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An Evaluation of Sustainable Waste Management Practices in Selected Households in Johannesburg: The Source Separation Outlook

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An Evaluation of Sustainable Waste Management Practices in Selected Households in Johannesburg: The Source Separation Outlook

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WITS Business School

The thesis presented in partial fulfilment for the degree of Master of Business Administration to the Faculty of Commerce, Law, and Management, University of the Witwatersrand

20 April 2020

DECLARATION

I, Tshidi Russon declare that this research report entitled '*An Evaluation of Sustainable Waste Management Practices in Selected Households in Johannesburg: The Source Separation Outlook'* is my own unaided work. I have acknowledged, attributed, and referenced all ideas sourced elsewhere. As a result of this, I am submitting it in partial fulfilment of the Master of Business Administration requirements at the University of the Witwatersrand, Johannesburg. I have not submitted this report before for any other degree or examination to any other institution.

Tshidi Russon

Signed at Johannesburg on the 20th of April 2020

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ABSTRACT

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Thesis title:	An Evaluation of Sustainable Waste Management Practices in Selected Households in Johannesburg: The Source Separation Outlook		

The purpose of this research study is to evaluate the readiness for South African households to adopt the separation at source method of waste management with a focus on Johannesburg northern suburbs. Separation at source and successful recycling can ultimately lead to a cleaner environment with increasing opportunities for much-needed jobs. This research has been done many times in different geographical locations; however, no study has focused on South African households and the potential business opportunities for small and medium-sized companies, given the increasing unemployment levels. The recycling industry in the United States of America created 3,9 million jobs in 2010. With such statistics, there is potential for South Africa to create jobs and play a significant role in minimizing the problem of increasing filth, its health consequences, and the damage to the environment. The research revealed that steps are being put in place to drive household separate at source in the property sector as mandated by Pikitup and the City of Johannesburg in certain areas.

Johannesburg, 20 April 2020

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Tshidi Russon

DEFINITION OF KEY TERMS AND CONCEPTS

Abbreviation	Description
‘NEWMA”	“National Environment Waste Management Act”
“NWMS”	“National Waste Management Strategy”
COJ	City of Johannesburg
S@S	Separation at Source
DEA	Department of Environmental Affairs

1. INTRODUCTION TO THE RESEARCH

Context And Background To The Study

This research examines the separation of waste at source from a household perspective, focusing on sectional titles, complexes and residential estates. The objectives are to determine whether a waste separation at source programme implemented at these levels will minimise the effects of waste to landfills and maximize business potential and opportunity. Before addressing the research conceptualisation, we take a brief look at terms and concepts that have been used in conceptualising this research generally and broadly—while Chapter 2 has a more specific and detailed discussion on the research context. The research conceptualisation section provides for the research problem statement and consequently, the purpose of this research and the research questions.

The Concept Of Waste Management

Waste management is the collection, transportation, disposal, managing and monitoring of waste (Maluleke, 2002 - 2016). The term waste can be defined as unwanted, used materials that result from the economic use of human, household and commercial consumption. Some of these waste materials have value and can be recycled for the purposed of reuse (Oladebeye, 2010).

Recycling items such as paper, plastic, glass, food, textiles and so forth promote minimization of waste to landfills by diverting this waste and using it to produce other goods.

The impacts of waste on landfills influence human health, pollution through greenhouse gases, soil erosion, and the most significant effect is on the environment. The environmental impacts of waste dumping are global warming, which increases temperatures resulting from greenhouse gases (Greencape , 2019).

The South African population increased from 53 million in 2012 to 58,72 million in 2019 (Statistics South Africa , 2018). There is a direct link between population size and the amount of waste generated. According to the Department of Environmental Affairs, factors contributing to increases in garbage levels include; population growth, increased urbanisation, the growing middle class, and increases in income levels and purchasing power (Department of Environmental Affairs , 2018). Developing countries generate more waste due to the abovementioned reasons, and South Africa is no exception. The challenge facing many

developing economies is the lack of sophisticated waste disposal methods that reduce dumping and waste to landfills (Mandevere, 2016) (Sichiweza, 2017).
80% of the South African population will be urbanized by 2050, therefore directly impacting the existing waste collection methods. The country will need to rework collection methods that cater to this increased urbanisation and promote separation of waste at source (Department of Environmental Affairs , 2018).

South African Waste Policies – An Overview Of The National Environmental Waste Management Act 2008

Waste management in South Africa is governed by the National Environmental Waste Management Act of 2008 (South African Waste Information Centre , 2019). “The NEWMA is a progressive environmental management legislation in South Africa that draws on global best practices. It provides the framework for decision-making for individuals, institutions, and government” (Government of South Africa , 2009). The act's primary objectives are; minimising natural resources consumption, building environmental awareness to communities, and providing appropriate waste management solutions. The National Environment Waste Management Act (NEWMA) was amended in 2014. The revised act includes establishing the Waste Management Bureau and the National Waste Management Strategy (NWMS). The revised strategies further encompass; the specific steps that the Government intends to take to meet the objectives of NEWMA,” promote and facilitate minimisation, re-use, recycling and recovery of waste, and the disburse of revenue collected from waste management charges”(Republic of South Africa, 2014)

The NWMS outlines the desired state of waste treatment known as waste avoidance and reduction. Waste avoidance and reduction requires conscious participation by every individual, e.g. having a reusable shopping bag for your groceries instead of buying a plastic bag. Waste reduction and avoidance focus on using materials that are not harmful to the environment, preserving natural resources through the circular economy matrix and promote sustainability. The least desired waste management process is known as “waste treatment and disposal”(Maluleke, 2002 - 2016).

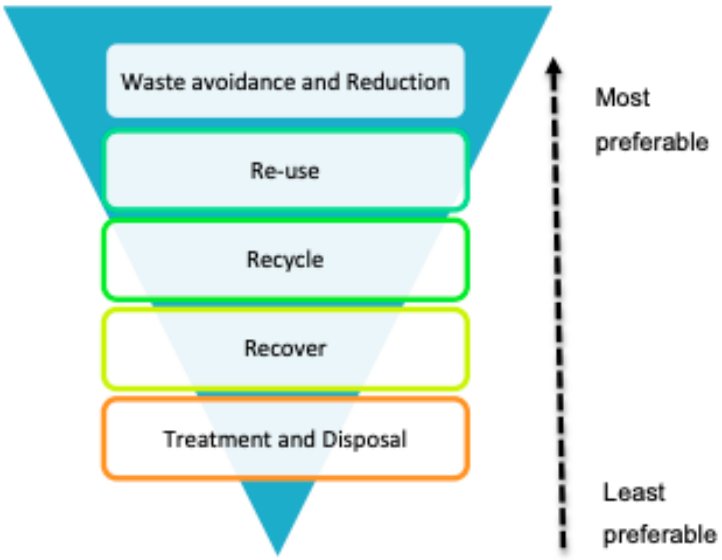


Figure 1: Waste Management Hierarchy

The Research Problem Statement

In 2014 the South African National Waste Management Strategy set a waste to landfill diversion target of 25% (Republic of South Africa, 2014). South Africa needs to tap into the circular economy, and progressive recycling methods meet this target. A circular economy is defined as *" Looking beyond the current take-make-waste extractive industrial model. A circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. A transition to renewable energy sources underpins it; the circular model builds economic, natural, and social capital*" (Ellen MacArthur Foundation, 2017).

