

Assessment of Challenges Affecting Management of Electronic Waste (E- Waste) in Tanzania: A Case of Tanzania Postal Corporation (TPC)

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Abstract: *This study assessed the challenges affecting management of electronic waste (E- waste) in Tanzania, especially in postal industry so as to make workable recommendations for enhancing management of electronic waste. Specifically, the study focused at studying the roles management system, technological advancement, financial capacity and staff competence on management of e- waste at the Postal industry. A cross-section research design was applied and questionnaires were used to collect data. Descriptive as well as regression were used to analyze data. The analysis revealed that though there is a significant correlation between independent variable (technological, financial, management system and staff competence) in enhancing e-waste management but further the analysis showed that postal industry faces different challenges to realize efficient e-waste management. Firstly, on management challenges, the study recognized that there is no effective communication among staff on e- waste management, the management does not provide adequate chance to share knowledge, and also there is no clear direction toward e-waste management. On technological challenges, the study revealed that postal industry lacks efficient recycling facilities; there are no good infrastructures for controlling e-waste disposal. On case of financial ability, the study revealed that postal industry encounters with limited budget set on e-waste management and furthermore, the allocated budget is not also utilized efficiently. Moreover, the study showed that staff lacks incentives to stimulate accountability on e-waste management. The study generally, recommends for authorities involved to re-evaluating the approaches applied in dealing with e-waste in a collaborative manner by involving key Stakeholders.*

Keywords: Electronic waste, e-waste management

1. Introduction

Electronic waste (e- waste) is a term used to cover almost all types of electrical and electronic equipment (EEE) that cannot be upgraded or repaired for re-use and finally enter the waste stream. It covers televisions, computer, mobile phones, white goods for instance: fridges, washing machines, dryers and its accessories (Robison, 2009).

Over time, Information Communication Technology have transformed and revolutionized the world in all facet of the socioeconomic fabric of life through the use of communication gadgets, electronic commerce, electronic banking, electronic government, tele-medicine and electronic health among others coupled with changes in cities and rapid urbanization (UNSEAR, 2000). The world Information Telecommunication Union (ITU) illustrates that the combination of a number of issues such as unexpected population growth, rural urban migration which is escalating to unprecedented urbanization, human capacity growth, economic growth, modified lifestyle and highly globalized world as the result, it is anticipated that developing countries will triple their electronic waste production over the next few years (UNSEAR, 2000).

Globally, the United States is the world leader in producing e-waste, tossing away about 3 million tons each year (Schluepet *al.*, 2009). Not left aside, China is regarded also to be among the leading countries in the generation of e-waste amounting to 2.3 million tons domestically annually (Schluepet *al.*, 2009). Despite having banned e-waste imports, China remains a major e-waste dumping ground for developed countries (Schluepet *al.*, 2009). While this happening, a question can come in mind that are there neither global no national incentives to tack the incident? Provided a picture on that Agata (2014) demonstrated that

technical solutions are available, but in most cases a legal framework, collection, logistics, and other services need to be implemented before a technical solution can be applied.

The UNEP report (2011) shows that majority of the African countries function as depot areas (dumping sites) for e-waste materials, due to both legal and illegal importation of e-waste regarded to be valuable products received from the developed world perceived and received as valuable second hand products. Sorted some areas in Africa, Jerie and Tevera (2014) showed that practice of waste management system in Zimbabwe are unsustainable in the long run that requires authorities to provide more resources for financing, training, and manpower to enable effective provision of an environmentally friendly solid waste management system in the available cities.

Tanzania is seemingly one of the victims and encounters the problem at a large extent. Though, Mataheroe (2009) asserted that the scale of the problem with e-waste was relatively small in comparison to solid waste problems especially in total amounts generated, Magashi and Schluep (2011) showed that e-waste in Tanzania will continue increasing due the fast adoptability of electronics in all facets of life. Their study projection shows that the e-waste problem will keep on increasing. The then Tanzania Deputy Minister of communication science and technology reported in the National assembly 2014 that the government was in the process of initiating the policies to control e waste, These facts show that there is a gap in policies therefore the chances to intensification of the problem is inevitable.

