

THE ROLE AND LINKAGES OF BUY-BACK CENTRES IN THE RECYCLING INDUSTRY: PRETORIA AND BLOEMFONTEIN (SOUTH AFRICA)

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Purpose/objectives: The aim of this paper is to get a better understanding of the role and linkages of buy-back centres (BBCs) in the recycling industry. The first objective is to analyse the institutional profile of the BBCs in two different geographical areas – namely, Pretoria and Bloemfontein. The second objective is to discuss the role and linkages of BBCs with the informal sector activities and specifically the activities of street waste pickers. The third objective is to explain the linkages that exist between BBCs and recycling companies.

Problem investigated: Recycling, and specifically the collection and sorting of waste, is currently receiving much attention on the national as well as municipal level. To understand the recycling industry, and to make informed policy decisions concerning the recycling industry, policy makers need to have an understanding of the role and crucial link of all role players in the industry. Knowledge on the BBCs, who act as a link between the formal and informal sector activities in the recycling industry, is of the utmost importance.

Design/Methodology/Approach: A mixed method approach consisting of a quantitative survey coupled with qualitative questions was used. The mixed method approach is used to collect as much data as possible from the BBCs, which is beyond the scope of what a structured questionnaire on its own can achieve. A lack of accurate location information on BBCs necessitated an intensive search for BBCs in the two areas.

Findings/Implications: The BBCs in Pretoria and Bloemfontein act as an important link between informal sector activities and recycling companies and therefore promote informal and formal job opportunities. Formal job opportunities are created at the BBC sites as well as formal jobs at the upper end of the recycling chain, namely at formal recycling companies. Informal income generating opportunities are created for the informal waste collectors. Any changes in the formal or informal recycling sectors will have a direct influence on the operations and existence of the BBCs.

Originality/Value: The role of BBCs in the recycling chain has been neglected in the literature. This study is the first study on the linkages and role of BBCs in South Africa and addresses a gap in the literature.

Conclusion: BBCs play an important role in creating formal jobs and informal income generating opportunities for the poor and unemployable. More research is needed to understand the industry and its role players. This study can form a basis for additional research in this field.

Key words: recycling, waste management, informal sector, job creation, street waste pickers, poverty

INTRODUCTION

The official unemployment rate, according to the second Quarterly Labour Force Survey of 2011, (Statistics South Africa, 2011:vi), is 25.7 percent. Compared to the previous year's figures, the number of unemployed persons increased by 3.1 percent (137,000 people). The persistent high unemployment rate and associated poverty rates compelled the South African government to expand its employment creation efforts. The Department of Trade and Industry (DTI) identified significant opportunities for job creation in the recycling industry. The collection and sorting of waste has been acknowledged as a major source of job creation in the recycling industry (Department of

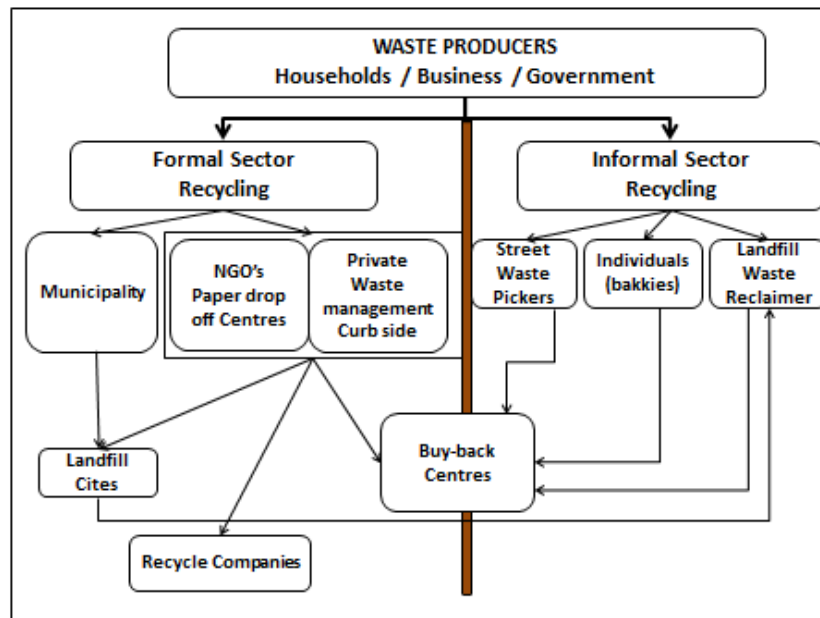
Environmental Affairs (DEA), 2010:33; Goldblatt, 2009:2; Lowitt, 2008:12). The activities in the collection and sorting phases are more labour intensive and for that reason a potential source of job creation. These activities include formal as well as informal sector activities. Many unemployed people earn some income collecting and selling recyclable goods on an informal basis (DEA, undated:22). Waste picking is therefore an important alternative for those who cannot find employment in the formal labour market (Fiehn & Ball, 2005:12; Masocha, 2006:844) due to a lack of skills (Sentime, 2011:97). Almost 1.6 percent of households in South Africa derive an income through selling recyclables (Statistics South Africa, 2009:32). It is estimated that in Pretoria approximately 6,000 individuals depend on some form of waste picking for their livelihood (Pillay, 2010:46). There are no barriers to entering the waste collection industry, and waste picking therefore becomes a survival strategy for many poor people (Langenhoven & Dyssel, 2007:115; Masocha, 2006:844).

