UNIVERSITY OF CAPE COAST

PURCHASING BEHAVIOUR AND THE ACCUMULATION OF

ELECTRONIC WASTE AMONG TEACHERS OF SECOND-CYCLE

SCHOOLS IN THE TAKORADI SUB-METROPOLIS

AMA MBEABA QUARSHIE

2013

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BY

AMA MBEABA QUARSHIE

DISSERTATION SUBMITTED TO THE INSTITUTE OF DEVELOPMENT

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MANAGEMENT AND POLICY

NOVEMBER 2013

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research and that no part has been presented for another degree in this University or elsewhere.

Candidate's Name: Ama Mbeaba Quarshie

Signature:……………….......................   Date…………………

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Name: Miss Harriet Potakey

Signature:…………………………....   Date………………………

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ABSTRACT

Ghana's electronic waste is alarming for a number of reasons, purchases of these electronic goods like many other normal goods are increasing, the non-existence of specific regulations on electronic waste management and the general weak enforcement of existing laws on general waste management makes the handling of electronic waste in particular a daunting task for waste managers. The study sought to examine the purchasing behaviour of teachers of second cycle schools for electronic goods and the accumulation of electronic waste within the Takoradi sub metropolitan.

The study used both primary and secondary sources of data. Data collection instrument used was questionnaire. The study employed the descriptive survey. A total of 150 respondents made up of teachers of second-cycle schools in the Takoradi Sub- Metropolis were used. The data collected during the study were entered into the SPSS version 16 to facilitate analysis. The study revealed that price promotions or price of electronic goods influences consumers' purchase of electronic goods. The teachers however, disagreed that their status in the society or community influences them to purchase electronic goods.

It was therefore recommended that sensitization and awareness creation of the disposal and management of electronic waste goods should be embarked upon by the Takoradi Metropolitan Assembly to help curb or address the challenges associated with electronic waste.

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DEDICATION

To my children Dede Manko, Korkor Shiegblie, Jojo Akpeng and Nhyira

Amissma Quarshie and all other student entrusted to my care for their education.

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LIST OF ACRONYMS ACTIVITY

BAN   Basal Action Network

CED's   Consumer Electronic Devices

CRTs   Cathode Ray Tubes

EEE   Electrical and Electronic Equipment

E-waste   Electronic waste

GDP   Gross Domestic Product

IDS   Institute for Development Studies.

IT   Information Technology

UN   United Nation

URENCO   Urban Environmental Company Limited

Pb   Lead

PBT   Persistent Bioaccumulative Toxins

PCB   Polychlorinated Biphenyls

PCs   Personal Computer

PVC   Polyvinyl Chloride

SPSS   Statistical Package for Social Sciences.

SVTC   Silicon Valley Toxic Coalition

TVs   Television Set

UNEP   United Nations Environment Program

WEEE   Waste Electrical and Electronic Equipment

CHAPTER ONE

INTRODUCTION

Background to the study

Life today is inundated with one of the most staid consequences and challenges of waste generation. The generation of waste has been a concern ever since humans started using the resources of the environment. The environment also performs the function of waste repository as waste is taken care of by natural means via the process of recycling. Unfortunately, the increasing generation of waste has made it quite challenging for the natural waste management processes of the environment to occur as the volume of these waste together with its special characteristics outruns the carrying capacity of the natural environment. This increasing generation of waste has mainly been due to population growth coupled with high consumption levels of people. The problem that this unfortunate situation brings is experienced not only globally, but at the national and local levels.

In today's modern life, the generation of a new type of waste; the waste from electrical and electronic equipment (EEE) or electronic waste (e-waste) is growing exponentially due to the increasing use of electrical and electronic devices in every aspect of modern lifestyle and its subsequent discard. It is estimated that the world's production of e-waste is about 40 million tonnes per year (UNEP 2010; Schluep et al. 2009). E-waste is said to be the fastest growing waste stream in the world (Nnorom & Osibanjo, 2008; Jain, 2008; Cui and Forssberg, 2003), with the growth rate pegged between

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3% to 5% per year, (Secretariat of the Basel Convention 2005 in Mohan et al. 2008) which is three times faster than the rate of growth in general waste (Pucket et al. 2002). This creates great management challenge to most countries worldwide. Schluep et al. (2009) have stated for instance that in the year 2006, some Latin American countries like Peru, Colombia and Mexico generated 24,420; 3,600 and 368,300 metric tonnes of e-waste respectively. Schluep et al. (2009) again contend that in 2007, China and India also generated 2,212,000 and 439,000 metric tonnes of e-waste respectively; in the same year South Africa, Morocco and Kenya also generated 59,650; 38,200 and 7,350 metric tonnes of e-waste respectively.

Schluep et al. (2009) comments on the West African situation by maintaining for instance that Senegal also recorded 3,730 metric tonnes of e-waste in 2007. This data does not only show the extent to which e- waste is skyrocketing; it also depicts an even more worrying picture about the extent of harm human consumption levels of these electronic goods (e-goods) are finally going to put unto the environment particularly in the situation where most countries dispose these waste together with household waste which finally ends up in landfills. Such huge amount of e- waste being churned out into the environment could add to the already deteriorating problem of waste management in most economies.

This indeed suggests to all environmentally apt minds a sense of crises that seem hard to sustain and yet potent enough to break the entire sanctity of our natural environment. The inconsiderate way by which the activities of man leave all sort of waste - particularly electronic - in the environment is alarming. Attempting an explanation to this social canker, Nnorom &

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Osibanjo (2008) have maintained that, it is the digital revolution that started in the late 1970s that has led to the explosive production and extensive use of electronic and electrical equipment in the world.

The 20th century undeniably marked the impact of information and communications technology (ICT) on social and economic circles. Electrical and electronic products have thus become ubiquitous in today's life around the planet. Without these products, modern life would not be possible in post-industrialized and industrializing countries. These products play a significant role in areas of development such as health (Kleine & Unwin, 2009), education (Hayford & Lynch, 2003), mobility, food supply, communication, security, environmental protection, culture and indeed in every aspect of man's life. Such appliances include many domestic electrical gadgets like refrigerators, washing machines, mobile phones, personal computers, printers, toys, TVs etc. The widespread demand for these gadgets coupled with the massive capacity of the manufacturers to produce and supply has been some of the few reasons that have made the acquisition of the electronic goods affordable. However, this has also meant that ICTs have become commodities and have over time been designed to reach their end of life sooner (Brigden et al., 2008).

In this technological age, more and more people use electronic gadgets globally because of the benefits electronic gadgets (i.e. e-gadget) give to its user. These new technologies are not only building up electronic waste but are creating growing e- waste concerns.

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Steiner (2006) maintains that mobile phones and computers make the largest waste and cause the biggest problem because they form the category that is most often replaced. He explains that the real problem has been what consumers are to do with those electrical devices that reach the end of their useful life.

One may have thought that since there is a real problem as to what consumers are to do with their old electronic goods, consumers will be mindful of the purchases of new once meanwhile whenever there is a more modern household gadget such as phones, television sets, microwave oven etc., people abandon the old ones and crave to switch on to the use of the current ones as the new ones may have a lot more functions that makes the consumers more comfortable to use. The problem is when these newly acquired household gadgets become obsolete or dysfunctional again, their disposal becomes a burden again on their owners; as there is currently no comprehensive way to dispose them in many parts of the world particularly Ghana. Better recycling practices of e-waste only exist in few developed countries.

Apart from the astronomical growth of e-waste and the task its disposal practices bring, many environmental groups have maintained that some developed countries use developing countries or emerging economies as "dumping grounds" for their e-waste. These groups also observe that the growing consumerism as well as the fast improvements in technology is leading to an increased amount of obsolete e-goods and dangerous e - waste being dumped on the world's poorest nations. E-waste is increasingly sold and exported from rich developed countries to developing ones for the stated

purpose of re-use. Such re-use exports have been touted as a means to bridge the "digital divide" and satisfy the great desire and need in the developing world to become a part of the information age through access to information technology. Unfortunately the very ugly side to this "re-use" trade is the great burden the developing countries have on their shoulders in managing the waste obsolete technologies bring.

As indicated earlier the main mode of disposal of these e-waste in most developing countries including Ghana has been through landfills and efforts aimed at finding new methods or locations to dispose this waste are futile because e-waste is laden with toxic 'heavy metals' such as lead, mercury, cadmium etc. These can leach into the soil; contaminate water bodies and the atmosphere, posing significant environmental and health risks to humans, plants and animals. The United Nations Environmental Protection Agency (UNEPA) confirms this fact by estimating that more than four million tons of e-waste hit landfills each year, causing untold health and environmental issues not only to the people who handle these waste but also to the entire settlements close to the disposal site (Nayab, 2010).

According to Nayab (2010), the growing environmental problem of e-waste is not only disturbing because of numbers; it does not lend itself to the traditional waste management solutions and unfortunately makes the handling of e-waste very burdensome. Unlike some municipal waste that decomposes and so enriches the soil thereby making it useful for farming activities if properly managed, e- waste is rather very hard and contains poisonous 'heavy metals' that are almost impossible to decompose but rather destroy the fertility of the soil, through their disposal.

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Ghana's case of electronic waste is alarming for a number of reasons; purchases of these electronic goods like many other normal goods are increasing, the non-existence of specific regulations on electronic waste management and the general weak enforcement of existing laws on general waste management makes the handling of electronic waste in particular a daunting task for waste managers and most municipal assembly authorities.

The Sekondi - Takoradi metropolis is one of the few twin cities in Ghana that has a harbour where all sorts of imports enter the country. Heavy truck loads of these obsolete electrical and electronic goods flowing out of the Ports to their various destinations within Sekondi-Takoradi township, is a common site to glimpse. Almost every few metres walk through town reveal a display of old fridges, old TV's and a host of these 'dumped imports' displayed in shops for sale.

Again, the proximity of the ports and harbours to the twin city gives both importers and buyers a fair opportunity and ease to transact business. Most of these importers find the twin city the first point of sale for some of their imports to accrue some money to clear other goods from the port. Their peculiar need for money to clear other containers from the port makes them drastically reduce the price of their goods, and most buyers in the metropolis are aware that they could get access to cheaper electronic products from these marooned importers.

High income earners who constitute the minority in the metropolis represent the few buyers who are normally able to purchase brand new electrical goods; the low and average income earners who form the majority of

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the population in the metropolis fall on the second-hand imports for their electronic needs.

Most teachers in the metropolis like many other metropolis of the country form part of the set of purchasers who mainly patronize these slightly used electronic imports. It has also become almost a norm that some awardees of many best teacher award ceremonies whether at the national, regional or school level are presented with an electronic gadget mostly fridges, television sets, blenders, sound systems among others. The question the researcher immediately asks is 'do the organizers of these events find out whether or not the particular awardee already has that electronic good' before deciding on the prize to be given. Marketers of most companies that deal in the supply of electronic goods also find it most convenient to transact business with customers who draw their monthly remuneration from the Controller and Accountant General Department to enable them easily make deductions on their pay for the payment of the purchased electronic gadget; teachers and particularly those within the metropolis are at home with this arrangement.

It is important to note that electronic goods whether purchased new or slightly used have an end of life; this point of the life of an electronic good is even more shortened for those which were purchased used since they may already have one hitch or the other; a condition that explains the catch phrase 'as it is' popularly used in the sale and purchase of these dumped electronic imports in the city. This condition makes its current user have a high tendency of discontinuing their use a short while after their purchase. As a result, it is not uncommon to see in most homes one or two abandoned electrical equipment.

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The researcher then wonders why consumers particularly teachers within the metropolis still make new purchases of these gadgets in the form they come when they have a glaring problem of proper disposal of old once.

Statement of the problem

In the Takoradi sub-metropolis of the Western Region of Ghana, the problem of managing the buildup of waste from electrical and electronic gadgets is not different from other communities of other regions. E-waste management has become an added challenge to waste managers in the metropolis. From the preliminary observation of the researcher, consumers of electronic goods within the metropolis seem unaware of what to do with their old, obsolete and dysfunctional electronic gadgets; yet majority of these consumers particularly teachers of second cycle schools and other government workers have a strong preference for new and slightly used electrical and electronic equipment. Most of the consumers for example have abandoned the use of their old but functional television sets and are now using Plasma Television sets. Some intentionally leave their old fashioned gadgets - some of which may be functional - at the electronic repair shops and never go for them again; this creates a burden for the electronic repairers since many of them no longer have spaces to keep them.

