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CELL PHONE DISPOSAL AND STRATEGIC EVALUATION OF ELECTRONIC WASTE MANAGEMENT IN KENYA, A CASE OF MOBILE PHONE DEALERS IN KISUMU COUNTY

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ABSTRACT *Strategic evaluation of electronic waste and cell phone disposal was conducted by the researchers in Kisumu County, Kenya. The researcher sought information from both the published and unpublished documents for the review. The study established that there is strong relationship between effective strategic evaluation management and cell phone disposal. The researchers concluded that there is need for the government to establish free shops in Kenya to bring the electronic wastes from the dumping sites to their proper disposal.*

KEYWORDS: Strategic evaluation, Cell phone disposal, Technology, Electronic waste.

INTRODUCTION

There is an increase of electronic wastes in the surrounding environment in both the developed and the underdeveloped nations due to the increase in level of technology across continents. Recyclers consider electronic waste a "rapidly expanding" issue (http://en.academic.ru/dic.nsf/enwiki/808743, date accessed 26/9/2013). A cell phone's shelf life is only about 3 years for the average consumer (http://www.aquasana.com/product_detail.php?product_id=27, date accessed 26/9/2013). What does this mean? It means that there is a constant replacement of the old cell phones in the market. This is as a result of the rapid progression of technology in the mobile industry (http://en.wikipedia.org/wiki/Mobile phone recycling, date accessed 26/9/2013). Cell phone coatings are typically made of lead, which is a toxic chemical that can result in adverse health effects when one is exposed to it in high levels (Alan *et al*, 2010). The circuit board on cell phones is made of copper, gold, lead, zinc, beryllium, tantalum, coltan that would require significant resources (Alan *et al*, 2010). This is why it is important to recycle old cell phones and source these increasingly scarce materials whenever possible, (Alan *et al*, 2010). Part of this evolution has involved greater diversion of electronic waste from energy-intensive down-cycling processes, where equipment is reverted to a raw material form (Igweta, 2013). This diversion is achieved through reuse and refurbishing (Alan *et al*, 2010). The environmental and social benefits of reuse include diminished demand for new products and virgin raw materials (with their own environmental issues); larger quantities of pure water and electricity for associated manufacturing; less packaging per unit; availability of technology to wider swaths of society due to greater affordability of products; and diminished use of landfills (Alan *et al*, 2010).

Statement of the Problem

As stated by the communication commission of Kenya (CCK) in the year 2007 in a report released by the government, many electronic devices contain high enough levels of toxic materials such as lead, barium, cadmium, and mercury that render them hazardous when not properly disposed. In the report, it was found that mobile phone dealers in Kenya dispose of electronics more than any other group in the electronic sector. These wastes end up accumulating and may lead to an environmental disaster if measures are not taken to manage the waste by recycling, asserted in the report. Apart from this report, many studies have been conducted on waste management. For example, Kamunde (1991), studied the influence of infrastructure on the pattern of urban growth: a case study of waste management in Chuka Town. Igweta (2013), did a study on strategic evaluation of e – waste management in procurement and disposal of mobile phones, a case of mobile phone dealers in Nairobi county and found out that most of the companies and shops dealing with electronics have no policies and measures put to ensure that there is proper disposal of the e-waste tying the findings only to cost and technology as the determinants of the influx of the electronic waste. Mwendwa, (2006) on the other hand, conducted a study on municipal solid waste management strategy selection model. Thuo, (1998) did an appraisal of solid waste management in small towns in Kenya: a case study of Othaya town, Nyeri District. From the above citations, it is evident that previous studies did not effectively address the relationship between strategic evaluation of electronic waste management and disposal of cell phones especially in Kisumu County. The researcher therefore established the extent of relationship between effective strategic evaluation management and cell phone disposal.

Knowledge Gap

Several research works have been presented concerning Cell phone disposal and electronic waste. According to Colin and Rainer (1999), on their study on European and Asian telecoms - their role in global sustainable development concluded that global impact of telecommunications developments on travel and lifestyles is poised to have a significant positive effect on the environment, through changes in working practices as well as impacting on both indoor and outdoor leisure activities. According to Leila and Jonathan (2010), on their study on new or recycled products: how much are consumers willing to pay, perceived functional risk as an important determinant of the price that consumers are willing to pay for products that have recycled or reused content. It was also found that consumers will switch from a recycled product to a new product within a smaller range of price for products with high functional risk. Roland and Vered (2009) on economics of cell phone reuse and recycling concluded that while cell phone reuse has a healthy profit margin, handset recycling is currently a byproduct of reuse. According to Wu *et al* (2008) on their assessment of toxicity potential of metallic elements in discarded electronics: A case study of mobile phones in China concluded that a single mobile phone can have a considerable toxicity to the environment, which suggests a major concern for the environmental impact of the total e-waste with a huge quantity and a heavy mass in China. The researcher therefore seeks to address the need to create awareness to Kisumu population by the use of jobless youths to bring to the attention of the population the value of these cell phones especially as

source of income to them. By so doing, the research can help as a strategy of getting these wastes out of the dumping sites. Other countries which face the same problem, this research can act as an avenue of investment opportunities to help boost revenue.