Buy-back centres (BBCs) play a crucial role in facilitating the recycling potential of these informal sector participants. BBCs are depots where waste collectors can sell their recyclable waste. Little research exists in South Africa on the BBCs and their linkage with the formal and informal sector activities in the recycling industry. Studies referring to BBCs are studies by Langenhoven and Dyssel (2007:114-132) in Mitchell's Plain, Cape Town, and Sentime (2011:96-111) in Braamfontein. Research on informal sector activities include studies on people who reclaim dumpsites and landfill sites (De Kock, 1987:51-55; Samson, 2008:1-57), and studies on other informal sector activities such as "street waste pickers" (Benson & Vanqa-Mgijima, 2010:1-31; Langenhoven & Dyssel, 2007:114-132; McLean, 2000:8-26; Mueller, 2005:1-90; Schenck & Blaauw, 2011:411-430; Visser & Theron, 2009:1-66). More research on the recycling industry in South Africa is therefore needed to better understand the industry and its operations as a whole (Goldblatt, 2009:8) and to address this gap in the literature. The role and linkages of BBCs in the recycling industry were identified as an important aspect that will provide policy makers with a more complete picture of the waste recycling industry.

THEORETICAL BACKGROUND

Recyclable waste originates from activities of economic agents such as households, businesses and government. Waste produced from these sources is collected either through formal or informal sector activities.

Figure 1: General overview of the waste recycling industry.



Source: Adjusted from DEA, (undated:7)

Formal sector activities include waste management by municipalities, NGOs and private waste

management companies. Waste collected by municipalities usually ends up at landfill sites. Some of the waste collected by private waste management companies and NGOs also lands up at landfill sites, but a significant volume is sold to BBCs or directly to the formal recycling companies (DEA, undated:7). BBCs therefore contribute to increasing the recycling of waste and thereby reducing the strain on landfill sites (Davie, 2002:1). Informal sector activities include waste collection activities by reclaimers at landfill sites, street waste pickers and other individuals with some form of transportation who sell their waste to BBCs. The BBCs, in turn, sell these waste products to other larger BBCs or directly to recycling companies (Enviro-Info, 2001:1). Formal recycling companies process the recyclable waste into a form that is readily usable by a manufacturer or end-use market, where the recyclable waste is converted into materials or other consumption products (DEA, undated:7). BBCs are the link between formal and informal sector activities. Figure 1 illustrates the crucial role that BBCs play in linking formal and informal sector activities in the recycling industry.

BBCs rely heavily on waste collected by individual waste collectors. For this reason, the location of their site is important. BBCs should be close enough and accessible to the informal waste collectors. For a BBC to be viable it should be close to an industrial and commercial hub where sufficient quantities of recyclables, such as packaging waste, can be obtained (DEA, undated:16). The BBCs should, however, be careful not to inconvenience the people, residents or businesses in the immediate vicinity of the BBCs (DEA, undated:6).

