



ASSESSMENT OF E-WASTE SMALL SCALE ENTERPRISE AS MEANS OF SUSTAINABLE LIVELIHOOD IN NIGERIA

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Abstract

Rapid changes in the technology of electronics (CDs, software, MP3 etc), their falling prices, and the equally rapid obsolescence of the devices have resulted in a fast-growing accumulation of electronic wastes (e-waste) around the globe. Hence, an entirely new economic sector is evolving around the trade, repair and recovery of materials from redundant electronic devices; and this has opened up a new source of livelihood for urban settlers in Nigeria. This study is directed at evaluating the various types of electronic wastes found with electronics repairers/ re-furbishers and with collectors of e-waste scraps in some parts of the country. The study also examines the economic viability of e-waste enterprise in Nigeria. The investigation was carried out through the administration of structured questionnaires and by conducting key informant interviews with some electronics repairers and e-waste scrap dealers in Lagos, Abuja and Kaduna. The results of the study show that electronics repairers earn between N27,000 to N45,000 every month, the lower cadre e-waste collectors (popularly referred to as 'mallams') earn an average of N30,000 per month while the e-waste merchants or high cadre e-waste collectors make an average net profit of as much as N100,000.00 per month. The study also revealed that the e-waste business is not only profitable but also comparable to other urban livelihood supports and will go a long way in reducing poverty level among the urban settlers in Nigeria, who engage in the enterprise.

Keywords: e-waste, electronics repairers, e-waste collectors, scrap dealers, livelihood.

Introduction

Electronic waste can be defined as discarded computers, office electronic equipment, entertainment device electronics, mobile phones, television sets and refrigerators. This definition includes used electronics which are destined for reuse, resale, salvage, recycling, or disposal. Functioning monitors and TVs could be reused after cleaning, software upgrading or even rebranding. Faulty components could be repaired or replaced. The plastic housing could also be replaced to improve on the aesthetics of the product. With the increasing rate of e-waste generation and rapid obsolescence of electronic equipment (UNEP, 2006; Cobbings, 2008; Widmer *et al.*, 2005), an entirely new economic sector is evolving around the trade in repair and recovery of materials from redundant electronic devices; and this has also opened up a new source of livelihood for the urban and rural unemployed.(Martin, 2010)

Livelihood refers to attempts by individuals and households to find ways to raise incomes through activities which are undertaken to generate income. Loubser (1995) defined livelihood as the totality of means by which people secure a living, have or acquire in one way or another, the requirements for survival and the satisfaction of needs as defined by the people themselves in all aspects of their lives. The term "Sustainable Livelihood" has been defined as a livelihood that can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Hussein and Nelson, 1998). Urban migration has resulted in the development of large slums in most urban centers resulting in high poverty in such areas. Poverty according to Sen (1999) is the failure to achieve basic capabilities such as being adequately nourished, living a healthy life, possession of skills to participate in economic and social life, permission to take part in community activities to mention a

few. Studies have indicated that poverty surveys do not adequately sample such settlements and as such, the incidence of urban poverty is likely to be higher than indicated by most statistics (Kuiper and van der Ree, 2005). Hence, urban poverty is rapidly increasing in pace with overall urbanization due to such migrations as is evidenced in sub-Saharan Africa, where the number of poor has risen from 227 million in 1990 to 314 million in 2001, and is expected to rise further in the next decade (Vandenberg, 2006). In a World Bank report (World Bank 2004), people living on \$1 per day or less in sub-Saharan Africa have been estimated at 46.5% in 2001 and was projected to reduce to 42.3% by 2015 which indicate that the region may not attain the 22.3% target required to meet the MDG. A rundown of population living on \$1 per day or less in all the sub-saharan African countries (Table 1) shows that Nigeria has the highest population of urban settlers living on a dollar or less.

