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Solid Waste Recycling and Job Market in Zambia

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ABSTRACT

The purpose of this research was to determine the contribution of solid waste recycling companies to the job market in Zambia. A comprehensive database of patents and company registration agency for thirty-four companies working with waste recycling in Zambia was used. The data was collected through semi-structured interviews with key stakeholders. The results revealed that recycling companies create job opportunities and environmental benefits. The study has also established that recycling industry is growing rapidly. However, the sector has a lot of challenges e.g. the poor status of machinery. Old technologies have made the industry structure more costly to operate at full capacity. There was no significant difference ($p > .05$) in job creation between companies using old and new technologies ($p = 0.635$). Similarly, there was no significant difference ($p > .05$) in contribution to job creation between paper and plastic recycling ($p = 0.456$). However, there was a significant ($p < .05$) difference in efficiency between old and new technologies.

Keywords: Job market; solid waste; recycling companies; employment opportunities.

1. INTORUCTION

Waste management and recycling can make a substantial contribution to economic growth and job creation (European Commission, 2008). The opportunities with the prevailing waste policies are encouraging; especially that 50% of the household waste is recyclable (Wilton,2011). Bird and Lawson (2009) contended that, there is a huge job opportunity in recycling, e.g., jobs in waste collection, jobs in reuse centers, jobs in recycling and jobs in composting. Almus (2004) and Wright etal. (2013) observed jobs are demolished with every tonne of waste dumped in landfills or incinerated. According to Friends of the Earth (2010), solid waste recycling sector is very dynamic, but still offers economic opportunities with vast potential for expansion.

Other studies done by (Emery et al., 2003; Keep and Mayhew,2010) compared the survival rates of new recycling firms to exist ones and found that new firms have a relatively high risk of failure during the first years of their existence. In his research, Cooper (2004) compared with the result for the survival of new firms, the failure rates of new and incumbent firms he used to assess the creation of jobs. According to Gray et al., (2003), recycling generally involves the processing of final products so that they become ready for another use. This method is becoming more and more relevant in the current scenario when waste management is the need of the hour. That is why recycling is regarded as one of the effective solutions to curb further wastage of natural resources (Environmental Management Protection Agency, 2002; Kouri and Clarke,2014). Bird and Lawson

(2009), founded that recycling methods can bring a big difference in our environment as they help considerably in restricting the emission of greenhouse gases which are the main cause of global warming (Gregson and Crang,2015).

Waste markets are increasingly physically important in an emerging capitalist, consumer economy as they provide employment to the sizeable numbers of the urban poor working in the so-called unorganized sector of such an economy (Warhurst et al., 2006; Gill, 2007 Cascadia, W. 2009). The growing environmental consciousness within society has resulted in an increase in the amount of recycled waste over time in many countries (Baksi and Van Long, 2009; Sthiannopka and Wong, 2013). According to Wilson et al., (2006; Loyd and Mayhew,2010) the degree to which a particular material is recycled depends on income levels, the existence of local and national markets, need for secondary raw materials, levels of financial and regulatory government intervention, prices of virgin materials, international trade in secondary raw materials and relevant treaties.

According to Roper and Parker (2008), over 50 tons of waste is collected in Edinburgh, Scotland everyday through street bin collections and street cleaning. Although recycling rates are high, trash heaps are piling up in rapidly growing countries like China and India (Medina, 2008; Winterbotham, 2014). On average, one person generates 0.6 kilogram of waste per day in low-income countries (Medina, 2008; Pearce and Stilwell, 2008). The wealthier the person, the more waste she or he generates.

The growth of the Zambian urban population and the growth in economic activity in most sectors have resulted in an accumulation of domestic solid waste as well as commercial and industrial waste in urban areas (Zambia Environmental Management Agency (ZEMA, 2012). As Zambia invests more into the economic sectors, the key aspect of waste generation and management needs to be addressed simultaneously. Furthermore, the increasing solid waste generated in Zambia has not been accompanied with adequate sanitation facilities and management programmes (ZEMA, 2011). Notable among the waste management problems is inadequate operational funding from the municipality's budget allocation for the collection and disposal processes (ZEMA, 2012). The disposal methods in Zambia mostly depend on the obsolete dumping with the associated environmental and social risks. Hence, one avenue which can be exploited to increase employment rates and at the same time safeguard the environment is recycling of solid waste (Lusaka City Council, 2010).

