



ASSESSING THE INFLUENCE OF E-PROCUREMENT PRACTICES ON ORGANIZATIONAL PERFORMANCE IN PUBLIC INSTITUTIONS IN RWANDA: A CASE OF NGORORERO DISTRICT OFFICE (2016-2020).

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ABSTRACT

The study was conducted for assessing the influence made by e-procurement used in Ngororero District on its general performance. To assess the validity of study objectives the researcher has used both primary and secondary data. Secondary data were collected using documentary search and primary data were collected from 69 Ngororero District staffs who have direct relation to procurement functions with support of IT practices from 227 total target population. Questionnaire were used for data collection. Descriptive, and correlative research designs were adopted and were achieved with support of Ms. Excel and SPSS software. Study results shows that: The test of correlation between (1.) E-ordering, (2.) Web-based ERP, (3.) E-Sourcing, (4.) E-tendering, (5.) E-reverse auctioning, (6.) E-evaluation and contract negotiation, and (7.) E-informing (including record keeping) on performance of organization reference to the institutions in public sector case of Ngororero District were resulted $R=0.379$ and $R^2 = 0.216$. Meaning that generally IT tools in procurement

Key Words: Assessment; Influence; e-procurement; Practices; Organization; Performance; Public Institutions; Rwanda; Ngororero District

have 37.9% (this influence remains weak as it is less than 50% or 0.5) influence or contribution in performance of any of the organization which belong to public institutions learned from Ngororero District. Based on the study findings, the researcher concludes by failing to accept the "H0: There is no significance influence of IT tools in procurement on performance of an organization in public institutions in Rwanda." In favor of "H1: There is a significance contribution of IT tools in procurement on performance of an organization in public sector in Rwanda.". Reference to the study findings, the researcher recommends the following: to avoid any corruption cases (to ensure transparency), to speed up procurement processes and to reach good delivery, all bidders and other beneficiaries of procurement services including population, they are encouraged to use online services rather than attending face to face at district office, sector or cells office requesting services where possible.

1. Introduction

This paper was developed for assessing the changes made in public institutions performance as an outcome of adopting e-procurement [19]. In Rwanda this was referred to easy doing businesses and promotion of quality services delivery to the public, by promoting use of electronic tools for services delivery in all aspects to replace empirical method of face-to-face contacts and use of papers in services delivery. It is in the same context Ngororero as other 26 Districts of Rwanda and Kigali city adopted use of e-procurement for services promotion [21]. Due to electronic use the World has become smaller in and speed in development was increased and now people can afford on more services without moving from home. E-procurement adopted in organizations of public institutions was made easy information access, transparency, ordering, purchasing, contract management and all other procurement services was automated [4].

2. Statement of the Problem

During the pilot phase of e-procurement start-up, more than 1,000 suppliers registered on the e-procurement platform. Those suppliers made 1,108 bids for a total of 376 tenders announced on the online platform, meaning the average tender received about three bids [14]. Rwanda strives to become SMART Rwanda [16]. Use of online system and services was developed where by 2018 around 90% of enterprises and 100% institutions in public sector excluding sectors and cells offices were using internet [18]. E-procurement was promoted and financed for modernization of procurement function: strategic sourcing to become more predictive, transactional procurement to be more automated, and supplier/contract relationship management to be more proactive [24].

Rwandan Districts was adopted e-procurement for modernizing the way procurement functions process is ensured. Rural Rwandan Districts are not well advanced in use of online or IT as a tool for services delivery due to more challenges such as access to stable network, insufficient training on services delivery using IT and insufficient of supporting materials due to the insufficient logistics budget [21]. Due to that, auditors general in different years has blamed districts delays in procurement services and raise of conflict associated between district and procurement stakeholders [17]. Due to that, this study intends for assessing the influence of information technology practices in procurement on organization performance in public institutions in Rwanda, a case of Ngororero district (2016-2020). At the end of the study, the researcher come up with proper recommendations on how IT can boost procurement functions and make stakeholders satisfied. The purpose of this study is to examine whether e-procurement has influenced organizational performance in public institutions or not in Rwanda and more specifically in Ngororero District [13].

Local administrations provide services to the population related to political, security, health, education, economy, infrastructure, and more others [22]. As District officials could not manager all these activities, through procurement they delegate authorities for contractors, and here the e-procurement was adopted for speed up the time for the contracting and contract management. The researcher intends to assess if this expectation was achieved counted or evaluated from Ngororero District.