Table 1: Population living on \$1 per day or less in Sub-Saharan African Countries

Country	Year	Population living on \$1 per day or less		
		Urban %	Rural %	National %
Burkina Faso	1999	5	74	62
Ghana	1998	7	55	38
Kenya	1998	1	32	25
Madagascar	1997	29	74	63
Mali	1995	28	90	72
Niger	1997	11	70	60
Nigeria	1999	37	82	68
Senegal	1997	1	43	26
Tanzania	1999	11	62	49
Zambia	1996	11	88	60
Zimbabwe	1994	2	58	41

Source: Sahn and Stiffel (2003)

Over the years, Nigeria has experienced rapid urbanization, with 50% of its population living in urban centers in 2010. The high population growth increases the need to open up productivity and welfare-enhancing potential of Nigeria's urban areas. Unemployment continues to be high, especially among the youth, overall unemployment rate in Nigeria was 23.9% in 2011 although there exist regional disparities in unemployment rate in Nigeria ranging from 33% in the north-eastern region to about 8% in Lagos State (African Development Bank Group 2013).

Scavenging from the waste stream, or waste picking, is an important economic activity that provides an income to over 15 million people worldwide and has a financial impact of several billion US\$ every year. According to the Bureau of Labor Statistics U.S. Department of Labor (2012), One percent of the urban population in developing countries make a living from scavenging. Scavenging is a common income-generating activity for disadvantaged individuals. Millions of people worldwide survive by recovering recyclable materials from waste. Traditionally, waste pickers have been considered a problem and municipalities have tried to get rid of them and as such, scavenging is still illegal in many cities of Africa, Asia, and Latin America. (Martin, 2010)

Repairs of electronic equipment is also a source of livelihood for many who choose that line of trade and it is lucrative and sustainable in a society where majority of the populace can afford to buy used or second hand electronics. Trading of secondhand electronics is currently booming at the famous 'computer village' in Lagos, Nigeria, owing to the large-scale importation of secondhand electronics into the state. These are the major sources of e-wastes as most of these secondhand electronics are e-wastes in disguise while others have limited lifespan before landing in repair workshops (Nnorom and Osibanjo 2008). The situation in Nigeria is such that majority of the populace depend on these secondhand electronics to have access to information and entertainment; this implies that the accumulation of e-wastes from them in repair workshops and dumpsites is likely to remain for long. These are indications that apart from those already involved in the e-waste trade and repairs, employment opportunities are likely to open to many more of the Nigerian unemployed. This study therefore aims to assess the viability of e-waste scavenging and repairs as a means of livelihood for the Nigerian youths and to determine whether or not it compares well with other sources of livelihood among the urban settlers in Nigeria.

Materials and Methods

Field studies were conducted through self-administered questionnaires and key informant interviews with the e-waste repairers, e-waste scavengers and scrap dealers in three cities in three different states (Lagos State, Kaduna State and Abuja) in Nigeria from February to August 2011. The cities where the study was conducted are- Kaduna metropolis in the northern Nigeria, Abuja (FCT) municipality in central part of the country and Lagos metropolis in the southern part of the country. The sampling locations are as shown in Figure 1.