The South African waste recycling industry is not advanced and lacks innovative solutions and funds to minimise the landfill effect. According to a 2018 research study, the City of Johannesburg (COJ) was predicted to run out of landfill space in less than six years (Statistics South Africa , 2018) due to the lack of recycling. With a low recycling culture that saw only 10% of waste recycled in 2011 and a 1% increase between 2011 and 2017, more vigorous efforts are needed to meet the government's targets (Statistics South Africa , 2018).
The largest generators of waste are households, contributing more than 70% of all debris. Homes have a weak recycling culture with only 5,2% of households displaying recycling signs in

2015 (Department of Environmental Affairs , 2018). Recycling initiatives need to begin at the source. Reducing waste from the largest contributors requires strong government policies that will support the municipal waste management sector and ultimately support municipalities and the property sector in driving households into adopting a new behaviour that makes them responsible for their waste sorting (Pikitup , 2019).

With the above objectives in mind, the emanating research questions that arise are;

1. What are the existing waste management methods, challenges experienced and current (proposed) interventions?
2. How is the City of Johannesburg and Pikitup aiming to shape the future of household recycling?
3. What are property developers & estate managers' existing efforts in implementing recycling schemes and the challenges encountered?
4. How can household separation at source (S@S) be driven with impact?

The Research Purpose Statement

The research report strives to determine whether there is merit in implementing a waste separation at source solution in South African households. The study investigated households' willingness to separate and recycle waste into different components if appropriately educated on the process of separation, the benefits of recycling, and applying incentives such as rewards systems through reduced household levies and rates that motived a change in behaviours.

A review of waste management literature was undertaken to establish solutions implemented in nations leading in waste management and recycling through waste separation at source. The study also evaluated the City of Johannesburg's challenges through their partnership with Pikitup in incorporating separation at source in residential properties. Additionally, this research determines whether property developers and estate managers can be active players in changing and driving the narrative around separating at source through estate rules and regulations.

Significance Of The Research Study

Incorrect and irresponsible disposal of waste better known as dumping, including the waste disposal to landfills, can seriously harm the most vulnerable in society, e.g. those that reside

around landfills, children, waste pickers and collectors. Health conditions identified relate to cancer from hazardous chemicals, eye problems, respiratory issues and blood infections (Edugreen, 2007). Some of the most affected workers in this industry are waste pickers (those collecting waste from kerbsides for resale and rampaging through dumpsites). These environmental service workers are considered informal workers and therefore, do not benefit from any basic employment conditions. They work under challenging circumstances and lack the essential protective gear. A study conducted by Cruvinel(2018) interviewed one thousand, and twenty-five waste pickers that revealed: “68.7% reported accidents related to sharp objects”. Additionally, the research showed that the most common diseases contracted were; hypertension, bronchitis, diarrhoea and diabetes (Cruvinel, 2018).

Environmental conditions that stem from waste dumping are soil contamination from hazardous chemicals, which can contaminate storm waters or nearby rivers and dams, causing harm to wildlife. Gases such as liquid leachate and methane are harmful to the earth and contribute to climate change (Ahmade, 2013).

Pikitup indicated in their 2019/2020 business plan that S@S is high on their priority as a critical lever to restoring the remaining landfill space and increasing recycling behaviours (Pikitup , 2019) .
A culture of proper recycling through separation at source can stimulate the economy by increasing the number of job opportunities in this sector. According to Greencape (2019), “the waste economy contributed R23 billion in 2016 and additionally provided 116 000 jobs to which 36 000 were formal jobs. This report's findings indicate that a further 128 000 jobs, both formal and informal, can be unlocked in this sector and another R11,6 billion in earnings per year (Greencape , 2019).
This study identifies strategies that should be implemented to curb the waste problem from the most extensive source, households. In this study, a business proposal is examined based on the collected and analysed data. The research shows that residential estates have an appetite to participate actively in these initiatives provided that the support from government is present.

Limitations

This section of the research discussions the limitations of this study. The identified limitations are; the population's size, data collection process and the study's geographic location.

Population Size

The numbers of participating property developers were less than the desired amount. The aim was to interview three of the most dominate property developers in Johannesburg; Summercon Properties, Balwin Properties and VTC Properties. The only participating developer was VTC properties. Summercon referred the researcher to the estate management company that manages the Summercon portfolio across Fourways, Bryanston and Lonehill. The consensus was that this estate management company would be well equipped to provide insights on these estates' daily operations and any planned separation at source programmes being run. After a property is developed and the trustees are appointed, property developers have little to no involvement in those estates' affairs. The selected household participants are not a fair representation of all the households in Johannesburg or the selected estates. Only eleven households were interviewed for this research.

Data Collection Process

The research study aimed to hold a focus group with household participants; however, this was unsuccessful. Household participants were available at different times, and others were afraid of meeting in groups because of the early stages of Covid-19 becoming an issue. Therefore, social distancing resulted in interviews being held over the telephone or in one-on-one sessions.

Geographic Location

The geographical location of this study was Johannesburg with limited suburbs as areas of focus. This is not a representation of all the suburbs in Johannesburg, nor is it a representation of South Africa.

Preface To The Research Report

To this end, the report has six chapters. Following this introductory chapter, Chapter 2 provides a literature review covering the problem, previous studies, the explanatory framework and the conceptual framework. Chapter 3 discusses the research strategy, design, procedures, reliability and validity measures, and limitations. Chapter 4 and Chapter 5 presents and discusses the findings, respectively, to interrogating our research questions while Chapter 6 summarises and concludes the research.

2. LITERATURE REVIEW

Research Problem Analysis

This chapter has three broad objectives: to understand the research problem; identify the knowledge gap, and develop a framework for interpreting the research findings. Based on the research questions posed in chapter 1, the study makes the following propositions; waste separation at source is a challenge amongst households (1), complexes and residential estates are driving separation at source (2), including a recycling tariff in the property levies will encourage separation at source participation from households (3), recycling incentives have a positive outcome than forced behaviours driven through regulations and tariffs (4).

