THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Determinants of Electronic-Waste Disposal Strategies by Utility Companies in Kenya

Daniel Wakaba. Kiniti
Ph.D. Student, Department of Business Administration, School of Business,
Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya
Dr. Daniel M. Wanyoike
Lecturer, Department of Business Administration, School of Business,
Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya
Dr. Joel Koima
Former Lecturer, Department of Business Administration, School of Business,
Kabarak University, Kenya

Abstract:
The Electronics industry is the largest and fastest growing enterprise globally with huge generation of electronic waste (e-waste) throughout the world. E-waste has hazardous components which if discarded unchecked result into serious consequences to the environment and human health. E-waste management is not yet properly researched in Kenya keeping in mind the unique needs of the under developed world, more so in the Kenyan context. The adequacy of e-waste regulations has been questionable with incidents of poisoning and industrial explosions going on unchecked. Examples include Uhuru Owino Village lead battery exposures and the subsequent children lead poisoning at Mombasa in year 2012. This study addressed e-waste disposal management issues in utility firms in the context of Kenya through an economic perspective and the associated environmental and social challenges. The firms are large generators of e-waste in Kenya. The study focused on various factors including e-waste stakeholder awareness. Regulations enforcement' as a moderator variable particularly in policy enforcement in utility companies was investigated. The research was a survey design. A random sample of 290 respondents drawn from employees in the utility firms was used. Data analysis comprised of descriptive statistics and inferential statistics using regression models. The results of the study revealed that stakeholder awareness influenced 15% of e-waste disposal practices which increased to 21.7% with regulations enforcement. The results will assist policy makers in drafting fact-based policies, environment managers in creation of green jobs and organizational strategy formulation in waste management.

Keywords: *E-waste, hazardous components, utility firms, stakeholder awareness*

1. Introduction

1.1. Background of the Study

Globalization has been realized through the growth of Information and Communication Technology (ICT) worldwide which in turn has resulted into huge amounts of e-waste due to the amount and dynamic short-life nature of the equipment. Electronic waste (E-waste) is now viewed as a huge pollution challenge globally. A wide variety of toxic substances are contained in E-waste with a potential to affect the environment and human health if poorly disposed and managed (Peernart, Ravi & Ming, 2013). This challenge from E-waste is relatively new and presents business opportunities. The huge volumes of valuable materials as well as their toxic nature can be exploited to create lifetime occupations (Widmer, Heid, Deepali, Scheneilillmann & Heinz, 2005).

Management of e-waste involves a complex of decision-making variables when choosing the disposal method. It requires analysis of the intended disposal method by a firm to arrive at the most efficient and environmentally acceptable management strategy to dispose e-waste. The decision maker has to do some evaluation by either assigning a quantitative value to each alternative or by providing information which clarifies properties of the alternatives.

1.1.1. E-waste in Kenya

Kenya similar to developing countries has encompassed ICT in the public and private segments. Despite the National Environment Management Authority (NEMA) making a draft e-waste management policy in 2011 its enforcement has never been implemented. As such, the country is facing the challenge of accumulated e-waste whose handling and disposal has not been substantively addressed by the present environmental laws.

Lack of segregation and poor disposal systems has led to mixing of e-waste with ordinary waste in Kenya's dumpsites (Onderi, 2010). A study by Okeyo and Wangila (2012) at the Kenyan coast established that a battery

refurbishing factory produced toxic effluent to a neighbouring village which affected children's health whose Blood Lead Levels (BLL) was found to be as high as 23 μg/dl against the World Health Organization (WHO) levels of 5 μg/dl. The consequences of such high magnitudes of lead have the undesirable effects of lethal lead poisoning among many other health hazards.

1.1.2. Utility Companies in Kenya

The utility companies in the study consisted of Safaricom Plc, Airtel Kenya ltd, Telkom Kenya limited (TKL), Kenya Power & Lighting Company (KPLC), Kenya Transmission Company (KETRACO), Kenya Generating Company, (KenGen), Geothermal Development Company (GDC) and Rural Electrification Authority (REA). Except Safaricom, none of these companies has made any environmental commitments in the website nor shown efforts addressing electronic waste.

1.2. Statement of the Problem

E-waste contains toxic substances such as lead, mercury and cadmium which are harmful to both human beings and the environment. The rapid growth of the amount of e-waste and the ineffectiveness of legislation has led to inappropriate management of e-waste disposal in Kenya with profound impacts on the environment and human beings. In 2014 it was estimated that Kenya generated 1 kg/inhabitant (kg/inh) of e-waste annually (Baldé, Wang, Kuehr & Huisman, 2015). E-waste contaminates soil, water and air. Poor recycling and disposal methods lead to poisoning of many local people engaged in the recycling process.

Okeyo and Wangila (2012) investigated toxic effluent in Mombasa from a battery recycling factory situated next to Owino-Uhuru village. The pollutants affected children's health whose Blood Lead Level (BLL) was found to be as high as 23 μg/dl against the World Health Organization (WHO) levels of 5 μg/dl. A summary of detailed health effects of e-waste elements is shown in Appendix 1. Effects of the poisoning will be felt long into the future.

For most utility firms in Kenya, disposal of e-waste is haphazard. Most methods used are usually those that are cheap, less involving and utilizing least time. Inventories of e-waste are not updated. Most utility firms usually donate e-waste to schools. The donated computers do not work for long before being dumped in stores and dumping sites. Some of the commonly used methods which utility firms use are public auction, destruction, dumping, burying, donation and trade. The Kenya government and its people will have to use more resources in health-related issues in additional to dealing with environment degradation if the hazardous components end up in dumpsites. Considering this, the study aimed at investigating the underlying reasons for e-waste disposal strategies adopted by utility companies in Kenya some of which are large generators.

1.3. Research Objectives

1.3.1. General Objective

To examine determinants of e-waste disposal strategies by utility companies in Kenya

1.3.2. Specific Objectives

- To determine the influence of stakeholder awareness on e-waste disposal by utility companies in Kenya.
- To investigate the moderating effect of regulations enforcement on e-waste disposal by utility companies in Kenya.

1.4. Research Hypotheses

- H_{o1}: Stakeholder awareness has no significant influence on e-waste disposal by utility companies in Kenya.
- H_{A1}: Stakeholder awareness has significant influence on e-waste disposal by utility companies in Kenya.
- H_{o2}: Regulations enforcement has no significant moderating effect on e-waste disposal by utility companies in Kenya.
- H_{A2}: Regulations enforcement has significant moderating effect on e-waste disposal by utility companies in Kenya.

1.5. Scope of the Study

The study focused on utility companies in Kenya which include companies and organizations which provide services to the public especially water, electricity and telecommunications. The employees who deal with e-waste in these companies formed the population of the study. The study samples were drawn from these individuals.