3. Empirical Review

By [20], e-procurement is the use of IT or computers with internet or special software's, databases, and system which are specific for making procurement services more easy and is one of the emerging procurement becoming popular: for business case it cannot be denied that, significant improvement in transparency: traceability of all transactions, enhances value for money [23]: e-procurement has made procurement services or practices more accessible, it ensure reduced costs of procurement services and save other transactions related to procurement and other services in both public na private sector organizations; IT in procurement has improved market intelligence. By [20] the study was aimed at assessing and highlighting the determinants (factors) for e-procurement success to show the Kenya Power as a role model for E- procurement practices [20].

[15] has conducted a study with the purpose of analyzing the significance of strategy of procurement costs reduction on e-procurement success of state Parastatals in Rwanda [2]. The Musau study clearly shows role of IT use in procurement and how it facilitated and lead to the reduction of costs in procurement activities coordination. [15] study has employed the cross-sectional survey as research design. To the IT and procurement managers (as study population around 380 people from 190 parastatal organizations) both qualitative and quantitative data were collected. Data collection was achieved using questionnaire and interview guide while secondary data were collected using desc review [25]. Questionnaire or list of questions used was with both closed and open-ended questions. Descriptive statistics and inferential statistics were used with a support of SPSS version 20 [1]. Test of significance was ensured at 5% margin error. Descriptive statistics were presented on key parameters such as frequency, percentage, mean and standard deviation, these were either in form of table or pie chart. Study results were indicated that independent variable (cost reduction strategy in procurement

services) has great influence on dependent variable (e-procurement success for parastatals organizations in Rwanda). The study recommend that organizations could develop strategies for procurement service costs reductions [15].

4. Conceptual Framework of the Study

As define in the figure 1, IT make procurement to ensure e-ordering, web-based ERP, e-sourcing, e-tendering, e-reverse auctioning, e-evaluation and contract negotiation and e-informing and record keeping [28]. IT make procurement process simplified and lead to costs reduction, transparent spending, increased productivity, stakeholder engagement, elimination of paperwork, increased transaction speed (time reduced), standardized buying, and reduce procurement risks [26]. Both are under control or support of public Procurement user guide, public Procurement Laws and Regulations and capacity building, institutions, personnel, and geographical background [12].