The Different Classifications Of Waste

Before diving into the study, it is imperative to define and address the different forms of waste. Waste is anything that no longer has a purpose or any unwanted materials discarded after primary usage (American Veterinary Medical Association, 2020). The four common types of waste categories are Municipal Solid Waste, Medical Waste, Hazardous & Non-Hazardous Waste and Industrial Waste (Health, 2006). Hazardous waste includes, but is not limited to, waste generated by hospitals, households and industrial companies. Its waste content involves; chemicals, sanitation, dead animals and radioactive waste, to name a few. All waste can be harmful to the environment. However, hazardous waste needs further special treatment to reduce its threatening impacts (Mondal, 2020). Non-hazardous waste has contents that are not harmful and encompasses the following kinds of waste; garden waste, household waste, commercial waste and industrial waste. (Government of South Africa , 2009). Medical Waste is any form of trash generated from the medical industry and contains any infectious materials. These types of wastes are; discarded gloves, gowns, human tissues and vaccines. Approximately 5.9 million tons of medical waste is generated per year, of which 85% of that waste is non-hazardous. An astonishing amount of 2 million needles a day and 16 million injections per year are discarded in this industry (MedPro Disposal, 2020). Waste generated from manufacturing or industrial processes is classified as Industrial Waste and contains liquids, food substances, chemicals and scrap materials.

This study is focused on Municipal Solid Waste, mainly hazardous and non-hazardous domestic refuse (Health, 2006).

An Overview Of Waste Management In Developed Economies And How It Impacts GDP

Many developed nations have focused on implementing recycling and separation at source programmes across all industries and households. These nations understand the value of proper waste management that limits disposal or waste treatment through landfills. Countries such as Germany, Sweden, Italy and the UK have advanced waste recovery programmes.

"Sweden recycles close to 99% of household waste with 1% going to landfills. Of the 44 million tons of household waste produced per year, 2.2 million tons are converted into energy by a process called waste-to-energy (WTE)" (Garima Bakshi, 2016). Sweden applies a process by which households and businesses are required by law to separate their different forms of waste; separation is according to recyclable and non-recyclable waste (Avfall Sverige, 2018). The culture of recycling is taught from an early age in schools, therefore becoming a way of life into adulthood. The country also has a cash voucher incentive scheme for recycling materials such as bottles and cans. These items are collected and processed through recycling stations known as Reverse Vending Machines (Mauborgne, 2004-2020). Sweden's waste economy is so huge that they purchase trash from their neighbouring countries to transform waste to energy that "heat up to 1.2 million Swedish households and electricity for another 800,000," (Avfall Sverige, 2018).

Germany is also one such country that is considered one of the most prosperous nations in waste management. It comprises a mature recycling industry that is more prominent than its construction industry and is the 3rd largest contributor to GDP. Other success stories are Italy and the UK, where waste recycling is the 5th largest contributor to GDP for the former and has created over a million jobs in the latter (Whyte, 2014).

Germany uses a system known as ' Green Dot". The Green Dot system was adopted to reduce the volume of waste generated as a result of packaging. This system focuses efforts on the circular economy and limits the use of non-recyclable packaging. "The crux is that manufacturers and retailers have to pay for a Green Dot on products: the more packaging there is, the higher the fee" (Chuck Emerson Media Services, n.d.) .

Germany fills its neighbourhoods with recycling bins that have slots designated to specific waste groups such as bottles, cans and plastic containers each sorted into their different grades. Residents in these areas must sort and clean their recyclable waste before disposing into the allocated separation bins (Fishbein, 1994).

With the high unemployment rate in South Africa which sat at 27,6%, youth unemployment at 55,2% and a GDP that fell by 3,2% in the first quarter of 2019 (Statistics South Africa , 2019), the country is not growing sufficiently enough to absorb people in the formal economy while increasing its GDP. Some of the most significant contributors to the unemployment rate in South Africa is the lack of education, skills gap and the previously disadvantaged who were segregated not only through spatial segregation, but also through economic and structural segregation.

The South African government needs to create sustainable job opportunities by looking into other industries, such as waste management. The benefit of creating jobs within the sector is that it can absorb skilled and semi-skilled workers. The kind of jobs created from recycling and separation of waste at source comprises; sales, collection and transportation, sorting, and facilities operations (Leblanc, 2019). The recycling industry in the United States of America is estimated to have created 3,9 million jobs in 2010. With such statistics, there is potential for South Africa to implement similar strategies to provide employment (Whyte, 2014).

Waste Management In The City Of Johannesburg

South Africa consists of nine provinces; Gauteng, Western Cape, Northern Cape, Eastern Cape, Kwa-Zulu Natal, Freestate, Mpumalanga, North West, and Limpopo which The City of Johannesburg is situated at the heart of Gauteng province.

Johannesburg and Cape Town are the biggest cities in South Africa with the majority of the business activities taking place in these two economic hubs. There is a considerable measure of economic activity in the City of Johannesburg. The city generates 16% of the national GDP and 40% of Gauteng's GDP, making it the largest contributor to GDP in the Gauteng Province (City of Johannesburg, 2018).

The city of Johannesburg is a metropolitan which covers an area of 1, 645 km square. It is home to 4,4 million residents. Johannesburg is further divided into the lower, middle- and upper-income residents with some of the wealthiest individuals calling it their home. Johannesburg is also the home of Africa's richest square mile, Sandton City (City of Johannesburg, 2018).

PikitUp

"Pikitup Johannesburg (SOC) Ltd is the official integrated waste management service provider for the City of Johannesburg". The company employs over 4500 people and have a fleet of 200

vehicles. "*Pikitup collects 6000 tons of waste and cleans about 9000km of street daily. The company has four landfills and 12 waste deposit sites which are dedicated to the 1, 6 45 km square of Johannesburg"* (Pikitup, 2019).

Pikitup provides its waste management services according to four categories; (1) waste removal and collection from households, (2) commercial businesses, (3) bulk waste management services with the use of bulk containers that are placed in specified locations permanently; this service is provided upon request, (4) wet waste collection which is predominately a service for restaurants, hotels, hospitals, canteens and food outlets (Pikitup, 2015).

Pikitup is considered a world-class waste management system by South Africa's neighbouring countries (Mandevere, 2016). However, the organisation faces many issues; regular strike action from the employees demands increased wages and improper management disposal solutions. Pikitup aims to identify innovative and cost-effective solutions to effectively manage the waste stream in Johannesburg, through "changing its strategic focus to reduce the amount of waste generated in the city. Using a community-driven approach, [and] developing innovative solutions, to achieve this" (Pikitup, 2019).