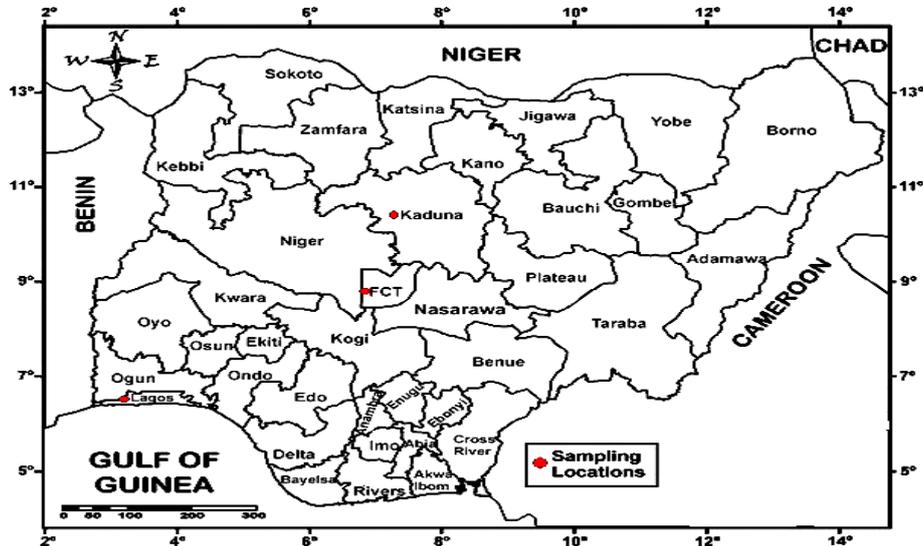


Figure 1: Map of Nigeria showing the 3 states under study

Results and Discussion

Viability of E-Waste Repairs/ Refurbishing and Scrap Trade in the Study Areas:

Repairers/Re-furbishers: The study showed that repairs/refurbishment of electronic equipments in Nigeria is mainly within the informal sector of e-waste management. However, in Kaduna metropolis 2 major electronics distributors were found to have repair workshops within their organization as part of the services they offer to their customers and these can be referred to as formal. Aside from this group, all other repair workshops fall under the informal e-waste sector and are owned by individual electronic repairers. The quantities of electronic items surveyed (Ibrahim, 2011) in some repair workshops in the Computer village Lagos, Central Kaduna and Abuja respectively are as shown in Table 2.

Table 2: Computer items surveyed in computer workshops in Computer Village Lagos

Items surveyed	Total no.	No. unserviceable	No. for minor repairs	No. for major repairs/ refurbishing
Computer Village Lagos (5 Workshops)				
CPU	141	35	15	91
Keyboard	337	141	23	173
Monitor (CRT)	449	112	23	314
Monitor (LCD)	818	23	43	752
Printer	77	33	10	34
Computer Village Lagos (33 Workshops)				
TVs	1086	108	917	61
Refrigerator	916	89	712	89
Video recorder	156	14	135	7
Radio	772	106	630	36
Mobile phone	3612+40kg	471	2990	693
CD player	-	-	-	-

Source: Field survey, 2011

Table 3: Computer items surveyed in computer workshops in Kaduna

Items surveyed	Total no.	No. unserviceable	No. for minor repairs	No. for major repairs/ refurbishing
Kaduna (4 Workshops)				
CPU	225	69	90	66
Keyboard	210	59	132	19
Monitor (CRT)	84	20	33	31
Monitor (LCD)	103	35	21	47
Printer	106	24	59	23
Kaduna (39 repair Workshops)				
TVs	739	227	304	208
Refrigerator	577	138	217	222
Video recorder	318	35	256	27
Radio	299	103	115	81
Mobile phone	35	2	29	4
CD player	309	70	158	81

Source: Field survey, 2011

Table 4: Computer items surveyed in computer workshops in Abuja

Items surveyed	Total no.	No. unserviceable	No. for minor repairs	No. for major repairs/ refurbishing
Abuja (12 Workshops)				
TVs	6	2	3	1
Refrigerator	9	5	2	2
Video recorder	4	2	1	1
Radio	16	4	6	6
Mobile phone	179	75	77	27
CD player	23	7	15	1
Abuja (17 repair Workshops)				
CPU	63	16	25	22
Keyboard	39	16	22	1
Monitor (CRT)	39	6	28	5
Monitor (LCD)	9	3	4	2
Printer	22	7	9	6

Source: Field survey, 2011

From Tables 2, 3 and 4, it is evident that repairs of computers and its accessories as well as other electronics listed are highly patronized especially in Lagos and Kaduna. The lower numbers of electronics for repairs recorded in Abuja is due to the fact that most of the repair workshops are located outside Abuja central. The survey showed that computer monitors and CPU (central processing unit) are the highest number of electronic equipment found in repair workshops while mobile phones recorded highest among other electronic items studied. It can be inferred from this study that the repairers/refurbishers play an important role of extending the lifespan of electronic equipment through repairs and refurbishment as some electronic equipment are returned to their owners after minor or major repairs for reuse.