Statement of the Problem

Due to increased urbanization and advancement in science and technology in different field including communication arena, the rate of e-waste materials and obsolete devices

keep accumulating at a fast speed and thus leading to harmful and devastating effects to land, air and atmosphere with adverse consequences to life. The alternative to worse scenarios created the electronic waste are coming up ways to curb the ill effect generated by e-waste and one of the initiative to solve the problems was the initiation of electronic waste management initiatives as a world program or techniques aimed to control and manage environmental health. To continue findingsolutions for controlling e waste, other initiatives have been established at different levels in different jurisdiction in order to oversee the environment surroundings. Moreover, a number of studies have been conducted worldwide besides all these efforts the challenges to realize total e-waste control still exists.

For instance in Tanzania, the rate of e-waste has kept increasing over time thus harming the life of human beings and the environment at large (Koloseni and Shimba, 2011). In residences and in offices the dwellers are surrounded by the e-waste materials which greatly affect their livelihood. The conditions for why such scenario prevail to such extend have not yet given high attention in context of Tanzania. Therefore, to bridge that gap, this study assessed the challenges affecting management of electronic waste in Tanzania with a specific focus on Tanzania Postal

Corporation (TPC) by considering the four aspects highlighted in study specific objectives.

2. Literature Reviews

Conceptual Framework

Conceptual framework can be described as a diagram which shows the main areas for the research intend to be investigated and to understand from the study area and the population of the study. It is usefulness as a tool to assist a researcher to make meaning of subsequent findings. It form part of the agenda for negotiation to be scrutinized, tested, reviewed explains the possible connections between the variables (Smith, 2004).

The conceptual framework presented in figure below describes that management of e- waste is an attempt that is integrated to different aspects or inputs. As shown, management of e-waste is an output that highly depends on management role in controlling the e waste, in the same way technological capability that enhance smooth operation of the exercise, fund capacity also facilitate ability to run the tasks and finally competent staff equipped with sufficient skill and knowledge in the field.

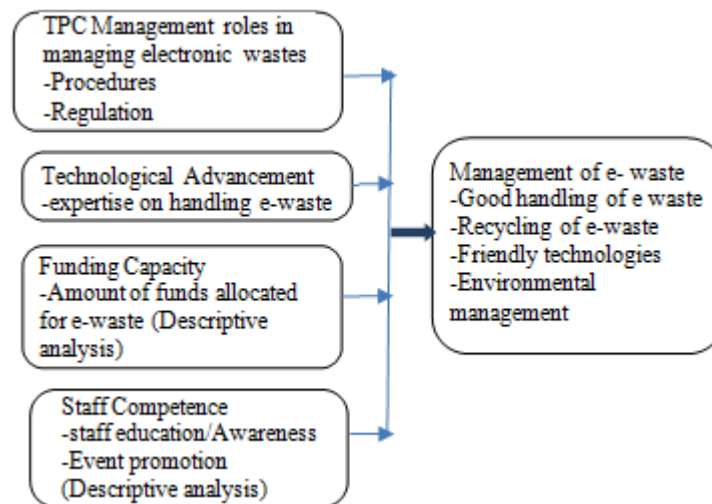


Figure 1: Conceptual Framework

Staff Competence

In any organization the productivity and improvement of performance is highly associated with the organization level of investment in training its staff (Gordon, 1992). In different institutions training of staff has been recognized as the best approach that increases organization performance as it develops higher staff ability to provide quality services to customers (Gaidajis, Angelakoglou, Aktisonglou, 2010). Hence, trainings are essential for the successful implementation of a waste management plan. Lack of trained staff and expertise's that provide the technical knowledge is realized as one of the important issue that challenge waste management programmes.

Technological Advancement

Museet *al.*, (2011) demonstrated how lack of technology modification to be one of the main problems in waste management. Observed that in his study, he went further on

explaining the need for further investment in adopting the technology for better management of waste through the reduction of the produce waste before the production reaches the final stage of products through enhancement of product life and the quality of the products.

