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## Effects of ICT Adoption on Procurement Performance in Government Ministries in Rwanda : Case of Ministry of Health

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### **Abstract:**

*ICT adoption will help change the role of the procurement, from a transaction-oriented function to be more managerial one that focuses on improving efficiency, effectiveness and provide a User-Friendly Platforms to Input Data for enhanced procurement in government ministries and thereby eradicate the prevalent problems associated with manual practice in disseminating procurement services which is highly desired in enhancing ministry performance. Many of the government ministries have not fully adopted ICT as a strategy for improving procurement performance. This study investigated the effects of ICT adoption on procurement performance in Government Ministries in Rwanda. Specific objectives for the study included; to determine the effect of ICT applications on procurement performance of Rwanda ministry of health, to assess the effect of individual user factors on procurement performance of Rwanda ministry of health and to determine the effect of environment on procurement performance of Rwanda ministry of health. This study adopted a descriptive research design. Both primary and secondary data was used in the study. A total of 472 employees of the Ministry of Health formed the target population of this study. Though stratified random sampling a sample size of 218 respondents was determined using Yamane's formula. This study used questionnaire as the data collection tool which consisted of both open and closed questions. Descriptive statistics was achieved through descriptive analysis to generate frequencies and percentages of various variables. Inferential statistics was done through Pearson correlation analysis to determine if they exist any relationship between the variables. Further linear regression was carried out to determine the percentage change in Procurement performance that could be attributed to ICT adoption. From the findings correlation analysis indicated that there is a positive significant relation between procurement performance and ICT adoption ( $r=0.757$   $p< 0.01$ ). The findings also showed that holding ICT applications, individual factors and environmental factors to a constant zero, procurement performance would be 0.218, a unit increase in ICT applications would lead to increase in procurement performance by a factor of 0.339, a unit increase in individual factors would lead to increase in procurement performance by a factor of 0.392 and also unit increase in environmental factors would lead to increase in procurement performance by a factor of 0.443. These predictions indicate that all the three independent variables studied would together lead to a significant improvement in procurement performance in the ministry of health. Thus, the study recommends that organization should embrace the adoption of ICT as a strategy for improving procurement performance.*

**Keywords:** Information and Communication Technology (ICT), Information system), public procurement, procurement

### **1. Introduction**

There is no community that can exist without interacting with its neighbors. Even in the era of barter trade, communities used to exchange what they had in excess for what they did not have. Various organizations have implemented the use of information and communication technology (ICT) in order to develop the products and services they offer to their customers. Owuor (2004) defines Information and Communication Technology (ICT) as the technology which supports activities relating to the design, storage, and transmission of data and voice, jointly with their interrelated methods. Based on this definition, ICT signifies the technological standpoint of an information system (IS) and comprise computing, telecommunications and automation activities. Lucas (1987) defines an information system as a set of structured procedures which, when effected, gives information for decision making.

Procurement process entails the acquiring of goods or services at the best possible price and total cost to meet the needs of the buyer in terms of quality and quantity, time and place. Procurement as a supply chain function has developed considerably over time; at the outset, it was a wholly a clerical function until Porter (1980) impelled firms to think of procurement as a strategic function rather than an administrative one in his five forces model where he proved supplier and buyer power as two vital forces for competitive advantage. Technology adoption research explains in almost all cases, particularly in network technologies ICT included, that S-shaped adoption curves can be observed. The diffusion of an innovation starts slowly with a few early adopters.

Information technology makes easy communication between persons or groups who are not physically near the same locality (Raymond, 2005). Systems such as cell phone, telex, radio, television, and video conferencing are included, as well as more modern computer-based technologies, e.g. electronic data interchange and e-mail. According to Lui (2008) the early days of procurement, procuring entities and 3rd party solution providers under-projected the prerequisite resources, time and effort, necessary for e-business among suppliers and clients. Major and big enterprises usually used a combination of supplier enabled approaches. Whose benefits and trade-offs needed to be reviewed.