Recycling can be both a business opportunity as well as an opportunity to deal with the problem of waste. Reuse, recycling and waste reduction offer direct job opportunities for local communities and considered an economic development tool as well as an environmental tool (Aljaradin, 2011; 2014). Therefore, the purpose of conducting this research was to determine the contribution of solid waste recycling companies to job creation in Zambia.

2. MATERIALS AND METHODS

The study was carried out in Lusaka and the target population was all the 34 registered recycling companies registered with Patents and Companies Registration Agency (PACRA) in Zambia (Figure 1).

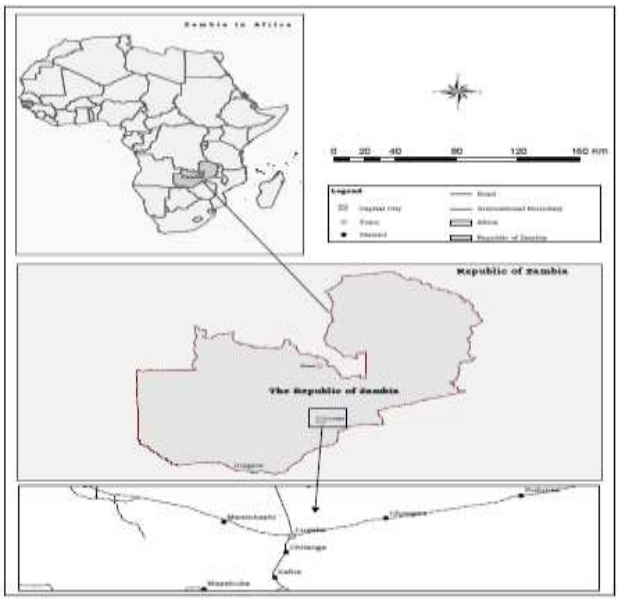

Figure 1: Map of Zambia showing the study area Lusaka (Kabungo,2015).

The study site lie between 12° 49′ ; 12° 59′S latitude, and 28° 22′ ; 28° 22′E longitudes. The elevation of the study site lies between 1200m and 1500m above sea level though undulating. This area was found suitable for research because it has a big population which poses a challenge in terms of high unemployment levels and substantial increases in solid waste (Zambia Environmental Management Agency, 2011).

The study employed a cross-sectional design and purposive sampling was used where the researcher purposely targeted recycling companies. Data for this study was gathered through semi-structured interviews with key stakeholders in the recycling companies. Two methods were used for the validity and reliability of the questionnaire namely pre- testing and information triangulation. The questionnaire and interview schedules were pre-tested among two (2) waste pickers and one (1) recycling company and were adjusted accordingly. Information triangulation using informal chats, checking records and collecting data from different sources on the same issue was used to cross check the accuracy of information. Data was collected through usage of questionnaires. The questions containing. both closed and open ended were used for the study. Cost benefit analysis and statistical analysis methods were used for analyzing the data through Statistical Package for Social Scientists (SPSS) due to its simplicity in analysis of data.

3. RESULTS

3.1 Recycling companies

As shown in Table 1 paper recycling contributes 2.9 % to job creation to the recycling industry. Sac recycling contributes i 3.4%. Scrap metal recycling contributes 13.0% while plastic recycling contributes 80.7%. (see table 1).

Table 1: Contribution of recycling companies to creation of jobs (Source: field work March, 2015).

Types of recycling companies	Type of products recycled	Contribution to creation of jobs in percentages (%)
Paper recycling	cardboard	2.9
Plastic recycling	Plastic bottles for soft drinks and mineral water Plastic containers -Plastic plates and cups -Plastic conduit pipes -Plastic hangers -Plastic washing basins -P.V.C pipes -Lunch boxes - black and transparent Pothylene sheets	80.7
Sac recycling	5 kg, 10kg,25kg and 50 kg empty sacks	3.4
Scrap metal recycling	Bronze and Aluminum	13.0

According to table 1 there was no significant (p >.05) difference in job creation between paper recycling and scrap metal recycling (p = 0.635). However, there was a significant (p <.05) difference in efficiency between old and new technology.

Table 2: Recycling companies.