Research Objectives

The main objective of this study was to establish the relationship that exists between effective strategic evaluation management and cell phone disposal in Kisumu County, Kenya. This was to be achieved by establishing the extent of relationship between technology and management of electronic waste of cell phones in Kisumu County, establishing the extent of relationship between cost and management of electronic waste of cell phones in Kisumu County, and to establish the extent of relationship between availability of resources and management of electronic waste of cell phones in Kisumu County.

THEORETICAL FRAMEWORK

Waste Management Theory

Waste management theory suggest tools to be used to achieve set goals by environment management systems. For example, design for environment is recommended to develop such equipment assembly from which the most valuable components are easy to recover at the end of its useful life. This procedure will also help to define more practical categories and classes of waste, specify the role of waste prevention, waste minimization and waste management actions and their mutual relationships (http://www.oulu.fi/resopt/wasmin/nurminen.pdf, date accessed 26/9/2013).Environmental management systems development, and policy-making activities that can through demonstrations. In the attempt to conceptualize waste management theory as an object for the basis of a new system, modeling the theoretical parts of the existing knowledge. The structural decomposition has been done to enlighten the formation of the waste management hierarchy but still with the aim of not locking any individual objects from moving freely from one category to another. By applying the conceptual model of WMT, the interaction between these two can be both monitored and further developed. This aims for a systematic approach to generate both better WMT development combining present theories dealing with environmental engineering able also to coordinate their development as independent objects each having a target set by environmental management system purpose, as well as developing the multidisciplinary evaluated best practices for the whole field of environmental technology (Rogers, 1995).

Empirical Framework

According to a study by (Satyabrata and Nanjundappas, 2012), developing countries are expected to triple their e-waste production over the next five years. It is not only the developed countries that generate e-waste; Asia discards an estimated 12 million tonnes each year (Satyabrata and Nanjundappas, 2012) . The lifespan and lifecycle of electronic products are fast changing because of rapid technological advancements and of people's changing lifestyles and aspirations. The shortened life spans of these products tend to generate more waste than before (Satyabrata and Nanjundappas,

2012). According to a study conducted by (Edgar, 2011), the usefulness of Information and Communications Technologies (ICTs) has led to an overwhelming elastic demand for electronics most especially computing devices such as mobile phones and computers. Individuals and government institutions worldwide are adopting ICTs at a fast pace. He continues to say that widespread consumption has resulted into huge amounts of Waste of Electrical and Electronic Equipment (WEEE) or e-waste generated from non-usable or old electronics (Edgar and Gronlund, 2008). In addition, e-waste contains chemical elements that have considerable effect to the environment and human health. There are environmental regulations which are not specifically designed for e-waste (Edgar and Gronlund, 2008). These include the waste management regulations of 2006 enforced by NEMA-the institution that implements all policies relating to the environment. These laws help in controlling generation, handling, transportation, storage, or disposal of waste that threatens public health, the environment or natural resources. There is also an ICT policy instituted by Ministry of Information and Communications in 2006 (CCK, 2012).