2. Literature Review

2.1. Introduction

This chapter considered theoretical as well as empirical literature and conceptual framework. Theories put forward by various writers were explored. The chapter reviewed literature on stakeholder awareness in relation to e-waste disposal by utility companies. The chapter concluded with the discussion of the research gap.

2.2. Theoretical Review

From its occurrence, e-waste management process has many activities which have been approached by different theories. It is no wonder that many theories have been utilized to help the academicians understand the nature of those

activities, and to help practitioners successfully manage the process. This creates confusion among the researchers of this phenomenon. It is common knowledge that each activity can be described by several frameworks that are embedded in various theoretical approaches. Two theories were reviewed which included waste management theory and awareness theory as applied in E-waste management.

2.2.1. Waste Management Theory

Waste Management Theory (WMT) is a conceptual description of waste management, providing definitions of all waste-related concepts, and suggesting a methodology of waste management. A domain-specific set of problems is put forward, described and their relationships explained, thus providing a system of logically interconnected knowledge sets. Waste management should be understood as a system composed of physical things, human activities, and links between and within the former and latter. In such a system, the physical things would refer to waste-related materials and processing devices, while the human activities would include any activities which are affected by or have an effect on these physical things. Pohjola and Pongrácz (1998) named this system a Waste Management System (WMS).

2.2.2. Awareness Theory

As a concept, awareness has been applied in many fields of science, philosophy and economics. Awareness is realized through a process of recognition of certain features in an object.

The model is then represented as in equation 2.1. In the model, the k most often repeated features are represented as 1, 2…, k. The agent picks object 1 if

$\text{wo} + \sum_{f=1}^{k} \text{wf} > \sum_{f=1}^{k} vf$ …… equation 2.1

Item	Description
w_f	Feature f with weight w
v_f	Feature f with weight v
w_o	Initial bias in favour of object 1

Table 1

2.3. Empirical Review

2.3.1. Stakeholder Awareness Construct

From the theory of awareness, the construct of stakeholder awareness will consider predictors illustrated in Table 2.

Predictor (feature)	Description	Reference
Harzadous (h_z)	Stakeholder awareness of the hazardous nature of e-waste?	Widmer et al (2005), OECD (2004), Anuj et al. (2014), Tocho and Waema (2013)
Sensitization (s_z)	Stakeholder offer or participate in sensitization programs using Road shows, TV, Internet, newspapers?	Tocho and Waema (2013), Swati et al. (2014), Anuj et al. (2014), Gathuka (2013)
Training (t_n)	Stakeholder offer or participate in training on e-waste handling at seminars and workshops?	Tocho and Waema (2013), Anuj et al. (2014)
Public information (p_i)	Stakeholder issue warnings or labels on e-waste such as product harzard warning, durability warning, expire date, energy efficiency warning?	Tocho and Waema (2013)
Labelling (l_b)	e-waste labelled for hazardous nature, energy efficiency, recyclability?	Anuj et al. (2014), Tocho and Waema (2013)
Banners and Brochures (b_b)	Stakeholder use banners and brochures, notice boards to communicate e-waste issues?	Anuj et al. (2014), Tocho and Waema (2013)
Forums for e-waste policy framework (fp_e)	Participating in forums for e-waste formulation and improvement	Widmer et al. (2005), Tocho and Waema (2013).

Table 2: Predictors of Stakeholder Awareness

2.4. Conceptual Framework

The conceptual framework depicted by Figure 1 illustrates the relationships that exist between the dependent and independent variables under study. The dependent variable is the disposal of e-waste. The Independent variable to be investigated in this study and establish level of influence on the dependent variable is the Stakeholder awareness and regulations enforcement as a moderating determinant.

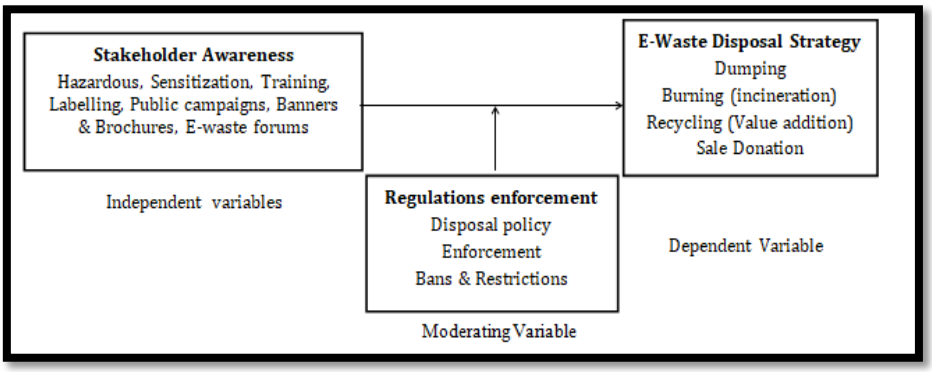

Figure 1: Conceptual Framework.

2.5. Research Gaps

E-waste research in Kenya has mostly investigated e-waste management from the point of view of regulatory and policy frameworks. This is demonstrated through research work by Waema et al. (2008), Tocho and Waema (2013), Gathuka (2013) and, Ndolo and Omwenga (2015). E-waste management and its implication to the strategic competitiveness of a firm has not been investigated as a distinct subject.

Despite disposal methods being regulated in Kenya by the procurement and disposal act, 2015, the government departments and corporates including utility firms have the leeway of dumping waste as one of several alternatives when deciding on disposal of e-waste. The method of decision making is not specifically driven by the fact that e-waste is hazardous. Research carried out in Kenya has not addressed stakeholder awareness and limited data is available on the awareness level of the Kenyan Public as regards e-waste effects. This creates a gap which this study attempted to bridge.

3. Research Methodology

3.1. Introduction

This chapter covered research design, population, sample and sampling techniques, data collection instruments and pilot test. Each of these sections was discussed in relation to the proposed study objectives.

3.2. Research Design

The research philosophy used in this study was positivism where hypotheses are generated from existing theories and tested through data analysis. Both qualitative and quantitative methods were used. Descriptive statistics were used to establish the relationship between the dependent variable of e-waste disposal and the independent variables of awareness and regulations enforcement as shown on the conceptual framework.

Survey design was employed to establish these relationships. According to Saunders, Lewis, and Thornbill (2009) survey design is a popular method to answer who, what, where and how questions. Quantitative data analysis using questionnaires was used to find out the relationship between the dependent and independent variables. Various analytical tools were used to establish the required statistics.

3.3. Target Population

The study focused on utility companies in Kenya which included companies and organizations that provide services to the public specifically water, electricity and telecommunications. The population of the study comprised utility companies in water, electricity and telecommunications sectors in Kenya. Water utility companies are in county governments in all the forty-seven counties. Utility companies that deal with electricity are KPLC, KETRACO, KENGEN, REA and GDC. Public telecommunication companies are Telkom Kenya, Safaricom and Airtel. The individuals who deal with e-waste in these companies formed the target population of the study.

