

*Full Length Research Paper*

## Factors influencing fixed asset losses in local government authorities in Tanzania

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Received 8 November 2016; Accepted 28 November, 2016

Fixed asset management has been a challenge despite having government policies and procedures in Local Government Authorities in Tanzania. The study investigated the factors which influence fixed asset management in Local Government Authorities, and analysis was carried out to determine the extent to which each of the individual factors influence fixed asset losses. The significance of this study stems from the fact that, the government of Tanzania has had steady losses of an average of 70 billion a year for a period of five years starting in 2009. This situation has prompted the government to seek for informed interventions to combat these losses as these assets deliver important services to the public. This comes as an intervention to analyse these factors, the extent of their influences and therefore provide more information to government procedure reviewers on strategies and guidelines on quick-wins, high impact and foundational intervention to help improve asset management procedures. The Likert scale questionnaires were used to collect data from these LGAs. The data were collected from 9 LGAs and analyzed using Statistical Package for Social Sciences (SPSS) data analysis tool. Discriminant analysis was employed and it was observed that, there is a wide variation in LGAs asset losses intervention requirements. Through the analysis, physical counting versus record difference was found to be more critical followed by scope of asset tracking. In this paper, these findings and discussion which sets the basis for the recommendations that we herein put forth are presented.

**Key words:** Local Government Authorities, asset losses, accountability, framework, asset management, extent of influence, intervention, fixed assets.

### INTRODUCTION

Public Fixed Assets in Tanzania Local Government Authorities are very important as they deliver important services to the public. Their importance cannot be overlooked as they require a lot of money during their initial investment or during their purchasing; hence ensuring their sustainability is required. According to Hanis et al. (2010), public asset management framework

is not advanced in developing countries, resulting to inefficient recording and accounting for public assets. The growing number of public assets results into increased demand for accountability, which tends to increase the system complexity as the system has to account for the growing number of fixed assets (Kuhn et al., 2011). On reviewing the Tanzania government annual audit reports

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by Utouh from 2007-2012, it shows that assets worth ~70 billion are not being accounted for, resulting into losses and decline of services they provide to the public. The study investigated the extent to which some of the factors influence asset losses. The variables which were critical in influencing asset losses were identified so that they could be used for intervention during the review of asset management strategies and guidelines.

Tanzania has about 134 local government authorities which are categorized into urban and rural authorities. Urban LGAs comprises of municipal and city councils, whereas rural LGAs are district councils. There are about 22 Urban LGAs where 5 of them are city councils, the remaining 17 are municipal councils and the rural LGAs are 112. The study was conducted in 4 urban LGAs and 5 rural LGAs based on nearest convenience to reach. The four urban LGAs were Moshi, Ilala, Kinondoni and Temeke and rural LGAs were Hai, Meru, Arusha district council, Babati district council and Moshi district council. The questionnaires were distributed in the 9 LGAs and data were collected and analysed using SPSS version 20.

Before adopting or applying the proper public asset management framework, it is important to identify the challenges and opportunities related to the adoption and application of the framework (Hanis et al., 2010). The government audit reports by Utouh shows several challenges like; some fixed assets were not recorded in the asset register, the actual number of assets was not known due to lack of asset details in asset register, some asset registers were missing, some registers did not contain detailed location information of fixed assets, unverified fixed assets at their location and non maintained fixed assets. Four variables were derived from the mentioned challenges to investigate the extent to which each of them influences asset losses. These were scope of tracking assets, rate of maintenance performed, accessibility of asset records in different departments or outside the LGA and counts versus record difference.

Pu and Chao (2011) discussed on the importance of managing fixed asset in the university library as they provide service to the readers. They further explained on the common problems experienced in the fixed asset management and put forward the recommendations and measures to be taken. One of the problems stated is weakness in asset management awareness where there is no cost accounting for asset and no provision for depreciation of fixed assets. Lack of clear responsibility in asset management is another problem where there is no mode of fixed asset classification and there is no centralized management. No inventory and no regular checking of fixed assets, generally the inventory is to be checked annually or semi annually but this is not the case in most LGAs, resulting in asset losses. Lastly, the management of fixed assets has not been included in the work routine, the management is lax and the losing of assets is common. Pu and Chao (2011) recommended

the following measures; raising awareness on the importance of proper fixed asset management, improve the management of asset system to prevent loss, introduce the centralized management of asset system, establish the fixed asset inventory system and include the asset management in the routine work. Since Pu and Chao (2011) only stated the challenges and recommendations without prioritizing which factors demands more attention in intervention, it is important to identify factors which are more critical in ensuring proper management of assets. This study analyzed the extent to which different factors influence asset losses and enlightens the critical areas which require an improvement in asset management framework.