Waste Pickers

Waste Pickers are South Africa's most environmental asset when it comes to waste diversion from landfills. Waste pickers are responsible for 90% of the 10% waste diverted from landfills in 2011 (Schenck, 2019). "*These workers are better defined as informal workers based in landfill sites rampaging through the dumps looking for recyclables and street pickers operating on the streets by moving from house to house looking for recyclables*" (GroundWork, 2014). However, the name waste picker and street pickers seem to be used interchangeably. There are reportedly between 90 000 – 215 000 waste pickers in South Africa, and the numbers keep on rising due to the increased levels of unemployment (Schenck, 2019).

Waste pickers are unrecognised workers in the waste management industry, although they make a massive contribution towards waste sorting and recycling. However, this profession is increasing rapidly and requires more focus on formalising and incorporating it into the sector (GroundWork, 2014). According to a study conducted by Schoeman (2018), waste pickers contribution to recycling has placed developing countries competitively against developed countries that have sophisticated systems in place (Schoeman, 2018). "These informal workers

save municipalities up to R750 million per year", and making an average income of about R900 per week and can generate up to R3600 per month (Nowicki, 2019).

The solution of household separation at source will have to be smart enough to not disadvantage these workers from making a living. To do that they need to be formally recognized in the waste sector and find alternative methods for those that cannot be absorbed. Authorities in the industry have expressed many challenges in formalizing these individuals. Challenges encountered are; lack of proper documentation- many of these workers are migrant workers who do not have the necessary South African legal documentation (Schoeman, 2018).

Research Knowledge Gap Analysis

This section explores related scholarly materials on waste separation and waste management. Across all the studies reviewed, specific demographic determinants were presented as contributing factors towards effective recycling. Age, gender, education levels and income play a significant role in recycling (Wen & Zhang, 2014). We take a look at comparative studies conducted in China and Zimbabwe.

China implemented separation at source programmes in 2002 in the nine major cities (Beijing, Suzhou, Shanghai, Shenzhen, Guangzhou, Guilin, Hangzhou, Nanjing and Xiamen). The Chinese government provided recycling stations in each community and separation bins (bins with different compartments) to each pilot community (Haibin Chen & Yan Yang, 2016). Zhang and Wen (Wen & Zhang, 2014), conducted this study between January and March 2014 in the Suzhou government. Suzhou is a highly developed city located in the eastern region of China, boasting a sixth position GDP ranking higher than Beijing's. The study stretched across various groups in Suzhou, consisting of; communities that did not participate in separation at source regional programmes(1), communities that were part of the regional separation at source pilot programme(2), those that only formed part of the solid food separation at source pilot programme(3).
The study concluded a 23% participation rate. It was also clear that the residents understood the process and had positive feedback on the initiative; however, the behaviour change was not displayed (Wen & Zhang, 2014).

A study conducted in Zimbabwe, Harare by Benjamin Mandevere, also aimed at detailing challenges faced by communities struggling to manage waste effectively. It is essential to analyze waste separation programmes implemented in the African context to determine whether Africa's conditions could hinder success factors. In his study, Mandevere mentioned that most households in Harare resort to illegal waste dumping, which can be attributed to low government policies, lack of infrastructure, lack of finances, and educational programmes in communities (Mandevere, 2016). Zimbabwe has attempted to run countrywide clean-up campaigns which take place in September however this is not enough to curb the problem “There is a need for Zimbabwe to adopt a model that will deal with waste at source” (Newsday, 2017)

In his study, Mandevere observed the differences in household incomes and their average waste generation. Furthermore, observations of low, medium and high-income suburbs concluded that medium and higher-income groups generate the most waste due to higher purchasing power. The observations revealed that most household waste generated is organic waste that consists of food leftovers, paper, and dry grass, which is waste that if managed properly can be transformed into compost instead of dumping (Mandevere, 2016).

As duly put by Elison Sichiweza (Sichiweza, 2017), households worldwide look to governments to solve and provide for many of their needs. Carefully crafted and adopted government policies have been proven to increase recycling participation rates as demonstrated in economies such as The United States of America, where a “Carton Council” was established to improve households' carton recycling rates. This attributed to a 50% carton recovery rate from an 18% rate (Comere, 2014). Given the information that has been presented for both cases in China and Zimbabwe, it is apparent that adoption is optional without sufficient support from the government unless participants are incentivized as in the case of Sweden and Germany.

South Africa’s Advancing Separation At Source Programmes

The Management of Waste in South Africa is still primarily dominated by collecting and disposing of waste at landfill sites. The City of Johannesburg is making some efforts to curb the issue at source. However, some municipalities are not present enough (Bizcommunity , 2019). Many suburbs are taking the matter into their own hands and looking for solutions to serve their communities. Lonehill communities have put together recycling initiative, mostly focusing on collecting bottles, cans, and plastic containers. The sorted waste is managed by an independent

waste collection company that comes at an additional cost to Lonehill. This initiative is an opt-in solution, so residents are not forced to participate (Dhlamini, 2019).
Additionally, Pikitup implemented a mandatory separation at source programme in Johannesburg (Zondi, Central Camp, Marlboro, Waterval, part of Avalon, Orange Farm, Diepsloot, Zandspruit and Southdale). This programme has been made mandatory in these mentioned communities where recycle bags are being received. This programme aims to collect 13kgs of dry recyclable waste from households every month. Although this programme is required, it still does not force households to separate their waste because there are no penalties for lack of participation(Pikitup, 2019). However, some communities believe this is still not effective because of a lack of resources; bags are not always available and lack consistent communication (Hindley, 2020).

The Western Cape appears to be ahead of Johannesburg with their separation at source initiatives. “76% of municipalities in the Western Cape have a separation at source system in place” (Western Cape Government Department of Environmental Affairs and Development Planning Directorate, 2019). Separation at source initiatives in rural and settlement areas can be used as a form of job creation and will encourage community residents to participate. One such initiative the Western Cape has embarked on is the Khayelitsha Based Recycling Programme (Bizcommunity , 2019). The industry will create jobs by opening buy-back centres within the community, allowing waste collectors to sell directly to the buyback centres and encourage community members to separate their waste for resale. This concept is aimed at formalizing waste picking and sorting in townships.

The above cases are an indication that South Africa has established the need for an effective separation at source programme to be implemented countrywide. Every small stride has been a step in the right direction towards a bigger goal.

Proposed Strategies Towards A Circular Economy

Human consumption has always been endless, and with new technologies and discoveries, the need for natural resources increased the rate of consumption. *A Linear economy is what is recounted as a state where “we do not account for the side-effects generated by a product once sold to an end customer. The aim is to sell the maximum number of products at minimal cost* (World Economic Forum , 2019). “ A characteristic of the linear economy is the ‘hyper-production crisis” where an excessive amount of goods are produced and ultimately impact the environment

negatively through increase natural resource strain and dumping after consumption. (Drljača, 2015).