The quantities of electronic equipments found in the repair workshops shows that there is sufficient electronics for the sustainability of the enterprise and the possibility of increasing the viability through proper training of repairers is very high. A recent report by Schluep (2010) on e-waste management in developing countries focusing on Africa categorized Nigeria as one of the promising countries for the introduction of pre-processing technologies if the informal sector is given strong support in capacity building through technology and knowledge exchange. Also, the fact that some unserviceable electronics were found (abandoned) in the repair shops visited suggests that repair workshops serve as dumping grounds for e-wastes and is therefore a direct source of e-wastes for scrap dealers and scavengers.

(b) Informal e-waste collectors

There are no formal e-waste collectors in Nigeria presently; however, informal individuals/ groups referred to as “mallams” collect e-waste for the purpose of extracting metal scraps. For instance, in the computer village in Lagos, these informal groups buy unserviceable/unrepairable computers and other electronics for extraction of metals and plastics from them. The situation is similar at the Ojota dumpsite where these scrap dealers erect their stalls for the purpose of extracting metals/plastics from electronic wastes that are brought to the dumpsites for landfilling. Table 5, 6 and 7 shows the quantity of e-wastes found with 16 scrap dealers at both the computer village and Ojota dumpsite in Lagos and 1 scrap dealer in Abuja. Tables 5, 6 and 7 show the quantities of electronic scraps found with some e-waste scrap dealers in Lagos and Abuja. A total of 132.2 tons of scraps from computer and its accessories and 37.99 tons of scraps from other electronic items were found with 16 scrap dealers in Lagos while 2.72 tons of scraps from both computer and other electronic items were found with 1 scrap dealer within the FCT.

Table 5: E-waste from computer items found with 16 scrap dealers at computer village and Ojota dumpsite

Computer items	Quantity of items	Weight (tons)
CPU motherboard	515 pieces + 50 tons	53.50
Keyboard	530 pieces + 50 tons	51.11
Monitor (CRT)	237 pieces + 15 tons	17.70
Monitor (LCD)	82 pieces + 10 tons	10.41
Printer	32 pieces	0.20
Total Weight (tons)		132.92

The average weight of CPU, keyboard, CRT monitor, LCD monitor and printer are estimated as 6.8kg, 2kg, 11.38kg, 5.0kg and 6.5kg respectively.

Table 6: Other items found with 16 scrap dealers at Computer Village and Ojota dumpsite

Electronic Items	Weight (tons)
TVs	5.94
Refrigerators	16.32
Video recorder	1.85
Radio	1.14
Mobile phone	6.26
CD player	6.48
Total Weight (tons)	37.99

Table 7: Electronic items found with 1 scrap dealer at Abuja

Electronic Items	Quantity	Weight (tons)
CPU motherboard	66	0.45
Keyboard	32	0.06
Monitor (CRT)	33	0.38
Monitor (LCD)	15	0.08
Printer	36	0.23
TVs	9	0.27
Refrigerators	5	0.60
Video recorder	10	0.11
Radio	26	0.20
Mobile phone	47	0.01
CD player	41	0.33
Total Weight (tons)		2.72

The average weight of TV, refrigerator, Video recorder, Radio, mobile phone and CD player are estimated as 30kg, 120kg, 10.8kg, 7.52kg, 0.23kg and 8.0kg respectively. These results shows that more scraps are generated from computer and its accessories and this is due to the fast growing use of Information and Communication Technology as well as rapid turnover in technology which has led to increased use of ICT equipments such as computers and in turn the increase in the wastes

generated from them. This increase in e-waste generation also translates to increase in the trade of scraps generated and creation of employment opportunities for the urban settlers.

