The Influence of Information Communication Technology System on Performance of Weights and Measures Agency in Tanzania

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***Abstract*: Metrology is fundamental to the economic and social development of any country in the world. This study examined the influence of Information Communication Technology (ICT) system on performance of weights and measures agency in Tanzania. The study adopted a case study research design where by primary and secondary data were used. The population applied of 200 Weights and Measures officials. The sample size of the study was 60 respondents WMA officials. Dar es Salaam was purposively sampled to be used as research location of this study. Random sampling procedure was used to select WMA officials in this study. Results revealed that, the ICT play great role in enhancing organization performance, also, using ICT system enables employees to accomplish tasks more quickly, improves organizational communication, increase speeds decision making in an organization and employees can accomplish the targeted activities as per budget. The study recommends that organizations should embrace ICT services so as to enhance their performance as well as improve service delivery to customers. Furthermore, the study recommends that supporting initiatives by the government and other stakeholders in enhancing mass awareness programs ICT system usage.**

***Keywords*: ICT, Measures, Weights, Tanzania**

Introduction

Metrology is the discipline of dimension, taking on both investigational and hypothetical determinations at several level of ambiguity in any ground of discipline and knowledge, as defined by the International Bureau of Weights and Measures [2, 4]. It is disturbed with as long as precise measurements which affect our financial system, safety, health and common welfare. According to [6] recommends that modern metrology has its roots in the French Revolution with a political motivation to harmonies units throughout France, a length standard based on a natural source was propose. In March 1791, the meter was defined leading to the creation of the decimal-based metric system in 1795, establishing standards for other types of measurements [5]. Some other nations opted the metric structure between 1795 to 1875; to guarantee global conventionality, the International Bureau of Weights and Measures (Bureau International des Poids et Mesures, or BIPM) was established by the Metre Convention. The metric structure was modernized in 1960 with the formation of the International System of Units (SI) as a result of a declaration at the 11th General Conference on Weights and Measures.

Empirical evidence explained that; metrology is divided into three basic overlapping activities, the first being the definition of units of measurement, second the realization of these units of measurement in practice, and last traceability, which is linking measurements made in observe to the orientation principles. These extend beyond tasks are used in unreliable amount by the three essential sub-fields of Metrology. The sub-fields are technical or basic metrology, which is disturbed with the organization of units of measurement, practical, technological or industrial metrology, the request of dimension to manufacturing and additional procedures in people, and lawful metrology, which wrap the rule and constitutional necessities for gauge tool and the techniques of measurement. Many organizations, businesses, as well as government institutions and agencies have adopted the use of ICT in their operations, especially with networked computers and internet access. For example, different fields use ICT these include: insurance companies, universities, schools, banks, hospitals, hotels, and transportation companies [1, 3]. With the presence of internet and computer in an organization, it has helped in simplifying work and increasing productivity.

Previous study on use of ICT has also been adopted and started to be used in weights and measures, this is because metrology is the technology or science of measurement and its applications. More importantly is that a number of scientific discovery and innovation, industrial manufacturing and international trade, improving the quality of life and protecting the global environment have been made thus effective weights and measures which is associated with ICT is used [7]. The importance of ICT in measurements is enormous for economy, society, medical sciences and much more. ICT is critically significant because it is through which economic, social and medical decisions are based on results of measurements. ICT came into existence because ordinary measurements were subject to errors leading to wrong measurements whose consequences are both direct (loss of profit, death of patient, failure of equipment) and indirect (incorrect environment protection, inefficient business plans).

Literature Review

According to [8] stated that, internet services, mobile services by its nature offers more convenience and flexibility to customers coupled with a virtually absolute control over the banking. Thus internet services allow the client to perform transactions and obtain

other information within the scope shown at the website of the organization. As an alternative delivery conduit for organization, internet and mobile services has all the impact on productivity attributable to organization. It is also the most cost-efficient technological means of yielding higher productivity. Furthermore, internet services eliminate the barriers of distance / time and provide continual productivity for the organization to unimaginable distant customers. Previous study explores the adequacy of Tanzania's ICT Policy for enhancing transparent and efficient service provision in the public sector and begins by defining e-transparency, challenges associated with its implementation together with policy formulation. The discussion then proceeds by focusing on the role of e-transparency within the Tanzanian National ICT Policy, by considering e-Transparency within the broader ICT challenges in Tanzania. The paper concludes by providing recommendations on National ICT policy in light of the imperatives of e-transparency for public service delivery and an open society [9].