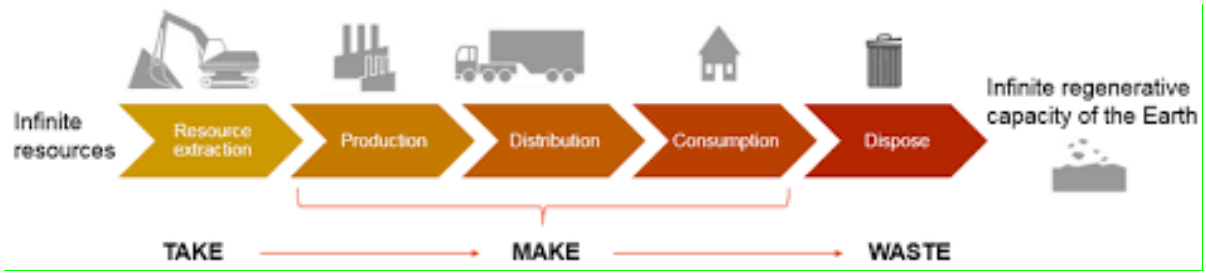


Figure 2 Linear Economy

Circular Economy

In a circular economy, there is responsible consumption. This economy can be broadly defined as a process of keeping resources in use for extended periods. This involves the 3R's; Reduce, Re-use and Recycle (hetgroene brein , 2019). According to The World Economic Forum (World Economic Forum , 2019) attributes of a circular economy include products being manufactured to last "several lifespans. Products' lifespans are extended via maintaining, repair, redistribute, refurbishment and re-manufacture loops". They urge that recycling should not start at the disposal stage, but should instead be a part of the production process." In a circular economy product are designed to create the least amount of trash as possible" (Now This World , 2016). An estimated $57 Billion of electronic products is discarded annually with a less than 20% recovery collection rate. Tech giants such as Apple, Dell and Huawei are leading the industry by plugging into the circular economy. These organisations are now extracting valuable materials from old electronics such as phones and computers to produce new products. "Apple used their Daisy and Dave robot to remove components from old devices and was the first in the industry to manufacture a phone out of 100% recycled materials " (Kimberley Botwright & James , 2020). Food and other parcel packaging industries follow a similar strategy. Organisations like Unilever are consciously changing packing designs and using less plastic (Unilever, 2020). Mr Price has also increasingly moved away from plastic packaging, recovers plastics to make new products such as clothing and bedding. They stress that recycling "starts at home" (Mr Price Home , 2020).

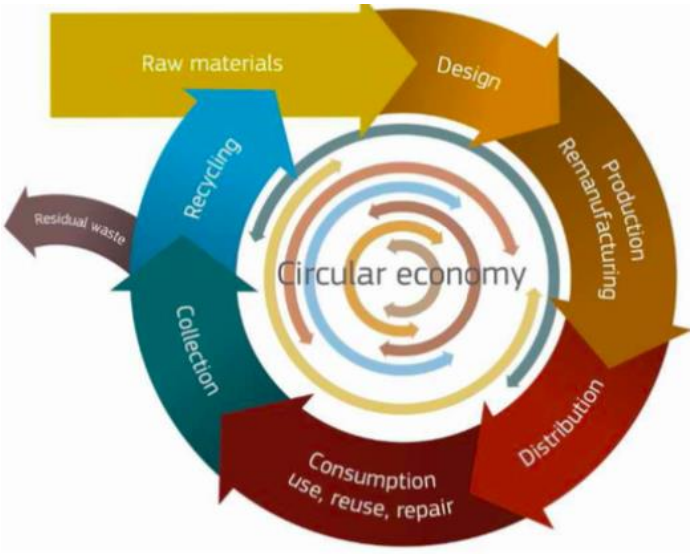


Figure 3 Circular Economy

Summary Of Literature Reviewed

Recycling poses challenges and opportunities. The challenges faced range from lack of knowledge and education on how to implement separation at source (S@S). The possibility exists in the job creation aspect of this problem. This sector could create 126 000 additional jobs, and this cannot be done solely by Pikitup and the municipalities, but requires an open industry that facilitates innovation and competitiveness.

Small players are, therefore, crucial in driving disruption. Small players can be used to come with alternative methods to reach communities , households, schools and the property sector. These organisation have increased reach in the communities which they currently operate.

3. RESEARCH METHODOLOGY

A research methodology is simply described as a systemic way of gathering or collecting data to analyse and determine the results of that data to conclude a research question (Research, 2009). C.R Kothari describes research as a voyage of discovery from the unknown to the known. He also states that the research methodology is a “process of collecting, organising and evaluating data; making deductions and reaching conclusions; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis” (Kothari, 2004). The previous sections focused on the research questions and a literature review on this topic. This chapter focuses on the research approach and design employed to collect and analyse research data.

Research Design

The research paper followed a qualitative research framework which consisted of questionnaires and document analysis. The research questionnaires took the form of face-to-face interactions and virtual telephonic interactions due to the impact of Covid-19 that necessitated South Africa to go under “Level 5 Lockdown” restrictions. The researcher compiled the questionnaires and included questions that aimed at assessing the level of knowledge and understanding of the importance of recycling, the concept of S@S, whether there is an appetite to participate and implement S@S initiatives. Households were also questioned on whether incentive-based recycling would encourage an increased willingness to separate their waste.

Research Target Population

A total of fourteen participants were approached to take part in the research study. Three of the approached participants were property developers, however only one (VTC Africa Developments) agreed to take part in the survey. Another developer referred the researcher to an estate management company that manages a number of their developments (Easy Living Estates), and the other property development company did not respond to the numerous requests. Therefore the total participants that were interviewed consisted of thirteen (two property companies) and eleven households.

VTC Africa Developments is a property development company that develops sustainable properties that cater to the South African economic climate. Their properties incorporate an “Earth Series” programme that includes energy efficiency, stormwater harvesting and recycling through separation at source. The researcher had the opportunity to tour one of their developments,

incorporating waste separation into their residents' lifestyle. The interviewer also managed to unpack issues experienced in attaining household participation.

The second property company interviewed was Easy Living Estate, this company manages twelve estates between Fourways, Lonehill, Bryanston and Midrand. The owner and director of this property management company took the researcher through the areas and complexes where separation at source initiatives have been implemented. These complexes are namely; Cedar Lofts(Fourways), Cubana(Lonehill), Bacara(Bryanston). This gave the interviewer a good representative measure of how this imperative is being implemented through estates' lens.