#### 1.1.1. Global Perspective on ICT Adoption.

The three pillars of public procurement are; accountability, integrity and transparency. The Transparency International report always emphasize some key methods in supporting the three pillars such as public disclosure of the bid evaluation process, debarring of corrupt suppliers, nondisclosure of confidential information to the bidder and to promote fairness in each element in the procurement process. According to Thai & Grimm (2000), public sector procurement is large and complex, accounting for between 20 and 30 percent of Gross Domestic Product (GDP). Callender & Mathews (2000) also argued that in almost all countries in the world, estimates of the financial activities of government procurement managers are believed to be in the order of between ten and thirty percent Gross National Product (GNP).

Unlike the private sector which would want to limit the number of suppliers based on trusted relationships aimed at minimizing operating risks, the trend in the public sector may be different. According to Office of the Chief Information Officer (OCIO) (2000) in Miami, the government should aim at having as many sellers as possible in order to broaden competition and maximize opportunities for value for money.

These technologies are not just helping people to do things better and faster, but they are enabling profound changes in the ways that work is done in organizations (Wayne and Ramiro, 2016). As Murray (2015) contends, "Together these innovations are hurtling us toward a new industrial revolution. Savvy corporate leaders know they have to either figure out how these technologies will transform their businesses or face disruption by others who figure it out first."

Information is very critical guide in decision making. However, it is the availability, speed of access, reliability, timeliness and accuracy of information that actually ensures that information aids in making informed decisions. Riley (2012) adds three important elements not mentioned by many others, they are ease of understanding, worth the cost and able to meet the needs of the users.

This was accompanied by law and standards which were set to indicate who was supposed to supply good or service to certain areas such as to government institutions. By then preference regulations were not basically concerning with the youth, women or disabled, but it was concerned with ensuring that the government entities grow and expand to reach to the local citizen.

#### 1.1.2. Regional Perspective on ICT Adoption

Preference regulations in Africa can be dated back in 2000 with Africa Growth and Opportunity Act (AGOA) being passed as part of the Trade and Development Act of 2000. This provided beneficiary countries in Sub-Saharan Africa (SSA) with the most liberal access to the United States' (US) market available to any country or region with which the US does not have a free trade agreement. AGOA became the first preference regulation to be given to Africa in general as it was based on Generalized Systems of Preferences (GPS) which were used in the international trade regime since 1971, which is concerned with allowance of developing nations to sell their goods and services to the developed nations at duty free or low duty entry (Nyeko, 2004).

Preference regulations in Africa states were introduced in South Africa in 2000 hence becoming the first nation in Africa to introduce preference regulations in its constituency.

#### 1.1.3. Local Perspective on ICT Adoption

Rwanda is land locked with low industrial production; its economy is almost based on agricultural productivity since almost 90% of the population occupies the agriculture sectors. From the use of 1959 law in public procurement in Rwanda to the Public Procurement Law enacted in April 2007, Rwanda moved towards a national public procurement system which respects international standards. As in many other countries, the use of the Country Procurement System in Rwanda was adopted following the Paris Declaration on Aid effectiveness endorsed on 2 March 2005 and Accra Agenda for Action drawn down in 2008 that is embedded in a set of five inter-related principles whose aim was to make aid more effective and accountable to the benefiting communities.

The declaration's commitments and targets reflect the lessons donors and partner countries have learnt about how to make aid more effective in reducing poverty (RPPA annual report, 2011).

ICT and procurement have been a common theme of many organizations for the promotion of transparency and good governance in procurement in Rwanda. ICT and procurement systems have proven themselves within various government Organizations as an effective tool for instituting procurement reforms and establishing a fully transparent and open procurement environment. ICT in procurement systems have also allowed governments to apply standard procurement processes across institutions, using appropriate monitoring and management controls to delegate more responsibility to the individual procuring entities (Expert Group Meeting, 2011).

