due to the use of e-procurement system in Rwandan public institutions both sides are confidents on the agreement or contract signed (4.15 mean, 0.040 standard error of the mean, 0.359 standard deviation, and strong homogeneity standard deviation).

The findings from the study show that, due to the use of e-procurement system user has sufficiently appreciate empathy in services delivery where RPPA employees confirm that, due to the use of e-procurement system in Rwandan public institutions both sides can understand each other either supplier and institutions (3.96 mean, 0.065 standard error of the mean, 0.583 standard deviation, and strong heterogeneity standard deviation) and due to the use of e-procurement system in Rwandan public institutions, system provide common information without separation for any bider or any supplier or another (3.80 mean, 0.068 standard error of the mean, 0.604 standard deviation, and strong heterogeneity standard deviation).

Generally the study findings indicate that, user satisfaction was strongly but not fully achieved due to the use of e-procurement system in Rwanda public services delivery. The findings indicate that the 4.07 mean of the mean, 0.053 standard error of the mean, 0.478 standard deviation and strong homogeneity. Meaning that, 100% user are not satisfied, that improvements are still needed to make e-procurement fully utlized and all tenders and services in procurement process should be digitalized.

4.2 Inferential statistics

Here the study assess the findings using inferential statistics to confirm whether hypotheses are valid or not. And here below is the summary of findings:

Table 3: Bivariate correlation analysis

Correlations		Tangibility	Responsiveness	Reliability	Assurance	Empathy
E-sourcing	Pearson Correlation	.365**	-.326**	.337**	-0.112	-0.098
	Sig. (2-tailed)	0.001	0.003	0.002	0.323	0.388
	N	80	80	80	80	80
E-tendering	Pearson Correlation	-.379**	0.133	.307**	.642**	.460**
	Sig. (2-tailed)	0.001	0.239	0.006	0.000	0.000
	N	80	80	80	80	80
E-auctioning	Pearson Correlation	0.1	.292**	0.206	0.071	-.228*
	Sig. (2-tailed)	0.379	0.009	0.067	0.533	0.042
	N	80	80	80	80	80
E-ordering	Pearson Correlation	-0.098	0.084	-.297**	-0.181	-.339**
	Sig. (2-tailed)	0.385	0.461	0.007	0.107	0.002
	N	80	80	80	80	80
E-informing	Pearson Correlation	0.027	0.012	-0.001	0.164	0.097
	Sig. (2-tailed)	0.809	0.918	0.99	0.147	0.392
	N	80	80	80	80	80

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 3, is interpreted based on the value of r or Pearson correlation, the negative value means negative correlation between tested indicators and positive value means positive correlation between values. For the sig.(2-tailed) once is less than 0.01 for values with ** signs and less than 0.05 for these with * sign, means that the correlation is statistically signficant and vice versa for the values in the other range. This means for example that, there is a positive and statisticaly

signficance between e-sourcing and tangibility of services delivered by Rwanda Public Institutions using e-procurement system (r=0.365 and p=0.001). Here below are linear functions for each study hypothesis:

$$Y_1 = 4.352 + 0.195X_1 - 0.422X_2 + 0.196X_3 - 0.200X_4 + 0.174X_5 + \varepsilon$$ With adjusted R Square equal to 0.262 and F=6.604 and p=0.000.

Based on the equation for first hypothesis analysis or valiadation, Y1 represent tangibility in services delivery using X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing). The function explain that one unit change from any value among Xs lead to Y1 change times the existing coeficients as added value (means 0.195; 0.422; 0.196; 0.200; and 0.174). In other case there is a positive correlation between tangibility and e-sourcing, negative relationship between tangibility and e-tendering, positive correlation between tangibility and e-auctioning, negative correlation between tangibility and e-ordering and positive relationship between tangibility of services delivery in Rwandan public institutions due to the use of e-informing.

As seen from the function of first hypothesis, the model had Adjusted R^2 of 0.262, implies that X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing) explain 26.2% of tangibility in services delivery of Rwanda public institutions. While the remaining 73.8% (determinant) of tangibility in services delivery of Rwanda public institutions are resulted from other factors that have not been captured in the model or in this study.

H_{O1}: *There is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on tangibility within RPPA services:*

As seen from function of first hypothesis, the results show that the model had an F ratio of 6.604 and the P value was 0.000<0.05, signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that the predictors variables (X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing)) used in this study are statistically significant to tangibility in services delivery of Rwanda public institutions. Therefore, the formulated null hypothesis stated that there is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on tangibility within RPPA services should be rejected. Therefore, the researcher concluded that there is a significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on tangibility within RPPA services.