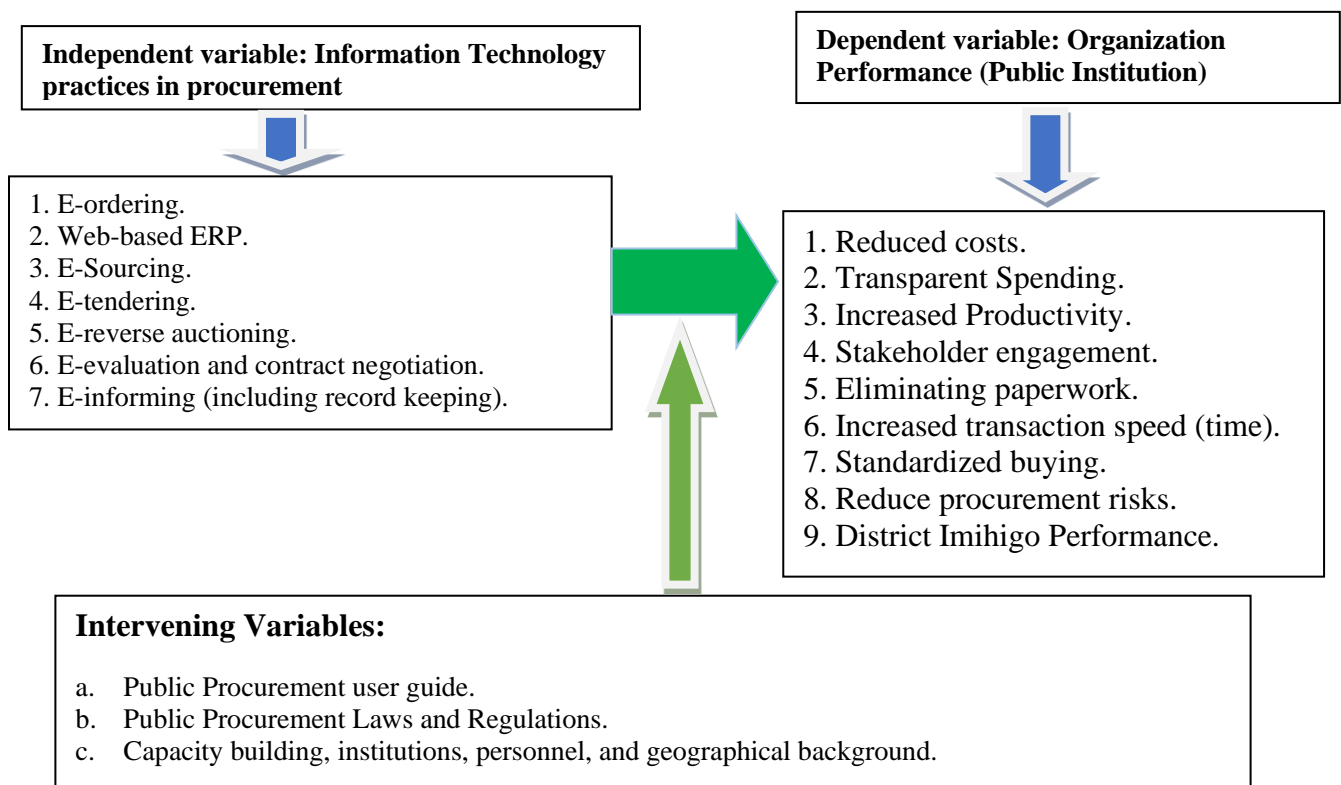


Figure 1: Conceptual Framework of the Study

5. Methodology

To assess the validity of study objectives the researcher has used both primary and secondary data. Secondary data were collected using documentary search and primary data were collected from 69 Ngororero District staffs who have direct relation to procurement functions with support of IT practices from 227 total target population. Questionnaire ere used for data collection. Descriptive, quantitative, qualitative, and correlative research designs were adopted [4]. Data analysis was both descriptive and inferential statistics and were achieved with support of Ms. Excel and SPSS software [27].

6. Objectives of the study and hypothesis

The main aim of this study is to assess the influence of information technology practices in procurement on organization performance in public institutions in Rwanda.

The specific objectives of this study are in four folds:

- i. To assess the E-procurement practices used by Ngororero District in procurement.
- ii. To examine the performance of Ngororero District due to the adoption of E-procurement.
- iii. To assess the relationship between E-procurement and organization performance (public institution: Ngororero District).

The study intends to test of the following hypotheses:

H₀: There is no significance influence of information technology practices in procurement on organization performance in public institutions in Rwanda.

H₁: There is a significance influence of information technology practices in procurement on organization performance in public institutions in Rwanda.

7. Findings

This section gives summary of findings as descriptive statistics and inferential statistics:

7.1 E-procurement practices used by Ngororero District in procurement

In this section, the researcher present findings on the perception of respondents on effective use of IT practices make procurement services more effective. The assessment relay on the extent to which staff whose functions has direct relation to procurement services use e-ordering, web-based ERP, e-sourcing, e-tendering, e-reverse auctioning, e-evaluation and contract negotiation, and e-informing (including record keeping) toward effective procurement services delivery and overall Ngororero District performance as one among public institutions [8].

Table 1: Effectiveness of information technology (IT) practices used in Procurement by staff in Ngororero District

| Effective use of IT tools in procurement | N | Min | Max | Mean | Std. Deviation |
|---|----|-----|-----|------|----------------|
| E-ordering | | | | | |
| All required materials are requested online. | 69 | 1 | 5 | 3.54 | 1.195 |
| Testing and field visit for checking the quality of materials is made face to face, but the purchase order is made online. | 69 | 1 | 5 | 3.29 | 1.152 |
| Web-based ERP | | | | | |
| Due to the use of IT tools in procurement, district procurement plan is well ensured every year or period of planning. | 69 | 1 | 5 | 3.33 | 1.120 |
| Due to the use of IT tools in procurement, district procurement plan is regular published. | 69 | 2 | 5 | 3.74 | .741 |
| E-Sourcing | | | | | |
| Due to the use of IT tools in procurement, Ngororero District is ensuring E-sourcing. | 69 | 2 | 5 | 3.38 | 1.001 |
| Due to the use of IT tools in procurement, district procurement plan and staff are aware on IT practices to perform e-sourcing. | 69 | 1 | 4 | 3.49 | .901 |
| E-tendering | | | | | |
| Due to the use of IT tools in procurement, Ngororero District ensure all tender online. | 69 | 1 | 5 | 3.30 | 1.129 |
| Due to the use of IT tools in procurement, Ngororero District ensure process of tendering online. | 69 | 2 | 5 | 3.77 | 1.059 |