#### 1.1.4. Ministry of Health Rwanda

Rwanda's health sector, like many others in the country, has in the last twenty years evolved into vibrancy. In 1990, the health system had a total of 34 hospitals, 186 health centers, 69 dispensaries, 179 private pharmacies and 17 private medical clinics. In terms of human resources, only 261 medical doctors were working in the public sector. There were 23 pharmacists, 949 graduated nurses (A1,

A2, and A3) and 240 Auxiliaries (Annual report, 1990). According to the DHS 1992, the life expectancy was 51 years. The under-five mortality was at 150/1000 live births, while infant mortality was at 72/1000 live births, and the maternal mortality was 500/100,000 live births. The total fertility rate was 6.2 and use of modern contraceptive rate was at 13%. For the nutrition status, the chronic malnutrition was 48%, while underweight was 29%, and acute malnutrition was 4%. The rate of antenatal and deliveries in health facilities was 26% while the percentage of children aged 0-23 months fully immunized was 79%, and ANC visits was at 94% (1 visit) and at 12% (4 visits).

During the genocide against Tutsi, most of infrastructure was destroyed and many of the health staff killed or fled the country. Consequently, an emergency plan for rehabilitation of the health system was prepared in the second semester of 1994 and the plan was implemented with the collaboration of Partners. Given the situation of our health status, the period 2003-2005 was the time to think about the priorities of the health sector. As provided in the Health Sector Policy the priorities were defined in 7 policy objectives: Availability of Human resources, availability of drugs, vaccines and consumables, Geographical accessibility to health services, Improvement of financial accessibility to health services, strengthening the referral system and research, and the institutional capacity strengthening.

## 2. Statement of Problem

Most organizations want to manage procurement with the lowest possible levels of risk and of investment while still ensuring adequate quality, avoiding duplication and waste, and sustaining the organization's competitive position and outside image (Perlman 1990, Zenz and Thompson 1994). Purchasing policies and forms are among the most common instruments used to standardize and control the purchasing process resulting in procedures which are often complex, slow, and expensive (Perlman 1990, Zenz and Thompson 1994). In the recent past procurement process in many ministries in Rwanda have revealed some practices that compromise transparency and end up prolonging the process, The Transparency International annual report (2008).

The advent of globalization and global financial crisis, adopting Information and Communication Technology (ICT) in Rwanda government institutions and private companies has become increasingly important. Croom (2005) and Aberdeen (2001) affirms that using ICT tools in procurement enables the organizations to save time and money, considerable reduction of travel requirements, and thus increasing the efficiency and effectiveness of the institutions. Studies by Chang, (2011) revealed that in the year 2010, over 60% of Korea's total public procurement (124 billion USD) was conducted through e-procurement system. As a result, procurement performance of state corporations in Korea were greatly improved; thus, yielding short procurement cycle-time, higher efficiency in service delivery, lower cost of procurement and enhanced policy compliance. Adopting ICT in procurement in government ministries has a great significance on internal process optimization (Caldwell, Roehrich and Davies, 2009). Kakwezi and Nyeko (2010) studied procurement process and performance and concluded that procurement efficiency and effectiveness of the purchasing function are measures of procurement performance.

However, in contrast to these research findings, studies indicate that more than 50% of procurement processes in state corporations in Rwanda are still being carried out manually; with the internet only being used for e-mails and web browsing (Malela, 2010; Miheso, 2013; Makau, 2014). According to (Caridi et al, 2004), while over 70% of American buyers use internet technologies at work the percentage of public procurement conducted electronically is relatively low ranging from 10% to 20% (Kulp et al, 2006). This disconnect is also evident in Rwanda with a recent study by Gunasekaran and Ngai (2008) indicating that, 80% of ministry respondents agreed that the use of the ICT was important in procurement but only 20% had actually adopted EPTs. This research seeks to examine the effects of ICT adoption on procurement performance in government ministries in Rwanda, a case study of Ministry of health.

## 3. General Objectives

The general objective of this study is to investigate the effects of ICT adoption on procurement performance in government ministries in Rwanda, with a case study of the Ministry of health.

### 3.1. Specific Objective

- i. To determine the effect of ICT applications on procurement performance of Rwanda Ministry of Health.
- ii. To assess the effect of individual user factors on procurement performance of Rwanda Ministry of Health
- iii. To determine the effect of environment factors on procurement performance of Rwanda Ministry of Health.