Apart from their contribution to increasing the recycling of waste, BBCs also have job creating roles at three different levels. Jobs are created within the BBC itself. These jobs include the entrepreneur who starts, operates and manages the BBC, as well as sorters and balers who accept the recyclable waste from the different waste collectors (DEA, undated:17). At the upper end of the chain, it also creates jobs at the recycling companies, as more waste is collected and retrieved for recycling. BBCs also create job opportunities for informal waste collectors at the lower end of the recycling chain, as confirmed by the study in Mitchell's Plain (Langenhoven & Dyssel, 2007:115). The South African government's recognition that BBCs help sustain the livelihoods of impoverished communities dated back to 1998, with a campaign to encourage entrepreneurs to open buy-back centres. The Western Metropolitan Local Council of Greater Johannesburg also encourages entrepreneurs to start BBCs, as they create income generating opportunities for people who can earn a reasonable living collecting and selling waste (Mondi, 1999:43).

In developing countries, informal waste collectors play a significant role in diverting recyclable materials away from waste disposal and towards recycling (Sembiring & Nitivattananon, 2010:808). The informal waste collectors are generally known as 'scavengers', but they have many different names, depending on their local language, place where they work, and the waste material they collect (Medina, 1997:2). The term scavengers is a collective term referring to people who collect waste products either from the street, from informal or formal dumping areas (Supriyadi, 2000:559; Taylor, 1999:265) and from areas close to retail businesses (Sentime, 2011:97). People who collect waste on the streets with trolleys, bags or wheelbarrows are called street waste pickers but also generally referred to by BBCs as "hawkers" or "bergies" or "delwers". For a BBC's sustainability, it is the task of the entrepreneur of the BBC to ensure that the BBC is supplied with enough recyclable waste, whether from street waste pickers, landfill reclaimers or individual waste collectors. As Langenhoven and Dyssel (2007:126) stated, "...the success of these centres rests, amongst others, on the amount of material supplied to them by collectors". BBCs therefore need to have sufficient information about the type and quality of waste that the recycling companies demand (Enviro-Info, 2001:1).

PURPOSE AND OBJECTIVES

The purpose of this research paper is to explore the role and linkages of BBCs in the recycling industry and specifically with reference to waste collectors, who are involved in informal sector activities at the bottom end of the waste recycling chain, namely the individual street waste pickers. The case study covers two areas in South Africa, with different geographic locations, namely Pretoria and Bloemfontein. These two areas were decided upon for this study due to their differing proximities to the formal recycling companies, as well as the fact that one area is a major metropolitan area while

the other one is a much smaller metropolitan area. In order to achieve this aim, the first objective is to analyse the institutional profile of the BBCs in the two geographical areas under study. The second objective is to discuss the role and linkages between BBCs and the informal sector activities and specifically the street waste pickers. The third objective is to explain the linkage that exists between BBCs and recycling companies.

METHODOLOGY

A quantitative survey coupled with qualitative questions similar to the mixed method approach used in a study by Schenck and Blaauw (2011:415) on street waste pickers was adopted in this study. A mixed method approach helps in the interpretation and understanding of the complex reality of a given situation as well as the implications of the quantitative data (Mack, Woodsong, MacQueen, Guest & Namey, 2005:2). It is however, important to state explicitly the reasons for using the mixed method design (Creswell & Plano Clark, 2011:61). The reason for using this design is to collect as much data as possible from the BBCs, which is beyond the scope of what a structured questionnaire on its own can achieve (Creswell & Plano Clark, 2011:5). No previous studies on BBCs of this nature exist, and a completely new questionnaire had to be developed. This necessitated the inclusion of qualitative questions to obtain as much information as possible on the role of the BBCs as well as the broader picture of the recycling industry. This approach includes both post-positivist and constructivist thinking to allow the participants to give their own meaning to some of the questions (Creswell & Plano Clark, 2011:40).

Interview questionnaire and data analysis

The interview questionnaires were developed by the research team as part of the reconnaissance phase of a country wide research project on the socio-economic aspects of street waste pickers in South Africa. The questionnaire consists of five sections. The first section relates to the ownership, employees and activities of the BBC. The second section deals with information on the BBC's sources of recyclable waste. The third section includes questions which deal with the different recyclable waste products that the BBC buys from waste collectors as well as the price structures of these products. The fourth section covers the BBCs relationship with and support to waste pickers. The last section covers the relationship between the BBCs and the manufacturers who uses these recyclable products as an input. The data capturing and analysis was also done by the research team.