Since the study sought to examine e-waste disposal strategies in Kenya it was necessary to target employees who make e-waste related decisions in the utility companies. The research therefore focused on the employees who dealt with e-waste within these organizations. The employees formed the target population. The designations of the employees included Directors, Managers, Engineers, Technicians, Accountants and Employees. The category of officers constituted systems administrators, ICT, Billing and Commercial, Clerks and meter reading employees.

3.4. Sampling Frame

The sampling frame proposed for this study constituted the employees involved in e-waste handling for each utility company. The interviewees were employees including functional and operational employees in the departments within the utilities. The employees were considered to be key informants for the research. In addition, the departments in which the intended respondents work were the key departments in which e-waste was generated and processed. The interviewees were expected to be involved in e-waste disposal process. Sample frame is shown in Table 3.

Utility Firm	Number of Employees
GDC HQ	46
Kengen HQ	14
Ketraco HQ	23
KPLC HQ	142
REA HQ	71
Airtel	52
Safaricom HQ	37
Telkom Kenya	34
County HQ (47)	765
Total	1184

Table 3: Sampling Frame
Note. HQ=Headquarter, Source: Human Resource Registry at the Utility Companies Premises

3.5. Sample Size and Sampling Technique

The sample for this study constituted employees drawn from individuals who dealt with e-waste directly in each of the public utility companies.

3.5.1. Sample Size Formula for Finite Population

When the target population is finite, the formula (Krejcie & Morgan, 1970) used to determine the sample size is as shown in Equation 3.1.

$$S = \frac{X^2 NP(1-P)}{d^2(N-1)+X^2P(1-P)} \quad \ldots\ldots\ldots\ldots Equation\ 3.1$$

$$S = \frac{1.96^2 \text{x} 1184 \text{ x } 0.5(1-0.5)}{0.05^2(1184-1)+1.96^2 \text{x} 0.5(1-0.5)}$$

$$S = \frac{1137.1136}{2.9575 + 0.9604}$$

$$S = \frac{1137.1136}{3.9179} = 290.235 \approx 290$$

Where;

R	Required Sample Size
X	Z value (e.g., 1.96 for 95% confidence level
N	Population size
P	Population proportion (expressed as decimal) (assumed to be 0.5 (50%)
d	Degree of accuracy (5%), expressed as a proportion (0.05); It is a margin of error

Table 4

3.5.2. Sampling Technique

The study applied simple random sampling technique to arrive at the sample size of 290 determined in Section 3.5.1. Random sample spacing = 1184/290 ≈ 4. Proportional stratified random sampling was used to allocate strata sample size using Equation 3.2.

$$n_i = \frac{nN_i}{N} \quad \ldots\ldots\ldots\ldots Equation\ 3.2$$

Where n= Sample size =290, N= Total population = 1184, N_i = Strata Population, n_i = Strata sample size. This is illustrated in Table 4

Utility Firm	Strata Population (N_i)	Strata Sample Size (n_i)
GDC HQ	46	11
Kengen HQ	14	4
Ketraco HQ	23	6
KPLC HQ	142	35
REA HQ	71	17
Airtel	52	12
Safaricom HQ	37	9
Telkom Kenya	34	9
County HQ (47)	765	187
Total	1184	290

Table 5: Strata Sample Size
Note. Hq=Headquarter, Ni = Population of Strata And, Ni Is the Sample Size of the Strata

3.6. Research Instruments

The instruments used included questionnaires, and open-ended questions. The questions implored demographic data that sought to explain the experience of the respondent on e-waste issues. Open ended questions assisted to collect data that allowed content analysis to prod the respondent to give wider views on e-waste issues. These questions were included in the last section of the questionnaire.

3.7. Data Collection Procedure

The study used primary data which were collected through face-to-face interviews with the researcher and by the use of questionnaires. Review of secondary data contained in company documents especially the inventories were explored. Mugenda and Mugenda (2003 p. 86) define an interview guide as "a set of questions that the interviewer asks when interviewing". The respondents interviewed were those involved with formulation and implementation of organization's strategy that deal with disposal of e-waste.

The instruments made it possible to obtain data required to meet specific objectives of the study (Yabs, 2010). Observations made that concern e-waste disposal were recorded. The data collected provided an insight in understanding how utilities decide on e-waste disposal process.

3.8. Pilot Test

The pilot test used in this study involved developing and testing the adequacy of the research instruments which were administered on a small scale to a group of selected respondents. The pilot group was as similar as possible to the target population and the size was at most 10% or 29 respondents of the target study sample. The actual study used 20 respondents which was approximately 6.9% of the sample size. The pilot assisted in assessing the feasibility of the final study and whether the research protocol was realistic and workable. The pilot helped to determine whether the sampling frame and techniques used for sampling were effective.

This approach assessed the likelihood of occurrence of logistical problems when using the proposed methods. The pilot assisted to estimate variability and reliability of the research instruments. The outcomes helped to determine suitable sample size while collecting preliminary data (Teijlingen, Rennie, Hundley, & Graham, 2001). The pilot test was used to develop fine-tuned research questions and research methodology.

4. Research Findings and Discussion

4.1. Introduction

This chapter covered research findings and analysis of the data collected from the Utility firms which comprised of water companies in the forty-seven counties, electricity utility companies, and the major telephone companies in Kenya. The chapter has subsections on response rate and the descriptive statistics. The chapter covered analysis of the assumptions of Ordinary Least Squares (OLS) in regression analysis with and without the moderating factor. Discussions on the findings are also included in this chapter.

4.2. Response rate

The response rate was analyzed as shown in Table 6. The study surveyed 203 respondents out of the expected 290 which was equivalent to 70%. This was deemed adequate as Saunders and Lewis (2009) recommend an average response rate as low as 30% for survey research.

The researcher examined the questionnaires for the fullness of data completion. Three (3) questionnaires were found to have been poorly filled up with a lot of missing data and inconsistent content. The questionnaires were therefore rejected and omitted from further analysis. 203 questionnaires had been filled correctly and accurately.

Utility Firm	Strata Population N_i)	Strata Sample Size (n_i)	Actual Data Collected	% Data Collected Per Strata
GDC HQ	46	11	6	54.5
Kengen HQ	14	4	3	75
Ketraco HQ	23	6	5	83.3
KPLC HQ	142	35	26	74.3
REA HQ	71	17	9	52.9
Airtel	52	12	0	0
Safaricom HQ	37	9	8	88.9
Telkom Kenya	34	9	9	100
Water Utilities in County HQ (47)	765	187	137	73.3
Total	1184	290	203	70.0

Table 6: Response Rate for Data Collected Per Strata

Note. HQ=Headquarter, N_i = Population of strata and, n_i is the sample size of the strata

4.3. Background and General Information

Background and general information responses were in the first section of the questionnaire. The questions were in three sections. The first question required respondents to name the organization in which they work, the second question was the town or county name, the third question was the designation in the company, fourth question the department or section in which the respondent worked and finally the duration of working in the organization. This set of questions sought an insight into how relevant and experienced the respondent was in giving the required opinions.