### 3.2. Research Questions

The study sought to respond to the following research questions.

- i. What is the effect of ICT applications on procurement performance of ministry of health?
- ii. How do individual user factors affect the procurement performance of ministry of health?
- iii. Do environment factors affect the procurement performance of ministry of health?

## 4. Research Methodology

### 4.1. Research Design

Study used descriptive research design using case study method. Both quantitative and qualitative analysis is done used for the data collected.

#### 4.2. Target Population

The target population for this study was 472 staff from Rwanda ministry of health. This consisted of staff members from procurement department, supply chain, finance, ICT and stores department.

##### 4.3.1. Sample Frame

#### 4.3. Sample Size

The sample size was 218 staff members from the ministry of health calculated by Yamane (1960) method

#### 4.4. Sampling Procedures

This study employed stratified random sampling techniques.

#### 4.4. Data Collection Instruments

The main instrument for data collection was a structured questionnaire. Questionnaires were preferred for this study since they are easy to use and allow collection of data from a large sample in a short time. The questionnaire contained both open and closed questions.

#### 4.5. Data Analysis and Presentation

The raw data collected from primary sources by the researcher is edited and coded, is statistically treated and drafted in tables, the statistical package for social sciences (SPSS) is used to produce results that are further interpreted.

## 5. Research Findings and Discussion

### 5.1. Formal Training in ICT

Analysis of data regarding respondents having received any formal training on ICT is indicated in Table 1

	Frequency	Percentage (%)
Yes	41	38
No	66	62
Total	107	100

Table 1: ICT Training

The majority (62%) of the respondents reported not having been formally trained on ICT applications while 38% indicated they had received formal training on ICT. This means that majority of the respondents have the relevant system knowledge to handle e-transactions.

### 5.2. Extent to which Respondent's Work Involved use of ICT Devices

Analysis of data regarding extent of work involving use of ICT devices is indicated in Table 2

	Frequency	Percentage (%)
A little extent	9	8
Moderate extent	28	26
Great extent	62	59
Very Great extent	8	7
Total	107	100

Table 2: Extent of work involving use of ICT Devices

Table 2 shows that 59% of the respondents reported having a great extent in use of ICT devices in their work, 26% indicated they use ICT in their job to a moderate extent, 8% and 7% respectively reported to have a little and very great extent in ICT devices usage in their work.

### 5.3. Effects of ICT Applications on Procurement Performance

Staff competence	Strongly agree	Agree	Disagree
Adoption of ICT applications has improved procurement performance in the MoH	32(30%)	73(68%)	2(1%)
The MoH uses ICT in determination of the procurement procedures	56(52%)	36(34%)	15(14%)
There are sufficient computers to enhance procurement in the ministry.	38(36%)	52(48%)	17(16%)
Adoption of electronic tendering allows for huge time savings	42(39%)	65(61%)	
Electronic tendering provides greater data accuracy	51(48%)	56(52%)	
There is efficient digital format necessary for e-procurement systems	2(1%)	57(53%)	48(44%)

Table 3: Effects of ICT applications on procurement performance

Table 3 indicate that 30 % of the respondents strongly agreed with the statement that adoption of ICT applications has improved procurement performance in the MoH, 68% just agreed while 1% disagreed with the statement. Majority (52%) of the respondents strongly agreed with the statement that the MoH uses ICT in determination of the procurement procedures 34% just agreed while 14% disagreed. The table also shows that 36% of the respondents strongly agreed with the statement that there are sufficient computers to enhance procurement in the ministry, 48% just agreed with the statement while 16% disagreed. Majority (61%) of the respondents agreed with the statement that adoption of electronic tendering allows for huge time savings while 39% strongly agreed. Forty eight percent of the respondents strongly agreed with the statement that electronic tendering provides greater data accuracy while 52% just agreed.

		Procurement performance	ICT Applications
Procurement performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	107	
ICT Applications	Pearson Correlation	.523**	1
	Sig. (2-tailed)	.001	
	N	107	107

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

Table 4: Correlation between ICT Applications and procurement performance

Table 4 indicates that there was a significant relationship between ICT applications and procurement performance ( $R = .523$ ,  $P < 0.01$ ). This implies that availing adequate ICT applications to the employees would result to increased procurement performance.