## METHODOLOGY

The study was conducted in 9 selected LGAs: Temeke Municipal council, Kinondoni Municipal council, Ilala Municipal council, Moshi District Council, Moshi Municipal Council, Arusha District Council, Meru District Council, Hai District Council and Babati District Council based on convenience of reach. The targeted population was council staff working in departments dealing with asset management in the 9 LGAs. The departments dealing with asset management were accounts, procurement, internal audit and land. About 160 questionnaires were distributed to the staff in the four departments; only 120 questionnaires were filled and collected due to less number of staff in some LGAs.

## Hypothesis

The study investigated the extent to which each of the factors (Independent variable) influence asset losses (dependent variable).

Asset losses were categorized into three categories: low, high and medium. The losses were categorized to reduce or minimize the subjectivity measurement of losses. The analysis used was discriminant analysis because independent variables were continuous whereas, the dependent variable was not continuous, it was categorical. The analysis investigated the relationship between  $X_i$  and  $Y$  variables. Using discriminant analysis we tested if the three categories of  $Y$  which are high losses, medium losses and low losses depend on at least one of the  $X_i$  variables. The analysis investigated the extent to which  $X_i$  variables influenced  $Y$  variable. The extent of the influences was expressed by the values of discriminant coefficients. The number of discriminant functions was  $(N-1)$  where  $N$  is group categories. For this case, since there are 3 categories for  $Y$ , therefore numbers of discriminant functions were two:

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \dots \dots \dots 1$$

$$Y_2 = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 \dots \dots \dots 2$$

The values of  $\beta_i$  and  $\alpha_i$  are the discriminant coefficient of the variables and they will show the discriminating power (the extent of influence) of each variable on asset losses. When using discriminant analysis, some assumptions were made such as the variables  $X_1, X_2, X_3$  and  $X_4$  are independent of each other, these  $Y$  categories/groups are mutual exclusive, the variance-covariance structure of the independent variables is similar within each group of the dependent variable, the independent variables follow a multivariate normal distribution, errors (residuals) are randomly distributed and the assets are in operation and productive if there

**Table 1.** Description of variables used in discriminant analysis

Variables	Type of variable	Explanation of variable
Count versus record difference	Predictor- X <sub>1</sub>	Difference between physical counting of number of assets and the recorded assets.
Scope of tracking assets	Predictor- X <sub>2</sub>	Whether all assets are tracked or some, tracked in real time or not, whether all necessary details of assets are tracked.
Rate of Maintenance Performed	Predictor- X <sub>3</sub>	Whether rate of maintenance is sufficient to enhance the life of asset, whether there is a tool to manage maintenance alert.
Accessibility of Asset Records in different Departments or outside the Organization	Predictor- X <sub>4</sub>	Whether the information is centrally stored for easy accessibility, every department can easily access the information
Asset losses	Dependent- Y	Categorized into: low, medium and high

**Table 2.** Variable X<sub>n</sub>.

X <sub>n</sub> -variable		SA(w <sub>1</sub> =5)	A(w <sub>2</sub> =4)	N(w <sub>3</sub> =3)	D(w <sub>4</sub> =2)	SD(w <sub>5</sub> =1)
LGA <sub>n</sub>	Respondents f <sub>i</sub>	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>	f <sub>4</sub>	f <sub>5</sub>
	Weighted average= (∑f <sub>i</sub> w <sub>i</sub> /N)			$\bar{x}_i = (\sum f_i w_i / N)$		

**Table 3.** Variable Y.

Y- asset losses		High	Medium	Low
LGA <sub>n</sub>	Respondents	f <sub>1</sub>	f <sub>2</sub>	f <sub>3</sub>
	High mode	Highest frequency category selected		

are no losses.

Data were collected using a questionnaire developed from the five mentioned variables which are scope of tracking assets, rate of maintenance performed, and accessibility of asset records in different departments or outside the LGA, counts versus record difference (independent variables) and asset losses (dependent variable) (Table 1). The indicators for each variable were used to develop questions using Likert scale of scales 5- strong agree, 4- agree, 3- neutral, 2- disagree and 1- strong disagree. The questions were also developed for dependent variable which is asset losses but categorized into three categories which is high, medium and low losses, the reason for categorizing asset losses was to minimize subjectivity from asset losses data. Data were collected using questionnaires and summarized in tables for each local government authority. The mean values were calculated for each variable as shown in Tables 2 and 3.

For asset losses (dependent variable) which is asset category, the results with highest frequency of respondents (mode) were considered.