Technology and Disposal of Electronic waste of cell Phones

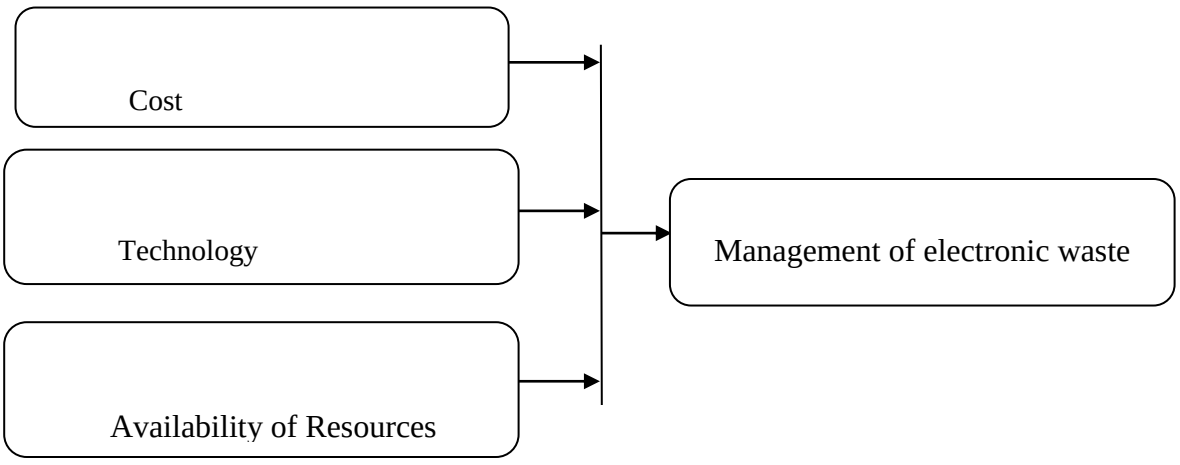
At the end of life, electronic wastes need to be disposed in an environmentally friendly manner. A 2010 United Nations Environmental Programme report shows that Kenya is responsible for more than 17,000 tonnes of e-waste every year. Out of this, cell phones contribute in excess of 150 tonnes. Many mobile phone handsets that are dysfunctional will worsen the challenge of e-waste. Rapid growth of mobile phone industry to some extent is responsible for e-waste crisis (http://www.china.org.cn/environment/2012-10/17/content_26833727.htm, date accessed 26/9/2013). E-waste contains more than 1,000 different substances which include toxic metals such as lead, arsenic, cadmium, hexavalent chromium and flame retardants used in the plastics which cause adverse socio-economic, public health and environmental impact (http://theconversation.com/e-waste-the-high-cost-of-high-tech-4378, date accessed 26/9/2013). The low cost and easy availability of electronic gadgets has further facilitated e-waste accumulation in homesteads, firms, and mobile dealer shops (UNEP, 2010).

Management and cell phone Dealers

Solid waste management services in Kenya is characterized by poor solid waste management services, uncontrolled dumping leading to serious pollution problems, unregulated private sector participation because most of the waste collection in Kenya has been privatized, lack of solid waste management infrastructure (http://www.slideshare.net/budhendra/e-wasteby-tbosoyeelect-in-physics, date accessed 26/9/2013). Emotional attachment to old electronic equipment is proving to be an impediment to disposal of e-waste in the country (http://www.slideshare.net/budhendra/e-wasteby-tbosoyeelect-in-physics, date accessed 26/9/2013). Kenyans and mostly mobile phone dealers are clinging on to old and at times obsolete computers, TV sets and hi-fi systems because they may have been their first items and have a degree of attachment (UNEP, 2007). Others do not want to part with old electronic equipment that includes tonnes of earphones, chargers and other mobile phone accessories (UNEP, 2007). Mobile phone dealers want incentives including money to give them away, not because they are using them but for sentimental value while others want incentives to give them up (UNEP, 2007). ICT firms like Safaricom has attempted to address the issue of e waste disposal by putting in place collection points at Safaricom shops where consumers can dump their obsolete mobile handsets and mobile phone accessories (UNEP, 2007). Other companies that have running programmes expected to

help in handling the e-waste include mobile handset makers Nokia and Samsung that have had disposal campaigns where counterfeit and obsolete phones are collected (and recycled) in exchange for genuine ones at discounted prices (UNEP, 2007). The NEMA regulations are implemented alongside the Environment Act that is deemed as not adequately addressing the issue of e-waste. The Act has a general penalty for poor waste management as fine of up to Sh300,000 and hazardous waste penalty goes up to Sh1 million, which is seen to be limited to firms with plants that generate industrial waste but silent on e-waste. The problem of e waste is made worse by the lack of laws that govern the management of e-waste especially for institutions including Government bodies and corporates that hold turns of such waste in terms of computers, TV sets and other obsolete electronic equipment. There is a need for laws compelling equipment manufacturers and large consumers of electronics to have in place policies for the safe disposal of e-waste is lacking. Also, there is a necessity for adequate infrastructure, expertise and financial resources to scale up e-waste recycling in Kenya (NEMA, 2009). As the number of ICT users grows, e-waste will increasingly become an environmental/health hazards and also discredit ICT as a tool for development especially in poor regions. In relation to the above background, drastic measures are required to prevent e-waste from escalation. It is estimated that 75% of electronic items are stored due to uncertainty of how to manage it. These electronic junks lie unattended in houses, offices, warehouses etc. and normally mixed with household wastes, which are finally disposed off at landfills. This necessitates implementable management measures. Governments must encourage research into the development and standard of hazardous waste management, environmental monitoring and the regulation of hazardous waste-disposal (UNEP, 2007). Governments should enforce strict regulations against dumping e-waste in the country by outsiders. Where the laws are flouted, stringent penalties must be imposed (http://www.tiptheplanet.com/wiki/Electronic_waste, date accessed 26/9/2013). In particular, custodial sentences should be preferred to paltry fines, which these outsiders / foreign nationals can pay (Igweta,2013). Governments should enforce strict regulations and heavy fines levied on industries, which do not practice waste prevention and recovery in the production facilities (NEMA, 2009).