As shown in Table 5, eight (8) utility firms responded out of the expected 9. Airtel limited did not respond. The counties surveyed were 33 out of the expected 47 counties. The response rate was 70.2 %. According to Mugenda and Mugenda (2003) response rates of 70 % and above are excellent when used in a survey.

4.3.1. Position in the Organization

The study sought respondents view regarding their positions in the organization. Results were as indicated in Table 7. The respondents were grouped into six categories. Table 6 shows the response frequency per group that included Directors (3%), Managers (12.3%), Engineers (10.8%), Technicians (5.4%), Accountants (6.9%) and officers (61.6%).

The officer group consisted of systems administrators, ICT support, Billing and Commercial, Office clerks and meter reading employees. The distribution closely follows the pyramidal nature of organizational hierarchal structures in most organizations with few directors on top and most employees at the bottom of the pyramid.

	Frequency	Percentage
Director	6	3
Manager	25	12.3
Engineer	22	10.8
Technician	11	5.4
Accountant	14	6.9
Officer	125	61.6
Total	203	100.0

Table 7: Position in the Organization

4.3.2. Department of the Respondent in the Organization

Respondent's view regarding their departments was as indicated in Table 8. 32.5% of the respondents worked in ICT department, 3.9% in Procurement and Stores, 26.1% in Technical, 11.3% in Commercial, 11.8% in Finance, 6.9% in Planning, and 7.5 % in Administration. ICT and Technical Department made the bulk of the respondents. The two groups were more involved in ICT equipment handling in the organizations.

The respondents' observations are deemed to be more objective and experienced due to the frequent interaction with ICT equipment and e-waste at the technical level.

	Frequency	Percent
ICT	66	32.5
Procurement & Stores	8	3.9
Technical	53	26.1
Commercial	23	11.3
Finance	24	11.8
Planning	14	6.9
Administration	15	7.5
Total	203	100.0

Table 8: Department of Respondent

4.3.3. Duration of Working in the Organization

The study established respondents view regarding working duration in the organization. Findings from descriptive analysis were as shown in Table 9. The results indicated that 48.8% of the respondents had worked for less than five years, 26.1% of them had worked for between 5 years to 10 years while 25.1% of the respondents worked for more than 10 years. This pattern is indicative of the fast-growing nature of ICT processes and structures in most organizations. Overall, the study had 51.2% who had worked for more than 5 years compared to 48.8% who were below five years which mean they had experience in the field of handling e-waste.

		Frequency	Valid Percentage
Valid	Less than five years	99	48.8
	5 to 10 years	53	26.1
	More than 10 years	51	25.1
	Total	203	100.0

Table 9: Duration of Working in the Organization

4.4. Descriptive Statistics on the Constructs

Responses on each question were analyzed using SPSS. The response on each Likert scale question was tabulated and the percentage out of 203 shown.

4.4.1. Stakeholders Awareness Influence on Disposal of e-waste

Respondent's views were sought in relation to stakeholders' awareness**.** The data was first taken through factor analysis to ascertain the validity of the instrument in measuring stakeholders' awareness. The analysis was first done to establish the sampling adequacy of the individual questionnaire using Kaiser Meyer Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity. The results were presented in Table 10.

KMO values range from 0 to 1. Cerny and Kaiser (1977) observed that KMO values greater than 0.8 are acceptable indicating that the sampling is adequate while values less than 0.5 may not be useful for Factor analysis. This study had a KMO of 0.860 which means that factor analysis may be applied. Bartlett's test measure whether the variables are correlated and whether there is significant multicollinearity (Todd, 2013). Values less than 0.05 indicate that factor analysis is applicable to the study data. This study results had a value of 0.000 which means that factor analysis was suitable for structure detection.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.860**
Bartlett's Test of Sphericity	Approx. Chi-Square	865.720
	df	36
	Sig.	.000

Table 10: KMO and Bartlett's Test

The construct of stakeholder awareness investigated respondents' level of awareness on pertinent issues regarding e-waste. The results are shown in Table 11. 47.8% of the respondents strongly and/or agreed with the statement that stakeholders were aware of e-waste. This recorded (Chi Square 20.818, with df of 4, p=.000). The result satisfies the Chi Square goodness of fit test. On the other hand, respondents were not sure whether stakeholders were aware of the current shortcomings in the handling of e-waste. 44.4% of the respondents agreed, 15.8% of them were neutral while 39.9% of the respondents disagreed. This recorded (Chi Square 47.911, with df of 4, p=.000). The result satisfies the Chi Square goodness of fit test.

Close relation is observed to findings by Korin (2014) who found that 86% of the respondents were aware of the term "e-waste" in the study carried out at the Wisconsin state in USA but lacked knowledge on pertinent issues in e-waste. Anuj, Tara. Pandey and Nisha (2014) had similar observations in the study carried out in India's Ahmedabad city of Gujarat where 66% of the respondents were familiar with e-waste issues with a similar fraction being unaware of specific issues pertaining to e-waste.

Contrary to this study, Gathuka (2013) observed that over 54.7 % of the respondents lacked public knowledge on safe methods of e-waste disposal at the University of Nairobi. Gathuka also observed that lack of sensitization was observed by 45.3 % of the respondents as having influence on the way e-waste was disposed at the University of Nairobi which closely relates to the findings of this study. In Kenya, Tocho and Waema (2013) observed that 73 % of the respondents were aware of e-waste issues. This study therefore concludes that although stakeholders are aware of e-waste as an issue, they lack knowledge on the pertinent issues pertaining to the subject such as the hazardous nature of e-waste.

	SA (%)	**A (%)**	**U (%)**	**D (%)**	**SD (%)**	**Chi Square**	**P value**
Most of the stakeholders are familiar {aware of} e-waste	31(15.3)	66(32.5)	35(17.2)	38(19.2)	33(15.8)	20.818	0.000
Stakeholders are aware of the current shortcomings in the handling of e-waste	19(9.4)	71(35.0)	32(15.8)	56(27.6)	25(12.3)	47.911	0.000
The company has recognized that environmental awareness is a source of competitive advantage	45(22.2)	78(38.4)	42(20.7)	33(16.3)	5(2.5)	67.616	0.000
Valid N (listwise)	203						

Table 11: Statistics on Stakeholder Awareness

4.4.2. Regulations Enforcement Influence on Disposal Strategy

Results on regulations enforcement illustrated in Table 12 established that respondents were undecided whether the company has appropriate mechanisms for enforcing policy on e-waste handling. 31.1% of the respondents agreed, 28.1% of them were undecided while 40.9% of the respondents disagreed registering a (Chi Square 30.276, with df of 4, p=.000) which satisfies Chi Square goodness of fit test.