According to [4], studies the information and communication technology in maize farmers. The results showed that 60.0% of the respondents were male while 40.0% were female. The results exposed that the utilize of television, radio, and mobile phone has improved the income and living of the maize farmers due to novel techniques learnt from undeveloped programmes, also maize farmers have been uncovered to newest technology on maize production during surveillance of documentaries and communicating with other maize farmers and consumers. The study also showed the harms face by the respondents was uneven authority supply, soaring cost of ICT devices, and insufficient information on technological know-how. It was consequently optional that maize farmers be supposed to be confident to access and develop ICTs by behind, them monetarily and significantly by the government and private sectors or donor agencies. According to [10], the lessons examined the types of ICTs organize to improve business procedures and the procedure they hold up, determinants of ICTs' feasible practice, and obstacles to their successful usage. The results shown that, computers, mobile phones, the internet and additional network systems, and social media are supposed as significant in boosting business competence connected to textile, product processing, management activities, service and marketing. The findings additional reveal that monetary assets have an increase result on other ICTs' practice determinants such as understanding and proficiency, and ICT communications savings. Concerning a company's profile, the answer points to that the size of a solid and its basis of raw materials powerfully forecast its original practice of ICTs. The impact also revealed the obstacles to original usage of ICTs and recommends that for commerce processes to be significant; an impartial consumption of ICTs be hypothetical to be done with proper consideration of all enabling elements.

According to [3], found ICTs as a source of innovative solutions for the competitive development of businesses. In other side, ICTs are critical in efforts to generate sustainable development in companies. One of the categorical donations is on the ways ICTs hold business procedure. obviously, ICTs make available opportunity for pending up with improved and original ways of increasing markets and civilizing performance. The acceptance and request of ICTs boost chances to find inventive solutions for treatment processes and product organization, hence allowing businesses to succeed in spirited markets. Previous study found that the government's initiatives and reforms to promote the adoption and application of ICTs in all sectors, slow acceptance and implementation of these tools have been registered across the business firms [8]. For instance, the practice of software has been established to be unimportant in all categories of business companies despite of their sizes. Divergently, the practice of internet services to promote industry performance has been recorded to be low in little size companies as contrast to medium and large companies. Concerning the usage of computers, companies of all sizes have been establishing to organize this knowledge to hold up their businesses.

Empirical evidence suggests that the types of ICTs used to support business processes vary from one firm to another [8]. While several of the companies are organizing complex ICT equipments, others are using fundamental ones. Basically, the firms deploy computers, networks, the Internet and various software products for business processes [7]. It is a established truth that ICTs such as Internet personal and computers are extensive in companies of dissimilar sizes. Surprisingly, few of the reviewed studies have reported mobile phones as tools for enhancing firms' business processes and innovation [8]. According to [9], conducted the study on determination of information systems service quality. The variables were Information Quality, System Quality and Overall Satisfaction. The research method based on the literature, items for each construct were developed to test the hypothetical models. The findings indicated that the new model proposed is a valid and reliable instrument that can be used confidently by researchers in Greece and elsewhere. These results enable the generalizability of the instrument and enhance its robustness as a valid measure of computing satisfaction and a surrogate for system success in a variety of cultural and linguistic settings.

Research Methodology

The study opted mixed research approach since involved ICT, weights and measures performance from a Dar es Salaam, Region. This study employed case study research design where by primary and secondary data were used. Questionnaire was used as a tool of data collection. The population applied of 200 Weight Measures Agency (WMA) officials. The sample size of the study was 60 respondents (WMA) officials. Dar es Salaam was purposively sampled to be used as research locations of this study. Random sampling procedure was used to select WMA officials. Yamanne (1967) formula was used to calculate the sample size of the study. Dar es Salaam Region were purposively sampled to be used as research locations of this study. The reason for selecting one (1) region as study areas is due to the fact that the one (1) region has many activities concerning the weights and measures Agency compare to other regions in Tanzania. The Crobanch Alpha was used to ensure the fattiness of the data collected from the respondents according to the study; the overall Crobanch Alpha of items is 0.792, this is extremely acceptable since is greater than 0.700.