#### 5.4. Effects of Individual Factors on Procurement Performance

The study sought to determine the effect of individual factors on procurement performance.

	Strongly agree	Agree	Not sure	Disagree	Strongly disagree
Individual factors that relates to ICT affect the performance of procurement in the ministry.	34(32%)	59(55%)		14(13%)	
Training of employees on ICT has improved performance of procurement in the MoH	55(51%)	35(33%)			17(16%)
Our ministry has trained staff on ICT use in procurement	81(76%)	10(9%)		16(15%)	
Competency of employees in ICT has led to effectiveness of procurement in the ministry.	64(60%)	36(34%)	7(6%)		
Our ministry conducts strategic hiring of staff that steer change in procurement through ICT adoption.	54(50%)	31(29%)		12(11%)	10(9%)
The procurement department has enough capacity to analyze all tenders and respond to all tenderers on time	72(67%)	24(23%)		11(10%)	
With adoption of ICT, procurement meets the basics of public procurement: accountability and transparency	50 (47%)	51(48%)	6(5%)		

Table 5: Effects of individual factors on procurement performance

Table 5 indicate that 32 % of the respondents strongly agreed with the statement that Individual factors that relates to ICT affect the performance of procurement in the ministry, 55% just agreed while 13% disagreed with the statement. Majority (51%) of the respondents strongly agreed with the statement that training of employees on ICT has improved performance of procurement in the MoH, 33% just agreed while 16% strongly disagreed. The table also shows that 76% of the respondents strongly agreed with the statement that their ministry has trained staff on ICT use in procurement, 9% just agreed with the statement while 15% disagreed. Majority (60%) of the respondents strongly agreed with the statement that competency of employees in ICT has led to effectiveness of

procurement in the ministry, 34% just agreed while 6% were not sure of the statement. Most (50%) of the respondents strongly agreed with the statement that their ministry conducts strategic hiring of staff that steer change in procurement through ICT adoption, 29% agreed, 11% disagreed while 9% strongly disagreed with the statement. Majority (67%) of the study participants strongly agreed with the statement that procurement department has enough capacity to analyze all tenders and respond to all tenderers on time, 23% agreed while 10% disagreed. Most (48%) of the respondents agreed with the statement that with adoption of ICT, procurement meets the basics of public procurement: accountability and transparency, 47% strongly agreed while 5% were not sure.

		Procurement performance	Individual factors
Procurement performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	107	
Individual factors	Pearson Correlation	.667**	1
	Sig. (2-tailed)	.005	
	N	107	107
**. Correlation is significant at the 0.01 level (2-tailed)			

Table 6: Correlation between individual factors and procurement performance

Table 6 indicates that there was a significant relationship between individual factors on procurement performance ( $R=.667$ ,  $P<0.01$ ). This means that addressing individual ICT related factors would result to increased performance in procurement in the ministry of health in Rwanda. This can be ensured through providing the employees with relevant ICT trainings to enhance their skills in the use of ICT in procurement.

##### 5.5. Effects of Environmental Factors on Procurement Performance

The study sought to determine the effect of environment factors on procurement performance

	Strongly agree	Agree	Disagree
Top management support in adoption and implementation of ICT for better procurement performance in the ministry is availed	70(65%)	37(35%)	
Procurement team is able to engage suppliers in long term and transparent negotiations and consequently broaden bargaining powers	52(48%)	36(33%)	19(18%)
Our ministry has organized procurement procedures and Systems	79(74%)	28(26%)	
The procurement system has a provision for handling large numbers of suppliers with an aim of promoting competition.	63(59%)	44(41%)	
The ministry support regular trainings are organized to acquaint the staff on the procurement system	47(44%)	22(21%)	38(35%)