Information on the location of BBCs was not readily available and the researchers conducted an intensive search for BBCs in the two areas covered in the study. Available information was found to be incomplete, inaccurate and outdated. Addresses and contact details were obtained from an internet search, telephone directories, referral by other BBCs and own observation. Referral by other BBCs constitutes snowball sampling, which is a non-probability sampling technique and is used to identify the potential population (Castillo, 2009:1). In some cases waste pickers on the streets directed the researchers to the BBCs.

Only BBCs that buy from informal waste collectors, such as street waste pickers, were covered by this study. BBCs that deal exclusively with scrap metal were excluded from the study. Ten BBCs were identified and visited in Pretoria and seven in Bloemfontein.

The fieldwork for the study was done between 19 April and 2 December 2011. The search for BBCs as well as the fieldwork was conducted by the authors themselves, which enhances the reliability of the results.

The BBCs were very cooperative and eager to share their information and ideas. The respondents provided valuable quantitative as well as qualitative information on the BBC as well as the recycling industry in general in their area. The experience of the authors was that so little research has been done on the BBCs that they really enjoyed sharing their commitment to and experiences in the waste industry. For the purpose of this study, the information obtained from BBCs is kept anonymous to prevent harm to any of the participants. This is important, as prices offered to street waste collectors are a very sensitive issue. In the next section the results of the study will be discussed and linked with

the relevant literature. This will be done in three sections in line with the three aims of the study.

ANALYSIS AND INTERPRETATION OF FINDINGS

This section gives a brief analysis of the institutional profile of the BBCs in the Pretoria and Bloemfontein.

Institutional profile of the buy-back centres

Table 1 summarises the institutional profile of the ten BBCs visited in Pretoria and the seven in Bloemfontein

Most of the BBCs in Pretoria and Bloemfontein are sole proprietors, namely seven and four respectively, followed by two partnerships in both Pretoria and Bloemfontein. The total number of owners amounts to thirteen in Pretoria and nine in Bloemfontein. The average ratio of owners per BBC is 1.3 in both Pretoria and Bloemfontein. The gender distribution of the ownership in the two areas is predominantly male orientated with only 30 percent and 11 percent female ownership in Pretoria and Bloemfontein, respectively. Each BBC not only provides, on average, opportunities for more than one entrepreneur, but also fulfils an important role in creating other job opportunities and income generating opportunities in the recycling industry.

Table 1: Institutional profile of the buy-back centres (Pretoria n=10; Bloemfontein n=7)

Attributes	Pretoria		Bloemfontein	
	Frequency	%	Frequency	%
Respondents' relationship to BBC				
Owner	7	70	3	43
Employee	3	30	4	57
Business Structure				
Sole Proprietors	7	70	4	57
Partnerships	2	20	2	29
Family Business	1	10	1	14
Total number of owners	13		9	
Average ratio of owners per BBC	1.3		1.3	
Gender distribution of ownership				
Males	10	70	8	89
Females	3	30	1	11

Source: Own Research

Number of employees working on the buy-back centre sites: Table 2 shows the total number of employees employed by the BBCs in Pretoria and Bloemfontein. A total number of 324 on-site formal job opportunities were created within the 17 BBCs covered by the study. The mean number of employees is very similar in the two areas, with a mean of 18.4 in Pretoria and 20 in Bloemfontein. The smallest and largest BBCs in terms of employee numbers are in Pretoria. Five (50 percent) of the BBCs in Pretoria employ fewer than five employees and two (20 percent) employ between five and eight employees. The research undertaken in our survey indicates that there are only two large BBCs in Pretoria. The largest BBC in Pretoria has 89 employees. In Bloemfontein, the smallest BBC in our survey employs 12 workers. Another two (28 percent) employ 13 workers each and four (57 percent) employ between 22 and 30 workers. Therefore although Pretoria houses the largest BBC, the smaller BBCs in Pretoria are much smaller than those in Bloemfontein. The reason for this phenomenon might be the fact that the BBCs in Bloemfontein collect more scrap metal than their counterparts in Pretoria.