Conceptual Framework



RESEARCH DESIGN

The researchers majorly used both the published and unpublished documents where most of the documents were gotten from the government's achieves in the pursuit of better understanding of the studies that have been conducted about electronic waste. The researchers also went ahead to critique a study which was conducted by Igweta, 2013 connecting electronic waste to procurement where the researcher failed to bring out clearly the existing knowledge gap which prompted the researcher to undertake the study and how the study could contribute to the already existing knowledge. According to Kothari (2004), before a study is carried out, the gap has to be identified and proves significant. Thus the researcher made use of the secondary data.

CONTRIBUTION TO THE EXISTING STUDIES

The study has added value to the existing knowledge of electronic waste by citing clearly the need of creating awareness, coming up with the suggestion of removing these wastes from the dumping sites to act as a business venture, re – emphasizing on the government and public roles in the management of the electronic wastes. To the academicians, the study has created a contra- indication that as much as several studies have been conducted in this field and government sensitization on the same, there is still a growing trend especially within the Kenyan population that people still cling to these electronics. So, further studies need to be done to shade more light in the question: what motivates most people to still have this view?

CONCLUSIONS

Based on the findings of the study, the following conclusions were based on the relationship between strategic evaluation and cell phone disposal. Technology was concluded to be having stronger relationship with cell phone disposal because as the technology rapidly increase or improves, the influx of the electronic wastes are experienced in both the developed and underdeveloped nations. Because of this, the study concluded that if the technology could be tied up with the quality of the electronics, most people would seek better disposal of their electronics to act as their source of income and reducing their amount in the environment. From the analysis of the study, cost of the cell phone should also match with their quality in such a way that there is an element of durability in the cell phones to reduce the rate at which the disposal is taking place since from the study, the researchers realized that it is the cheaper cell phones which have high disposal rate in the environment. In terms of the availability of resources, if the government can provide quality infrastructure to the cell phone dealers to enable them open more free shops to put into consideration the old cell phones in exchange with the new ones then the environment will remain habitable because there existed relationship between resources and where the disposals were taking place.

RECOMMENDATIONS

The study found out that there is a strong relationship that exist between cell phone disposal and effective strategic evaluation management. Therefore to overcome the problem of electronic waste the following measures are recommended: Governments should employ energetic and highly ambitious youths to sensitize the population on the importance of proper disposal of the electronic wastes. The researcher also recommends that the Kisumu population should be made aware that these electronic wastes can act as their source of income especially if they dispose them in the right way. The electronic dealers are also supposed to be made aware of the strategic issues on how to deal with the electronic waste for example, coming up with the free shops where there is an exchange going on between the old cell phones and the new ones with a little fee on top to take care of the depreciation of the latter. If these recommendations are implemented, there will exist an environment free of these threatening wastes.

REFERENCES

Alan, Kevin, Melissa and Madeleine, (2010) ,*Public procurement*: 52 articles, dating from 1961 to 2000, The International Library of Critical Writings in Economics Series), Edward Elgar Publishers.

Babu, B. , Parande, A. K., &Basha, C., A. (2007), Electrical and electronic waste: a global environmental problem. *Waste Management & Research*, 25(4), 307-318

Buenker M. (2007). The New Frontier: *E-waste. Environmental Policy and Law*, 37(1), 22-24

C.C.K, (2012) ,*Counterfeit phones statistics reports*, Nairobi, Kenya

Cairns, C., (2005), *E-waste and the consumer: improving options to reduce, reuse and recycle*,USA

Camp, W. G. (2001). Formulating and evaluating theoretical frameworks for career and technical education research. *Journal of Vocational Education Research*, 26(1).

Carl A. (2005), *Cash for Your Trash: Scrap Recycling in America*. New Brunswick, NJ: Rutgers University Press. ISBN 0-8135-4694-X.