It is also a common practice to see all sorts of electronic equipment-refrigerators, microwave ovens, computers, mobile phones among others disposed together with domestic waste at dump sites, waste of electrical and electronic equipment are also mostly found piling up on verandas, basements and indeed any available space in various homes. Drawers, ward robes and in

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some cases empty cartons have become an abode for old mobile phone and its accessories mostly chargers. It is obvious that the purchases of new or slightly used electronic gadgets create a problem not only for the user but also for the environment. One may have thought that, consumers would be alert of this burden and minimise the purchases of these electronic equipment, but the crave and subsequent purchase of new electrical gadgets still occurs.

The crave for new or slightly used electronic goods despite the problem it creates for consumers and the environment incited the researcher to the find out the purchasing behaviour and the accumulation of electronic waste among teachers of second-cycle schools in the Takoradi sub-metropolis.

Objectives of the study

The general objective of the study is to examine consumers' purchasing behaviour for electronic goods and the accumulation of electronic waste among teachers of second-cycle schools in the Takoradi sub-metropolis. It aims at achieving the following specific objectives:

1. To assess the electronic goods teachers of second-cycle schools in Takoradi mostly purchase.
2. To identify the factors that influence teachers' purchasing behaviour for electronic goods.
3. To assess ways through which teachers pile up / accumulate electronic waste.
4. To assess the effects of the pile up of electronic waste in their homes.

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Research questions

The questions that the research sought to answer are:

1. Which kinds of electronic goods do most teachers of second cycle schools in the Takoradi sub- metropolis purchase?

2. Which factors influence the purchasing behaviour of the teachers for those electronic goods?

3. By what means are electronic waste piled up/build up in their homes.

4. What are the effects of the pile up of electronic waste in consumers' home?

Significance of the study

The study intends to add to the debate on the need for all consumers of electrical and electronic gadgets to be alert of the attitude that creates e-waste and provide a valuable addition to the existing literature on the environmental issues of the country particularly relating to electronic waste. It will enlighten people especially consumers on the nuisance their wild taste and references for electronic equipment brings and the subsequent pile up of e-waste they create. It will further bring home to consumers the possible health and environmental hazards their electronic waste is associated with.

It will further help local government to play a lead role in the education of consumers against the buildup of hazardous electronic wastes and thereby reduce the disposal of these wastes in landfills and residences. It will also provide in-depth analysis that includes and takes into consideration the assessments, views, and opinions of teachers on their preferences for

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electronic gadgets. It will also equip the community to understand the issues regarding e-waste and its health implications.

Delimitations of the study

The study covered only teachers of the three senior secondary schools within the Takoradi sub metropolis. The non-teaching staff of these schools was not included in the study. This was because the researcher was interested in the purchasing behavior of only the teachers and not the entire staff.

The study did not cover the purchases of general goods but only focused on the electronic gadgets among the general durable goods.

Limitation of the Study

Questionnaire was the principal tool of data collection for the study. For this reason, biases could not be ruled out. There is also the possibility that collector may unconsciously distort the data so as to make certain outcomes more likely than others. Some of the respondents were unwilling to answer the questions and even demanded to be paid before answering the questions truthfully. Some respondents were observed answering the questionnaire in haste during their free periods to quickly hand the questionnaire over to the researcher before their next class therefore was likely to provide responses that do not present the true picture of the existing situation. Even though the above limitations were observed in some instances, they were not so much to affect the validity and reliability of the study.

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Organization of the study

The study has been organized into five chapters. Chapter one, considers the introduction to the study and has the following sub headings: background of the study, statement of the problem, objectives of the study, research questions, significance of the study, the organization of the study and definition of terms. Chapter Two deals with the review of related literature and gives an overview of the works of some earlier writers and researchers on the problem under study. The literature has been reviewed under the following sub headings: concept of e-waste, consumer purchasing behaviour for electronic goods, factors that influence consumer purchasing behaviour, the buildup of electronic waste. The harzardous content of e-waste and effects of the accumulation of electronic waste on the immediate environment of their users.

Chapter Three deals with the methodology of the study and also has the following subheadings: research design, population, population sample, instrument used, procedure for the data collection and analysis. Chapter Four deals with analysis of the collected data and findings of the study. Chapter five considers the Summary, Conclusions and Recommendations.

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CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter begins with theoretical issues of electronic waste; factors that influence consumer purchasing behaviours for electronic equipment; the buildup of electronic waste; effect of the buildup of electronic waste.

Concept of e-waste

E-waste also known as 'Waste of Electrical and Electronic Equipment (WEEE)' or 'Electronic waste' is defined in various ways by different researchers. Davis & Heart (2008) and E-waste guide (2009) defined e-waste as obsolete, end-of-life or discarded appliances that use electricity. On the other hand, Peralta and Fontanos (2005:34) defined e-waste as "electronic products that no longer satisfy the needs of the initial purchaser". E-waste has become a serious environmental issue since the early 1990s due to two reasons - its rapid growth in volume and its hazardous content.

As a new addition to the waste stream, the emergence and rapid increase of e-waste demands a comprehensive management system. Although the amount of hazardous substances in e-waste is generally small, they constitute 2.7% of the total elements of e-waste (Bandyopadhyay, 2008) or 9% of the weight of e-waste (Umweltbundesamt, 2006; Sarkar, 2008). They have significant impact due to the hazardous nature, high concentration level and their persistence when disposed into the environment which may have long term effects on public health and the environment.

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The term e-waste encompasses computers and their peripherals, consumer electronics, fridges, etc. that have been disposed off by first-hand users. However, the term is also used generically to describe all waste containing electrically powered components which are valuable, but hazardous and may require special handling and recycling methods. In the views of Snap data International Group (2008) and U.S. Environmental Protection Agency (2008) electronic waste or e-waste, refers to electronic products that have been retired from use or discarded. Some definitions of e-waste reflect divergent but significant meanings. Second hand products (some of which are imported by developing countries) that are fully functional are regarded as e-waste because they (the products) can no longer serve the needs of the original purchaser.

The nature of some of these used e-products may not suit such definitions. For example a consumer can buy product *B* before their previously bought product, product *A* is obsolete, that is, it has been used for a month when its end-of-life time is 3 years. The consumer's action could result from luxurious needs or product preferences, for example, new technology features appearing in a new version of the product. Disposing off product *A* should not qualify it to be "e-waste" if it will be used by a secondary user at any time in its life time. Accordingly, Edgar (2009) intimated e-waste to be electronic equipment that are considered to be hazardous and do not, in their functional state, serve any purpose to any intending user unless the equipment has been refurbished.

The e-waste concept came to light as far back as the 1970s and 1980s following environmental degradation that resulted from hazardous waste imported to developing countries (Shinkuma & Huong, 2009). In reaction to

hazardous waste importation, the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal was instituted in 1992 to control the situation. Since then many countries have become members of the convention. Although the Basel Convention does not regulate second-hand items and some e-waste scrap (Shinkuma & Huong, 2009), it has played a role in banning exportation of obsolete products and engineering waste solutions. For example, its theme in 2006 was: "creating innovative solutions for the environmentally sound management of electronic waste" (Buenker, 2007).

E-waste phenomenon continues to flourish due to rapid adoption and use of ICTs which has contributed to increase in e-waste stream. E-waste is said to be one of the fastest growing waste streams (Cairns, 2005); growing at a rate of 3–5% per annum that is, approximately three times faster than an ordinary municipal solid waste (Davis & Heart, 2008). Increase in e-waste stream has attracted the attention of many governments, individuals and researchers due to its impact on the environment and human health. Managing e-waste has become a serious problem as new sales and replacement rates of electronic products have increased. Sales of electronic products, most notably information technology and telecom (IT) equipment, have steadily increased over the past twenty years. The U.S. EPA states that the purchase rate for electronic products, most notably information technology and telecom (IT) equipment has increased significantly in the past ten years alone. For example, over 10 million laptops were sold in the United States (U.S.) in 2002. Five years later, sales had tripled: over 30 million laptops were sold in 2007 (U.S. Environmental Protection Agency, 2008).

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This rate of growth reflects the fact that, for many people, computers and mobile phones have become a must-have component of everyday life and business. It also reflects the rate of technological obsolescence of IT products. As processor speed continues to improve rapidly, along with other vital features of the computer system, consumers have felt a need to upgrade their computers before they reach the end of their useful life. In the span of 20 years, computer processor speed has jumped from 16 MHz to 3.6 GHz; in the same time period, the average length of ownership has dropped from 8 years to 3 years (Babbitt et al. 2009; Intel 2009). Another reason for the rapid rate of growth in ownership is the fact that a significant portion of IT consumers own multiple computers simultaneously (Jackson et al. 2009). In 2006, 21% of European households owned more than one computer (Fogg et al. 2007). Other electronic products with typically longer life cycles, namely household appliances, have also seen an increase in market penetration.

In the last 20 years, the percentage of U.S. homeowners owning a refrigerator, washer, dryer and cooking range has increased from 48% to 71%; 99.9% of U.S. homes contain a refrigerator (Euro monitor International 2009). In the 7-year period from 2000 to 2007, total sales of home appliances in the U.S., including major appliances (e.g. refrigerators) and portable appliances (e.g. blenders), increased by almost 30% (Appliance 55th Annual Report 2008).

There is tremendous development in terms of technology and use of ICTs in East African Community; for example mobile markets in this region are amongst the most liberalized on the continent where Kenya, Tanzania and Uganda are on top with about 10 million subscribers (ITU, 2009). The UN

global e-government on Telecommunication infrastructure index and its components shows that there has been an improvement in use of ICTs in the region (UNPAN, 2010).

According to the Stevenson Company (2010) as cited in Brown- West (2003), recent data implies that consumers are beginning to replace their appliances before they reach end-of-life. The company report that between 2000 and 2008, trend data about washing machine replacement reveals that there is a slowly growing movement among consumers to replace their washers at young age. In 2008, 26% of washers were replaced before six years of ownership as opposed to 14% in 2000. In fact, the number of consumers who buy new washers and dryers "just because" doubled from 5.3% and 6.2% respectively in 2000 to 9.2% and 12.9% respectively in 2009 (The Stevenson Company 2010). The International Business Information Services (IBIS World) claim that in 2009, 25% of consumers bought new appliances for discretionary reasons (IBIS World 2009). Thus, because of increasing market penetration, multiple product ownership, and early product replacement, the volume of e-waste continues to grow.

Characteristic of e-waste

A report by the Urban Environmental Company Limited (URENCO) in Vietnam in 2007 indicated that electronic waste has three primary characteristics namely its valuable content, its partly hazardous nature and its rapid increase at an alarming rate.

Concerning its valuable content, the report showed that end of life motherboards for instance may well sell for more than 800 US$ per ton to

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recyclers who recover the valuable metals like gold from them. On its hazardous nature, it indicated that e waste is laden with over 1000 different substances, some of which are toxic, and can pose serious risks and create severe pollution upon wrong handling and disposal. The report emphasized that due to the fast evolution of e-technologies high rates of obsolescence occur. Combined with an explosion of new applications, e-waste produces high volumes of waste which increase globally very rapidly.

Theoretical studies on the buying behavior of consumers.

Buying decisions are normally not made in isolation it instead follows a process of interaction between purchasers, reference group, information search, the purchaser's self-concept, the environment among others.

Understanding consumers purchasing behavior for electronic goods requires firm knowledge of the consumer with regard to the above factors and how these factors interacts with each other in the course of their purchasing.

Consumer Buying Process

Various models and theories have been developed to describe the consumers' decision making and this has been considered by marketers as a good help to aid in reaching target consumers. Standard concept of consumer theory suggests that, consumer decision making goes through processing of a series of stages. While some researchers have developed five stage of the purchasing process, few others have developed multi stage purchasing models. All the processes or models basically deal with knowledge, motivation, attitude and experiences.

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According to Ratneshwar (2005), consumer decision making process consists of six stages, and referred to it as the stylized stage model. These stages include, problem recognition, information search, formation of consideration set, evaluation of alternatives, choice/purchase and post purchase process as illustrated by the model below.