Table 2: Total number of employees working on the buy-back centre sites (Pretoria n=10; Bloemfontein n=7)

	Total number of employees	Minimum number of employees	Maximum number of employees	Mean
Pretoria	184	2	89	18.4
Bloemfontein	140	12	30	20
Total	324			

Source: Own Research

The results on the racial distribution of the employees at the BBCs reveal that BBCs in these two areas are an important employment generator mostly for African employees.

Role and linkages of BBCs in the recycling chain

BBCs do not create job opportunities only on their sites; they also indirectly create informal sector jobs opportunities at the lower end of the recycling chain, as well as at the upper end – namely at the large recycling companies.

Number of street waste pickers selling waste to buy-back centres: A study by Schenck and Blaauw (2011:418) estimated the number of street waste pickers active within the Pretoria city limits as between 150 and 200. Frequent movement of street waste pickers from one location to another makes an accurate estimation of the number of street waste pickers extremely difficult. The same waste pickers move between the different BBCs and deliver goods to depots in different areas on different days of the week. They can also sell the waste at any time and as many times during the day as they wish. The study of street waste pickers in India conducted by Hayami, Dikshit and Mishra (2006:44) reveals similar movements between BBCs. The population of street waste pickers is therefore unknown. Although no accurate population size exists for street waste pickers, it is noteworthy that the studies by both McLean (2000:8) and Schenck and Blaauw (2011:426) revealed that each waste picker has, on average, four dependants. The livelihood of four people therefore depends on the income earned by each street waste picker from the income earning potential created by the BBCs.

Operations and activities at the buy-back centre: The main activities of all BBCs in the two areas are the basic tasks of receiving, weighing, sorting and packing the recyclable waste. The results from the study show that only three BBCs that buy from street waste pickers in Bloemfontein and three in Pretoria are large enough to have baling equipment. The baling machines are either bought by the owner of the BBC or are provided by the recycling companies to BBCs who supply them with sufficient quantities of recyclable waste to justify the expense. The large number of smaller BBCs in both areas is a direct result of the need to have several smaller BBCs across the area in order to provide easier and closer delivery points for the street waste pickers. According to the guidelines by the DEA (undated:17), each centre should be strategically located to service collectors within a 2 to 5 kilometre radius. The recyclable waste collected by the street waste pickers is heavy and becomes uncomfortable to carry for long distances.

The results of the study show that some BBCs are selective in the kind of recyclable waste products they buy from street waste pickers. The recyclable waste product that is bought by all 17 BBCs is white paper. With regard to other sorts of paper, all ten BBCs in Pretoria also buy newspapers, magazines, mixed paper and cardboard. Only one indicated that it does not buy coloured paper. In Bloemfontein, the picture looks somewhat different, with 71 percent of the BBCs buying cardboard and just over 50 percent buying magazines and newspaper. The demand for coloured paper and mixed paper is much lower, as only 43 percent of the BBCs in Bloemfontein buy these products.

The BBCs in these two areas are even more selective with regard to plastic recyclables. The Plastic Federation of South Africa (2010:5) claims that PET¹ offers one of the most widely available recycling

¹ PET – plastic usually clear or green, sinks in water, rigid, glossy e.g. cooldrink bottle, peanut butter jars, vegetable oil bottles.

options in terms of all recyclable plastics. One would therefore expect all BBCs to buy PET, but this is not the case. Only 70 percent of the BBCs in Pretoria and just over 50 percent in Bloemfontein buy PET. In Bloemfontein, the same percentage of BBCs buys the other plastic recyclables, namely HDPE,² PET and LDPE.³ In Pretoria, this percentage is a little higher at 60 percent for HDPE and LDPE. Very few BBCs in both areas buy other plastic products such as PVC,⁴ PS,⁵ and PP,⁶ In Pretoria, 60 percent of the BBCs also buy cans and glass. In Bloemfontein, all BBCs buy glass, but just more than half buy cans. In Bloemfontein, 43 percent of the BBCs also buy ferrous and non-ferrous metals on a large scale. The prices that the BBCs pay for these recyclable waste products differ between the BBCs. The next section shows the results of the price linkages and price structures.