The results are similar to the study by Anuj, Tara, Pandey and Nisha (2014) whose investigations in India observed that 64 % of respondents had no knowledge of policies on e-waste. In Kenya, Tocho and Waema (2013) observed that only 20% of the respondents had policies in place. Gathuka (2013) had also observed that 45 % of the respondents at the University of Nairobi had indicated that there were not aware of any e-waste policies in the institution.

	SA (%)	A (%)	U (%)	D (%)	SD (%)	Chi Square	P value
The company has appropriate mechanisms for enforcing policy on e-waste handling	19(9.4)	44(21.7)	57(28.1)	57(28.1)	26(12.8)	30276	0.000
The policy specifies bans restrictions on certain materials and disposal methods for e-waste	15(7.4)	37(18.2)	55(27.1)	62(30.5)	34(16.7)	33.921	0.000
Valid N (listwise)	203						

Table 12: Descriptive Statistics on Regulations Enforcement

4.4.3. E-waste Disposal Strategy

Finally, respondents' views regarding e-waste disposal were established. The analysis findings were compiled and presented as shown in Table 13. The respondents disagreed that more than 50% of e-waste is disposed through recycling. 50.7% strongly and/or disagreed with disposal through recycling with (Chi Square 23.773, with df of 4, p=.000) which satisfies Chi Square goodness of fit test. On the contrary, respondents were neutral on the statement that the company upgrades much of its electronic systems instead of buying new ones. 45.3% of the respondents agreed, 17.2% of them were undecided while 37.4% of the respondents disagreed. The results recorded a (Chi Square 35.695, with df of 4, p=.000) which satisfy Chi Square goodness of fit test.

Contrary to this study where only 29.4% reported disposal was done in designated dumping sites. Okoye and Chijioke (2014) on the research carried out at Onitsha, Southeastern Nigeria observed that 36.4 % of the respondents reported that disposal was done in designated dumping sites. 9.1% noted that disposal was by way of selling to recyclers in Onitsha as compared to 39.4 % in this study. 18% reported that disposal is in any available dumping site in Onitsha while none of the respondents reported dumping by burning or incineration or dumping into the sea or river bank in Nigeria.

The descriptive comparisons defer in quantities but agree on the trend as the figures for the dumping locations are closely related. The sale to recyclers variance can be explained by the considerable difference in the sample sizes where the Onitsha study had a sample size of 110 as compared to this study which had a sample size of 203. Another explanation could be due to improved knowledge and awareness of the stakeholders due to the time and geographical differences (regions) of the two studies. This fact was observed by Korin (2014) in the study at Winconsin though the study did not investigate how it could be explained. This study concludes that the respondents' views indicated that e-waste is not processed for value addition in most organizations and that there are no known designated disposal locations by respondents.

	SA (%)	A (%)	U (%)	D (%)	SD (%)	Chi Square	P value
More than 50% of e-waste is disposed through recycling	14(6.9)	41(20.2)	45(22.2)	52(25.6)	51(25.1)	23.773	0.000
The company upgrades much of its electronic systems instead of buying new ones	23(11.3)	69(34.0)	35(17.2)	50(24.6)	26(12.8)	35.695	0.000
Old systems refurbished for further usage	17(8.4)	71(35.0)	38(18.7)	48(23.6)	29(14.3)	41.310	0.000
More than 50% of e-waste is disposed through dumping	25(12.3)	49(24.1)	49(24.1)	52(25.6)	28(13.8)	16.581	0.000
Valid N (listwise)	203						

Table 13: Descriptive Statistics on E-waste Disposal

4.5. Tests for Ordinary Least Squares (OLS) Assumptions

4.5.1. Test for Normality

To test for normality of the dependent variable (E-waste disposal), the study employed the Kolmogorov-Smirnova (KS) and Shapiro-Wilk test (SW). This assisted in establishing the appropriate tests to be conducted and ensure that assumptions of normal distribution are upheld. Following the Sharpiro and Wilk (1965), the tests reject the normality hypothesis if the p-value is less than or equivalent to 0.05. The findings from the test were as presented in Table 14.

The analysis show that KS and SW statistics were 0.069 and 0.989 respectively. The p-values were 0.019 and 0.115 for KS and SW respectively. The KS test p-value was less than the 0.05 level of significance thus suggesting that the hypothesis for normality of data should be rejected indicated that the data was somehow skewed. However, the p-value for

SW test of 0.115 was greater than 0.05 level of significance indicating that the hypothesis for normal distribution of data should fail to be rejected concluding that the data is normally distributed.

Findings from Yap and Sim (2011) upon comparisons of various normality tests concluded that in case skewness is suspected as in the case in this study, then the SW test is the best test to confirm the skewness. Mendes and Pala (2003) as well as Keskin (2006) had also concluded that SW test is the most powerful normality test. In this regard, based on SW test the study concluded that the data on the dependent variable was normally distributed.

Visual examination of the distribution of independent variables on the dependent variable was as shown in Figure 2 and Figure 3. It is observed that minimal deviations from normality can be depicted though not very pronounced. Therefore, on overall the data appeared normally distributed. Based on SW statistics computed, the normality of the dependent variable was maintained and therefore the conducted significance test on the data was accurate (Shlin & Miles, 2010).

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
E-Waste Disposal	.069	203	.019	.989	203	.115