| Effective use of IT tools in procurement | N | Min | Max | Mean | Std. Deviation |
|---|-----------|------------|------------|-------------|-----------------------|
| E-reverse auctioning | | | | | |
| Ngororero District staff ensure online services delivery with maximum respect of time management and costs reduction. | 69 | 2 | 5 | 3.03 | 1.029 |
| Staff of Ngororero District involves presentation by suppliers or contractors of successively lowered bids during a scheduled period and the automatic evaluation of bids online. | 69 | 1 | 4 | 2.78 | 1.149 |
| E-evaluation and contract negotiation | | | | | |
| Due to the use of IT tools in procurement, Submission of bids and evaluation is ensured online. | 69 | 2 | 5 | 3.83 | .822 |
| Due to the use of IT tools in procurement, Contract negotiation is made online. | 69 | 2 | 4 | 3.25 | .976 |
| E-informing (including record keeping) | | | | | |
| All information received online are kept on the server. | 69 | 1 | 4 | 3.19 | 1.154 |
| Reports are ensured automatically from the server summarizing all procurement process happened online. | 69 | 2 | 4 | 3.22 | .983 |
| Valid N (listwise)/ Average | 69 | 1 | 5 | 3.37 | 1.03 |

Source: Primary data, 2021

Keys: Minimum (Min). Maximum (Max), Mean and Standard deviation were calculated from the following codes assigned to the respondent level of agreement or perception (5: Strongly Agree, 4: Agree, 3: Not Sure, 2: Disagree and 1: Strongly Disagree). N is the total sample size of the study. The mean and standard deviation categories were defined in chapter three [6].

As seen from Table 1 from all items assessed the mean of the mean is 3.37 with 1.03 standard deviation. From all possible option of choice for the respondent the minimum choice was 1 (Strongly Disagree) while the highest choice was 5 (Strongly Agree). This shows then moderate mean and heterogeneity standard deviation. It implies that in Ngororero District use IT tools in procurement is not well developed. Around 50% of procurement services are delivered using traditional services o place of using modern IT system.

7.2 Performance of Ngororero District due to the adoption of E-procurement

In this section, the researcher has assessed the perception of respondents on the extent to which use of IT tools in procurement has influence on organization performance in public institutions. From this case the researcher has selected nine (9) indicators to assess the dependent variable (organization performance in public institutions) [7]. From each in assessed indicator (Reduced costs, Transparent Spending, Increased Productivity, Stakeholder engagement, eliminating paperwork, Increased transaction speed (time), Standardized buying, reduce procurement risks, and District Imihigo Performance to services delivered by Ngororero District to the public) two items were evaluated to each respondent. Here below is a table summarizing responsiveness of respondents per each item assessed [5]

Table 2: Effective performance of Ngororero District due to E-procurement practices used in Procurement

| Effective performance of Ngororero District due to E-procurement practices used in Procurement. | N | Min | Max | Mean | Std. Deviation |
|---|-----------|------------|------------|-------------|-----------------------|
| Reduced costs. | | | | | |
| Due to the use of IT tools in procurement costs of tendering and bidding was reduced. | 69 | 2 | 5 | 3.42 | 1.049 |
| Due to the use of IT tools in procurement Contractors also were saved the costs formerly used for deposit and visit of officers. | 69 | 2 | 4 | 3.41 | .880 |
| Transparent Spending. | | | | | |
| Use of IT tools in procurement ensure transparency in market delivery. | 69 | 1 | 5 | 3.00 | 1.176 |
| Use of IT tools in procurement in procurement process all bidders are equally treated. | 69 | 2 | 5 | 3.58 | 1.117 |
| Increased Productivity. | | | | | |
| Due to the use of IT tools in procurement services were increased and productivity increased. | 69 | 1 | 5 | 3.10 | 1.238 |
| Production was increased due to use of IT tools in procurement process within Ngororero District. | 69 | 1 | 4 | 2.83 | 1.098 |
| Stakeholder engagement. | | | | | |
| For all procurement process, Ngororero District ensure consultation of stakeholders. | 69 | 2 | 5 | 3.61 | .927 |
| Ngororero District ensure use of Stakeholder comments and ideas in Procurement functions. | 69 | 2 | 4 | 3.16 | .994 |
| Eliminating paperwork. | | | | | |
| Due to the use of IT tools in procurement process and functions use papers were eliminated for saving the environment. | 69 | 1 | 4 | 3.14 | 1.179 |
| Due to the use of IT in procurement process and functions costs for printings and papers was reduced. | 69 | 2 | 4 | 3.33 | .950 |
| Increased transaction speed (time). | | | | | |
| Due to the use of IT tools in procurement process, Ngororero District has saved time for tendering and other long processes. | 69 | 1 | 4 | 3.19 | 1.154 |
| IT practices use in Procurement has made reduced time of activities which need procurement of materials or markets. | 69 | 2 | 4 | 3.30 | .960 |
| Standardized buying. | | | | | |
| Due to the use of IT tools in procurement materials received meet standards. | 69 | 2 | 5 | 3.55 | 1.051 |
| Use of IT in procurement process meet standards requirement for procurement market. | 69 | 2 | 5 | 3.57 | .882 |
| Reduce procurement risks. | | | | | |
| IT practices use in procurement has reduced contracting market. | 69 | 1 | 5 | 3.13 | 1.175 |
| IT practices use in procurement is good and facilitate the management of procurement risks. | 69 | 2 | 5 | 3.54 | 1.158 |
| District Imihigo Performance | | | | | |
| Ngororero District has ranked good performer from last five years in Imihigo performance by the NISR and the office of Prime Minister. | 69 | 2 | 5 | 3.45 | 1.119 |
| Ngororero District has made good performance in Poverty reduction, education development and as general in achievement of national decentralized development strategies (NST1). | 69 | 1 | 4 | 3.20 | 1.092 |
| Valid N (listwise)/ Average | 69 | 1 | 5 | 3.31 | 1.067 |