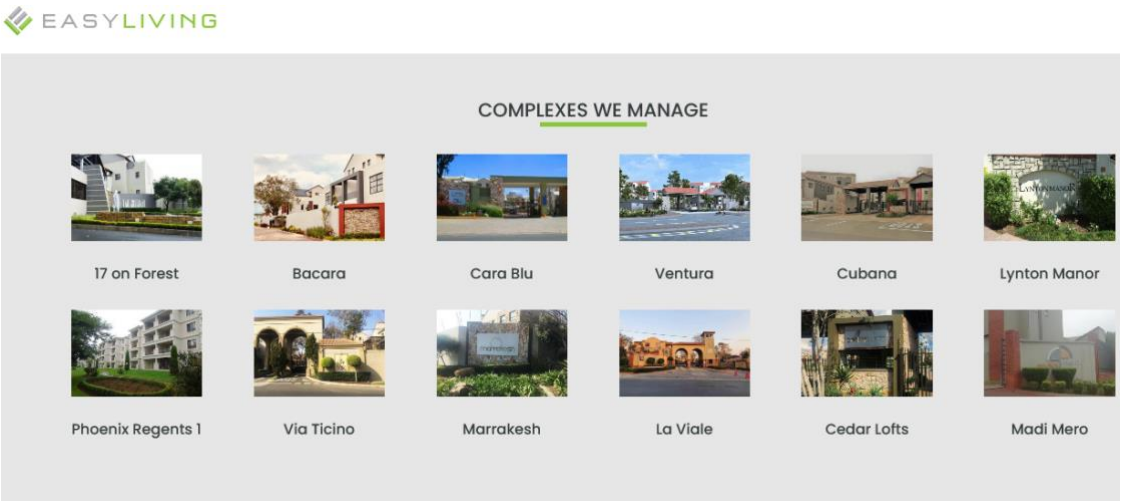


Figure 4 Properties Managed By Easy Living Estates

Household Demographics

A target population is the entire set of individuals from where a sample will be selected for further analysis (Bryman, 2012). Firoz Qureshi describes it as a set of individuals with common research characteristics (Firoz Qureshi, 2016).
This research's household target population consists of 18 years and older adults who reside in Johannesburg City, Gauteng. A requirement for the above audiences is that they live in sectional titles and complexes.

The household research groups in this study are further broken down into;

1. Age: 18 -60 years. The mix included three age groups; 18-25, 25-35 and 35 -60.
2. Sex: A mix of males and females were considered

3. Education: a degree of awareness and education was taken into account based on the assumption that those that reside and own properties in the selected areas have some form of education.
4. Job role: The level of education and job role was tested to determine whether there is a pattern between these variables and the desire to engage in separation at source. Additionally, most employers offer recycling stations at their premises, and this was taken into consideration.
5. Geographic location: respondents reside in Johannesburg in the following suburbs; Fourways, Bryanston, Lonehill, Midrandand Roodepoort.
6. Lifestyle estates: the research identified and interviewed those in lifestyle estates around the selected Johannesburg suburbs.

Ethical Considerations Used In The Collection Of Research Data

Ethics and ethical conduct to research are primarily dependent on the researcher. Neuman articulates ethics in the study as “the concerns, dilemmas, and conflicts that arise over the proper way to conduct research” (Neuman, 2014). Bryman lists four focal points that play a part in the ethic of a research; “whether consent has been granted; whether there was harm to participants; protection of privacy and lastly whether deception was involved” (Bryman, 2012).

Consent requires that the researcher obtain approval for the interviews and data usage from the selected respondents or organisations before conducting the research. The respondents must be given clarity about the study's purpose and objectives and how their information will be used (Bryman, 2012). The participants in this study have been provided with full disclosure with regards to the research. Consent from participants was obtained using the primary communication method between researcher and participants, email consent and recorded permission was obtained before any interviews could proceed. The research participants were also reassured that the data would only be used for this study and would not be shared with external parties.

Data Coding

Data coding is the process of converting verbatim into themes or groups that can easily be interpreted into knowledge that gives insight into a research study, questions or objectives (Bryman, 2012). Cropley identifies two forms of data coding that can be used in qualitative research; substantive and theoretical coding. “ *substantive coding, which has the purpose of identifying concrete references to the object of study (i.e., identifying what I will later call “content*

*units"), and "theoretical" or "higher-order" coding, which involves finding statements in an interview which refer to discipline-based concepts such as motivation, coping strategies, self-image, and the like "(*Cropley, 2019).

This research study collected data and grouped them into themes that can be interpreted. This approach ensures that the essence of what the respondent was articulating is captured. Cropley suggests that the best way to guarantee that the researcher does not lose valuable information is by summarizing the data to remove slang and irrelevant statements before classifying and grouping the data into themes.

4 . PRESENTATION OF RESEARCH RESULTS

The data collected is presented in this section of the research. The data collected is discussed in line with the research questions and objectives

Introduction

Proposition 1: Waste Separation At Source Is A Challenge Amongst Households

This section of the study unpacks the processes and guidelines households need to adhere to comply with the compulsory services offered by Pikitup in the City of Johannesburg (COJ). Pikitup has detailed how each complex, depending on the size, should structure their waste areas and operations to prepare for waste removal and collection. The specifications are split according to; small, middles sized and large residential complexes.

The rules detail that a complex is deemed small if it has 8 to 10 units, medium-sized complexes host not more than 20 units, and large complexes are those that are above 20 units. Pikitup provides every townhouse, complex, a block of flats, sectional titles or full titles with standardized 240 litres black wheelie bins to which residents should temporarily store their waste. This waste is collected every week from either the kerbside (an area close to the road just outside the residential complex) or within the complex's waste communal area. Pikitup charges tariffs calculated according to the size of the property (Pikitup, 2013). *"Those residents who live in small complexes are responsible for taking out and collecting their 240-litre wheelie bins to and from the kerb outside their complex because these smaller complexes are not required to have the standard communal waste area"* (Pikitup, 2015). Middle and large-sized complexes are required to have a communal waste area where the waste is stored until collection, according to Pikitup, The Johannesburg Roads Agency requires them to collect trash from within the complex to avoid any traffic incidents. However, this does not seem to be the case in most circumstances (Pikitup, 2015). Waste is placed outside of these complexes or residential areas where waste pickers have access to the garbage.

	Property value	Collection tariff (excl. vat)
(a)	R200 000 and less (***Including Indigent Households***)	**Free**
(b)	R200 001 to R300 000	**R 91.42**
(c)	R300 001 to R500 000	**R 106.46**
(d)	R500 001 to R700 000	**R 121.47**
(e)	R700 001 to R1 500 000	**R 160.30**
(f)	Greater than R1 500 000	**R 222.93**

Table 1 Domestic Refuse Removal Tariffs (Pikitup, 2013).