Table 7: Effects of environmental factors on procurement performance

Table 7 indicates that 65% of the study respondents strongly agreed with the statement that top management support in adoption and implementation of ICT for better procurement performance in the ministry is availed while 35% just agreed. Also 48% of the respondents strongly agreed with the statement that Procurement team is able to engage suppliers in long term and transparent negotiations and consequently broaden bargaining powers, 33% just agreed while 18% disagreed with the statement. Majority (74%) of the respondents strongly agreed with the statement that their ministry has organized procurement procedures and Systems while 26% just agreed. Majority (59%) of the respondents strongly agreed with the statement procurement system has a provision for handling large numbers of suppliers with an aim of promoting competition while 41% just agreed. Also 44% of the respondents strongly agreed with the statement that their ministry support regular trainings are organized to acquaint the staff on the procurement system, 21% just agreed while 35% disagreed with the statement.

		Procurement performance	Environmental factors
Procurement performance	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	107	
Environmental factors	Pearson Correlation	.608**	1
	Sig. (2-tailed)	.001	
	N	107	107
**. Correlation is significant at the 0.01 level (2-tailed)			

Table 8: Correlation between environmental factors on procurement performance

Table 8 indicates that there was a significant relationship between environmental factors on procurement performance ( $R=.608$ ,  $P<0.01$ ). This implied that enhancing top management support, transparency and formulating policies that support adoption of ICT for procurement in the ministry of health would better the procurement performance.

### 5.6. Regression Analysis

Multiple regression analysis was further conducted in order to predict the possible percentage change in procurement performance that would be brought about by the independent variables under study.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.876 <sup>a</sup>	.757	.726	.57287

a. Predictors: (Constant), ICT applications, Individual factors, Environment

Table 9: Model Summary

The relationship between ICT applications, individual factors and environment produced a coefficient R square ( $R^2$ ) = .757. This means that the relationship was positive and the three independent variables attributed up to 75.7% of the change in procurement performance.

Model	I	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
I	Constant	.218	.141		1.608	.001
	ICT applications	.339	.165	.205	1.653	.001
	Individual factors	.392	.271	.027	1.087	.002
	Environmental factors	.443	.113	.201	1.601	.005

a. Dependent Variable: Procurement Performance

Table 10: Coefficients

From the data in the above table the established regression equation was

$$Y = 0.218 + 0.339 (\text{ICT applications}) + 0.392 (\text{Individual factors}) + 0.443 (\text{Environmental factors})$$

From the above regression equation it was revealed that holding ICT applications, individual factors and environmental factors to a constant zero, procurement performance would be 0.218, a unit increase in ICT applications would lead to increase in procurement performance by a factor of 0.339, a unit increase in individual factors would lead to increase in procurement performance by a factor of 0.392 and also unit increase in environmental factors would lead to increase in procurement performance by a factor of 0.443.

These predictions indicate that all the three independent variables studied would together lead to a significant improvement in procurement performance in the ministry of health. Additionally, upholding any of the three variables separately could also result to a notable change in the procurement performance.

## 6. Summary, Conclusions and Recommendations

### 6.1. Summary of the Findings

The study findings indicated that most (52%) of the respondents were male while 48% of them were female. Also, majority (60%) of the respondents were aged between 36-45 years, 20% of them indicated that they were aged between 25-35 years, while 13% of the respondents indicated that they were aged between 46-55 years while 2% aged above 56%. 76% of the respondents had bachelor's degree while 24% had postgraduate degree. The findings also revealed that 48% of the respondents indicated that they had an experience of 2-5 years in the ministry of health, 45% of them had worked in the ministry for a period of more than 5 years while 7% of the respondents indicated that they had an experience of less than 2 years. Also, it was found out that 45% of the study participants were in operations, 29% supervisors, 19% Middle level managers, 6% were Top Managers while 1% of the respondents did not disclose their job levels in the organization. The majority (62%) of the respondents reported not having been formally trained on ICT applications while 38% indicated they had received formal training on ICT. Additionally, 59% of the respondents reported having a great extent in use of ICT devices in their work, 26% indicated they use ICT in their job to a moderate extent, 8% and 7% respectively reported to have a little and very great extent in ICT devices usage in their work.