Source: Primary data, 2021

Reference to Table 2 generally, use of Information Technology (IT) practices in procurement has moderately influenced organizational performance in public institution, a case of Ngororero District as confirmed by the overall mean from the nine assessed indicators consisted by 18 items which is equal to 3.31 (ranged between 2.50-3.49: moderate mean category) with 1.067 (greater than 0.5: heterogeneity) standard deviation. Based on that, IT tools in procurement within Ngororero District are not well improved, they are like used 50% and 50% used traditional way of procurement services delivery consisted by meetings, paper use, etc [3].

7.3 Relationship between E-procurement and organization performance (public institution: Ngororero District)

Test of correlation was made using Bivariate correlation analysis and linear regression analysis. Results of bivariate correlation analysis are measured by two parameters such as Pearson correlation (r) and P-value (Sig. (2-tailed) [9]. The researcher has used mean from all items assessed as indicators for independent variable with a comparison to the mean of data obtained from indicators assessed for dependent variable. The following table gives SPSS outputs:

Table 3: Test of significance between independent variable and dependent variable

| | | Information Technology practices in procurement | Organization Performance (Public Institution) |
|--|---------------------|---|---|
| Information Technology practices in procurement | Pearson Correlation | 1 | .159 |
| | Sig. (2-tailed) | | .002 |
| | N | 69 | 69 |
| Organization Performance (Public Institution) | Pearson Correlation | .159 | 1 |
| | Sig. (2-tailed) | .002 | |
| | N | 69 | 69 |

Source: Primary data, 2021

As seen from the table 3, the analysis shows a Pearson correlation value or r which is equal to 0.159 and p-value or Sig. (2-tailed) which is equal to 0.002. The value of obtained for correlation is ranged between $0 < 0.159 < 0.5$ which signify a weak correlation between tested variables (use of IT tools in procurement) and this correlation is statistically significant as the p-value is less than 0.05 (level of significant 5%) [11]. This confirm that, there is positive weak correlation between IT tools in procurement and success of organizations in public sector or institutions and this correlation is statistically significant where for improving success of organization in public sector represented by institution there is a need to develop and make much emphasize on use of information Technology in procurement services delivery or functions [2].

Table 4: Model summary for the linear correlation between IT tools in procurement on Organization performance in public institution

| Model Summary | | | | |
|---------------|-------------------|----------|-------------------|----------------------------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .379 ^a | .216 | .199 | .1805851 |

a. Predictors: (Constant), 7. E-informing (including record keeping), 3. E-Sourcing, 4. E-tendering, 1. E-ordering, 2. Web-based ERP, 6. E-evaluation and contract negotiation, 5. E-reverse auctioning.