Financial Capacity

Financial aspects play fundamental role in waste management and the absence of financial supporting is a fundamental barrier in wastes management and applying new technologies for waste reduction Shekdar A. (2004).Financial and legislation incentives play important roles in improvement of waste management.

Management Role

Once new initiatives are introduced, people will need management and time to adjust until the new plan becomes normal behavior, once this working group is acquitted with

the new working environment with the new technologies a consistence management needs to be established for the sustainability of the new working norms (Timlett& Williams, 2009). Purcell and Magette(2010) argued that there is the need for a well-defined management to be instituted in order to achieve the desired goal and benchmark which have been agreed are directed towards specific targets and class.

Methodology

This study applied a cross-section research design were by questionnaire and interview were used as data collection methods. Descriptive as well as regression analysis were used to analyze data. The study was conducted at postal industry and specifically Tanzania Post Corporation. The study population comprised the employees of the Tanzania Postal Corporation (TPC). The target population of the study was three hundred and forty two (342) staff and hundred and twenty (120) employees were chosen comprising of Management, Middle level managers and lower level staff to form study sample size.

The study used both probability and non-probability sampling procedures. In case of probability sampling: stratified sampling was applied whereby respondents were categorized into stratum based on their position level and from there simple random sampling was applied to pick respondents involved in the study. Further, a purposive sampling technique was applied to select top management staff. Quantitative data were analyzed by using descriptive as well as inferential analysis.

3. Research Findings, Analysis and Discussion

Management Support in Handling e- Waste in the Posta Industry

This was the first objective which identified how management system at postal industry supports effective management of e- waste. The findings obtained in the field are presented in below.

Table 1: Handling of e waste in the Postal Industry

	SD	D	N	A	SA	Percentage
There is effective communication among workers in Managing e waste	29 (24.2%)	39 (32.5%)	17 (14.2%)	32 (26.7%)	3 (2.5%)	100
Staff have adequate skill related to e waste management	31 (25.8%)	45 (37.7%)	22 (18.5%)	15 (12.5%)	7 (5.8%)	100
There is intrinsic motives among staff to participate into e waste management programs	10 (8.3%)	25 (20.8%)	28 (23.3%)	52 (43.3%)	5 (4.2%)	100

As shown in the table 1 above the findings revealed that

39(32.5%) of the respondents disagree on the statement that there is effective communication among workers in managing e waste at the postal industry. Moreover, the findings show that 45(37.7) of the involved respondents disagreed on the statement staff at postal industry have adequate skills related to e waste management. Furthermore the finding also indicates that 52(43.3%) of postal industry have intrinsic motives to participate into e waste management programs. Based on the presented data it can be said, postal industry encounters a challenge of weak communication as well as inadequate skills among staff which direct affects the efforts for e-waste management. Further the findings depicts that staff are willing to participate on e-waste management practices. Despite the findings revealed the weakness in management system on e-waste control, Morton and Cross (2012) arguing that effective communication is the only and major key part that institutions need to adhere for effective on the intended message to reach the expected audience. Further a linear regression analysis was carried out to test whether there is relationship between predictors variable (management system) verses e-waste management as criterion variable. The ANOVA test was run to see the coexisting relationships among the tested variables, and the result showed a significant relationship (P=0.000, r=.58).

Technological Capability in Managing e-Waste in the Postal Industry

This was the second objective that wanted to examine, the technological capability of postal industry in dealing with e-waste, the findings are as shown below

Table 2: Technological Capability in managing e waste in the Postal industry

	SD	D	N	A	SA	Percentage
There is efficient recycling facilities	28 (23.3%)	48 (40%)	23 (19.2%)	15 (12.5%)	6 (5%)	100
Tracking system for detecting e waste devices	24 (20%)	47 (39.2%)	25 (20.8%)	24 (20%)	0	100
Good infrastructures for controlling e waste disposals	30 (25%)	43 (35.8%)	24 (20%)	14 (11.7%)	9 (7.5%)	100