The increased population size in the City of Johannesburg has created a challenge for Pikitup to provide waste management services. The population in Johannesburg has been increasing by 3% annually due to increased urbanization (City of Johannesburg, 2018). However, the Pikitup funding model is not growing in line with the population growth, and the tariffs imposed on citizens are insufficient to cover the growing operational costs (Pikitup, 2019). Among their financial constraints in driving separation at source, Pikitup faces labour disruptions that impact waste collection. These financial limitations also have an impact on the delivery of household separation at source programmes. This has resulted in the lack of an effective educational programme, the supply of waste bags for recyclable materials, and the collection of these materials (refer to figure 14 in the appendix).

Estate management companies and property developers are aware of the need to start recycling and have made attempts to encourage residents to recycle. VTC Africa Properties, have built residential properties that promote recycling. This property developer has in house programmes known as “The Earth Series*”. The interviewee stated that “the Earth Series is addressing environmental sustainability through eco-friendly living”* (Tavares, 2020).
Although this is a great programme that many homeowners have bought into, the development company still faced challenges in incorporating this into these residents' lifestyle. The main challenge expressed is; residents are unwilling to pay an additional R89 fee outside of the property’s rates, taxes and levies. This R89 fee is delivered to an independent waste collection for the intended purpose of recycling through reuse and resale (Tavares, 2020). The residents of this estate expressed that they have no recycling issues and encourage the programme as long as it does not affect their pockets. The estate faces the challenge of finding a solution that will not come at an additional cost to residents. The developer expressed that they already have a sunk cost in the implementation of this programme. The sunk cost comes in the form of a waste compactor which was purchased for this estate. Average waste compactor goes for above R1 million and is used for crushing recycled materials.

The interviewed director of Easy Living Estates stated that they have implemented some waste separation initiatives in some complexes and estates. This does not mean that residents take part because it is not compulsory to recycle (Hindley, 2020). This estate manager expressed that the issues also stem from a lack of communication from the City of Johannesburg (COJ) and Pikitup. The transmission is not consistent as they may communicate an initiative and seize to proceed when the go-live date approaches. As a result, many estate managers have attempted to drive these programmes in the complexes they manage with little success (Hindley, 2020).

Seven households expressed that they do not take part in separation at source (S@S) because they are simply unaware of any initiatives driven by the City of Johannesburg, Pikitup or the estate manager in their complexes. Three participants mentioned that they are aware of initiatives being driven in their estates; however, they do not participate due to lack of visibility and the estate not enforcing participation. Only one participant indicated the initiative works well in her estate due to a recycling levy. The participant stated that she believes this works well and forces residents to take part in recycling because the cost of recycling is formed part of their monthly property levies (Manuel, 2020).

Proposition 2: Complexes And Residental Estates Are Driving Separation At Source (S@S)

VTC Africa Properties, unlike their counterparts, have taken the lead in going beyond building luxury estates, but also took the initiative to incorporate separation at source facilities. This property developer indicated that these facilities result from international market research on sustainable living (Tavares, 2020). This is an indication that property developers are becoming aware of the opportunity that recycling presents.

The interviews conducted with the estate manager concluded that there is increasing environmental awareness in the property sector. The attention and pressures in South Africa present opportunities and challenges around building and managing eco-friendly properties.

Although these parties have been driving the adoption of separation at source, the imperative is still slow to gain momentum. The respondents indicated that the lack of regulation to enforce recycling from households is perhaps one of their biggest challenges. This makes it difficult for estates to implement this in the property rules unless agreed upon with the body corporate.

Stonemill Estate residents voted against recycling at the source because this directly impacted their pockets through the special monthly fee levied for the collection of recyclables.

The estate managers concluded that this initiative could be best driven through a strong partnership with the City of Johannesburg and Pikitup. Estate managers are essential in the daily operations of estates and complexes. In Stonemill Estates' case, estate managers would have been able to find solutions that would keep recycling going, given the sunken costs. Although development companies may build properties with this imperative in mind, it will not succeed without estate managers driving the adoption.

Proposition 3: Including A Recycling Tariff In The Property Levies Will Encourage Separation At Source

It has proven to be a mission to get residents to separate at the source without the supporting laws that will enforce households to participate in recycling. Therefore, property companies must find innovative ways to engage, communicate and educate households to provide awareness. The key to driving this imperative is through body corporates and estate managers. A body corporate can be defined as “the collective name given to all owners of units in a scheme. The body corporate comes into existence once the developer transfers the units to owners who have purchased into the system” (Guthrie & Theron Eiendome Properties , 2018) .

Additionally, the body corporate appoints trustees. The trustees are responsible for looking after the finances and the property scheme's operations (Property 24, 2013). The body corporate trustees are also responsible for appointing an estate management company to look after the estate's daily operations.

These two players are essential in driving the separation at source initiative in estates, complexes and sectional titles because of the mandates that they have been provided. They are responsible for tabling new levies, special levies, new services providers, and new recycling initiatives. These two bodies are essential in influencing owners to buy into separation at source, especially if the benefits and costs are clearly articulated.

Including this service as part of the property, levies are something that the trustees and the estate managers are responsible for driving. Estate managers indicated that this could be done if the owners' benefits outweigh the costs, e.g. receiving a rebate on monthly levies provided that the recycling volumes are at high levels.

Households that took part in this study indicated that they would not be willing to pay additional recycling fees unless those fees were already included in the levies. The respondents indicated that they are aware of the benefits of recycling to a certain degree. They, however, would like more visible programmes.

A suggestion to incorporate a Reverse Vending Machine(RVM) in these estates will also drive behaviours and justify the need to levy for recycling. The Levy will be used to service and lease the RVM. The benefits of having an RVM are the rewards that can be linked to the local shopping centres. These RVM's disperse cash rewards in the form of vouchers that can be used in local stores such as Woolworths.

Conclusion

The above insights present opportunities to drive separation at source through estate managers and body corporate trustees provided that the benefits outweigh the costs. The data collection highlighted that this programme would not succeed without trustees' involvement, state managers collaborating with local municipalities.

Property developers are essential in developing eco-friendly, sustainable homes that include separation at source facilities that incorporate recycling as a lifestyle.

The awareness drives between the City of Johannesburg and Pikitup need to be visible enough for those in the property sector to leverage. Also, the lack of laws that enforce this imperative is a huge problem.

Above that, estate managers, trustees, the City of Johannesburg and Pikitup should work together to finalize a scalable programme. Incorporating the recycling fee as part of the property levies may also encourage households to recycle. However, the estate managers should ensure that the facilities and equipment for recycling are available and visible to all residents.

5. PROPOSED BUSINESS VENTURE

This business venture proposal was put together for an already exiting entity known as RecycledWasteZa. This business venture proposal links the discussions in chapter 2; literature review and the research findings in chapter 4.