H_{O2}: *There is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on responsiveness within RPPA services.*

$$Y_2 = 4.086 - 0.296X_1 + 0.042X_2 + 0.381X_3 - 0.039X_4 - 0.025X_5 + \varepsilon$$ With adjusted R Square equal to 0.170 and F=4.228 and p=0.002.

Based on the equation for second hypothesis analysis or valiadation, Y2 represent responsiveness in services delivery using X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing). The function explain that one unit change from any value among Xs lead to Y2 change times the existing coeficients as added value (means 0.296; 0.042; 0.381; 0.039; and 0.025). In other case there is a negative between responsiveness and e-sourcing, positive relationship between responsiveness and e-tendering, positive correlation between responsiveness and e-auctioning, negative correlation between responsiveness and e-ordering and negative relationship between responsiveness of services delivery in Rwandan public institutions due to the use of e-informing.

As seen from the function of first hypothesis, the model had Adjusted R^2 of 0.170, implies that X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing) explain 17% of responsiveness in services delivery of Rwanda public institutions. While the remaining 83% (determinant) of responsiveness in services delivery of Rwanda public institutions are resulted from other factors that have not been captured in the model or in this study.

As seen from function of second hypothesis, the results show that the model had an F ratio of 4.228 and the P value was 0.002<0.05, signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that the predictors variables (X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing)) used in this study are statistically significant to responsiveness in services delivery of Rwanda public institutions. Therefore, the formulated null hypothesis stated that there is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on responsiveness within RPPA services should be rejected. Therefore, the researcher concluded that there is a significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on responsiveness within RPPA services.

H_{O3}: *There is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on reliability within RPPA services:*

$$Y_3 = 0.351 + 0.462X_1 + 0.424X_2 + 0.479X_3 - 0.223X_4 - 0.237X_5 + \varepsilon$$ With adjusted R Square equal to 0.331 and F=8.801 and p=0.000.

Based on the equation for first hypothesis analysis or valiadation, Y3 represent reliability in services delivery using X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing). The function explain that one unit change from any value among Xs lead to Y3 change times the existing coeficients as added value (means 0.462; 0.424; 0.479; 0.223; and 0.237). In other case there is a positive correlation between reliability and e-sourcing, positive relationship between reliability and e-tendering, positive correlation between reliability and e-auctioning, negative correlation between reliability and e-ordering and negative relationship between reliability of services delivery in Rwandan public institutions due to the use of e-informing.

As seen from the function of third hypothesis, the model had Adjusted R^2 of 0.331, implies that X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing) explain 33.1% of reliability in services delivery of Rwanda public institutions. While the remaining 66.9% (determinant) of reliability in services delivery of Rwanda public institutions are resulted from other factors that have not been captured in the model or in this study.

As seen from function of third hypothesis, the results show that the model had an F ratio of 8.801 and the P value was 0.000<0.05, signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that

$$Y_4 = 2.530 - 0.002X_1 + 0.349X_2 + 0.059X_3 - 0.017X_4 - 0.013X_5 + \varepsilon$$ With adjusted R Square equal to 0.378 and F=10.621 and p=0.000.

Based on the equation for fourth hypothesis analysis or valiadation, Y4 represent assurance in services delivery using X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing). The function explain that one unit change from any value among Xs lead to Y4 change times the existing coeficients as added value (means 0.002; 0.349; 0.059; 0.017; and 0.013). In other case there is a negative correlation between assurance and e-sourcing, positive relationship between assurance and e-tendering, positive correlation between assurance and e-auctioning, negative correlation between assurance and e-ordering and negative relationship between assurance of services delivery in Rwandan public institutions due to the use of e-informing.

As seen from the function of fourth hypothesis, the model had Adjusted R^2 of 0.378, implies that X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing) explain 37.8% of assurance in services delivery of Rwanda public institutions. While the remaining 62.2% (determinant) of assurance in services delivery of Rwanda public institutions are resulted from other factors that have not been captured in the model or in this study.

$$Y_5 = 3.355 - 0.039X_1 + 0.398X_2 - 0.238X_3 - 0.144X_4 + 0.116X_5 + \varepsilon$$ With adjusted R Square equal to 0.246 and F=6.162 and p=0.000.