Model Specification: Binary Logistic Regression Model (BLRM) was used to examine the influence ICT system on performance of weights and measures agency in Tanzania. The motive of selecting the BLRM is due to the truth that the dependent variable of the study is ***"categorical data in nature or dummy in nature (Strong Performance / Poor Performance)" Also the nature of questions in questionnaire is 5- Likert Scale.*** Therefore, the BLRM is fitting for this study. The equations of the study shown as follows:

$$log[(x)] = log(1 - \frac{\pi(x)}{(x) = \beta 0 + \beta 1 x 1 + \beta p) \quad \ldots \quad (i)}$$

Where, $\pi(x)$ is the likelihood of have occasion of concentration; in our container, it is ability of performance of weights and measurements agency; xi's are covariates and πi's are their own restriction. The answers of the model are available in the structure of a regression parameter estimate and predictable Odds Ratios (OR). The predictable OR, dogged by taking the encourage of the regression parameter estimates, demonstrate the raise or diminish in the possibility of having occasion of attention for subjects at a given level of the sovereign variable as evaluate to those in the orientation group. An estimate of OR > 1 shows that the probability of having event of interest for respondents at a given level of the sovereign changeable is greater than that for the reference group. Likewise, an approximation of OR < 1 indicate that the likelihood of having occurrence of attention for subjects at a given level of free variable is less than that for the orientation group.

Results and Discussion

According to Table 1, the correlation coefficient value is 0.769 which under the range between ±0.71 to ±0.90. This shown, the existence of high relationship between Information and Communication Technology and Development/performance of the weigh and Measures. Besides, the positive value from the correlation coefficient also can determine that ICT and Development/performance of the weights and Measures are interrelated. Therefore, we can conclude by saying, the study shown a positive relationship and statistical significant between Information and Communication Technology and Development/performance of the weight and Measures as the P-Value is 0.000 which is less than the P-Value of 0.05.

Table 1 - Correlation Analysis

		ICT
Development / Performance of the Weigh and Measurement		
Pearson Correlation	1	0.769
Sig. (2-tailed)		0.409
N	60	60
Information and Communication Technology		
Pearson Correlation	0.769	1
Sig. (2-tailed)		
N	60	60

Source: SPSS Data Analysis, 2021

Table 4 shows the model fits as variable increased. ICT have statistical significant -2log likelihood test statistics (-2log likelihood = 134.9, P-Value = 0. 008) which means linked with performance of the weights and measures since the P-Value is less than the significance level of 0.05%. From previous scholars observed when the ICT system is strong the performance of weights and measures were being good and when the ICT system is poor the performance of weights and measures were being poor. This result supported by different scholars who stated that ICT system is important in performance of weights and measurements [2, 5, 8, 9].

Table 2 - The Model Fits on ICT

Test Statistics	Values	P-Value
-2log likelihood	134.9	0.008
Cox & Snell R square	0.511	
Nagelkerke R Square	0.523	

Source: SPSS Data Analysis, 2021

Table 3 shows binary logistic regression model to determine the influence of ICT system on performance of weights and measures agency. As odd of ICT system declined, high performance of weights and measures raised by Exp (**β**) = 0.936 lesser times, which equivalent to 93.6% of reduce. This means that the ICT system is significantly performance of weights and measures because the P-Value is 0.008 < 0.05 significance level. On other side the ICT systems is poor that cause poor performance in weights and measures agency and previous studies identify like this findings [3,7,10].

Table 3 - The Binary Logistic Regression Model to Determine the Influence of ICT system on Performance of Weights and Measures Agency

Variable	β	Standard Error	Wald	Sig	Exp (β)	95% C I Exp (β)	
ICT system	-0.066	0.314	0.044	0.008	0.936	0.506	1.732
Constant	-0.138	0.826	0.028	0.008	0.871		
Dependent Variable: Performance of Weights and Measures Agency (1 = Poor Performance, 0 = Strong Performance)							

Source: SPSS Data Analysis, 2021

Conclusion

Regarding the extent ICT system influence the performance of weights, the study concludes that ICT play the great role in enhancing organization performance. The results show that using ICT system enables employees to accomplish tasks more quickly, ICT Improves organizational communication, increase speeds decision making in an organization, using the ICT systems employees can accomplish the targeted activities as per budget, such that there is little variance between actual spending and budget, ICT Increases participation in organizational processes, ICT Influences the way people interact in organizations, ICT Structures organizational life, ICT, Supports open discussions, Using the ICT system has made our job easier, the ICT system provides and up to date sufficient information supported by [3,7,9]. The study recommends that organizations should embrace ICT services so as to enhance their performance as well as improve service delivery to customers. Furthermore, the study recommends that supporting initiatives by the government and other stakeholders in enhancing mass awareness programs ICT system usage.

The researchers suggest that the coming researchers to expand the sample size, this research were limited only Sixty (60) respondents involved in the study which is extremely small. Also to expand the study location in order to get the best picture of the findings.

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