Problem Recognition
Experience, Endogenous activation

Information Search
External, Internal, Alternative vs Attribute based, Global vs Local

Consideration Set Formation
Size, Composition, Construction process

Evaluation of Alternatives
Sensitivity to content, Strategy, Endogenous Activation

Choice / Decision
Rules, Risk taking, Context effect / variety seeking, Status quo / default

Post Choice / Decision Process
Satisfaction/Dissatisfaction, Emotional responses, Process Satisfaction

Figure 1: Stylised Stage model (S Ratneshwar 2005)

This model focuses more on motivational factors as the influencing factor consumers' purchasing decision; it explains the reasoning consumers' purchase of particular product or brand.

The model demonstrates that, the consumer decision making is triggered by the recognition of a problem or an arousal of a need which may arise due to various circumstances such as personal circumstances (e.g., new job or function the consumer may have assumed), marketing circumstances (e.g., an interesting advertisement or price promotion the consumer may have

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witnessed), or social comparison (e.g., the consumer in question witnessing other consumers enjoying the utility of the commodity). Once this problem or need is recognised, the search for information starts; this search can be quite extensive, internal or external (based on knowledge or environment), alternative based (additional informational search holding number of attribute constant) attribute based (additional informational search holding number of alternative constant) and global or local.

Based on the gathered information, the consumer then tries to narrow down the available set of option, which he or she considers seriously when making a purchase decision. Afterwards the consumer follows through to the evaluation of alternatives stage and goes with the alternatives which are attractive and gives aspirational benefits (e.g., luxury, sensory gratification, and aesthetic). The evaluation of alternatives is used in the choice of one alternative against the other. This choice process depends on factors such as rules used to filter alternatives (inclusion or exclusion of other alternatives); decision maker's attitude towards risk (eagerness and new product have greater risk and consumers attitude toward it) and context effects and variety seeking (compromise option and multiple items from same selection.

At the final stage i.e post purchase stage, the consumer experiences the product and finds the outcome which may be satisfactory or unsatisfactory; experiences may also be desirable or undesirable. This model is relevant to the study of the purchasing behaviours of consumers for electronic products as it shows the motives behind the decision of a consumer to purchase a particular electronic product.

Consumer purchasing behaviour for electronic goods

Consumer taste and preference attitude is mostly manifested by their purchasing behaviours; thus whatever influences consumers' taste and preference attitude for electronic goods finally motivates him to buy those electronic goods he intends to have. Their purchasing decisions according to Kotler et al (2005) involve five main stages; they express these stages to include need recognition, information search; evaluation of alternatives, purchase decision and finally the post purchase behavior as demonstrated in their model in Figure 2.
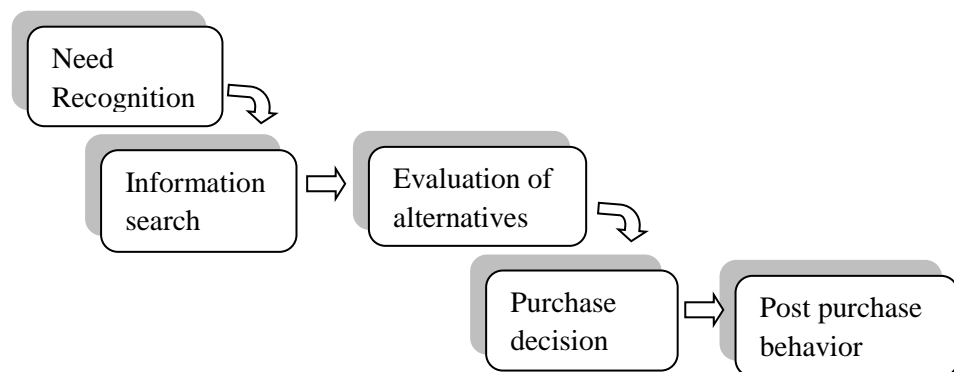
Figure 2: Household Decision Making Process (Kotler et al, 2005).

Need recognition

The buying decision process starts with the consumer recognizing a need for a product (Kotler et al., 2005). Solomon (2004) confirms this stage and adds that whenever the consumer sees a significant difference between his or her current state of affairs and some desired or ideal state, need recognition occurs since the consumer then perceives that there is a problem to be solved, small or large, simple or complex. According to him, this process is often stimulated by marketing efforts although need recognition can and does occur

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naturally. This implies that at the need recognition stage, consumers for instance perceive a problem if their current stage reveals a consumer that still uses old fashioned electrical gadget while the ideal stage discloses the use of more modern gadgets. To add, assuming a consumer had originally purchased and begun using the old fashioned television set with the cathode ray tube (CRT) and he suddenly encounters a marketer or experiences the new plasma television set, he then perceives the need for his functional but old fashioned television set as a gadget that must be changed, here, need recognition state is said to have occurred.

Information search

Kotler et al. (2005), argue that after the need for a product is noticed, the consumer could immediately buy a suitable product depending on how strong the need is. Otherwise the consumer might not take any action except to memorize the need. The consumer will most likely start the information search stage; a stage in which their attention to the product is heightened. Sources of information according to Kotler et al. (2005) could be from personal sources for instance family, friends or neighbours; commercial sources such as catchy advertising and persuasive discussions with sales persons. Public sources such as the mass media or consumer-rating organizations also serve as a good source of information to the consumer. Lastly, consumers get information from experiential sources where they now have the opportunity to handle or use the product for the first time (Kotler et al., 2005).

Consumers gather both general information about the product category and explicit information about actual alternatives in this step. This information

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is available from a number of sources; internal and external. Internal sources refer to consumer's memories and accumulated knowledge gained from previous experiences. Internal sources are used when the search activity is ongoing and where high involvement or accumulated knowledge exists. External sources on the other hand are used when specific information is needed. This might be the case when the process requires high involvement, a new discovered need, little knowledge, marketing communications, or interpersonal communications (Wells & Prensky, 1996).

Consumers actively consider a set of alternatives called evoked or consideration set during the decision making process, which is constructed from internal memory and external sources. Wells & Prensky (1996) contend that some of the alternatives are excluded; the ones that are not considered as well as those consumers are indifferent towards are placed in the inert set. Molander (1998) also argues that the consumer relies on the stored information in order to make decisions, once the decision making process starts. She also refers to other studies which have shown that the consumer engages in relatively little external information search in a purchase decision making process, even in more complex problem solving processes.

Evaluation of alternatives

Kotler et al. (2005) continue to argue that at this stage, the consumer evaluates which product to buy by considering and grading and the importance of many different attributes of the product. How the consumer evaluates the alternatives does not only depend on the consumer's personality and characteristics, but also the situation. Wells and Prensky (1996) suggest that

the evaluation in addition depends on the level of effort the consumer puts on the task. While buying food may be a very routine process where not much effort is spent, the process of buying for instance a car may result in a much higher level of effort spent. Further, sometimes consumers might buy a product on impulse and at other times they make their choice very carefully (Kotler et al., 2005).

Molander (1998) draws attention to the existence of evoked set in evaluation of alternatives. The evoked set consists of the products already in memory. Evaluation of products occurs interrelated to the knowledge the consumer already has about the product or the product group. The category in which the consumer places the product is determinant in its comparison with other products. Therefore the categorisation has a crucial effect on the evaluation process and the products in consumer's evoked set are expected to share same characteristics.

The evaluation of the different alternatives occurs in two stages. First the consumer selects certain evaluative criteria and second he/she establishes a decision rule to integrate those criteria into a choice. Commonly decisions are divided as compensatory and non-compensatory rules. The choice of a compensatory versus a non-compensatory rule is among other things influenced by the consumer's level of involvement and effort (Wells & Prensky, 1996). Compensatory rules give a chance to the product although it does not meet certain criteria in all attributes and require more mental effort from the consumer since it is more used in extended problem solving (Howard, 1989). When using compensatory decision rules, the consumers tend to be more involved in the purchase and thus are willing to exert more effort

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(Solomon, 2004). In the multi attribute compensatory rule, the consumers consider all attributes simultaneously to calculate an integrated rank ordering. The rank ordering is calculated based on all attributes weighted by their relative importance. This rule uses all of the criteria and takes their relative importance into account (Wells & Prensky, 1996).

A simple non-compensatory rule is used if the consumer has low involvement in the decision and desires to avoid applying effort in his or her choice (Wells & Prensky, 1996). When using non-compensatory rules the consumers consider each attribute by itself separately. Non-compensatory rules are made if the product knowledge or the product familiarity is low, according to Howard (1989). However, sometimes neither compensatory nor non-compensatory rules are used; instead elimination rules help consumers to discard a number of alternatives quickly and easily. For instance consumers might choose McDonald's instead of an unfamiliar restaurant and thereby lowering the risk of non-satisfaction and the complexity of the process (Wells & Prensky, 1996).

Purchase decision

The two stages evaluation criteria and purchase decision are highly connected to each other. The processes that are described in the evaluation criteria are true in this stage too. The final purchase decision is also influenced by other people's attitudes, for instance what family and friends advise. When the consumer is about to buy a product the decision might be reconsidered, due to unexpected situational factors, which could be for example, that another

purchase has become more important. Therefore, the first intention of the consumer might not result in a purchase after all (Kotler et al., 2005).

Post purchase behaviour

This last step of the model refers to the purchase results in either a satisfied or dissatisfied consumer and this is dependent on the consumer's expectations and the actual performance of the product (Kotler et al., 2005). Consumer satisfaction or dissatisfaction is determined by the overall feelings or attitude a person has about a product after it has been purchased (Solomon, 2004). The Maslow's hierarchy of need is also another model that can suggest the consumer taste and preference attitude and further influence the purchasing decision of consumers for most goods including electrical and electronic goods.
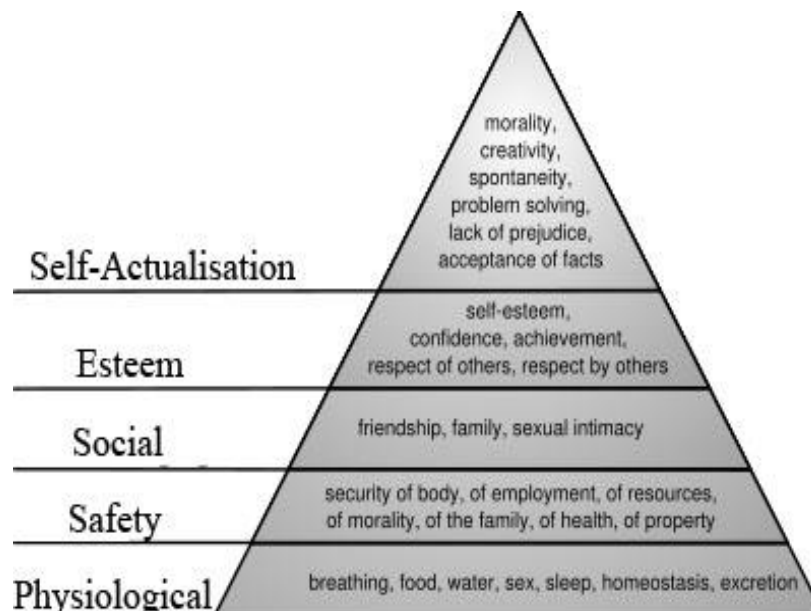
Figure 3: Maslow's hierarchy of needs (Harvey, 2007)

According to Maslow, the consumer is driven by specific needs at different times. The needs are positioned in a hierarchy according to the importance. The most commonly discussed needs are: (with the most

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important need first) physiological needs, safety needs, social needs, esteem needs and self actualisation needs. People are according to this theory trying to fulfill the most important need first and only when this need is satisfied they are going to move to the next need. That can sometimes explain why people buy a specific product and not another one (Kotler et al., 2005).

Factors that influence consumer purchasing behaviour

The behaviour of consumers is influenced by cultural, social, personal and psychological factors. These factors are explained based on the descriptions by Asch and Wolfe (2001):

1. Cultural factors influence consumers to a large extent, since individuals are formed by the society they grow up and live in. The individual learn the values, perceptions and preferences from the society. Each culture also consists of smaller groups of subcultures, which also influence the consumers' behaviour, like religious groups and social classes.

2. The social factors are reference groups, family, social roles and status. A reference group is a group that influences the behaviour of the individual, most likely a group in which the person belongs and interacts.

3. Personal factors also affects consumer's buying decisions and they are age and lifecycle stage, occupation, economic circumstances, lifestyle and personality.