Based on the equation for fifth hypothesis analysis or valiadation, Y5 represent empathy in services delivery using X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing). The function explain that one unit change from any value among Xs lead to Y5 change times the existing coeficients as added value (means 0.039; 0.398; 0.238; 0.144; and 0.116). In other case there is a negative correlation between empathy and e-sourcing, positive relationship between empathy and e-tendering, negative correlation between empathy and e-auctioning, negative correlation between empathy and e-ordering and positive relationship between empathy of services delivery in Rwandan public institutions due to the use of e-informing.

As seen from the function of fifth hypothesis, the model had Adjusted R^2 of 0.246, implies that X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing) explain 24.6% of empathy in services delivery of Rwanda public institutions. While the remaining 75.4% (determinant) of empathy in services delivery of Rwanda public institutions are resulted from other factors that have not been captured in the model or in this study.

As seen from function of fifth hypothesis, the results show that the model had an F ratio of 6.162 and the P value was

the predictors variables (X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing)) used in this study are statistically significant to reliability in services delivery of Rwanda public institutions. Therefore, the formulated null hypothesis stated that there is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on reliability within RPPA services should be rejected. Therefore, the researcher concluded that there is a significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on reliability within RPPA services.

H_{04}: *There is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on assurance within RPPA services:*

As seen from function of fourth hypothesis, the results show that the model had an F ratio of 10.621 and the P value was 0.000<0.05, signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that the predictors variables (X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing)) used in this study are statistically significant to assurance in services delivery of Rwanda public institutions. Therefore, the formulated null hypothesis stated that there is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on assurance within RPPA services should be rejected. Therefore, the researcher concluded that there is a significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on assurance within RPPA services.

H_{05}: *There is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on empathy within RPPA services:*

0.000<0.05, signifying that the F ratio was statistically significant, therefore the overall regression model for all the variables tested were statistically significant and can be used for prediction at 5% significant level. This further indicate that the predictors variables (X1 (e-sourcing), X2 (e-tendering), X3 (e-auctioning), X4 (e-ordering) and X5 (e-informing)) used in this study are statistically significant to empathy in services delivery of Rwanda public institutions. Therefore, the formulated null hypothesis stated that there is no significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on empathy within RPPA services should be rejected. Therefore, the researcher concluded that there is a significant correlation of e-sourcing, e-tendering, e-auctioning, e-ordering, and e-informing on empathy within RPPA services.

4.3. Discussion

The study results are important to increase the existing literature [1], [11], [22], [31], [19] and [23]. From literature review, the e-procurement has made easy collaboration between public institutions and suppliers and managing institution. Howver the signficance of e-procurement on user satisfaction do not always remain static, it depends on the level of implimention or use of the system and e-procurement functions are applied.

The current study results show that, E-sourcing, E-tendering, E-auctioning, E-ordering and E-informing are statistically signficant to Tangibility, Responsiveness, Reliability, Assurance, and Empathy as determinants of user satisfaction in

public institutions as an outcome of e-procurement system adoption [8].

5. CONCLUSION

As defined in the study hypotheses all setted null hypotheses were rejected in favor of alternative hypotheses. This was considered based on the analysis results in the current study. The study also has shown that, there is negative correlation between different varibales due to the level of use which is still inefficent in e-procurement system among public institutions in Rwanda. For each improvement is suggested. In other case, the e-procurement has made user satified, but the level is still less than 50% and this is not meeting government targets. Thus, there is a need for developing sufficient tools, decentralizing the e-procurement system, ensure that, the system is flexible to all procurement goods and services and the system is accessible to budget owner institutions and budget dependent instutions.

All in all, the study has achieved its goals, and the hypotheses were validetated and found not valid in favour of their alternative. In general way, there is a statistical signficance of e-procurement system use and user satisfaction in public instituions services delivery. However, the influence is still low and need further improvements.

References

[1]. Agyekum K. et al. (2018). *Impact of project monitoring and evaluation practices on construction project success criteria in Ghana.* Kumasi, Ashanti Region, Ghana: Kwame Nkrumah University Of Science and Technology.

[2]. Andam. (2015). *Impact of project monitoringand evaluation practiceson construction projectsuccess criteria in Ghana.*

[3]. Diane, M. (2018). *The contribution of monitoring and evaluationof the publicprojects on the success of Rwanda Local Government performance contracts; in the case study of the projects of construction of modern markets in KICUKIROdistrict (2009-2013).* Kigali, Rwanda: Mount Kenya University.

[4]. Felicien et al. (2015). *Monitoring, evaluation (M&E) and the successful road project delivery in rwandaa case study of kigali special economic zone roads built by NPD-Contraco ltd.* Kigali, Rwanda: Mount Kenya University.