Table 14: Tests of Normality

a. Lilliefors Significance Correction

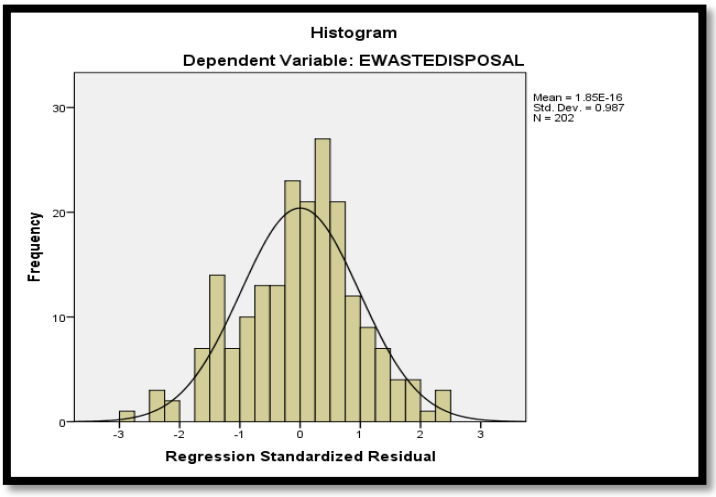

Figure 2: Histogram on Normality

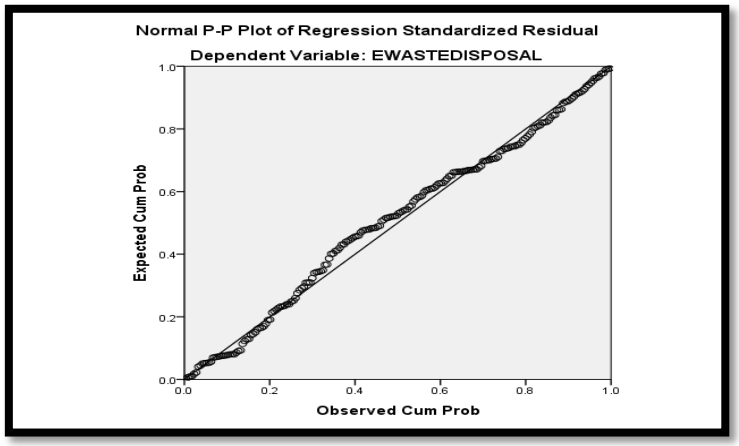

Figure 3: Normal PP Plot

4.5.2. Linearity Test

The study employed the comparison of means to test for linearity. This was done with the following decision-making rule:

- If the value of sig. deviation from linearity is greater than 0.05, then the relationship between the independent variables is linearly dependent.
- If the value of sig. deviation from linearity is less than 0.05, then the relationship between independent variables with the dependent is not linear.

Results from the analysis were as presented in Table 15. The findings indicated that the Deviation from linearity was 0.821. This value was greater than 0.05 indicating that the relationship between the independent variable and the dependent variable (stakeholder awareness) are linearly dependent. As such, the study concluded that the data for e-waste disposal and stakeholders' awareness met the requirement for the linearity assumption.

			Sum. of. Squares.	df.	Mean. Square.	F.	Sig.
E-Waste Disposal * Stakeholders Awareness	Between Groups	(Combined)	23.541	38	.619	1.641	.018
		Linearity	12.756	1	12.756	33.789	.000
		Deviation from Linearity	10.785	37	.291	.772	.821
	Within Groups		61.534	163	.378		
	Total		85.075	201			

Table 15: ANOVA on Linearity Test on E-waste Disposal and Stakeholders Awareness

4.5.3. Test for Heteroskedasticity

The study utilized Breusch Pagan (BP) test to examine whether the data was heteroskedastic or homoscedastic. Table 16 shows the results of the test. The null hypothesis for homoskedasticity failed to be rejected. As such, the data for dependent and independent variables was concluded to be homoscedastic.

	SS	df	MS	F	Sig
Model	2.075	5	0.415	0.405	0.106
Residual	11.276	11	1.025	-999	-999

Table 16: Anova on Heteroscedasticity Test

Breusch-Pagan (BP) and Koenker test statistics and sig-values:

	LM	Sig
BP	1.038	'959
Koenker	2.643	0.755

Table 17

4.6. Correlations Analysis

Pearson product moment correlation coefficient was used to indicate the relationships between the independent and dependent variables. The responses were first computed into a composite score of their means. This was possible because the responses were in a Likert scale making it possible to compose them together into a composite score. The scores for the independent variables were then correlated with composite scores of the dependent variable.

4.7. Hypothesis Testing

The study set to test the hypothesis of the study in examining the determinants of e-waste disposal by utility companies in Kenya. The study used the analysis of variance (ANOVA) at a level of significance of $p<.05$. If the level of significance is greater than the p-value, the null hypothesis fails to be rejected and when level of significance is less than the p-value the null hypothesis is rejected.

The hypothesis H_{01} indicated that stakeholders' awareness has no significant influence on e-waste disposal by utility companies in Kenya. Simple regression analysis on this hypothesis gave the results shown in Table 18.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	-387[a]	.150	.146	.60133

Table 18: Model Summary on Stakeholder Awareness
a. Predictors: (Constant), Stakeholders Awareness

R-squared from the model summary was 0.150. Stakeholders' awareness could only count for 15.0% of the total variance. The remaining 85% could be accounted for by factors not included in this model. Findings from analysis of variance gave the results shown in Table 19

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	30.363	1	30.363	35.557	.000[b]
Residual	171.637	201	.854		
Total	202.000	202			

Table 19: ANOVA on Stakeholder Awareness

From the table, the F-statistic value ($F_{(1,200)} = 35.276$, $p=.000$) was found to be significant at $p<0.05$ level of significance. Therefore, the study observed that stakeholders' awareness had a significant influence on e-waste disposal by utility companies in Kenya. Stakeholders awareness plays a significant role in determining e-waste disposal.

Model Coefficients						
Model		Unstandardized Coefficients		Std Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.962E-016	.065		.000	1.000
	Stakeholder Awareness	.388	.065	.388	5.963	.000

Table 20

Model: $Y = 9.96E\text{-}016 + 0.388X_1 + 0.601$

… equation 4.1, where X_1=Stakeholder Awareness

The null hypothesis H_{01} that, stakeholder awareness has no significant influence on e-waste disposal by utility companies in Kenya was rejected.

The second hypothesis H_{02} indicated that regulations had no significant influence on e-waste disposal by utility companies in Kenya. Simple regression analysis on this hypothesis gave the results shown in Table 21.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.402[a]	.161	.157	.59661

Table 21: Model Summary on Regulations

a. Predictors: (Constant), Regulations

The R-squared value obtained from the model summary was 0.161. Regulations could only account for 16.1% of the total variance in e-waste disposal. This means that regulations had a little significant influence on e-waste disposal by utility companies in Kenya. Results from the analysis of variance were as shown in Table 4.15.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.760	1	13.760	38.657	.000[a]
	Residual	71.545	201	.356		
	Total	85.305	202			

Table 22: ANOVA[b] on Regulations

a. Predictors: (Constant), Regulations

b. Dependent Variable: E-Waste Disposal

The table gave an F-value of ($F_{(1,201)}$ =38.657, p=.000) for regulations which was significant at p<.05 level of significance. Findings indicated that regulations significantly influenced e-waste disposal by utility companies. Thus, regulations determined e-waste disposal by utility companies in Kenya.

The null hypothesis H_{02} that, regulations have no significant influence on e-waste disposal by utility companies in Kenya was rejected.