Colin Beard, Rainer Hartmann, (1999*) "European and Asian telecoms* - their role in global sustainable development", European Business Review, Vol. 99 Iss: 1, pp.42 – 54

Edgar N., and Gronlund A. (2008), *E-waste in East African Community*.

Edgar N, (2009), *E- waste management in developing countries*, Oxford University

Greenop, Matt (2007-10-18), "Greenpeace slams Apple over 'toxic' iPhone". *New Zealand Herald*.Retrieved 2009-03-17.

Grosse, F. (2010), "Is recycling 'part of the solution'? *The role of recycling in an expanding society and a world of finite resources"*. S.A.P.I.E.N.S. 3 (1): 1–17.

Hayford, L. & Lynch, P. (*2003), A Review of Good Practice in ICT and Special Educational Needs for Africa.* Retrieved 18 March, 2010, from Imfundo, Web site:

http://imfundo.digitalbrain.com/imfundo/web/papers/SEN/SENPHASE1FINAL.pdf

http://en.academic.ru/dic.nsf/enwiki/808743.

http://en.wikipedia.org/wiki/Mobile phone recycling.

http://www.docstoc.com/docs/125240539/waste-impacts-challenges-and-the-role-of

http://www.oulu.fi/resopt/wasmin/nurminen.pdf.

http://www.tiptheplanet.com/wiki/Electronic_waste.

Igweta, K (2013), *strategic evaluation of e- waste management in procurement and disposal of mobile phones.* Unpublished document.

Judkis, Maura (2008), *"4 Ways to Earn Cash for Recycling"*. *Fresh Greens*. U.S. News and World Report.Retrieved 2008-03-05.

Kamunde, J.M, (1991).*The influence of infrastructure on the pattern of urban growth : a case study of waste management in Chuka Tow*n: University of Nairobi, Kenya

Kenya Institute for Public Policy Research and Analysis (KIPPRA), (2006),*Public Sector Procurement in Kenya: The Need for a Coherent Policy Framework.*

Leila Hamzaoui Essoussi, Jonathan D. Linton, (2010) *"New or recycled products*: how much are consumers willing to pay?", Journal of Consumer Marketing, Vol. 27 Iss: 5, pp.458

Kleine, D., & Unwin, T. (2009). Technological Revolution, Evolution and New Dependencies: what's new about ICT? *Third World Quarterly*, 30(5), 1045 – 1067

Mureithi W, Wanjira A, Schulep M, (2007), *E waste in Kenya: Baseline Assessment*, School of Computing informatics, University of Nairobi

Mwendwa, S., (2006).*Municipal solid waste management strategy selection model: Jomo Kenyatta University of Agriculture and Technology*, Kenya

National Environment Management Authority,(2009), *E waste management in Kenya*, Annual report

Prashant, Nitya (2008-08-20). "Cash For Laptops Offers 'Green' Solution for Broken or Outdated Computers". *Green Technology* Retrieved 2009-03-17. In "Opinion", *National Center For Electronics Recycling News Summary* (National Center For Electronics Recycling)

Robinson, B., (2009). *E-waste: An assessment of global production and environmental.* Washington D.C.: National Academies Press.

Rogers, E. (2003), *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Rogers, Everett M. (1962), *Diffusion of Innovations*. Glencoe: Free Press. ISBN 0-612-62843-4.

Satyabratta,S,Nanjundappas, S, (2012), *Mobile phone waste,* Resource Development Centre

Silicon Valley Toxic Corporation, (2006), "*Poison PCs/Toxic TVs Executive Summary*". Retrieved 2006-11-13.

Slade, G. (2007), *"E-Waste"*, Mother Jones.Retrieved 2007-04-03.

Thuo, J. (1998) . An appraisal of solid waste management in small towns in Kenya : a case study of Othaya town, Nyeri District: Kenyatta University, Kenya

United Nations Environment Programme (UNEP) (2010), Available at www.unep.org

United Nations Environment Programme (UNEP), (2007), Available at www.unep.org

United Nations Public Administration Network report (UNPAN) (2010), Nairob

Veneris, Yannis (1984), *The Informational Revolution, Cybernetics and Urban Modelling*, PhD Thesis. University of Newcastle upon Tyne, UK.

Wu B.Y , Y.C. Chan A. Middendorf,X. Gu and H.W. Zhong (2008) Assessment of toxicity potential of metallic elements in discarded electronics: A case study of mobile phones in China

Veneris, Yannis (1990), "Modeling the transition from the Industrial to the Informational Revolution". *Environment and Planning* A 22 (3): 399-416. doi:10.1068/a220399.