4. The psychological factors, which are for example motivation, perception, learning, beliefs and attitudes, as well as the needs

consumers have. Not only basic needs, as hunger, but also needs for
recognition, esteem and belonging. The different types of needs are
positioned by Maslow in his theory of motivation in the previous
section.

The buildup of electronic waste

Schmidt (2002) asserts that the growing stockpile of used and obsolete
consumer electronic devices (CEDs) has been called the "largest toxic waste
problem of the 21st century" and prescribes two common trends to explain
problem. First, he contends that more consumers around the globe are using an
increasing number of CEDs. Second, with technological advances, the average
life span of the typical CED has dropped significantly in the past several years.
For example, since 1995, the useful life of a cellular phone in the United
States has decreased by 50% (it is currently approximately 18 months), while
the number of subscribers has increased from 33.8 million to 140.8 million
(Fishbein,2002; Most,2003).

As a result, electronic waste (e-waste) is one of the fastest growing
components of the municipal waste stream. According to the United States
Environmental Protection Agency (EPA; 2002), at least 2 million tonnes of
consumer e-waste is generated annually in the United States and
approximately 90% is discarded. Anecdotal reports suggest that a large
percentage of discarded e-waste is exported to Asia, where processing is very
cheap; unfortunately, e-waste is often handled improperly there, in effect there
is severe human exposure and environmental pollution (Basel Action Network
& Silicon Valley Toxics Coalition, 2002).

When it is not exported, discarded e-waste is often land filled. It has become the largest contributor of lead (Pb) to the solid waste stream in the United States since the creation of battery recycling programs (EPA, 2000). In addition, large volumes of e-waste are stored. In California alone, for example, an estimated 6 million obsolete computers and televisions are stockpiled in homes (Electronic Waste Recycling Act of 2003 [SB 20]). To address this problem, the California Electronic Waste Recycling Act of 2003 (SB 20) authorizes the collection of e-waste recycling fees at the point of sale and mandates a reduction in the use of hazardous substances in electronic products sold in California in accordance with regulations recently passed in Europe (Schoenung, Ogunseitan, Saphores, & Shapiro, 2004).

According to (Nnorom and Osibanjo 2008, Jain 2008, Cui and Forssberg 2003) E-waste is one of the fastest growing waste streams in the world with estimated world's generation rate at 40 million tonnes per year (UNEP 2010, Schluep et al. 2009). Although there have been several attempts to estimate the growth of e-waste in several countries in the world (such as the work of Cobbling (2008) in USA, Sinha-Khetriwal et al. (2005) in Switzerland, Liu et al. (2006) in China, the estimation and reporting system applied are not uniform, hence is not precise for comparison purposes. Robinson (2009) claims that the growth of e-waste is positively correlated with the Gross Domestic Product (GDP) of a country. Robinson (2009) found that his finding agrees with the prediction of e-waste production in Europe by Hischier et al. (2005), who noted that the annual e-waste growth rate in Europe in the three-year period (between the years 2005 to 2008), is at 3% to 5%, during which the average increase of GDP is 2.6%.

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According to NGOs the Basel Action Network (BAN) and the Silicon Valley Toxic Coalition (SVTC) the rate of e-waste increase is three times faster than the increase in regular municipal waste (Puckett et al. 2002). Moreover, as more computers are manufactured, economies of scale gives way to much lower prices for computers, thus increasing the global demand (and contributing to more e- waste generation). While the increasing sales of computers in the less economically developed countries is due to the success of penetration market, the increase in the more economically developed countries is due to replacement market. In the USA for example, the life span of computers was four to six years in 1997, but by 2005 it had been drastically reduced to less than two years (Babu et al. 2007).

As such, Robinson (2009) suggests that the driving force behind e-waste production is the rapid growth of computers and computing systems. Other than computers, another factor which is contributing to the rapid increase in the volume of e-waste worldwide is innovations in televisions, such as the migration from analogue to digital and from CRT to flat-screen technologies. Television owners are discarding their old device for new flat screen- digital sets to keep up with the advanced technology. Tremendous technology revolutions in communication industry, and it's very rapid advancement (where mobile phones are doing more than just connecting people, but are also multi functioning as camera, audio visual recorder and player and much more besides), have resulted in the increase in e-waste volume as people frequently opt for the latest version of devices with upgraded features (Campbell & Hassan, 2003).

E-waste is composed of a mixture of metals - particularly copper, aluminum and iron - which are attached to, covered with or mixed with various types of plastic and ceramic (Hoffmann 1992). However, according to Widmer et al. (2005), a detailed account of e-waste content, produces a list of more than one thousand chemical substances. These substances are grouped into three categories based on their relative amount in e-waste, such as: bulk elements (such as lead, tin, copper, silicon, carbon, iron and aluminium), elements in small quantity (such as cadmium and mercury) and trace elements (such as platinum, arsenic, silver, gold, lithium, titanium, cobalt, manganese and many others). The composition of e-waste (including the type and percentage of materials) varies depending on the type of equipment.

E-waste content is a significant environmental issue due to its toxicity; the adverse health effects of major hazardous substances in e-waste are presented in Table 1 below.

Besides the hazardous substances, there are several types of trace elements in e-waste (such as platinum, silver, gold, and titanium) which are precious materials, while some are both precious and hazardous (such as copper, mercury, lead and cadmium). The contradiction between environmental and economic value of e-waste has made e-waste management a daunting challenge (Widmer, 2005).

The hazardous contents of e-waste

Plastics used to house computer equipment and cover wire cables to prevent flammability often contain polybrominated flame retardants, a class of dangerous chemicals. Studies have shown that ingesting these substances may increase the risk of cancer, liver damage, and immune system dysfunction. Lead, mercury, cadmium, and polybrominated flame retardants are all Persistent Bio-accumulative Toxins (PBTs), that can create environmental and health risks when computers are manufactured, incinerated, landfill or melted during recycling. PBTs, in particular are a dangerous class of chemicals that linger in the environment and accumulate in living tissues; and because they increase in concentration as they move up the food chain, PBTs can reach dangerous levels in living organisms, even when released in minute quantities. PBTs are harmful to human health and the environment and have been associated with cancer, nerve damage and reproductive disorders.

Looked at them individually, the chemicals contained in e-waste are a cocktail of dangerous pollutants that kill both the environment and humans slowly. Lead, which negative effects were recognized and therefore banned from gasoline in the 1970s causes damage to the central and peripheral

nervous systems, blood systems, kidney and the reproductive system in humans. Effects of lead on the endocrine system have been observed, including the serious negative effects it has on children's brain development. When it accumulates in the environment, it has high acute and chronic effects on plants, animals and micro-organisms.

Cadmium compounds are also toxic with a possible risk of irreversible effects on human health and accumulate in the human body, particularly the kidneys. Cadmium occurs in certain components such as chip resistors, infra-red detectors, and semi-conductor chips. Mercury on the other hand, can cause damage to various organs including the brain and kidneys as well as the foetus. More especially, the developing foetus is highly susceptible through maternal exposure to mercury. These are only a few of the chemicals used in the manufacture of electronics equipment. Other chemicals are Hexavalent Chromium which is used as a corrosion protection of untreated and galvanized steel plates and as a decorative or hardener for steel housings.

Plastics including Polyvinyl Chloride (PVC) are also used. Plastics constitute about 13.8 pounds of an average computer. The largest volume of plastics, 26% used in electronics is PVC. When PVC is burned, dioxin can be formed because it contains chlorine compounds. Barium is a soft silvery-white metal that is used in computers in the front panel of a CRT, to protect users from radiation. Studies have shown that short-term exposure to barium has caused brain swelling, muscle weakness, damage to the liver, heart and spleen. Considering the health hazards of e-waste, another ubiquitous computer peripheral scrap worth mentioning is toners. The main ingredient of the black toner is a pigment commonly called, carbon black – the general term used to

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describe the commercial powder form of carbon. Inhalation is the primary means of exposure and acute exposure may lead to respiratory tract irritation.

Effect of the pile up of e- waste on the immediate environment.

Indeed, e-waste contains many toxic materials such as lead (Pb), cadmium, mercury, barium, beryllium, hexavalent chromium, and brominated flame-retardants. The toxic elements in e-waste may be released to the environment in three ways. Firstly, due to improper disposal of e-waste, where e-waste is commonly disposed of together with municipal solid waste and ended in non-hazardous landfill or being incinerated and some are just dumped indiscriminately. In these instances, the toxic elements in e-waste may enter the soil and contaminate the groundwater, or enter the atmosphere as toxic fumes if burning is used as a way of disposal. In the USA, it is estimated that 70% of mercury and cadmium pollution and 40% of lead pollution in landfills are caused by leakage of e-waste (Puckett et al. 2002).

Secondly, toxic substances are released into the environment through improper dismantling and precious material recovery processes, where open burning and acid baths are used to recover precious material, which release toxic substances into the air, soil and water, while the less precious (but highly hazardous materials) are disposed of in an unsafe manner. Finally, hazardous substances have the potential to enter the environment through possible leakage in the process of movement of e-waste from one country to another.

Sagapolutele (2009) has opined that there is a tendency among the population of Samao to keep some electronic waste in service with them in their homes for a longer period or even after the end of its useful life without

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disposal. This according to him is obvious as it is a common practice for a number of families especially in the rural areas who still have in possession some out of order televisions, radios, refrigerators and others. Sometime refrigerators and ovens are used by some families to store household items such as coconuts, agricultural crops and others in the kitchen area.

The continuous storage of these electronic wastes in households has been considered by most waste management authorities as part of the solid waste category of the general waste stream.

A paper displayed at the webpage of angelfire.com has attempted to examine the effects of these wastes on the domestic environment and has noted the following effects; the continuous store of these wastes

- ✓ Prevent aeration system of the soil if such wastes are stored in the gardens of households. This ends up reducing fertility of the soil for gardening purposes.
- ✓ Pose significant harm to domestic animals if these accidentally contaminate the food sources of the domestic animals as well as other stray one. It indicated that most death of animals like cattle, dogs and domestic fowls result from careless disposal of waste.
- ✓ Create ugly scenery in the domestic environment, a situation that is most likely to affect the tourism potential of a country.
- ✓ Serve as breeding ground for rodents and other disease causing insect such as cockroaches, mosquitos and others.
- ✓ Can also lead to human injury in the situation where a person accidentally kick, steps or bumps into such household waste.

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CHAPTER THREE

METHODOLOGY

Introduction

This chapter deals with the methodological approach used for the study. The study aims at investigating the consumer purchasing behaviour of electronic goods and the build-up of electronic waste among teachers of second cycle-schools in the Takoradi sub metropolis of the Western Region of Ghana. The chapter includes the study area, research design, and population, sampling and sampling procedure, data collection and data analysis.

Study area

Sekondi Takoradi is one of the twin cities and the third largest city in Ghana. It also serves as the capital town of the western region of Ghana. It is located on the west coast of Ghana. The research focused on one half of the twin city that is the Takoradi metropolitan area. The area map of the region shows that the Takoradi metropolis shares a common boundary with two other sub metropolitan areas of the region, namely the Effia - Kwesiminstim submetro and the Sekondi submetro to the north. It is bounded to the south and east by the Gulf of Guinea and to the west by the Ahanta west district. The choice of the Takoradi sub metropolitan area for the study was due to the influx of electronic goods from the Ports into the City.