4.8. Moderation Effect of Regulations Enforcement

4.8.1. Regulation Enforcement as an Intercept Shifter

Multiple regression analysis was undertaken for the data to establish the extent to which the independent variable (including the moderating valuable) predicts the dependent variable. The findings from the analysis were as presented in Table 22. The model gave an R-squared value of 0.215.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.464[a]	.215	.207	.89031

Table 23: Multiple Regression Model with Regulations Enforcement as Intercept Shifter

a. Predictors: (Constant), Stakeholders Awareness, Regulations enforcement

ANOVA gave the results shown in Table 24. From the findings an F-value of ($F_{(2, 200)}$ =27.418, p=.000) was established and was significant at p<.05. The study observed that the independent variables (Stakeholders Awareness and Regulations enforcement) had a positive influence and vital role on e-waste disposal by utility companies in Kenya.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	43.466	2	21.733	27.418	.000[b]
Residual	158.534	200	.793		
Total	202.000	202			

Table 24: ANOVA[a] for Independent Variables Including Regulations Enforcement

a. Dependent Variable: E-waste Disposal,

b. Predictors: (Constant), Regulations, Stakeholder Awareness

Model		Unstandardized Coefficients		Std Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.572E-016	.062		.000	1.000
	Stakeholder Awareness	.260	.070	.260	3.705	.000
	Regulations	.285	.070	.285	4.066	.000

Table 25: Coefficients of Model with Regulations Enforcement as Intercept Shifter
a. Dependent Variable: E-Waste Disposal

Model: $Y = 6.57E\text{-}016 + 0.260X_1 + 0.285X_2 + 0.890$ …equation 4.2,
where X_1=stakeholder awareness, X_2=Regulations enforcement

4.8.2. Regulations Enforcement as Both Intercept and Slope Shifter

Findings on Table 26 demonstrated that R-squared value of 0.217 was established. The study observed that the independent variable in presence of moderating variable as both an intercept and slope shifter explained 21.7 % of the total variation in the dependent variable. Therefore, the inclusion of the moderating variable as both an intercept and slope shifter changed R squared by 0.002. The moderating variable enhances the ability of the independent variable to explain the changes in dependent variable.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.466[a]	.217	.205	.89157469

Table 26: Summary of the Model with Moderating Variable

The results from analysis of variance were as shown in Table27. The ANOVA gave an F-value of ($F_{(3, 199)} = 18.373$, p=.000) which was significant at p<0.05 level of significance. As such, the independent variable (stakeholder awareness) in presence of moderating variable was found to have significant influence on e-waste disposal. Thus, the independent variable significantly influenced e-waste disposal by utility companies in Kenya.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	43.814	3	14.605	18.373	.000[b]
Residual	158.186	199	.795		
Total	202.000	202			

Table 27: ANOVA[a] for Summary of the Model with Moderating Variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.017	.068		.257	.798
	Stakeholder Awareness	.268	.071	.268	3.759	.000
	Regulations	.276	.071	.276	3.871	.000
	X1M	-.039	.059	-.042	-.661	.509

Table 28: Coefficients of the Model
a. Dependent Variable: E-waste Disposal

Model: $Y = 0.17 + 0.268X_1 + 0.276X_2 - 0.042X_{1M} + 0.891$ …equation 4.3
where X_1=stakeholder awareness, X_2=Regulations enforcement, X1M = Zscore product of Awareness & Regulations
Stakeholder awareness variable is significant as shown in equation 4.1, 42 and 4.3. This shows a constant behavior when the regulations enforcement moderating variable is introduced. In this study, stakeholder awareness is therefore an important influencer of e-waste disposal strategy with or without the regulation's enforcement.
This reinforces studies by Anuj, Tara. Pandey and Nisha (2014) who found that most stakeholders were aware of e-waste as an issue. This study therefore rejected the null hypothesis and concluded as follows:

- H_{A1}: Stakeholder awareness has significant influence on e-waste disposal by utility companies in Kenya.

5. Research Conclusion and Recommendations

5.1. Stakeholders Awareness

Findings indicated that respondents agreed that most of the respondents were familiar or aware of e-waste. Findings further established that stakeholders' awareness had a positive relationship with e-waste disposal. This study concludes that stakeholder's awareness is significant in influencing e-waste disposal by utility companies in Kenya.

5.2. E-Waste Disposal

Findings indicated that respondents disagreed that more than 50% of e-waste is disposed through recycling. On the contrary, they were neutral on the statement that the company upgrades much of its electronic systems instead of buying new ones. This study concludes that utility companies are not consistent in their e-waste disposal procedures.

5.3. Recommendations

The study was focused on influence of stakeholder awareness on utility companies in Kenya. The study investigated the regulatory policy influence on the disposal of e-waste. The study recommends that further research be carried out to establish awareness on e-waste issues for the general public. Further, the focus should be expanded to include more stakeholders who handle e-waste in the supply chain and recycling.

6. References

i. Anuj, S., Tara D., Pandey T. & Nisha K. S. (2014). An Assessment of Public Awareness Regarding E-Waste Hazards and Management Strategies. *Journal of Sustainable Development and Social Change*, *5*, 120-134. doi:org/10.4236/jep.2014.52016.
ii. Baldé, C.P., Wang, F., Kuehr, R. & Huisman, J. (2015). The global e-waste monitor. United Nations University, IAS – SCYCLE, Bonn, Germany.
iii. Basel Convention. (2011). Where are We in Africa? Findings from the Basel Convention E-waste Africa Programme: Advance version: Executive summary. Retrieved from http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/WhereAreWeeInAfrica_ ExecSummary_en. pdf.
iv. Brigden, K., Labunska, I., Santillo, D. & Allsopp, M. (2005). Recycling of Electronic Wastes in China and India: Workplace and Environmental Contamination. Greenpeace Research Laboratories, Department of Biological Sciences, University of Exeter, Amsterdam, Natherlands, p. 12.
v. Brown, S. & Sibley, D. (2003). The Theory of Public Utility Pricing. New York: Cambridge University Press. ISBN-0-521-31400-3.
vi. Cerny, C.A., & Kaiser, H.F. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. Multivariate Behavioral Research,12(1), 43-47.
vii. Corder, G.W. & Foreman, D.I. (2014). Nonparametric Statistics: A Step-by-Step Approach. New York: Wiley. ISBN 978-1118840313.
viii. Darlington, R.B. (1990). Regression and Linear models. New York: McGraw-Hill.
ix. Esty, C. D. & Charnovitz, S. (2012). Green Rules to drive innovation. Harvard Business Review, March 2012. Retrieved from Https://HBR.org/2012/03/Green-rules-to-drive innovation
x. European Union. (2003b). 'Directive 2002/96/EC of the European Parliament and the (WEEE)', Official Journal Euro.Union, 46(L37), 24-39.
xi. Den Hond, F. (1996). In Search of a Useful Theory of Environmental Strategy, PhD thesis, Amsterdam: Vrije Universiteit, p. 49-74 (isbn 90-9009717-1)
xii. Free Dictionary. (2005). Definition of Public Utility. Retrieved from http://legal-dictionary.the reedictionary .com/Utility+companies
xiii. Gathuka, P. (2013). Factors influencing e-waste disposal in public organizations in Kenya: The case of University of Nairobi. Retrieved from http://erepository. uonbi.ac.ke/bitstream/handle/11295/56073/
xiv. Goforth,T. (2015). Validity and Reliability of the questionnaire. https://www.researchgate. net/publication /305693069_The_Validity_and_Reliability_of_Persian_Version of_Wijma _ Delivery_Expectancy Experience_ Questionnaire_Version_A_ among_ Iranian_Nulliparous_Women
xv. Hayes, A. & Matthes, J. (2009). Computational procedures for probing interactions in OLS and Logistic regression: SPSS and SAS implementations. *Journal of Behaviour Research Methods 41*(3), 924-936. Retrieved from http://link. Springer. com /article/ 10.3758 /BRM.41.3.924
xvi. Kaiser, H. (1974). An index of factor simplicity. *Psychometrika*, *39*, 31-36.
xvii. Kim, J. (2019). World Development Report 2019: The Changing Nature of Work. Retrieved from. https://www.worldbank.org/en/news/press-release/2018/10/11/jobs-of-the-future-require-more-investment-in-people.
xviii. Korin, F. (2014). Ewaste and Practices among Wisconsin Business and institutions. (Doctoral dissertation). University of Wisconsin. Retrieved from https://www.wisconsin. edu/waste-research /download/2011
xix. Kotter, J. (2002). Heart of Change, the Real-Life Stories of How People Change Their Organizations. New York: Amazon.
xx. Krejcie, R. & Morgan, D. (1970). Determining Sample size for Research activities. *Journal of Educational and Psychological Measurement, 30,607*-610. Retrieved from http://home.kku .ac.th/sompong/guest speaker/KrejcieandMorgan_article.pdf
xxi. Linton, D. & Yeomans, J.S. (2003). Electronic products at their end-of-life. *Journal of Electronics Manufacturing,9* (1), 45-67.
xxii. Mugenda, M. & Mugenda, G. (2003). *Research Methods. Quantitative & Qualitative approaches.* Nairobi: African Centre for Technology Studies Press.
xxiii. Nachmias, V. & Nachmias, N. (1996). *Research Methods in the Social Sciences*. London: Arnold Press.