Pricing structure and prices of the different recyclables: The prices of recyclable waste are set by the recycling companies and then passed on to the BBCs (Langenhoven & Dyssel, 2007:124). Each waste product's price is subject to its own supply and demand function. The demand is dictated by the consumers or end-users of items made from recycled materials, whereas the supply is subjected to the volume of waste products offered by BBCs (DEA, undated:22; Langenhoven & Dyssel, 2007:124). The BBCs, as suppliers of the waste products, can negotiate better prices from the recycling companies if they can supply large volumes, if the quality of the sorting and preparation of recyclables is high and if the level of contamination is low (Plastic Federation of South Africa, 2010:5). Better prices are also paid to BBCs that deliver the recyclable waste to the recycling companies. The BBC in this case bears the full transport cost for deliveries, which will have an impact on the price they in turn can offer the waste pickers who supply the waste to them.

The prices that BBCs can offer waste collectors, on the other hand, are subject to each BBC's own cost structure. Their costs include a transport and fuel bill, the rent or cost of the premises, workers' salaries, electricity costs and materials and equipment to sort and bale the recyclable waste. The premises of the BBCs can be funded by the recycling company, the municipality or the entrepreneur and owner of the BBC himself. Differing cost structures result in price differences between BBCs. The informal waste collectors can, in turn, also negotiate better prices from BBCs for waste in bulk or waste that has been baled (DEA, undated:17). Although all BBCs have the facilities and capacity to sort waste, the informal waste collectors have to pre-sort the waste they sell to the BBCs to ensure better prices (Mondi, 1999:43).

Table 3 shows the mean, maximum and minimum prices as well as the standard deviation of the different recyclable waste products in Pretoria and Bloemfontein. All ten BBCs in Pretoria and all seven BBCs in Bloemfontein disclosed their prices to the researchers. However, all BBCs do not buy all the waste products and the number of observations as depicted in Table 3 gives an indication of the number of BBCs that buy the specific waste product. The prices of the different products vary between the two areas as well as between the BBCs in the same area.

² HDPE – high density PolyEthylene, milky coloured or dyed e.g. milk and water jugs, juice and bleach bottles.

³ LDPE – Low Density PolyEthylene (clear and mixed) flexible not crinkly e.g. 6-pack rings covers, bread and sandwich bags, shrink wrap.

⁴ PVC – PolyVinyl Chloride, semi-rigid, glossy, sinks in water e.g. detergent/cleanse bottles, pipe, copper cable strippings.

⁵ PS – polystyrene, often brittle glossy e.g. Styrofoam, packing peanuts, egg-cartons, foam cups.

⁶ PP – PolyPropylene, semi-rigid, low gloss e.g. margarine tubs, straws, screw-on lids.

Table 3: Mean, maximum and minimum prices and standard deviation of the different recyclable waste products (per kg), in Pretoria (P) and Bloemfontein (B).

		Obs	Mean Price (kg)	Median Price (kg)	Maximum Price (kg)	Minimum Price (kg)	Std. Dev
White Paper	P	10	1.84	1.9	2.3	1.3	0.309839
	B	7	0.914286	0.9	1	0.8	0.089974
Coloured Paper	P	9	0.461111	0.45	0.7	0.1	0.255903
	B	3	0.433333	0.2	0.9	0.2	0.404145
Magazines	P	10	0.235	0.2	0.45	0.2	0.078351
	B	4	0.175	0.2	0.2	0.1	0.05
Newspaper	P	10	0.17	0.15	0.45	0.1	0.105935
	B	4	0.175	0.2	0.2	0.1	0.05
Mixed Paper	P	10	0.125	0.1	0.2	0.1	0.035355
	B	3	0.2	0.2	0.2	0.2	0
Cardboard	P	10	0.52	0.5	0.65	0.3	0.094868
	B	5	0.24	0.25	0.3	0.15	0.054772
PET	P	7	1.171429	0.8	2	0.8	0.521901
	B	4	1.4825	1.4	1.9	1.23	0.300929
HDPE	P	6	0.766667	0.7	1	0.7	0.121106
	B	4	0.75	0.8	0.9	0.5	0.173205
LDPE	P	6	1.383333	1.7	1.7	0.6	0.499663
	B	4	0.75	0.8	1	0.4	0.251661
Plastic mix	P	4	0.4	0.4	0.4	0.4	0
	B	3	0.833333	0.8	0.9	0.8	0.057735
CANS	P	6	0.433333	0.4	0.6	0.4	0.08165
	B	4	0.325	0.3	0.4	0.3	0.05
Glass	P	6	0.25	0.2	0.4	0.2	0.083666
	B	7	0.221429	0.2	0.35	0.15	0.063621