[5]. Gruyter, A. (2021). *Rwanda's Commercialization of Smallholder Agriculture: Implications for Rural Food Production and Household Food Choices.*

[6]. Guskey. (2015). *A systematic approach for monitoring and Evaluating the construction project progress:.* The Institution of Engineers, Malaysia (vol. 67,No. 3, September 2011).

[7]. Halligan, J. (2010). *Performance Management in the Public Sector, London: Routledge.*

[8]. Ibrahim, O. (2002). *Handbookfor Monitoringand Evaluation.* CH-1211 Geneva 1: International Federation of Red Cross and Red Crescent Societie.

[9]. James, G. (2016). An Exploration of the Guiding principles, importance and challenges of M&E of community development projects and programs. *International Journal of Business and Social Science (2014): 5-1.*

[10].John, B. (2020). *The EFFECT OF MONITORING AND EVALUATION PRACTICES to project performance in Rwanda. A case study of World Vision 2013-2017 .* Kigali, Rwanda: World Vision.

[11]. Jose, A. M. (2020). *Sustainable Agricultural Development and Environment: Conflicts and Contradictions in the context of the Rwandan Agriculture. .* Huye: University of Rwanda Faculty of Economics and Management .

[12]. Kant, M. (2020). *The relationship between Monitoring and Evaluation (M&E) practices and public projects performance in Rwanda with reference to Science and Technology Skills Development (STSD) project.* Kigali, Rwanda: School of Social sciences, Mount Kenya University.

[13]. Lucie, M. (2015). *Monitoring and evaluation system andprojectsuccessa case study of UNFPA Rwanda.* Kigali, Rwanda: Mount Kenya University.

[14]. Mackay. (2016). Effect of project cost and time monitoring on progress of construction projects. *International Journal of Research in Engineering and Technology,* P12-15.

[15]. MINECOFIN. (2018). *National Startegy for Transformation (NST1).* Kigali: National Bank of Rwanda.

[16]. Miner, J. (2017). *Organizational behavior 4: From theory to practice.* New York: Armonk, NY: ME Sharp.

[17]. Mobley, R. (2016). *Total plant performance management: A profit-building plan to promote, implement, and maintain optimum performance throughout your plant,* Gulf Pub. Co.

[18]. Mutinda, V. (2015). *Role of Monitoring and Evaluation on performance of public organization projects in kenya: a case of kenya meat commission.* Jomo Kenyatta University of Agriculture and Technology, Kenya.

[19]. Nielsen, R. (2017). *Rethinking the relationship among monitoring, evaluation, and results-based management: observation from Canada.* S.B.2017.

[20]. NISR. (2014). *Household Living Condition Survey: EICV3.* Kigali: Nyabihu District/ National Institute of Statistics of Rwanda.

[21]. NISR. (2020). *Seasonal Agriculture Survey Report 2019.* Kigali: Ministry of Agriculture.

[22]. Nyabihu District. (2014). *District Developmnet Plan (2013-2018).* Nyabihu City: Nyabihu District.

[23].Porras, J. I. (2014). *Built to last: Successful Habits of Visionary Companies.* New York: NY: Harper Collins.

[24]. Rodney, T. (2014). *The Relationship between Project Success and Project Efficiency.* Procedia-Social and Behavioral Sciences 119 (2014) 75-84.

[25].Saraswathi M. et al. (2015). *Hand book on planning, monitoring and evaluating for developmnet results.*

[26]. Schillinger, D. e. (2018). *Goal setting in diabetes self-management: Taking the baby steps to success.* Patient Education and Counseling, 77, 218-223.

[27].Scriven. (2011). *A guide to the project management board of knowledge: PMBOK.3rd edition.* Pennsylvania: Project Management Institute, Inc.

[28].Tengan, C. (2016). *Stakeholder Engagement and Participation in Monitoring and Evaluation of Construction Projects in Ghana.* South Africa: University of Johannesburg.

[29]. UNDP. (2015). *handbook on Monitoring and Evaluation Results.* New York: UNDP evaluation Office.

[30]. USAID. (2020). *Feed the Future Rwanda Hinga Weze: Feed the Future Rwanda Hinga Weze Activity.* Kigali: https://agriprofocus.com/organisation/cnfa-hinga-weze.

[31]. Williams, K. (2013). *Missing the mark: effects of time and causal attributions on goal revision in response to goal-performance discrepancies.* The Journal of applied psychology, 88(3), pp.379–90.