Variable		**DF**	**MS**	**F-Value**	**P-Value**
Job creation	Type	2	4.972	0.46	0.635
	Paper	1	99.933	91.63	0.000
	Scrap Metal	24	70.485	6.46	0.000
	Error	122	10.906		
Type of technology	Old	1	323.21	240.58	0.000
	New	8	5.96	4.44	0.001
	Error	44	1.34		

3.2 Potential for recycling industry in Zambia

A total of 34% of recycling companies have high potential for growth, (41%) of the recycling companies were reported to have average potential and on the other hand (25%) have low potential for growth as shown in table 3.

Table 3: Potential for recycling industry (Source: field work March, 2015).

Potential for recycling companies	Percent (%)
High	34
Average	41
Low	25
Total	100

Likert scale: high= 8-10, Average=5-7.9, Low=1-4.9

There was no significant difference in response to the question between companies using old and new technology as potential was high. Similarly there was no difference in view between companies using old and new technology (x^2=7.25,df=3, P ≥0.05).

3.3 Challenges of recycling industry in Zambia

The results reveal that eighty-eight percent (88%) of recycling companies are still using old technology while twelve percent (12%) are using new technology as shown in table 4. However, there is was no significant difference in challenges between companies using new (88%) and old technology (12%).

Table 4: Technology used for recycling industry (Field work March, 2015)

Type of technology	Percent (%)
Old	88
New	12
Total	100

4. DISCUSSION

The study revealed that recycling industry as a whole is very diverse and includes a wide variety of service and product businesses, from those that collect and process all sorts of materials to those that reuse materials or manufacture with recycled content. The industry also supports businesses in transportation, brokering and retailing of recycled products. Because recycling-based manufacturing produces the greatest economic, social, and environmental benefits within the industry, the focus was exclusively on manufacturing with recycled materials.

4.1 Contribution of recycling to job creation

The recycling industry in Zambia contributes about 9%, in terms of job creation which includes: skilled, semi-skilled and unskilled workers. Jobs in the industry include: sorters, recycling machine operators, refuse collectors; waste management officers; waste engineers; environmental engineers and plant maintenance engineers. As supported by Morgan and Mitchell, (2015) recycling also creates new businesses such as transportation, processing and selling recovered materials as well as companies that manufacture and distribute products made with recycled materials and in turn create jobs. As supported by Gray et. al (2003), recycling creates many jobs for both rural and urban communities than landfill and incineration disposal options. These new recycling based manufacturers employ even more people and at higher wages as depicted in Figure 2, Solid Waste Recycling and Job Creation Model.

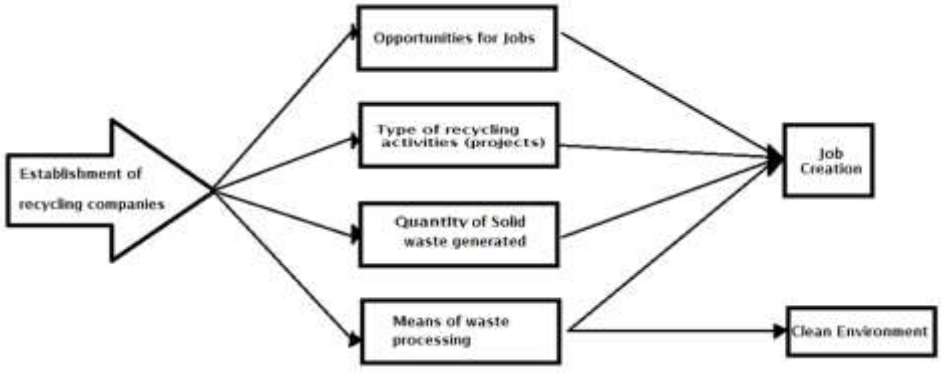

Figure 2: Solid Waste Recycling and Job Creation Model. Source: Adapted from Marchand 1988

The high percentage of full-time employees entails that jobs in recycling industry are more stable than in other sectors where jobs are seasonal for instance in construction industry.As supported by Warhurst etal., (2008), recycling employs 60 times more workers than landfills. The current labour-force for recycling companies stands at 9 % employees who are directly employed by recycling companies. There are more males than females. This can be attributed to the fact that recycling jobs are riskier and more demanding in terms of strength and physical competency. This is in line with Warhurst etal. (2006) and Gill, (2007), who indicated that recycling jobs are labour intensive and thus create more jobs than waste collection and disposal. However, it was difficult to estimate the number of waste pickers who are indirectly employed by recycling companies. The study however, revealed that, the number is high up to 3000.