**RESULTS AND DISCUSSION**

Table 4 summarizes the results after computing mean for independent variables and mode for dependent variable for each LGA. From 160 questionnaires distributed, only 120 filled in questionnaires were collected. The results presented were from 120 respondents who responded.

The summarized results were analyzed by multivariate data analysis in SPSS version 20 using discriminant analysis to find the discriminating coefficients (discriminating power) of each independent variable on asset losses. The two functions were used to find the discriminant coefficients:

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \dots\dots\dots 1$$

$$Y_2 = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 \dots\dots\dots 2$$

Finding the discriminant coefficients β<sub>i</sub> and α<sub>i</sub> using SPSS; where i=0, 1, 2, 3, 4.

**Discriminant analysis on factors influencing asset losses in local government authorities**

The following are presented findings of the discriminant coefficients after performing discriminant analysis. From the two functions above, that is, Y<sub>1</sub> and Y<sub>2</sub>, one function which is more significant in discriminating asset losses was chosen. The following parameters were used to determine which among the two functions was more significant in discriminating.

**Table 4.** Variables for all LGA.

LGA	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_3$	$\bar{X}_4$	Y
Temeke	3.4	2.9	3.1	3.3	Medium
Ilala	3.5	3.1	3.1	3.1	Low
Moshi Municipal	3.9	3.2	3.6	3.6	Medium
Arusha District Council	3.7	2.8	3.5	3.3	High
Meru	3.9	3.5	3.7	3.4	Low
Moshi District Council	3.9	2.9	3.6	2.8	Medium
Hai	3.4	3	3.2	2.8	Medium
Kinondoni	3.4	2.8	3.2	3.3	Medium
Babati Municipal Council	3.6	3.2	3.2	3.1	Medium

**Table 5.** Discriminant coefficient for  $Y_1$ .

$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$
-8.260	0.277	6.530	-2.763	-1.052

Wilks' Lambda for  $Y_1$  is 0.358 and that of  $Y_2$  is 0.897 in Table 7. The Wilks' Lambda for  $Y_1$  is smaller than that of  $Y_2$ , this shows that  $Y_1$  is more significant in discriminating than  $Y_2$ . For a good model, Eigenvalue must be greater than one. From Table 7, Eigenvalue for  $Y_1$  is 1.503 and that of  $Y_2$  is 0.115. Eigenvalue of  $Y_1$  is greater than that of  $Y_2$  which shows that it has more discriminating power than that of  $Y_2$  by 13.0 factor. So, the discriminant coefficients of  $Y_1$  to determine the influence of each variable were considered.

Function one was found to be more significant than function two in discriminating the losses, therefore the discriminant coefficient for function one which are  $\beta_1=0.277$ ,  $\beta_2=6.530$ ,  $\beta_3=-2.763$  and  $\beta_4=-1.052$  from Table 5, were considered since  $\beta_3$  and  $\beta_4$  are negative discriminant coefficients than their discriminating power in discriminating alternative groups apart from the specified three groups which are high, medium and low losses. Therefore,  $\beta_1$  and  $\beta_2$  which are the discriminant coefficients with positive values were considered, with  $\beta_2$  leading with the value 6.530 followed by  $\beta_1$  with the value 0.277 which are count versus record difference- $X_2$  and scope of tracking asset - $X_1$ , respectively. The two factors have more influence on the asset losses than other factors. The variables have more impact on intervention as their discriminating powers over asset losses are high. The current process of tracking assets in the LGAs is not effective, it is done once in a year and if anything happens to the assets it can only be noticed at the end of the year during stock taking which is a long time interval. Tracking assets after such long time interval can be challenging and it might be too late for intervention. Some assets are tagged as group assets meaning if you track them, you cannot get the information status of the

individual asset as they are recorded as grouped assets, the information for the individual assets are hidden in the recorded grouped assets. This creates a challenge of tracking the information for each individual asset as some individual assets may not be working but the recorded status of the grouped asset may still show they are working and they are in good condition. Assets physical verification is also done only during auditing and it is only once annually, causing late intervention like before. The government can improve the asset management framework by addressing the two identified factors by reviewing the asset management strategies and guidelines and by increasing the frequency on physical verification and tracking of fixed assets. Function two with discriminant coefficients  $\alpha_1=-3.726$ ,  $\alpha_2=0.838$ ,  $\alpha_3=5.566$ ,  $\alpha_4=1.580$  from (Table 6) was not considered because it is less significant compared to function one because of its higher Wilks' Lambda value which 0.897 than 0.358 from function one (Table7).