Source: Primary data, 2021

As seen from the table 4, the test of correlation between (7). E-informing (including record keeping), (3). E-Sourcing, (4). E-tendering, (1). E-ordering, (2). Web-based ERP, (6). E-evaluation and contract negotiation, and (5). E-reverse auctioning on success of organization in public sector case of Ngororero District were resulted $R=0.379$ and $R^2 = 0.216$. Meaning that generally IT tools in procurement have 37.9% (this influence remains weak as it is less than 50% or 0.5) influence or contribution in success of organization in public sector in public institutions learned from Ngororero District [19].

Table 5: ANOVA for the linear correlation between IT tools in procurement on success of organization in public sector

| ANOVA ^a | | | | | | |
|--------------------|--------------|----------------|-----------|-------------|-------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 1.700 | 7 | .243 | 7.446 | .000 ^b |
| | Residual | 1.989 | 61 | .033 | | |
| | Total | 3.689 | 68 | | | |

a. Dependent Variable: Organization Performance (Public Institution)

a. Predictors: (Constant), 7. E-informing (including record keeping), 3. E-Sourcing, 4. E-tendering, 1. E-ordering, 2. Web-based ERP, 6. E-evaluation and contract negotiation, 5. E-reverse auctioning.

Source: Primary data, 2021

As seen from the table 5, the ANOVA results have shown a p-value which is equal to 0.000 less than 0.05 or 5% and tells that, there a statistical significance correlation between IT tools in procurement and Organization performance in public institution.

Table 6: Linear regression coefficients for the linear correlation between IT tools in procurement on Organization performance in public institution.

| Coefficients ^a | | | | | | |
|---------------------------|--|------------|---------------------------|------|--------|------|
| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | |
| | B | Std. Error | Beta | | | |
| 1 | (Constant) | 2.933 | .265 | .156 | 11.054 | .000 |
| | 1. E-ordering. | .039 | .027 | .388 | 1.470 | .047 |
| | 2. Web-based ERP. | .160 | .045 | .036 | 3.574 | .001 |
| | 3. E-Sourcing. | .011 | .030 | .493 | .366 | .016 |
| | 4. E-tendering. | .156 | .031 | .248 | 4.979 | .000 |
| | 5. E-reverse auctioning. | .070 | .034 | .468 | 2.087 | .041 |
| | 6. E-evaluation and contract negotiation. | .156 | .038 | .204 | 4.072 | .000 |
| | 7. E-informing (including record keeping). | .094 | .061 | | 1.553 | .026 |

a. Dependent Variable: Organization Performance (Public Institution)

Source: Primary data, 2021

As seen from the table 6, the following function was obtained:

$$Y = 2.933 + 0.39x_1 + 0.160x_2 + 0.011x_3 + 0.156x_4 + 0.070x_5 + 0.156x_6 + 0.094x_7$$

X1 to X7 represents (1.) E-ordering, (2.) Web-based ERP, (3.) E-Sourcing, (4.) E-tendering, (5.) E-reverse auctioning, (6.) E-evaluation and contract negotiation, and (7.) E-informing (including record keeping). And means that once other factors remain constant, one-unit change of x1 to x7 lead to an increased value of “y” or organization performance in public institutions added with the actual value times 0.039; 0.160; 0.011; 0.156;

0.070; 0.156; and 0.094 [10]. All values were resulted p-value less than 0.05 meaning that, there is a positive correlation between IT practices use in procurement toward success of organization in public sector a case of Ngororero District. And this correlation is statistically significant. Based on the study findings, the researcher concludes by failing to accept the “H₀: There is no significance influence of information technology practices in procurement on organization performance in public institutions in Rwanda.” In favor of “H₁: There is a significance influence of IT (information Technology) practices in procurement on success of organization in public sector in Rwanda.”.

8. Conclusion

The study assessment was based on the influence of information technology practices in procurement on success of an organization in Rwandan public institutions. A case of Ngororero district (2016-2020). The test of correlation between (1.) E-ordering, (2.) Web-based ERP, (3.) E-Sourcing, (4.) E-tendering, (5.) E-reverse auctioning, (6.) E-evaluation and contract negotiation, and (7.) E-informing (including record keeping) on organization performance in public institutions with reference to Ngororero District were resulted R=0.379 and R² = 0.216. Meaning that generally IT tools in procurement have 37.9% (this influence remains weak as it is less than 50% or 0.5) influence or contribution in success of the organization learned from Ngororero District. Based on the study findings, the researcher concludes by failing to accept the “H₀: There is no significance influence of information technology practices in procurement on organization performance in public institutions in Rwanda.” In favor of “H₁: There is a significance influence of information technology practices in procurement on organization performance in public institutions in Rwanda.”.

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