#### 6.1.1. Effect of ICT Applications on Procurement Performance

The findings indicated that 30% of the respondents strongly agreed with the statement that adoption of ICT applications has improved procurement performance in the MoH, 68% just agreed while 1% disagreed with the statement. Majority (52%) of the respondents strongly agreed with the statement that the MoH uses ICT in determination of the procurement procedures 34% just agreed while 14% disagreed. Also, 36% of the respondents strongly agreed with the statement that there are sufficient computers to enhance procurement in the ministry, 48% just agreed with the statement while 16% disagreed. Majority (61%) of the respondents agreed with the statement that adoption of electronic tendering allows for huge time savings while 39% strongly agreed. Forty eight percent of the respondents strongly agreed with the statement that electronic tendering provides greater data accuracy while 52% just agreed.

Correlation analysis indicates that there was a significant relationship between ICT applications and procurement performance ( $R=.523$ ,  $P<0.01$ ). Further, regression analysis showed that for every unit increase in ICT applications procurement performance would increase by a factor of 0.339.

### 6.1.2. Effect of Individual Factors on Procurement Performance

The findings also indicated that 32 % of the respondents strongly agreed with the statement that Individual factors that relates to ICT affect the performance of procurement in the ministry, 55% just agreed while 13% disagreed with the statement. Majority (51%) of the respondents strongly agreed with the statement that training of employees on ICT has improved performance of procurement in the MoH, 33% just agreed while 16% strongly disagreed. Also 76% of the respondents strongly agreed with the statement that their ministry has trained staff on ICT use in procurement, 9% just agreed with the statement while 15% disagreed. Majority (60%) of the respondents strongly agreed with the statement that competency of employees in ICT has led to effectiveness of procurement in the ministry, 34% just agreed while 6% were not sure of the statement. Most (50%) of the respondents strongly agreed with the statement that their ministry conducts strategic hiring of staff that steer change in procurement through ICT adoption, 29% agreed, 11% disagreed while 9% strongly disagreed with the statement. Majority (67%) of the study participants strongly agreed with the statement that procurement department has enough capacity to analyze all tenders and respond to all tenderers on time, 23% agreed while 10% disagreed. Most (48%) of the respondents agreed with the statement that with adoption of ICT, procurement meets the basics of public procurement: accountability and transparency, 47% strongly agreed while 5% were not sure. There was a significant relationship between individual factors and procurement performance ( $R=.667$ ,  $P<0.01$ ). A unit increase in individual factors was found to lead to an increase in procurement performance by a factor of 0.392.

### 6.1.3. Effects of Environmental Factors on Procurement Performance

Further, the study findings showed that 65% of the study respondents strongly agreed with the statement that top management support in adoption and implementation of ICT for better procurement performance in the ministry is availed while 35% just agreed. Also 48% of the respondents strongly agreed with the statement that Procurement team is able to engage suppliers in long term and transparent negotiations and consequently broaden bargaining powers, 33% just agreed while 18% disagreed with the statement. Majority (74%) of the respondents strongly agreed with the statement that their ministry has organized procurement procedures and Systems while 26% just agreed. Majority (59%) of the respondents strongly agreed with the statement procurement system has a provision for handling large numbers of suppliers with an aim of promoting competition while 41% just agreed. Also 44% of the respondents strongly agreed with the statement that their ministry support regular trainings are organized to acquaint the staff on the procurement system, 21% just agreed while 35% disagreed with the statement

Correlation analysis indicated that there was a significant relationship between environmental factors on procurement performance ( $R=.608$ ,  $P<0.01$ ). From the regression analysis, the findings showed that a unit increase in environmental factors would lead to increase in procurement performance by a factor of 0.443.

### *6.2. Conclusions*

The study concludes that that the ministry of health in Rwanda makes use of ICT in procurement. Accordingly, the ministry of health adopted ICT in various phases to a great extent. It was also concluded that ICT adoption affects procurement performance of ministry of health in Rwanda. The listed factors that relates to ICT adoption has a positive influence on procurement performance.