Assessment of Income Generation from E-Waste Enterprise in the Study Areas: The study assessed the average incomes from e-waste enterprise in the study areas in order to compare the incomes with that of other similar means of livelihood as obtained from other studies. It was found from the study that an electronics repairer in Lagos earns an average of N45, 000 every month while their counterparts in Kaduna and Abuja earn N33, 000 and N27, 000 averagely respectively. This income is well above the current minimum wage in the country which is N18,000 per month. The average input, average output and the average income per month for each of the study areas are as shown in Table 8. Also, the collection, extraction and sales of plastics and metal scraps is a lucrative business for the group of the scavengers or “mallams” who earn as much as N30,000 averagely per month from the business while the scrap dealers make between N200,000.00 to N1.2 million with average net profit of as much as N100,000.00 per month.

A recent study in Lagos (Manhart *et al.*, 2011), revealed that the e-waste refurbishing sector in Lagos generates about 50.8 million US dollars per year which is equivalent to 0.015% of Nigeria’s GDP and also pay tax to the Local and State Governments to the tune of 419,000 US dollars annually. Also, the same study reported that the sector has its own apprenticeship which produces around 2,000 alumni per year. A comparison of the earnings from various urban livelihood supports as shown in Table 9 shows that the income from e-waste enterprise is within the axis of what obtains in similar trades among the urban settlers in Nigeria. Moreover, except for the employee, who are usually apprentice in training, the income from all the self employed livelihood supports is well above the minimum wage of the country which is N18,000.00.

Table 8: Average income (₦) from electronics repair

	Average income per month	Average output	Average income
Lagos	5,000.00	50,000.00	45,000.00
Kaduna	12,000.00	45,000.00	33,000.00
Abuja	5,000.00	32,000.00	27,000.00
Scrap dealers	300,000.00	400,000.00	100,000.00
Scavengers	5,000.00	30,000.00	25,000.00

Table 9: Comparison of earnings (₦) from various urban livelihood supports

Livelihood supports	Average earnings per month		Source
	Self employed	Employee	
Mechanic	35,000.00	14,000.00	Duru, 2012
Tailoring	37,000.00	15,000.00	Duru, 2012
Electrical works	46,000.00	19,000.00	Duru, 2012
Electronics Repairs & refurbishing	35,000.00	-	Present study
Electronics Repairs & refurbishing	70,000.00	13,000.00	Manhart <i>et al.</i> , 2012
Welding	38,000.00	-	Duru, 2012
Trading	45,000.00	-	Duru, 2012
e-waste scavenging	25,000.00	-	Present study
e-waste scavenging	-	85,500.00	Manhart <i>et al.</i> , 2012
e-waste scrap trading	100,000.00	-	Present study
Commercial motorcycle	42,000.00	33,000.00	Ogunrinola, 2011.

Improvement of the means of livelihood of urban settlers through e-waste small business/enterprise: Although the e-waste enterprise is very promising as a source of livelihood for the urban settlers, it is still possible to improve the productivity of the sector if appropriate strategy is put in place. Some of the ways of improving the productivity is by improving the skills used by the repairers and refurbishers by giving them strong support in capacity building through technology and knowledge exchange with developed countries. They can also be trained on pre-processing

technologies for non-repairable parts of the e-wastes to make them marketable in the global e-waste market. Financial support in form of equipment loan or public-private partnership to enhance their efficiency will go a long way in attracting more of the unemployed urban settlers to the trade. The establishment of e-waste collection centers is also a strategy that will ensure that input into the sector is easily assessed. The informal e-waste collectors can be incorporated into the collection system while means of encouraging users to drop their end-of-life electronic equipments at a collection centers can be sought. Finally, end market for refurbished electronic equipments and pre-processed e-wastes should be sought for to ensure sustainability and smooth running of the whole system

Conclusion and Recommendation

This study has shown that electronics repairs/ refurbishing and e-waste scavenging is a viable source of livelihood for urban dwellers in Nigeria. With proper support through training, funding (in the form of soft loans from the government or public-private partnership) and improvements on their working and living conditions, it can make positive contributions towards employment generation and thus bring about economic, social and environmental benefits to the country.

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