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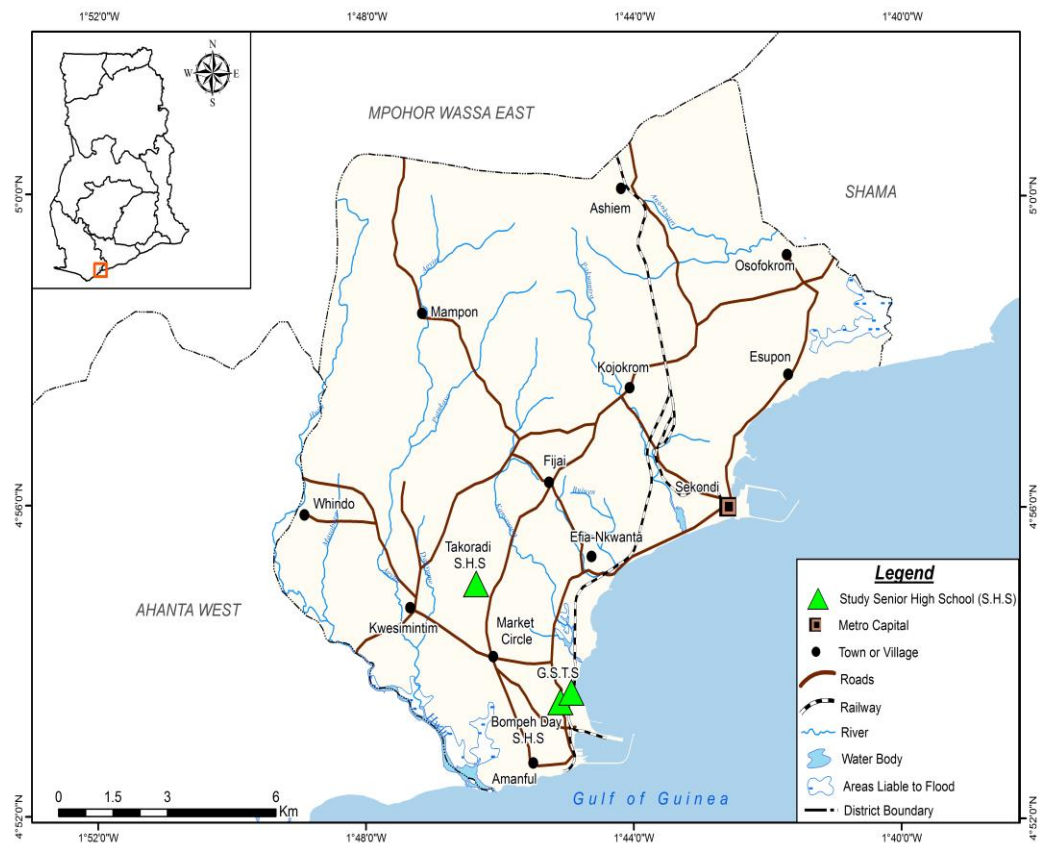
Area Map

Figure 4: Area map showing the study area

Research design

The descriptive survey design was employed for the study. This design involves the collection of data in order to answer research questions on the subject of the study. In descriptive survey design, the researcher draws a sample from the population of interest and generalizations are made taking into consideration their responses. Osuala (1993) indicated that descriptive surveys are practical to the present needs. He opined that descriptive surveys are regarded by social scientists as the best design especially where large populations are involved and it is widely used in educational research since data gathered through this design represent field conditions. Therefore,

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descriptive survey describes and interprets what it is. It is concerned with conditions that exist, practices that prevail, beliefs and attitudes that are held, processes that are ongoing and trends that are developing (Osuala 1993).

Again this research design gives information about what is happening when one is undertaking the research. According to Osuala (1993) research is the process of aiming at a dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data. The descriptive research design was used for the study, because the study involved a collection of data to answer questions pertaining to the purchasing behaviours of consumers (teachers) and the effect on the build- up of electronic waste. It determines the way things are (Gay, 1992). Fraenkel and Wallen (1996) stated that, obtaining answers to a set of carefully designed and administered questions from a large group of people, lies at the heart of survey research.

Population

For the purposes of the study, the term study population can be taken to mean all the members of the target of study as defined by its aims and objectives (Nwana, 1992; Sanders, Lewis & Thornhill 1997). The population for this study includes all 3 second cycle-schools in the Takoradi sub metropolitan area, they are, Takoradi Senior High, Bompeh Day Senior High, and Ghana Secondary Technical School. The purpose for selecting the consumers (teachers) is based on the fact that they are the people on the ground and can provide concrete information on their own purchases of

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electronic goods and can subsequently tell the effect of electronic waste accumulation on their immediate environment.

Sample and sampling procedure

Sampling denotes the process of choosing the research units from the target population which are to be included in the study. It is the process of taking any portion of a population or universe as representative of that population or universe. Sekaran (1992) affirms that sampling is essential in any research because in research investigations involving several hundreds and even thousands of elements, it would be practically impossible to collect data from, or to test, or to examine every element.

Mckenzie (1993; p18) also defined sampling as "a process of choosing the units of the target population which are to be included in the study". Payne and Payne (2004) have presented a table from which sample size for conducting a study can be selected. Based on this, the sample for the study was selected. Again, from this same table, Krejere and Morgan (1970) suggested that for a population of 250, the required sample size is 148. It therefore implied that for a study involving a target of 250 senior high school teachers the required sample size is approximately 150. The simple random sampling technique of was used in selecting the respondents.

To obtain the total of 150 respondents for the study from the three secondary schools within the study area, the simple proportion computation was first used to determine the sizes of respondents to be selected from each school. To obtain a total sample size of 150 respondents, 60 teachers were selected from the total teacher population of 96 from the Takoradi Senior High

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School; 46 teachers were also selected from the 74 teacher population of the the Bompeh Day Senior High School and 44 were also selected from the 70 teachers of the Ghana Secondary Technical School.

It was the case in all the three schools that each teacher was identified by a number. These numbers and the list of the names were obtained from the respective school administrations of each school visited and re written on smaller pieces of papers and put into an opaque bowl. The researcher then sorted for the assistance of any available nonteaching staff of each school to hand pick the numbers without replacement one respondent at a time until the required number of respondents were obtained from each school. The selected numbers were crosschecked with the list of names to identify the teacher for the administration of the questionnaire.

Sources of data

Primary and secondary data sources were used for the study. The primary data were collected using a questionnaire which consisted of open-ended and close-ended questions. In collecting the primary data, respondents were briefed on the purpose of the study. Respondents were assured of confidentiality of their responses and were expected to be sincere, factual and honest in responding to the questions. Secondary data in the form of journals, websites, books and research reports were used.

Data collection instrument

The collection of data is an extremely important part of all research endeavours, for the conclusions of the study are based on what the data reveal

(Fraenkel & Wallen, 2000). According to Fraenkel & Wallen (1996), the method(s) of collection to be used and the scoring of the data need to be considered with care. This means that for credible research results, the kind(s) of instruments to be used must be given the needed attention. In this study, the questionnaire was used to collect data.

Section A dealt with background characteristics of respondents (Appendix A). Section B dealt with respondents' preference for electronic goods. Section C dealt with teachers purchasing behaviour for electronic goods. Section D also looked at accumulation of electronic waste goods. Section E dealt with the effects of buildup of electronic obsolescence /waste goods on the immediate environment.

A questionnaire has several strengths: it is less expensive as you do not interview respondents; it saves time and resources. It also offers greater anonymity as there is no face-to face interaction between the respondents and the interviewer. Notwithstanding the strengths, a questionnaire has a several weaknesses. Its application is limited to a study population that can read and write but not illiterate, very young, very old, or handicapped. Questionnaires are notorious for their low response rates; that is, people fail to return them. Again, the opportunity to clarify issues is lacking. If, for any reason, respondents do not understand some questions, there is no opportunity for them to have the meaning clarified.

Pre-test

The data collection instrument i.e the questionnaire was pre-tested at the Methodist senior high school within the Sekondi Metropolis to check their

reliability and validity. There was also the need to find out if the items contained in the instruments were explicit enough and would therefore aid the respondents to complete the questionnaires. This process of the study aided the researcher to detect inherent problems and inconsistencies in the instruments intended to be used, and correct any abnormalities before carrying out the actual study.

Field challenges

The researcher observed that most of the respondents failed to respond to the open-ended questions as it appeared that almost all the respondent were too busy with their normal routine work.

Another difficulty encountered during the administration and the collection of the data from the teachers were that since most of the teachers were not concerned enough about e-waste and their build up in their homes they pleaded to be excused from the entire sample some did not make the time to fill in the form.

Again some teachers were reluctant to disclose their ownership level of electrical or electronic appliances and so did not choose any of the electronic goods registered on the questionnaire to show whether they had them in their house or not.

To add, many of the respondents seem not to have kept track of the various electrical or electronic appliances that they dispose and were reluctant to spend the time to recall this information to respond to the question that demanded them to indicate what they did with those electronic goods they did not use anymore.

Finally it was observed in one of the secondary schools that there was general apathy and so selected teachers did not want to own up to accept to respond to the questionnaire.

The few teachers who willingly accepted to respond to the questionnaires wanted the researcher to read the questions one by one to them before they could answer when one would have thought that since they could read and write they could have managed the filling of the questionnaires themselves.

Data processing and analysis

Data analysis is the process of simplifying data in order to make it comprehensible (Fraenkel & Wallen, 1996). Data analysis usually involves reducing accumulated data to a manageable size, developing summaries, looking for patterns, and applying statistical techniques (Cooper & Schindler, 2001). Data was analyzed using the Statistical Package for Social Science 16 (SPSS 16). The SPSS enable different kinds of statistical tools to be employed in the analysis. Frequency tables were used to summarise the data and made it possible the presentation of percentages of the various variables identified. The study to some extent relied on logical deductions to arrive at its conclusions.

Ethical procedure

In other to proceed smoothly through the conduct of the research, the researcher carefully followed through the following ethical processes particularly for the collection of Data for the study.

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Firstly the researcher obtained an introductory letter from the Institute for Development Studies (IDS), and attached a hand written permission letter and a sample of the questionnaire to it and submitted to the various heads of the Second Cycle Schools to be visited. The researcher then allowed for a week lapse for their response indicating their acceptance to permit the researcher on their school compound to administer the questionnaire to the selected teachers.

Before the actual data collection, the school administrators made available the list of the teaching staff together with their special identification numbers to the researcher for the lottery method of sampling.

Again the researcher assured every respondent of their confidentiality before giving out a questionnaire; they were assured that the information being sought for was purely for academic purposes.

The researcher politely enquired from the respondents when she was to return for the collection of the filled questionnaire; the researcher finally appreciated their support by thanking each one of the respondents who tendered in the filled questionnaire.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the results and discussion based on the analysis of the field data which examined senior high school teachers' purchasing behaviour for electronic goods and accumulation of electronic waste in the Takoradi Metropolis. The presentation is based on the study objectives as well as the research questions. The main issues covered in this chapter include background characteristics of respondents, purchase of electronic goods by senior high school teachers' and the factors that influence the purchasing behaviour of these electronic goods. Accumulation of electronic waste and its effect on the immediate environment were discussed in the chapter.

Background characteristics of respondents

In order to put the study into context, the background characteristics of the respondents are analysed. The characteristics included gender, age and educational background of respondents. The study revealed that out of the 150 respondents, 86 (57.3%) are males and 64 (42.7%) are females. Table 2 shows the age distribution of the respondents. About 34 percent of the respondents fall within the age ranges 20 and 29 years. Thirty-seven fell within the age ranges 30 to 39 years. About seven percent fell between age ranges 50 and above. Cross tabulation of respondents age against gender indicates that (15.3%) of the males and (18.7%) of the females fell within the age ranges 20

and 29 years. About (21.9%) of the males and (15.5%) of the females fell within the age ranges 30 and 39 years.

Table 2: Age of respondents

Age (Years)	Frequency	Percent
20-29	51	34.0
30-39	56	37.4
40-49	32	21.3
50 and above	11	7.3
Total	150	100

Source: Field work, 2013

Table 3 presents the distribution of respondents' educational background. About (61%) of the respondents had obtained Bachelor's Degree. Nineteen percent had obtained Higher National Diploma and (14%) had obtained Master's Degree. The cross tabulation of the respondents who held Bachelor Degree reveals that (36.7%) were males and (24%) were females. Of the respondents who held Master's Degree, (11.3%) were males and three percent were females.

Table 3: Educational background of respondents

Educational background	Frequency	Percent
Diploma	9	6
Higher National Diploma	29	19.3
Bachelor's Degree	91	60.7
Master's Degree	21	14.0
Total	150	100

Source: Field work, 2013

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Electronic goods patronise by Senior High School teachers

Consumers taste and preference attitude is mostly manifested by their purchasing behaviours thus whatever influences their taste and preference for electronic good finally motivates him to buy those electronic goods they intend to have. Table 4 shows the distribution of the responses. About (24%) of the responses gathered indicated that respondents do patronise small household appliance such as tablets, mobile phones, palm tops, lap tops and mixers blenders as observe in the table. Thirteen percent and eleven percent of the responses were attributable to males and females respectively.

Again it can be observed from the table that teachers of second cycle schools show high preference for lighting equipment such as rechargeable lamps, torch lights, Bed side lamps etc; Of the total responses of (20%) under this category 10% are males and 10 % females this indicate a balance among the gender and also stress the point that there is an equal preference for lighting equipment among the gender.