Source: Survey data (2011)

The recyclable waste product, excluding scrap metal that has the highest minimum, maximum and average price per kilogram, is white paper in Pretoria. This is a clear indication that white paper is in high demand in Pretoria. The standard deviation measures how much variability there is from the mean. The standard deviation for white paper in Pretoria is high, implying high variability in the price from the mean. In Bloemfontein, the price of white paper is much lower, which could be ascribed to the higher transport costs as a result of the longer distance of the BBC from the recycling companies. There is also little variability from the mean.

In Bloemfontein, the highest price per kilogram is paid for PET, with high variability of prices from the mean. In Pretoria, PET is the third highest priced waste product just after LDPE. There is high variability from the mean in the prices of PET and LDPE in Pretoria. In Bloemfontein, there is also more variability from the mean in the prices of PET, LDPE, PET and coloured paper but less variability from the mean than in Pretoria. In Pretoria, the prices per kilogram for cans, glass and plastic mix between the different BBCs vary little from the mean.

In Bloemfontein, some of the BBCs without baling facilities do not sell their recyclable waste directly to the recycling companies, but sell it to BBCs with baling facilities. An interesting observation is that the prices paid by non-baling BBCs do not differ considerably from the prices that the baling BBCs pay to the informal waste collectors. The reason why they do not pay considerably lower prices is the fact that they have to stay competitive to attract waste collectors. The challenge for BBCs without baling facilities is, however, to increase their volume levels to allow them the opportunity to negotiate higher prices from the baling BBCs. Volume therefore plays an important role in their price negotiating powers.

Most BBCs claim that the prices of recyclables do not change very often. The three BBCs in Bloemfontein that also deal with ferrous and non-ferrous metals indicated that the prices of these products change on an almost daily basis. Reasons given for the changes in all products' prices are supply and demand factors that are seasonally driven, price changes as dictated by the recycling companies or other buyers, competitors' prices and fuel hikes. The prices of plastic and PET, ferrous and non-ferrous metals as well as car batteries are also influenced by exchange rate changes. BBCs export their excess plastic and especially PET to China; therefore, the exchange rate has a direct influence on the prices they receive from abroad. This instability in the prices is then carried over to the informal waste collectors in the form of lower or higher prices.

Patterns in business activities among informal waste collectors, specifically street waste pickers

The level of business activities at BBCs differs from day to day. The busiest season, according to most BBCs, is summer, and particularly the months of December and January. This is to be expected, as these months are the months in which consumers and households generally spend more and buy more goods, which creates more waste products. More waste is then accessible to waste collectors. Most BBCs indicated a decline in the activities of street waste pickers at month-end when government grants are paid. This indicates either that the income from waste collecting is complementary to grants some of them receive or that the street waste pickers have access to the grants paid to someone they know. Fridays are one among the busier days, most probably because the waste collectors need money for the weekend. In general, the working conditions of waste pickers are harsh (Schenck & Blaauw, 2011:15). They are exposed to the elements of nature, which, on some days, prevent them from collecting waste. They also have to push their trolleys over long distances with little support to make their lives easier. In some cases, however, BBCs do provide support to street waste pickers.

Buy-back centre support to informal waste collectors and specifically street waste pickers

The assessment as to whether or not the BBCs provide any kind of support or facilities to the street waste pickers showed that the street waste pickers and BBCs have a predominantly business-like relationship. However, some BBCs indicated that they have a direct and personal relationship with the street waste pickers who provide them with waste, as most of them visit the BBCs on a daily basis. The results reflect that two BBCs in Pretoria and two in Bloemfontein provide street waste pickers with meals. One BBC in Pretoria provides shelter for the street waste pickers and two give them money donations. One specific BBC in Bloemfontein provides meals, clothing, bags and blankets for the children who collect waste for a living. According to these BBCs, this personal relationship with the street waste pickers gives them a competitive advantage over the other BBCs.