As presented in the table 2 above the findings show that 48(40%) of the respondents disagreed on the statement that there is efficient recycling facilities at the Postal industry. Moreover the findings shows that 47(39.2%) disagreed on the statement that postal industry has a good tracking system for detecting e waste devices. Furthermore the study revealed that 43(35.8%) of the respondents disagreed with the statement that Postal industry has good infrastructure for controlling e waste disposal. Ramachandra, *et al.*, (2012) also added that management of e-waste in industries should begin at the point of generation. This can be achieved through waste minimization techniques and sustainable product design. Again, test of the relationship between technological capabilities versus e-waste management was carried out using linear regression analysis. The findings obtained

showed a significant relationship of the tested variables at the level of (P=.000, r=.95). Hence, the analysis calls the management to improve technological capability on dealing with e waste.

Influence of Financial Capacity on Management of e-Waste in the Postal Industry

This was the third objectives that wanted to examine whether postal industry has reliable fund that enhance it to deal properly with the challenge of e-waste.

Table 3: Influence of Financial Capacity on Management of e waste

	SD	D	N	A	SA	Percentage
Postal industry allocates enough budget to deal with e waste	28 (23.3%)	46 (38.3%)	23 (19.2%)	17 (14.2%)	6 (5%)	100
There is transparency in managing the allocated budget for e waste control	27 (22.2%)	41 (34.2%)	26 (21.7%)	21 (21.7%)	0	100

The findings in the table 3 above revealed that 46(38.3%) of the respondents disagreed on the statement that postal industry allocates enough budget to deal with e waste. further the findings revealed that 41(34.2%) of the involved respondents disagreed on the statement that there is transparent in managing the allocated budget for e waste control. A regression analysis was run to test the relationship between financial capacities versus e-waste management. The analysis revealed that financial capacity does influence e-waste management as the relationship was significant at level of (P=.000, r=.57). Hence, the management at postal industry needs to supervise perfectly the allocated budget so that to reach the intended goals.

Staff Competence on Management of e-Waste in the Postal Industry

This was the fourth objective that aimed to know if staffs at Postal industry have adequate skill related to e-waste management.

Table 4: Staff competence on Management of e waste

	SD	D	N	A	SA	Percentage
Training are provided to staff on e waste management	18 (15%)	41 (34.2%)	37 (30.8%)	21 (17.5%)	3 (2.5%)	100
Knowledge sharing from external experts	16 (13.3%)	56 (46.7%)	24 (21.7%)	16 (13.3%)	6 (5%)	100
Research are done on e waste disposal	27 (22.5%)	48 (40%)	18 (15%)	24 (20%)	3 (2.5%)	100

The fourth objective findings indicates that 41(34.2%) disagree on the statement that training are provided to staff on e- waste management.it was revealed further that 56(46.7%) of the involved respondents disagreed on the statement that there is knowledge sharing from external experts. finally the findings show 48(40%) of the respondents disagree on the statement that postal industry conduct research on e-waste disposals. Also a test was taken to measure the relationship between staff competences versus e-waste management via regression analysis. The analysis revealed that staff competence as a predictor variable influence e-waste management at the level of significant of(P= .000, r=.54).

Addressing the problem, Stephenson (2006) contends that inadequate knowledge among electronic devices users is what prompts to environmental degradation. Hence, the management needs to take extra efforts to improve the staff competence.

4. Conclusions and Recommendations

The findings showed that though the analysis portray a positive relationship between management factors and e-waste management at (P=0.000) but the postal industry lacks committed management system as the available management fails to implement initiatives that support the needs to handle e-waste within the corporation.

Moreover the study findings showed that postal industry still lags behind in having modern technology and financial capability that limit the monitoring of e-waste in the proper manner. According to the field data, postal industry fails to control e-waste due to the fact that, trainings are not provided to staff.

Recommendations

The study recommends for enough fund to be allocated, so that the management can implement its responsibility accordingly. Finally, the study propose that e -waste concerns are crosscutting in nature so a number of stakeholders need to be taken on board for effective management in a sustainable manner.

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