Eleven percent (11%) males and 9% females making a total of 20% indicated that they possessed large household appliances like deep freezer, ridges washing machine etc in their houses.

Electrical and electronic tools (ie mower, drilling tool, sealer etc) form a class of electronic goods that many households have; as observed from the table, approximately 8% males and 5% female making a total of 13% indicated that they had such electrical tools in their houses.

Concerning the possession of electrical toys, leisure and sports equipment, 4% males and 5% females making a total of 9% did indicate that they had those gadgets in their houses. Finally of the total responses of 6%,

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3% each of both males and female had some electrical medical devices at home.

All in all a critical look at the table also indicate that all the respondents for the study had some or all the electronic goods stated on the questionnaire. It is also striking from the table that of all the categories of electronic equipment, small and large household appliances formed the most purchased that is 24% and 20% respectively.

This finding is consistent with the views of Kleine and Unwin (2009) that electrical and electronic products have become ubiquitous in today's life around the planet and that without these products such as refrigerators, washing machines, mobile phones, personal computers, printers, toys, television etc, modern life would not be possible in post- industrialized and industrializing countries as according to them, these products play a significant role in areas of development such as health, education, mobility, communication, security and environmental protection and indeed in every aspect of man's life.

The findings support the views of Brigden et al., (2008) as they maintain that the widespread demand for gadgets such as washing machines, mobile phones, and personal computers and coupled with the massive capacity of the manufacturers to produce and supply these gadgets has been some of the few reasons that have made the information society affordable. They further asserted that, this has also meant that ICTs have become commodities, and have over time been designed to reach their end of life sooner.

Table 4: Electronic goods purchase by respondents

Electronic goods	Male		Female		Total	
	Freq	(%)	Freq	(%)	Freq	(%)
Small household appliance (i.e. tablets, mobile phones, palm tops, lap tops, mixers blenders etc)	82	12.8	70	10.9	152	23.8
Lighting equipment (rechargeable lamps, touch lights, bed side lamps, electric heaters, pressing irons etc	68	10.6	62	9.7	130	20.3
Large household electronic appliances/goods (i.e. deep freezers, fridges, movable air conditioners, washing machines, TV	70	10.9	57	8.9	127	19.8
Electrical and electronic tools	48	7.5	34	5.3	82	12.8
Monitoring and control instruments	25	3.9	33	5.2	58	9.1
Toys, leisure and sports equipment	23	3.6	28	4.4	51	8.0
Medical devices	19	3.0	21	3.3	40	6.3
Total	335	52.3	305	47.7	640	100

Source: Field work, 2013.   *N=150*

Factors influencing purchasing behaviour of electronic goods

Purchasing decisions according to Kotler *et al* (2005) involve five main stages which are need recognition, information search; the evaluation of alternatives; the purchase decision itself and finally the post purchase

behavior. The study objective sought to assess the factors that influence senior high school teachers in the Takoradi Metropolis in the purchase of electronic goods. Table 5 presents the distribution of the responses gathered from the field. In Table 5 (74.7%) of the respondents agreed that the price promotion or price of the electronic goods influences them in the purchase of electronic goods and (25.3%) disagreed. About (40%) of the respondents who agreed are males but (34%) are females. Fifty-five percent of the respondents agreed that their status in the society is a factor that influences them to patronise electronic goods but (45%) disagreed as seen in the table. In another vain, (30%) of the respondents were of the opinion that their friends normally introduce them first to the electronic goods and especially how these goods they functions before they buy; this is in consonance with the view expressed by kotler et al., (2005) that final purchasing decision is influenced by other people's attitudes. These individuals may be contacted by the would-be purchaser for information before making the purchasing decision. kotler et al., (2005) express for instance that what the family, neighbours and friends advise greatly influence purchasing decisions but (70%) of the respondents for the study totally disagreed with this claim.

Concerning the view of authorities like Ratneshwar (2005), "an attractive advertisement could influence the purchasing decisions of the consumers", While (59.3%) of the teachers agreed, (40.7%) did not support this assertion. Of the respondents who agreed (32.7%) are males and (26.7%) are females. One remarkable observation from table 5 was the unanimous stand by all the respondents that their purchasing decision for an electronic good is simply based on their need for the particular item. As depicted by the

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responses as many as 94% of the respondents supported the view that their need motivated them to buy while only (6%) disagreed.

On the view that fashion (It is what everybody is using these days) also influence purchasing decisions, (48%) of the respondents agreed while (52%) disagreed.

The table further shows that (58.7%) of the respondents disagreed with the statement that availability of a more modern or sophisticated electronic goods influence them in the purchase of electronic goods but (41.3%) agreed. About (53%) of the respondents agreed that their income levels do influence them in the purchase of electronic goods but (47%) disagree with the statement. Twenty four percent of the respondents who disagreed are male respondents while (23.3%) are female respondents.

Again it is observed from the table that whereas (52%) of the respondents disagree that the conditions of the weather influences their purchasing decisions, (48%) disagreed to this view.

About (79%) of the respondents agreed that self-fulfillment is a factor that influences them to patronise electronic goods but (21%) disagreed with the statement. Fifty percent of the respondents who agreed are males and (29.3%) are females. This finding is in support of Maslow's hierarchy of need that stress that consumers aim at achieving self-actualization and so once an electronic good could guarantee the consumer that needed fulfillment the consumer will buy. The findings support Asch and Wolfe (2001) views that cultural factors influence consumers to a large extent, since individuals are formed by the society they grow up and live in, and that the individual learn the values, perceptions and preferences from the society. They further stress

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that personal factors also affects consumer's buying decisions which include age, lifecycle stage, occupation, economic circumstances, lifestyle and personality.

Table 5: Influencing factors of purchase of electronic goods

Factors	Agree		Disagree	
	Freq	(%)	Freq	(%)
Price promotion or price of the electronic goods	112	74.7	38	25.3
My status in the society	82	54.7	68	45.3
My friends introduced me to buy it	45	30	105	70
An attractive advertisement	89	59.3	61	40.7
I needed it	141	94	9	6.0
It is what everybody is using these days	72	48	78	52
Availability of a more modern / sophisticated electronic good	62	41.3	88	58.7
Income level	79	52.7	71	47.3
Weather conditions	72	48	78	52
It gives me self fulfilment	119	79.3	31	20.7

Source: Field work, 2013.   *N=150*

Ages of respondents and Influencing factors of their purchases of electronic goods.

A crosstab of the ages of the respondents and what influences them to buy the electronic goods they have shows for instance that, of the total population of 150 respondents, a significant number, that is, 112 all agree that

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their purchases are normally influenced by the prices of the goods they buy. This number is made up of 36 respondents within the 20-29 age bracket, 40, within the 30-39 age bracket, 20 within the 40-49 age bracket and 8 within the age brackets 50-59 and 60+. 15, 8, 12, and 3 of respondents' aged between 20 and 59 disagreed with the statement that purchases of electronic goods are influenced by the prices of those goods. This is depicted in table 6 below.

Table 6: Ages of respondents and Influencing factors of purchase of electronic goods.

	Statement		
	Price of the electronic goods/product.		
Ages	**Agree**	**Disagree**	**Total**
20-29	36	15	51
30-39	40	8	48
40-49	20	12	32
50-59	8	3	11
60+	8	0	8
Total	112	38	150

Source: Field work, 2013.   *N=150*

Comparing the age ranges of the respondents and the statement that purchases are influenced by the fulfillment electronic goods gives to the purchasers, only 22 and 9 respondents of the age ranges 20-29 and 39-39 respectively disagreed whereas the rest of the respondents comprising 29 of the 20-29 age range, 39 of the 30-39 age range, 32 of the 40-49 age range, 11

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of the 50-59 age range and 8 of the 60+age ranges agreed to the statement. This is demonstrated in the table 7 below.

Table 7: Ages of respondents and Influencing factors of purchase of electronic goods.

| | Statement | | |
| | It gives me self fulfillment | | |
Ages	Agree	Disagree	Total
20-29	29	22	51
30-39	39	9	48
40-49	32	0	32
50-59	11	0	11
60+	8	0	8
Total	119	31	150

Source: Field work, 2013.   *N=150*

A crosstab of respondents ages and whether an attractive advertisements influences their purchases show that all 8 respondents of age 60+ together with 7 of the 11 respondents in the age 50-59 bracket agreed that indeed an attractive advert influences them to buy electronic goods. 21 respondents within both the ages 30-39 and 40-49 also supported the statement. 19, 27, 11 and 4 respondents within the ages 20-29, 30-39, 40-49 and 50-59 respective disagreed that advertisement has an effect on their purchases as illustrated in the table 8 below.

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Table 8: Ages of respondents and Influencing factors of purchase of electronic goods.

| | **Statement** | | |
| | **An attractive advertisement** | | |
Ages	**Agree**	**Disagree**	**Total**
20-29	32	19	51
30-39	21	27	48
40-49	21	11	32
50-59	7	4	11
60+	8	0	8
Total	89	61	150

Source: Field work, 2013.   *N=150*

Educational background and consumers' purchasing behaviour of Electronic goods.

A crosstab result on the relationship between the educational background and the purchasing behaviour of the respondents reveal that all of the 19 respondents who were SSCE/GSCE holders agreed to the fact that their purchasing behaviour of electronic goods is based on the fact that they actually needed it what they mostly buy or intend to buy. The situation is not different in the cases of those who are First degree and post graduate degree holders respectively. But for those who hold Diplomas, 55 respondents out of 64 agreed that they purchase because they needed the items whereas 9 of them also disagreed to this very statement as can be inferred from the below.

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Table 9: Educational background and consumers' purchasing behaviour of Electronic goods.

| | Statement | | |
| | I buy e-goods because I need it. | | |
Educational Background	Agree	Disagree	Total
SSCE/GSCE	19	0	19
Diploma	55	9	64
First Degree	33	0	33
Post graduate	26	0	26
Total	133	9	142

Source: Field work, 2013.   *N=150*

Again, whereas all 19 respondents of SSCE/GSCE holders category agreed the their purchases of e-goods are influenced by the self fulfillment they gain from possessing those gadgets, a significant number of respondents from the rest of the educational background of the respondents comprising 39, 29 and 24 diplomats,, first and post graduate degree holders respectively also firmly agreed to the statement. Only 25 diploma holder, 4 first degree holders and 2 post graduate degree holders disagreed with the statement as an influencing factor of their purchases of electronic goods. This is depicted in the table below.

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Table 10: Educational background and consumers' Purchasing behaviour of Electronic goods.

	Statement		
	It gives me self fulfillment		
Educational Background	Agree	Disagree	Total
SSCE/GSCE	19	0	19
Diploma	39	25	64
First Degree	29	4	33
Post graduate	24	2	26
Total	111	31	142

Source: Field work, 2013.   *N=150*

Considering the statement that consumers purchasing behavior is influenced by the incomes they earn, 40 diploma holders,13 first degree holders,10 postgraduates and 6 SSCE/GSCE holders disagreed whereas 24 diploma halders,20 first degree holders16 post graduate degree holders and 13 SSCE/GSCE holders agreed to the statement as shown for the table below.

Table 11: Educational background and consumers' Purchasing behaviour of Electronic goods.

	Statement		
Educational Background	Income level		
	Agree	Disagree	Total
SSCE/GSCE	13	6	19
Diploma	24	40	64
First Degree	20	13	33
Post graduate	16	10	26
Total	73	69	142

Source: Field work, 2013.   *N=150*

Accumulation of electronic waste

Schmidt (2002) asserts that the growing stockpile of used and obsolete consumer electronic devices (CEDs) has been labeled the largest toxic waste problem of the 21st century. In the light of the research objective, the researcher sought to explore extent to which teachers of senior high schools within the Takoradi Metropolis accumulate electronic obsolete goods they do not use anymore. Table 12 shows the responses gathered from the field. Forty five percent of the respondents often stored or kept electronic obsolescence goods that they do not use anymore. Thirty percent stated they never store or keep them and about (25%) opined that they most often store or keep these electronic obsolete goods they do not use anymore. Cross tabulation further reveals that (25%) of the respondents who stated that they often keep electronic obsolete goods are males and (20%) are females.