xxiv. Ndolo, I., & Omwenga, J. (2015). Factors affecting successful roll - out of electronic waste management in Nairobi City County. *International Journal of Social Sciences Management and Entrepreneurship,2*(2), 151-165. Retrieved from www.Sage publishers.org.

xxv. Nickols, F. (2010). Three forms of strategy: General, Corporate and Competitive. Retrieved from www.nickols.us/three_forms.pdf

xxvi. Nikhil, R. & Lance, F. (2010). A Computational Theory of Awareness and Decision Making. Retrieved from http://people.cs.uchicago.edu/~fortnow/papers/awareness.pdf

xxvii. Okeyo, B. & Wangila, A. (2012). Lead poisoning in Owino Uhuru slums in Mombasa-Kenya. Eco-ethics international- Kenya Chapter, 4, 8-19.

xxviii. Okoye, A. & Chijioke, O. (2014). Assessment of the Level of Awareness of E-Waste Management and Concern for the Environment amongst the Populace in Onitsha, Southeastern Nigeria. Journal of Environmental Protection, 5(2), 212-219.

xxix. Onderi, N. (2010). Guidelines For e-waste disposal in Kenya. National Environment Management Authority Publication (Nema). Retrieved fromhttp://www.nema.go.ke/index

xxx. Peernart, K., Ravi, N. & Ming, H. (2013). Electronic waste Management approaches: An Overview. E-Waste Management Journal, *33*, 1237 – 1250.

xxxi. Pongrácz, E. (2002). *Re-defining the Concepts of Waste and Waste Management: Evolving the Theory of Waste Management*. (Doctoral Dissertation). Process and Environmental Engineering, Oulu, Finland. Retrieved from http://herkules.oulu.fi/isbn9514268210/.

xxxii. Pongrácz, E., Paul, S. P. & Riitta, L. K. (2004). Evolving the Theory of Waste Management – Implications to waste minimization. Resources Use Optimization Conference. June 10, 2004, University of Oulu, Finland. Oulu University Press: Oulu. pp.61-67.

xxxiii. Pongrácz, E., & Pohjola, V.J. (1998). Object Oriented Modelling of Waste Management. Proc. 14th International Conference on Solid Waste Technology and Management

xxxiv. Puckett, J., Smith, T. (2002). Exporting harm: the high-tech trashing of Asia. The Basel Action Network. Seattle7 Silicon Valley Toxics Coalition.

xxxv. Shapiro, S. S., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality. (complete Samples). Biometrika, 52(3/4), 591-611.

xxxvi. Saunders, P., Lewis, A., & Thornbill, A. (2009). Research Methods for Business Students. New York: Prentice Hall Press.

xxxvii. Swati, A. & Neetu, M. (2014). Electronic waste –A literature review. International Journal of science and research *(IJSR),4*(4), 1622-1624.

xxxviii. Swati, K., Suneel, P., & Sumit, S. (2014). Understanding Public Knowledge and Awareness on E-waste in an Urban setting in India. Management of Environmental Quality Journal, 25, 6, 752-765

xxxix. Teijlingen, E., Rennie, M., Hundley, V. & Graham, W. (2001). The importance of conducting and reporting pilot studies, Journal of Advanced Nursing, 34, 289-295.

xl. Tocho, A. & Waema, T.M. (2013). Towards an e-waste management framework in Kenya, Emerald insight Journal,15(5), 99–113. doi.org/10.1108/info-05-2013-0028

xli. Todd, L. (2013). Factor Analysis. Retrieved from https://www.youtube.com /watch?v =pRA3 Wapx 7fY

xlii. Waema, T., Mureithi, M., Wanjira, A., Finlay, A. & Schluep, M. (2008). *E-waste in Kenya: baseline assessment*. Proceedings of the 19th Waste Management Conference of the IWMSA, 6-10 October, Durban, Disposal Mechanisms by South Africa.

xliii. Walton, S.V., Handfield, R.B. & Melnyk, S.A. (1998). The green supply chain: integrating suppliers into environmental management process. *International Journal of Purchasing and Materials Management*, *34* (2), 2-11. Retrieved from: http://www.google.com/url?

xliv. WEEE (2003), Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Retrieved: http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/l_ 037200 30213 en00240038.pdf

xlv. Widmer, R., Heidi O., Deepali, S., Schnelillmann, M. & Heinz, B. (2005). Global perspectives on e-waste. *Environmental Impact Assessment Review,25*, 436– 458.

xlvi. Widmer, R. & Lombard, R. (2005). E-waste Assessment in South Africa a Case Study. *Environmental Impact Assessment Review,25*, 534–539. Retrieved from www.ngopulse. org/sites/default/files/e-Waste%20Assessment %20 South% 20Africa .pdf

xlvii. Widmer, R., Oswald-Krap, H., Sinha-Khetriwal, D., Schnellmann, M. & Böni, H. (2005), Global perspectives on e-waste, *Environmental Impact Assessment Review*,*25*(5), 436-458.

xlviii. Yabs, J. (2010). *Guidelines on How to Write Project Reports*. Kenya: Lelax Global.