## CONCLUSION AND RECOMMENDATIONS

The results show that assets physical verification and tracking of fixed assets has more influence than asset losses. The government of Tanzania should focus on reviewing their strategies and guidelines in the two areas which are scope of tracking assets where individual asset vital information should be available at any time in order to know its status. The frequency of physical verification of asset should be increased per year, that is, reconciliation between the actual physical asset versus the recorded information to reduce the number of asset losses. This paper is set to inform the government asset

**Table 6.** Discriminant coefficient for Y2.

$\alpha_0$	$\alpha_1$	$\alpha_2$	$\alpha_3$	$\alpha_4$
-12.729	-3.726	0.838	5.566	1.580

**Table 7.** Testing of the functions.

Test of function(s)	Wilks' Lambda	Eigenvalues
1	0.358	1.503
2	0.897	0.115

management policy and guideline reviewers in Tanzania to give more emphasis on the identified areas for improvement in order to enhance asset accountability. The Information System can be developed or redesigned giving emphasis to the identified factors in order to address critical areas for asset losses intervention.

LGAs should introduce a department that will specifically deal with asset management because currently, the four departments are not specific in dealing with fixed assets, causing decentralization of fixed assets records with roles interference between departments. A single department would centralize the information and enhance fixed asset accountability by providing single point of access of information. This will make asset management more effective in each LGA.

Despite having government procedures and policies for managing fixed assets, the government of Tanzania ACT gives each LGA some powers to make their own decision on some issues including asset management. The government expects the LGAs to comply with government set policies and guidelines. However, the government policies and guideline should state clearly, specific areas which require LGAs to make their own decision and those that require compliance to avoid the interference of the two. Further study can be carried out to identify these areas.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interest.

## ACKNOWLEDGEMENTS

The authors acknowledge the Tanzania Commission for Science and Technology for sponsoring the study through NM-AIST. They sincerely appreciate the supervisors: Dr. Khamisi Kalegele and Dr. Bukaza Chachage for their tireless support and guidance. Lastly, they thank Dr. Haikael Martin for her help in proof reading this paper.

## REFERENCES

- Hanis MH, Trigunaryah B, Susilawati C (2010). Public asset management framework for local governments: Opportunities and challenges for public asset managers. In Proceedings of 2nd International Postgraduate Conference on Infrastructure and Environment. Hong Kong Polytechnic University. <http://eprints.qut.edu.au/32580/1/c32580.pdf>
- Kuhn B, Jasek D, Carson J, Theiss L, Songchitruksa P, Perkins J, Mwakalongo J (2012). Asset Management Guidebook for Safety and Operations (No. FHWA/TX-12/0-6390-P1). Report No. FHWA/TX-12/0-6390-P1. College Station, TX: Texas A&M Transportation Institute. <http://d2dtf5nnlpr0r.cloudfront.net/tti.tamu.edu/documents/0-6390-1.pdf>
- Poulsen J, French A (2008). Discriminant function analysis. San Francisco State University: San Francisco, CA. <http://userwww.sfsu.edu/efc/classes/biol710/discrim/discrim.pdf>
- Pu Liu, hao Li (2011), Status Analysis and Management Strategies of Library Fixed Assets, Shandong University of Technology, Zibo, China. <https://www.dropbox.com/s/gcsylzycnd1djnc/asset2.pdf?dl=0>
- Utouh SLL (2012). Annual General Report of the Controller and Auditor General. The United Republic of Tanzania National Audit Office, Tanzania. [http://www.nao.go.tz/?wpfb\\_dl=92](http://www.nao.go.tz/?wpfb_dl=92)
- Utouh SLL (2011). Annual General Report of the Controller and Auditor General. The United Republic of Tanzania National Audit Office, Tanzania. [http://www.nao.go.tz/download/cag\\_general\\_reports/local\\_government/LOCAL%20GOVERNMENT%20GENERAL%20REPORT%202010-2011.pdf](http://www.nao.go.tz/download/cag_general_reports/local_government/LOCAL%20GOVERNMENT%20GENERAL%20REPORT%202010-2011.pdf)
- Utouh SLL (2010). Annual General Report of the Controller and Auditor General. The United Republic of Tanzania National Audit Office, Tanzania. [http://www.nao.go.tz/?wpfb\\_dl=82](http://www.nao.go.tz/?wpfb_dl=82)
- Utouh SLL (2007/2008). Annual General Report of the Controller and Auditor General. The United Republic of Tanzania National Audit Office, Tanzania. [http://www.nao.go.tz/download/cag\\_general\\_reports/central\\_government/CENTRAL%20GOVERNMENT.pdf](http://www.nao.go.tz/download/cag_general_reports/central_government/CENTRAL%20GOVERNMENT.pdf)