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About (73%) of the respondents stated they never sell their electronic obsolete goods that they do not use anymore, (21.3%) stated they often sell them and approximately five percent said they most often sell these obsolete goods. Forty-eight percent of the respondents stated that they often throw obsolete goods away with general waste, (29.3%) opined that they most often throw the electronic goods they do not use anymore away together with general household waste and (22.7%) stated that they never throw obsolete goods away with general waste. About (21%) of the respondents who often throw these goods away with general waste are female while (26.7%) are males. Fifty-four percent of the respondents stated that they never give electronic obsolete good that they do not use anymore to a recycler. About (39%) said they often hand those electronic goods they do not need any more to a recycler while approximately seven percent stated they most often give these goods to a recycler.

According to the United States Environmental Protection Agency (2002), at least 2 million tonnes of consumer electronic obsolete goods are generated annually in the United States, and approximately 90% is discarded. Basel Action Network & Silicon Valley Toxics Coalition (2002) reports suggest that a large percentage of discarded electronic obsolete goods are exported to Asia, where processing is very cheap; unfortunately, electronic obsolete goods are often handled improperly there in which leads to severe human exposure and environmental pollution.

About (41%) percent of the respondents asserted that they often donate electronic obsolete goods to friends and employees but Thirty-two percent stated they never donate these obsolete electronic goods while (26.7%)

intimated that they most often do donate them to other people who may need them. A cross tabulation of the responses reveals that (26.7%) of the respondents who stated that the often donated these obsolete goods are male and (14.7%) are females. The majority (60%) of the respondents stated that they never burn the electronic obsolete goods that they do not use anymore while quite a significant number of respondents measuring about 29 percent and 11.3% indicated that they often and most often burn these goods. About (33%) of the respondents who intimated that they never burn these obsolete goods are female respondents while (26.7%) are male respondents.

The findings from table 12 shows high response rate for accumulation issues such as stockpiling unusable e goods in home; users throwing them away together with the household general waste which will end up in most landfills; donating them to friends and intentionally leaving them with the repair shops. These obviously underscores the point of Campbell and Hassan (2003) who assert that tremendous technology revolutions in communication industry, and it's very rapid advancement (where mobile phones are doing more than just connecting people, but are also multi functioning as camera, audio visual recorder and player and much more besides), have resulted in the increase in electronic waste volume as people frequently opt for the latest version of devices with upgraded features.

Table 12: Accumulation of electronic waste

Electronic obsolescence	Most Often		Often		Never	
	Freq	(%)	Freq	(%)	Freq	(%)
Store or Keep	37	24.7	68	45.3	45	30
Selling of electronic waste	8	5.3	32	21.3	110	73.4
Throw them away with general waste	44	29.3	72	48	34	22.7
Give them to a recycler	10	6.7	59	39.3	81	54
Donate them to friends, employees	40	26.7	62	41.3	48	32.0
Give them back to the person who sold them	6	4	14	9.3	130	86.7
Give them to the electronic repairers	28	18.7	88	58.7	34	22.6
Burn them	17	11.3	43	28.7	90	60.0

Source: Field work, 2013, *N=150*

Ages and Accumulation of Electronic Waste

The relationship between the ages of the respondents and what they do to prevent the accumulation of their electronic waste show as in table 13 below that majority of the respondents for the study comprising of 44 respondents in the 20-29 age range,37 respondents within the 30-39 age range,18 of those in the age ranges 40-49 and 11 of those within the age range50-59 all never sell their electronic waste. However few respondents making up of 7 respondents within the 20-29 age bracket,11 of those in the 30-39 age bracket,14 of those in the 40-49 age bracket and 8 respondents in the

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60+ age range attested to the statement that o prevent accumulation of the electronic waste in their homes ,they normally sell their e-waste.

Table 13: Ages and Accumulation of Electronic Waste.

| Age | Statement | | |
	Sell		
	Often	Never	Total
20-29	7	44	51
30-39	11	37	48
40-49	14	18	32
50-59	0	11	11
60+	8	0	8
Total	40	110	150

Source: Field work, 2013, *N=150*

Educational qualification and Accumulation of Electronic Waste.

It can be inferred from the crosstab results on the Educational background of the respondents and what they do with their e- waste from table 14 below that out of 19 respondents who were SSCE/GSCE holders 16 agreed that they often disposed of obsolescence/ waste electronic appliances to electronic repairers but 3 of them did not agree to that. 45, 27 and 22 of Diploma, First degree and post graduate respectively supported the majority of the SSCE/GSCE holders who left them with repairers while 19, 6, and 4 diploma, first degree and post graduate degree holders disagreed that they often disposed of their obsolete electrical appliances at electronic repairers shop.

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Table14: Educational background and Accumulation of Electronic Waste.

Educational Background	Statement		
	Give them to the electronic repairers		
	Often	Never	Total
SSCE/GSCE	16	3	19
Diploma	45	19	64
First Degree	27	6	33
Post graduate	22	4	26
Total	110	32	142

Source: Field work, 2013, *N=150*

From table 15 below, it is observed that all 33 who are first degree holders agreed that in other to prevent accumulation of e-waste in their homes they often throw their old electronic waste away in the municipal waste. This statement was also supported by 15 SSCE/GSCE holders, 41 diploma and 19 postgraduate degrees holders. However 4 SSCE/GSCE holders, 23 Diploma holders and 7 postgraduate holders disagreed.

Table 15: Educational background and Accumulation of Electronic Waste.

	Statement		
Educational Background	Throw them away with general waste		
	Often	Never	Total
SSCE/GSCE	15	4	19
Diploma	41	23	64
First Degree	33	0	33
Post graduate	19	7	26
Total	108	34	142

Source: Field work, 2013, *N=150*

Finally, majority of the respondents comprising all 19 SSCE/GSCE holders, 42 diploma holders,29 first degree holders and 19 post graduate degree holders all stated that they store the e-waste. Twelve respondents of both the diploma and first degree holders together with 7 post graduate holders do not store them in their homes as is depicted in the table below.

Table 16: Educational background and Accumulation of Electronic Waste.

Educational Background	Statement Store/ keep them		
	Often	Never	Total
SSCE/GSCE	19	0	19
Diploma	42	12	54
First Degree	29	12	41
Post graduate	19	7	26
Total	109	31	140

Source: Field work, 2013, *N=150*

Effects of Buildup of electronic waste on the immediate environment

Hazardous substances have the potential to enter the environment through possible leakage in the process of movement of these electronic obsolete goods. The research objective sought to investigate the effects of the buildup of electronic waste on the immediate environment of the respondents. Table 17 presents the distribution of responses gathered from the field.

From the table, majority (62%) of the respondents stated that buildup of electronic waste often creates a problem for them because it is difficult to dispose off. Thirty-six percent asserted that it is most often difficult to dispose of them. Approximately (51%) of the respondents stated that the electronic obsolete goods often takes a lot of space in their houses for their storage but (49%) asserted that it most often. About 31 percent of the respondents who

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stated that these obsolete goods takes a lot of space in their house are males and (19.3%) are females.

According to Puckett et al. (2002) due to improper disposal of electronic obsolete goods, where electronic obsolete goods are commonly disposed off together with solid waste and ended in non-hazardous landfill or being incinerated and some are just dumped indiscriminately. They further comment that the toxic elements in electronic obsolete goods may enter the soil and contaminate the groundwater, or enter the atmosphere as toxic fumes if burning is used as a way of disposal.

The majority (52%) of the respondents stated that these electronic obsolete goods when burnt most often lead to breathing and health problems while (48%) intimated that it often leads to breathing and health problems. The majority (56.7%) of the respondents asserted that electronic obsolete goods often affects soil composition and leads to soil infertility. About (33%) stated it most often while approximately (11%) said obsolete electronic goods never affects the soil composition and soil fertility. About (57.3%) of the respondents stated that electronic obsolete goods may often cause domestic accidents and injury. About 31 percent stated that electronic obsolete goods may most often cause domestic accidents and injury.

The findings are in agreement with Puckett et al. (2002) views, they stress that toxic substances are released into the environment through improper dismantling and precious material recovery processes. They again, maintain that where open burning and acid baths are used to recover precious material, which release toxic substances into the air, soil and water, while the less precious (but highly hazardous materials) are disposed of in an unsafe manner.

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Table 17: Effects of Buildup of electronic waste on the environment

Effects	Most Often		Often		Never	
	Freq	(%)	Freq	(%)	Freq	(%)
The buildup of electronic obsolescence creates a problem for the households because it is difficult to dispose off	54	36	63	62	3	2
It takes a lot of space in the house for their storage	74	49.3	76	50.7	0	0
The buildup of electronic obsolescence in the house serve as breeding ground for rodents	48	32	93	62	9	6
When burnt it can lead to breathing /health problems	78	52	72	48	0	0
Creates ugly scenery in the environment	66	44	75	50	9	6
Domestic animals may consume the poisonous parts and die	40	26.7	81	54	29	19.3
Affects soil composition and lead to soil infertility	49	32.7	85	56.7	16	10.6
May cause domestic accidents / human injury	43	31.3	86	57.3	17	11.4

Source: Field work, 2013

Educational background and the effects of buildup Electronic Waste on environment.

It is observes from table 18 below that all the 19 respondents who were SSCE /GSCE undoubtedly agreed to the statement that accumulation of electronic waste in the environment often cause domestic accident or human injury. Sixty two out 64 respondents who hold Diploma degrees also agreed to the same statement. Thirty three and 26 others who held First and Post graduate degrees respectively also agreed. Only 2 diploma holders indicated that building up electronic waste in the home and the environment never has cause domestic accident or injury.

Table 18: Educational background and effects of buildup Electronic Waste on environment.

	Statement		
Educational Background	May cause domestic accident/ injury		
	Often	Never	Total
SSCE/GSCE	19	0	19
Diploma	62	2	64
First Degree	33	0	33
Post graduate	26	0	26
Total	140	2	142

Source: Field work, 2013

Table 19 below shows an overwhelming support to the statement that the buildup of electronic waste in homes has an effect of taking a lot of space

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in the home. This realization has been confirmed by all respondents with the various educational background in the schools as all 19, 64, 33 and 26 respondents who held the SSCE/GSCE, Diploma, first and postgraduate degrees agreed to the statement as below.

Table 19: Educational background and effects of buildup Electronic waste on environment

Educational Background	Statement		
	They take a lot of space in the room		
	Often	Never	Total
SSCE/GSCE	19	0	19
Diploma	64	0	64
First Degree	33	0	33
Post graduate	26	0	26
Total	142	0	142

Source: Field work, 2013

The information respondents of different educational background gave concerning the statement that the buildup of electronic waste in the home environment takes a lot of space is not different from the effect of emitting harmful chemicals in the home environment when they are burnt.

In fact all respondents within the various educational background categories agreed that when electronic wastes are burnt, it emits harmful chemicals within the environment as demonstrated by table 20 below.

Table 20: Educational background and effects of buildup Electronic waste on environment.

Educational Background	Statement		
	When burnt it emits harmful chemical		
	Often	Never	Total
SSCE/GSCE	19	0	19
Diploma	64	0	64
First Degree	33	0	33
Post graduate	26	0	26
Total	142	0	142

Source: Field work, 2013

Ways consumers prevent the buildup of electronic waste.

Respondents were asked to suggest ways by which they prevent the accumulation of electronic waste in the homes; figure 5 below shows the responses of respondents.

It is observed from the figure that majority of the respondents numbering 98 and forming 65% of the overall respondents suggested the establishment of recognised recycling agencies that they could give their electronic waste to for recycling.

Again, a a significant number of respondents (23) and comprising about 15% indicated that they prevent the buildup of electronic waste in their hoes by giving their waste electrical appliances to repairers who may find some components of the gadgets useful for their business.   Fifteen

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respondents forming 10% however indicated that they normally throw them away as part of the municipal waste.

Five percent of the respondents numbering 7 individuals said they normally donate any electrical appliances they do not need any more to friends whiles 6 respondents forming 4% said they are preventing the accumulation of electronic goods by buying electronic goods only when they needed them.

One percent of the respondents however declined to answer the question as they did not know what to do to prevent the buildup of the electronic waste in their homes.