### *6.3. Recommendations*

The government should enhance ministries sensitization on adoption of ICT in procurement and also in all other undertakings. This will help them cut on extra costs and enhance efficiency and effectiveness in their dealings as well as their services to the public. The government should consider formulating policy on e- procurement adoption by all government agencies.

Also, the ministry of health should create an ICT team of Software developers in line with the activities of ministry. This team should also carry out installation, education, Training and maintenance on use.

## **7. References**

- i. Adams, F.K. (2008). Construction Contract Risk Management: A Study of Practices in the United Kingdom. Cost Engineering, Vol. 50, 22 - 33.
- ii. Amaratunga, D. and Baldry, D. (2002). Moving from Performance Measurement to Performance Management Facilities, Journal of management 20 (5/6). 217- 223.
- iii. Appiah, B. (2010). Impact of Training on Employee Performance. In unpublished thesis submitted to the Department of Business Administration. Ghana: Achesi University College.
- iv. Armstrong, C. (2001). Inventory Control Can Help Reduce Waste. Supply Journal, 9 (2).
- v. Banda, E. (2009). Politics and Economic Consequences (1st Ed.). Washington D.C.: Center For Study of Responsive Law.
- vi. Berger, E. & Humphrey, N. (2007). Simple Buying Methods. (1st. Ed.), Nairobi: East Africa Education Publishers.
- vii. Baldwin, L. (2002). "Total quality management in higher education: the implications of internal and external stakeholders' perceptions" Journal of Business Management 4(2) 245-269.
- viii. Boniface I. (2014). Factors influencing procurement performance in the Kenyan public sector: Case study of the state law office. International Journal of Innovation and Applied Studies Vol. 9 No. 4 Dec. 2014, pp. 1626-1650



- ix. Boyan, L. (2003). *Procurement in Private Sector* (1st Ed.). Canada: Cooper and Newland Institute.
- x. Campbell, J. (2005). *Management Concept and Strategies*. USA: University of Michigan.
- xi. Clemons, E., Reddi, S. and Row, M. (1993). The Impact of Information Technology on the Organization of Economic Activity: the "Move to the Middle" Hypothesis. *Journal of Management Information Systems*, Vol. 10, No. 2, pp. 9-35.
- xii. Cox, A. (2001). Managing with Power: Strategies for Improving Value Appropriation from Supply Relationships. *The Journal of Supply Chain Management*, spring, pp. 42-47.
- xiii. Cox, A. (2004b). The art of the possible: relationship management in power regimes and supply chains. *Supply Chain Management: International Journal of Management*, Vol. 9, o. 3, pp. 346
- xiv. Croom, R. (2006) "The Impact of Web-based procurement on the management of operating
- xv. resources supply" *Journal of Supply Chain Management*, 36(1), 4-13.
- xvi. Ellram, M. (2001): Activities relating to purchasing and supply management involvement in supplier alliances. *International Journal of Physical Sciences*, 32(2), pp. 321 – 456.
- xvii. Gallear, D. Ghobadian, A. &O'Regan, N. (2008) "Digital/web-based technology in purchasing and supply management: a UK study", *Journal of Manufacturing Technology Management*, 19(3), 346-360.
- xviii. Management, 19(3), 346-360.
- xix. Garcia-Dastugue, S. and Lambert, D., 2003. Internet-enabled coordination in the supply chain. *Journal of Industrial Marketing Management*, 32 (3), 251–263.
- xx. Heide, J.B. & John, G. (1990). Alliances in industrial purchasing: the determinants of joint action in buyer-supplier relationships", *Journal of Marketing Research*, Vol. 27 No. 1, pp. 24
- xxi. Homans G. C. (1958). *The Human Group* (New York: Harcourt, Brace and World).
- xxii. Kitay, J. and Callus, R. (1998). The role and challenge of case study design in industrial relations. In K. Whitfield & G. Strauss (Eds.), *Researching the World of Work*. USA: Cornell University Press.
- xxiii. Kothari, T., (2005). E-procurement: an emerging tool for the hotel supply chain management. *International Journal of Hospitality Management*, 24(3), 369-389.
- xxiv. *International Journal of Hospitality Management*, 24(3), 369-389.