In Pretoria, six of the ten BBCs provide the waste pickers with trolleys. Four of these six BBCs also provide their regular street waste pickers with bags. In Bloemfontein, six BBCs provide the waste collectors with bags and one of them provides trolleys as well. In Pretoria, most (seven) BBCs help the street waste pickers with the safe-keeping of their money, whereas in Bloemfontein only one of them does this. Lending money to street waste pickers is common practice in Pretoria, where seven BBCs indicated that they do this. None of the BBCs in Bloemfontein lend money to street waste pickers. The amounts that the BBCs in Pretoria lend to street waste pickers vary between a minimum of R20 and a maximum of R200. None of these BBCs charge any interest on the money they lend them. Toilet facilities and drinking water are commonly provided by most BBCs, but none provide them with facilities such as washing facilities or a kitchen to prepare meals. One BBC in Bloemfontein operates a tuck shop, which is accessible to the street waste pickers. Six of the ten BBCs in Pretoria and three in Bloemfontein have trucks or "bakkies" available to assist street waste pickers with transport if they find waste in bulk that they want to sell to the BBC. Eight of the nine BBCs indicated that they provide this service free of charge, but one BBC in Bloemfontein charges between R20 and R30 as a collection fee.

Relationship of BBCs with recycling companies

Apart from the job creation linkage and price linkages that exist between the BBCs and the recycling companies as discussed above, the BBCs have a direct relationship with the recycling companies. The BBCs sell their waste to a wide variety of recycling companies. Some of the BBCs are agents of large and well known recycling companies. These recycling companies usually guarantee that they will buy the waste products which they acquire from the BBCs (Mondi, 1999:43). The paper that the recycling companies collect through the BBCs is sent to the paper mills, which transform the waste paper into usable products. Mondi is the largest paper recycling company in South Africa, with a market share of 40 percent. Mondi alone purchased 460,000 tonnes of waste in 2010 (Mondi, 2011:1). According to the Paper Recycling Association of South Africa (PRASA, 2011:1), the volume of paper recycling in 2010 amounted to 1,090,198 ('000 metric tons). BBCs ensure that they provide recyclable waste in large quantities and on a regular basis to the recycling industries, which reduces the importation of raw materials, and in turn assures low-cost and affordable new products to the market.

POLICY IMPLICATIONS AND RECOMMENDATIONS

The paper used a case study approach and the findings can therefore not necessarily be generalised. The findings are specific to BBCs in Pretoria and Bloemfontein and reflect the role and linkages between BBCs and the formal and informal activities of the recycling industry in these two different geographical areas. The employment creation potential that BBCs provides should not be underestimated and should therefore be stimulated by a recycling model that increases the volumes of waste that are recovered by the BBCs through the informal sector activities. The implementation of "sorting by source" will supply greater volume and better quality waste to informal sector waste collectors and provide them with negotiating powers in terms of prices received from BBCs. The acceleration or leverage of this type of employment opportunity in the recycling industry can benefit all existing role players and have a significant impact on poverty reduction in South Africa.

SUMMARY AND CONCLUSIONS

This is the first study to focus on the role of BBCs in the recycling chain. The results provide us with a better understanding of the role and linkages of BBCs in the recycling industry in Pretoria and Bloemfontein. The BBCs have an important impact on the informal sector activities in the recycling industry and specifically the street waste pickers. The BBCs create income generating opportunities for street waste pickers who cannot find a job in formal employment sector. The prices paid to these street waste collectors differ between the different BBCs as well as between the different areas.

BBCs fulfil an important role in the social and economic environment of the recycling industry. BBCs also have an environmental impact by collecting many different kinds of recyclable waste. By providing income generating opportunities to informal waste collectors, the BBCs link informal sector activities with formal sector activities and the large recycling companies. The BBCs are therefore indirectly responsible for formal job opportunities at the upper end of the recycling chain, namely the recycling companies. The role of BBCs can be strengthened if the recycling companies are in closer vicinity to the BBCs. BBCs can be regarded as an important link in the recycling industry. This link should form part of the future research agenda on this topic. Further research could include a countrywide study of street waste pickers and BBCs to enhance our understanding of the recycling industry.

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