WAYS TO PREVENT BUILD UP OF ELECTRONIC WASTE
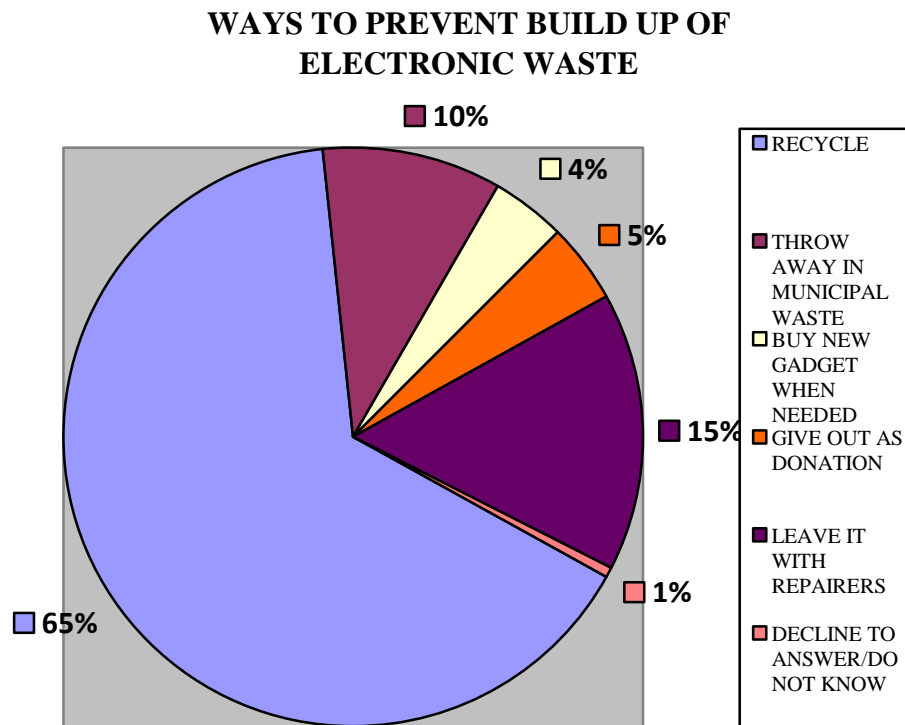
Figure 5: Ways consumers prevent the buildup of electronic waste.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the study including an overview of the study and the key findings made. It also looks at the conclusions drawn from the findings.

Summary

The study set out to examine senior high school teachers' purchasing behaviour for electronic goods and accumulation of electronic waste in the Takoradi Metropolis. The study identified the electronic goods that senior high school teachers in the Takoradi Metropolis purchased as well as the factors that influence senior high school teachers purchasing behaviour for the electronic goods. It also assesses ways through which senior high school teachers accumulate electronic obsolescence and the effects of these accumulated waste in their homes and immediate environment.

The descriptive survey design was employed for the study. Questionnaires were used to collect primary data. A total of 150 respondents were sampled using the simple random sampling technique for the study. Data administration and collection were carried out personally by the researcher. Both primary and secondary data were used to complement each other. Data analysis was facilitated by the use of Statistical Product and Service Solutions (SPSS) Version 16.

The main findings of the study are:

1. The study respondents were dominated by male. Majority of the respondents fell within the age ranges 20 and 29 years, of the number (15.3%) are males and (18.7%) are females. The majority (60.7%) of the respondents had obtained Bachelors Degree.

2. About (23.8%) of the responses shows that small household appliance such as tablets, mobile phones, palm tops, lap tops and mixers blenders are the top most purchased electronic goods by senior high school teachers. Medical devices are the least electronic goods purchased. Males do dominate in the purchase of these goods.

3. The majority (74.7%) of the respondents intimated that the price promotion or price of the electronic goods is a factor that influences their purchase of electronic goods. About (45%) of the respondents disagreed that their status in the society or community influence them to purchase electronic goods. Income levels and self-fulfillment were identified as factors that influence senior high school teachers to purchase electronic goods.

4. The study discovered that (45%) of the respondents most often stored or kept electronic obsolete/waste goods that they do not use anymore. About (48%) of the respondents often throw electronic waste goods away with general waste. The majority (60%) stated that they never burn these waste goods.

5. About (62%) of the respondents indicated that the buildup of electronic obsolescence/waste often creates a problem for the teachers because it is difficult to dispose off. The respondents indicated that the

electronic waste goods when burnt most often leads to breathing and health problems. About (57%) of the respondents indicated that electronic obsolete/waste goods may often cause domestic accidents and human injury.

Conclusions

Generation of electronic waste goods has made it quite challenging for the natural waste management processes of the environment to occur as volume of these together with their special characteristic outruns the carrying capacity of the natural environment. This increasing generation of waste has been due to population growth coupled with high consumption levels of individuals.

1. As evident from the findings, small household appliance such as tablets, mobile phones, palm tops, lap tops and mixers blenders were the top most purchased electronic goods which implies that the senior high school teachers have taste and preference for small household appliance to large household electronic appliances.

2. Price of electronic goods, teachers' status and income levels were identified as some of the factors that influence teachers' to purchase these goods. The findings imply that these factors to some extent play a vital role in the teachers' quest to patronise these goods to satisfy their needs. It can be concluded that the accumulation of electronic obsolete/waste goods by the teachers' poses a challenge as disposing them off becomes difficult. The effect of these unguarded

accumulations of the obsolete/waste goods may often lead to domestic accidents and human injury.

Recommendations

Based on the major findings and conclusions, the following recommendations are made:

1. Sensitization and awareness creation of the disposal and management of electronic obsolete/waste goods should be embarked upon by the Takoradi Metropolitan Assembly to help curb or address the challenges encountered by the teachers.

2. Indiscriminate burning of electronic waste goods should be discourage as it brings about its own environmental challenges. The metropolitan assembly should set up electronic waste goods collection centre to help in recycling of these goods if possible.

3. The influx of overage electronic goods should be curtailed by putting in place mechanisms to curb the situation.

4. A similar study should be conducted in the Greater Accra Region to investigate consumers or households purchasing behaviour for electronic and non electronic goods and its disposal.

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APPENDIX A

UNIVERSITY OF CAPE COAST

QUESTIONNAIRE

Dear Respondent,

The purpose of this study is to collect and collate information on consumers'
purchasing behaviour of electronic goods and the buildup of electronic waste
among teachers of second cycle-schools in the Takoradi Sub Metropolis. You
are kindly entreated to provide honest responses by ticking and or completing
the items on this form. Be assured that the responses you give will be treated
confidentially. Please indicate by ticking (√) appropriate responses where
applicable or supplying briefly the information required.

SECTION A: Background Characteristics

1.　　Gender: a) Male　　　[　]　　　b) Female　　[　]

2.　　Age (Years)

　a) 20-29　[　]　　　b) 30-39　[　]　c) 40-49　[　]

d) 50-60　　　[　]

3. What is your highest educational qualification?

　　　b) Diploma　　　　　　[　]

　　　b) HND　　　　　　　[　]

　　　c) First degree　　　　[　]

　　　d) Post graduate　　　　[　]

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e) Others (specify)...

SECTION B: Electronic Goods of Teachers

4.   Please indicate the electronic good/s your household have (Please tick

as many as applicable to you)

a.   Large household electronic appliances/goods (i.e. deep freezers,

fridges, movable air conditioners, washing machines, TV's etc.)   [ ]

b.   Small household appliance (i.e. tablets, mobile phones,

palm tops, lap tops, mixers blenders etc)   [   ]

c.   Lighting equipment (i.e rechargeable lamps, touch lights,

bed side lamps, electric heaters, pressing irons etc)   [   ]

d.   Electrical and electronic tools   [   ]

e.   Toys, leisure and sports equipment   [   ]

f.   Medical devices   [   ]

g.   Monitoring and control instruments (i.e door bell, alarm device)   [   ]

SECTION C: Consumers' Purchasing Behaviour of Electronic Goods

Please tick in the boxes provided to indicate what in your opinion influences

you to buy the electronic goods you have.

Influencing factors of purchases of electronic goods	Strongly agree	Agree	Disagree	Strongly disagree
5. Price of the electronic goods/Product promotion/reduction sales.	[ ]	[ ]	[ ]	[ ]
6. My status in the society.	[ ]	[ ]	[ ]	[ ]
7. My friends introduced me to buy it.	[ ]	[ ]	[ ]	[ ]
8. An attractive advertisement.	[ ]	[ ]	[ ]	[ ]
9. I needed it.	[ ]	[ ]	[ ]	[ ]
10. It is what everybody is using these days	[ ]	[ ]	[ ]	[ ]
11. Availability of a more sophisticated electronic good.	[ ]	[ ]	[ ]	[ ]
12. Income level	[ ]	[ ]	[ ]	[ ]
13. Weather conditions	[ ]	[ ]	[ ]	[ ]
14. It gives me self fulfilment.	[ ]	[ ]	[ ]	[ ]

15. Others please specify: ....

SECTION D: Accumulation of Electronic Obsolescence/Waste

What do you do with the equipments you don't use anymore?

What do you do with the equipments you don't use anymore?	Most often	Sometimes	Often	Never
16. Store/ keep them	[ ]	[ ]	[ ]	[ ]
17. Sell	[ ]	[ ]	[ ]	[ ]
18. Throw them away with general waste	[ ]	[ ]	[ ]	[ ]
19. Give them to a recycler	[ ]	[ ]	[ ]	[ ]
20. Donate them to friends, employees, etc	[ ]	[ ]	[ ]	[ ]
21. Give them back to the person who sold them	[ ]	[ ]	[ ]	[ ]
22. Give them to the electronic repairers	[ ]	[ ]	[ ]	[ ]
23. Burn them	[ ]	[ ]	[ ]	[ ]

24.Other,specify..

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SECTION E: Effects of Buildup of Electronic Obsolescence /Waste on the Immediate Environment (i.e. the burden of the pile up of electronic obsolescence on the immediate environment)

Statement	Most of the times	sometimes	often	Never
25. E-waste disposal is a problem.	[ ]	[ ]	[ ]	[ ]
26. They take a lot of space in the room for their storage (congestion)	[ ]	[ ]	[ ]	[ ]
27. The build-up of E –waste in the house serve as breeding ground for disease causing animals.	[ ]	[ ]	[ ]	[ ]
28. When burnt it emits harmful chemicals into the environment (i.e. causing air pollution) lead to breathing/health problems.	[ ]	[ ]	[ ]	[ ]
29. Creates ugly scenery in the environment	[ ]	[ ]	[ ]	[ ]
30. Domestic animals may consume the poisonous parts and die.	[ ]	[ ]	[ ]	[ ]

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31. Affects soil composition and lead to soil infertility.	[ ]	[ ]	[ ]	[ ]
32. May cause domestic accident / human injury	[ ]	[ ]	[ ]	[ ]
33. occupies space for gardening/ wastage of land	[ ]	[ ]	[ ]	[ ]

34. Please, kindly suggest ways to prevent the build-up / pile up of electronic waste in homes.

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Table 1: Health effects of electronic waste.

E-waste sources	Constituents	Health effects
Solder in printed circuit boards, glass lead panels and gaskets in computer monitors	Lead	• Damage to the peripheral nervous system and kidney damage. • Adverse effect on brain development of children; Causes damage to the circulatory system and kidney
Chip resistor and semi-conductors	Cadmium	• Toxic irreversible effect on human health. • Accumulation in kidney and liver. • Causes neural damage.
Relays and switches and printed circuit boards	Mercury	• Chronic damage to the brain. • Respiration and skin disorders due to bioaccumulation in fishes.
Galvanized steel plate s and decorator / hardener for steel housing	Chromium	• Causes bronchitis
Cabling and computer housing	Plastic and PVC	• Burning produces dioxins which causes reproductive and developmental problems.
Electronic equipment and circuit boards	Bromated flame retardants	• Disrupts endocrine system functions.
Front panel of crt	Barium phosphorus and heavy metals	• Causes muscle weakness and damage to the heart liver and spleen.
Copper wires, printed circuit board tracks	Copper	• Stomach cramps, nausea, liver damage or Wilson`s disease.
Nickel-cadmium rechargeable batteries.	Nickel	• Allergy of the skin to nickel results in dermatitis while allergy of the lung to nickel results in asthma.
Lithium-ion batteries	Lithium	• Lithium can pass into breast milk and may harm nursing babies • Inhalation of the substance may cause lung edema
Motherboard	Berrylium	• Carcinogenic (lung cancer) • Inhalation of fumes and dust causes chronic beryllium disease or berrylicosis.

Source: Petheeswari el at. (2012).