# Analysis of Mobile Phone e-Waste Management for Developing Countries: A Case of Uganda

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**Abstract.** Although considerable efforts are being made by many Governments and other entities in tackling waste-related problems, there are still major gaps to be filled in this area. The current practices of e-waste management in Uganda suffer from a number of problems such as informal recycling, inadequate legislation, lack of awareness from the stakeholders and limited government efforts. In addition to these e-waste management challenges, this paper also discusses the strategies to address this emerging problem in Uganda, considering related efforts in some regions such as Asia-Pacific, Europe and elsewhere in Africa. The paper mainly focuses on Mobile phone e-waste, with emphasis on safe disposal and recycling strategies.

**Keywords:** mobile phone e-waste, mobile phone e-waste management strategy.

## 1 Introduction

Electronic Waste (e-waste) comprises of waste electronics/electrical goods that are not fit for their originally intended use or have reached their end of life. Such products include computers and mobile phones. The fast growing application of Information and Communication Technology (ICT) means there is a rapid increase in number of computers, mobile phones and related accessories. This has led to a proportional increase in the e-waste stream not only in industrialized nations but also in developing countries like Uganda.

The challenge of managing e-waste is of greater concern in developing countries than elsewhere because they lack the capacity to handle and recycle the hazardous materials contained in e-waste. Furthermore, disposal of e-waste in dumpsites pollutes the environment, creating health hazards to the nearby community. Additionally, e-waste contains toxic materials that can pose danger to the human respiratory system, reproductive system, circulatory system and nervous system. Improper disposal of e-waste creates evironmental impacts such as global warming, depletion of resources, air and water pollution [1].

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More applications are being developed for the mobile phone platform and the future focuses on evolving this device into a hand-held computer [2]. This implies that more mobile devices will be in circulation due to diversity of applications. Therefore, there is an urgent need for strategies to manage and control hazardous mobile phone e-waste.

In Uganda, the ministry of ICT under NITA-U has a draft policy on Electronic waste [3]. The main aim of the policy is to enable a sustainable e-waste management for a safe environment and a healthy nation. As a measure to minimize e-waste in Uganda, the government in 2009 imposed a ban on used electronics such computers and fridges [4]. However, this did not control the number of used mobile phones penetrating the Ugandan market. The United Nations Development Organization (UNIDO) also commissioned a research on e-waste in Uganda [5]. Its report shows that government has the highest number of ICT infrastructure followed by NGOs and large enterprises. The report indicates that there are few resources to manage this e-waste. Given the limited data available on used mobile phones, little attention has been subjected to this category of e-waste.

Therefore, this paper presents the challenges of managing mobile phone e-waste and proposes strategies to address these challenges. The rest of the paper is organized as follows: Section 2 discusses related work, while Section 3 describes the research approach used. Sections 4 discusses the challenges of mobile phone e-waste management in Uganda and the strategies to address these challenges. Section 5 discusses a comparison of proposed e-waste flow with existing strategies. Finally Section 6 contains the concluding remarks and the future work.

## 2 Related Work

E-waste is an increasing concern in the world and many countries in Europe have started to strictly regulate it. Developed countries like New Zealand have gone further to implement policies and establish regulatory mechanisms for controlling e-waste [6]. Murali [6], highlights that for developing countries, a dedicated policy should be put in place to offer clear guidlines on handling e-waste. Mobile phones like many other modern electronic items contain toxic metals such as Arsenic, Beryllium, Cadmium, Copper and Nickel, which should not be disposed of in ordinary trash. Almost 90% of toxic metals and other materials found in mobile phones can be recovered to make new products. It is good practice for countries to establish collection centers that collect all materials from disposed mobile phones. On the other hand, ICT (computers and mobile phones) has been on the increase all over the world. Table 1 shows the level of ICT (mobile phone and PCs) in East Africa.

From Table 1, there is an increase in mobile phone users from 1.59% in 2003 to 27.02% by the year 2010 for Uganda in particular. This shows an increase in number of mobile phone users. Therefore, it is important to keep track of the life end of these rapidly increasing mobile phones in the country. A few studies about the E-waste management exist in different countries like India, China,