The age profile of the recycling industry workforce is considerably older than the national average, with a significant under representation of young people. It is apparent from this study that the desire for young men to work in recycling industry is very low as there is a perception that the jobs are for the old people.

As an economic activity, the recycling industry compares favorably to other key industries, such as hospitality industry, agro-processing industry, food and beverage industry. This is because recycling adds value to materials and thus contributing to a growing number of people being employed. Recycling also provides a large number of jobs that generally pay above the average national wage. Monthly wages in the recycling industry are also better than in other industries. This is supported by Cascadia (2009), that recycling is a very attractive and lucrative industry.

The study indicates that paper recycling contributes the least (2.9%) compared to plastic recycling which contributes (80.7%). This is a result of having few paper recycling companies in the country due to high technological investment required. It is estimated that, the net increase in employment is about 100-200 people per year as supported by Warhurst et al., (2006; Gill, 2007), who revealed that, 1000 people were employed in recycling companies, of which (40%) were women. Thus, women and previously unemployed youth have particularly benefitted from the newly created job opportunities. Women constitute (41%) of the total workforce. However, women are underrepresented in the decision making positions.

Currently, about 100 companies and organizations are engaged in recycling industry in Zambia. These include private recyclers, recycling centers operated by profit-making organizations and recyclers operating as Small and Medium Enterprises (SMEs) and they directly employ about 4,000 workers. In addition, there are also waste pickers who pick recyclable materials for sale and receive the payables rates.

4.2 Potential for recycling companies

As demonstrated by the Friends of the Earth (2010), abundance of solid waste in Zambia provide a great potential for the recycling industry. This is attributed to the fact that, 4000 tones are produced per month and this gives the sector a great opportunity in terms of raw materials.

As supported by Lusaka City Council and Zambia Environmental Management Agency there is a high potential for recycling companies as there is a high number of recyclable waste that have arisen due the

expansion in the manufacturing industries. However, despite the high potential, the industry is not fully developed due to the following reasons: Plant and equipment is outdated and badly needs replacing while workers are very demoralized due to compensation packages that are grossly inadequate to meet their daily needs (Emery et al, 2003).

4.3 Challenges of recycling companies

The study has further recognized that recycling industry in Zambia is facing many challenges one of which is inadequate machinery and lack of new technology as supported by (Emery et al., 2003; Keep and Mayhew, 2010). Hence despite increasing market demand for recycled products, the process for achieving high-quality recycled materials continues to prove challenging. While demand is increasing for uniformly sorted plastic which creates a higher value product, technological challenges make sorting difficult.

Most recycling operations are done manually due to the poor state of machinery and lack of new technology in the recycling companies. Plastics are sorted (usually manually) into polymer type and colour. Following sorting, the plastic is either melted down directly and moulded into a new shape or melted down after being shredded into flakes and then processed into granules called re-granulate. However, technology is being introduced to sort plastics automatically, using various techniques.

5. CONCLUSION

Establishment of solid waste recycling companies creates a lot of job opportunities. This depends largely on the type of recycling and the quantity of solid waste generated. The means of waste processing adds value to solid waste and therefore creating employment for people involved in value addition both directly and indirectly. Apart from creating jobs, recycling also plays a major role in cleaning the environment which is one of one of the biggest challenge Zambia is facing at the moment.

The significance of this study is to contribute to the body of knowledge on solid waste recycling companies not only in Zambia but also globally by showing insights based on the case study of Lusaka. Results of the study would inevitably be beneficial to researchers and policy makers, as the findings would be part of the reference material. The findings would also exploit the successful contribution of recycling companies to job creation.

Other researchable areas which need further attention is the role of waste pickers in the recycling industry in Zambia. It would also be beneficial to look at the role of women and children in waste picking in the recycling industry in Zambia. Further research is needed to formalize and regulate the informal waste recycling industry. Further research is also recommended to study the viability of community-based enterprises/projects dealing with waste management in Zambia.

The limitation of this study was the geographical coverage of sampled elements. The whereabouts of the recycling companies across Lusaka affected the response rate by a certain percentage.

6. CONFLICT OF INTERESTS

The author(s) have not declared any conflict of interests.

7. ACKNOWLEDGEMENTS

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