Description

RecycledWasteZa is a female-owned company which was founded in 2017 and registered officially in 2018. The company is owned and run by two females who desire to positively impact the environment and create job opportunities by offering their waste separation at source programmes that are inclusive of; the collection of separated recyclable waste intended for resale and residential education programmes.

The company currently supplies 240-litre wheelie bins on an ad-hoc basis and sales kitchen separation bins, as shown in figure 6 of the appendix.
The small business' goal is to offer their waste collection and education services to complexes and estates that wish to participate in recycling and ultimately join the Pikitup "S@S" (Pikitup, 2019) programmes as one of their vendors. RecycledWasteZa also aims to consult in this field by providing innovative solutions and knowledge to leapfrog developing nations in the waste matter.

Vision Statement

To become the preferred partner in the journey towards a clean green environment

Mission Statement

"To offer innovative waste management solutions that inspire individuals, households, & corporates to invest in recycling activities " (RecycledWasteZa, 2019).

Business Model Canvas

Key Partners



Property Developers
Estate Managers
Pikitup
COJ
Individuals
Corporates
Government

Key Activities



Collecting
Transporting
Processing
Educating
Selling

Value Proposition



Recyclable waste collection services
Education Programmes
Quality of Product & Service

Customer Relationship



Personal
Dedicated
Long-Term

Customer Segments



Property Developers
Estate Managers
Pikitup
COJ
Individuals
Corporates
Government

Competitors



Direct: City Recyclers
Phepha

Key Resources



Website
Waste App
Estate Managers
Drivers
Sales Agents

Channels



Website
Waste App
Physical Channels
Sales Agents

(Cost Structure)
R2 600 000 start-up capital



(Revenue Streams)
Waste recycling and collection
Educational framework
Waste bins



Market Analysis

The waste sector is structured according to; public, private and households with each of these sectors having varied responsibilities in the way waste management services are provided and conducted (Greencape , 2019).

The private sector that encompasses commercial industries is responsible for their waste disposal, collection, sorting and storing services and can appoint private waste management companies to facilitate these processes as instructed by law. On the other hand, households receive services from their local municipalities and come at a cost to the resident in the form of municipal rates. Households that wish to recycle are required to do so outside of these municipalities' mandated services unless they fall into the pilot projects.

“The industry has shown continued growth and estimated to be worth R27 Billion (Linnenkoper, 2019). The growth can be attributed to; greater awareness of the impact of waste to landfills, environmental changes, increased business opportunities in the beneficiation of waste (Greencape , 2019)”.

“According to the South Africa State of Waste Report, there was approximately 54.2 million tonnes of waste generated in 2017 and a market of size 38,6%” (Department of Environmental Affairs , 2018). *“Waste Management Strategy (NWMS) had set goals to divert 25% of recyclables from landfill sites; and for all metropolitan municipalities, secondary cities and large towns to have initiated separation at source programmes by 2016.”* (Stats SA, 2018). The abovementioned stats make it appear that South Africa is doing well in terms of recycling. However, opportunities still exist within the household sector, which, according to Stats SA, only has a recycling rate of 10% (Stats SA, 2018).

Pikitup, as the mandated party to ensure waste management services in Johannesburg, has also set themselves aggressive targets which aim to divert 93% of all waste from landfills by 2040 (Pikitup, 2019).

Although the figure below shows that out of the nine provinces, Gauteng has the second-highest recycling rates. This can still be improved with stricter measures and increased education and business partnerships.

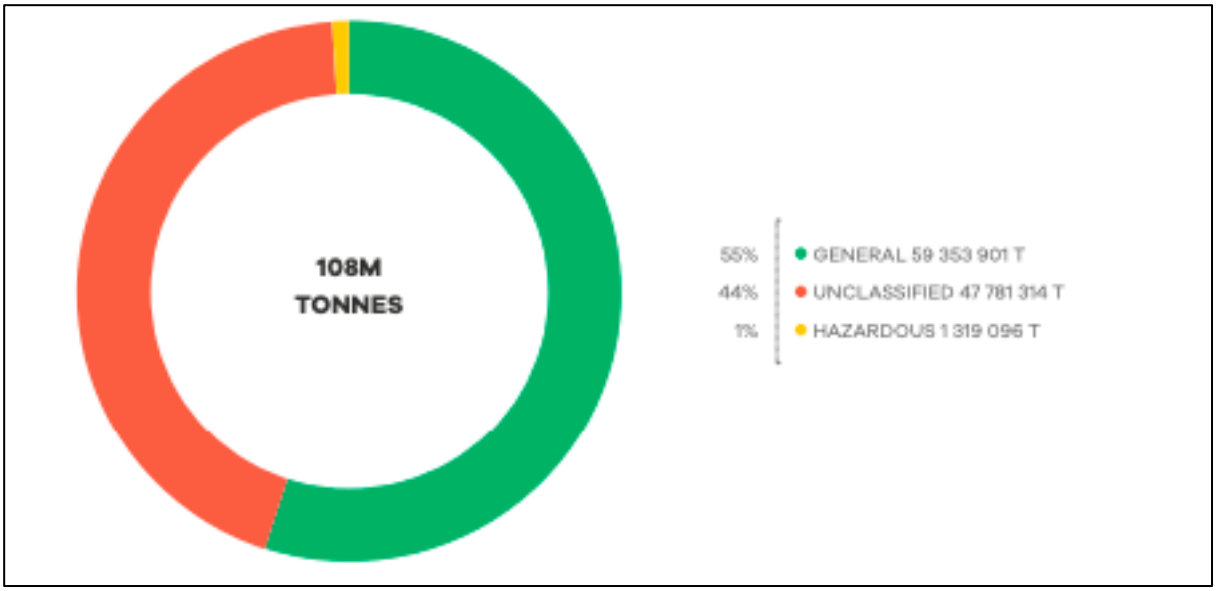


Figure 5 Waste Classification (Greencape , 2019)

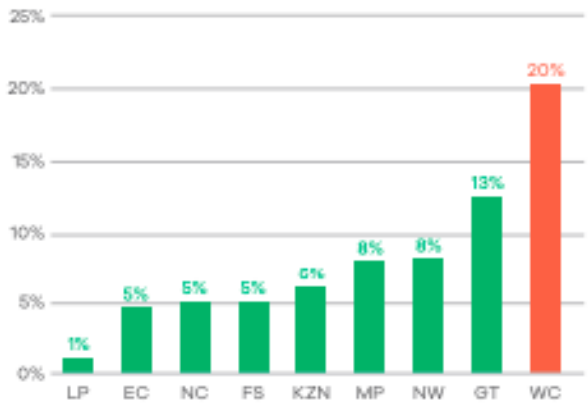


Figure 3: Household separation by province (2015)

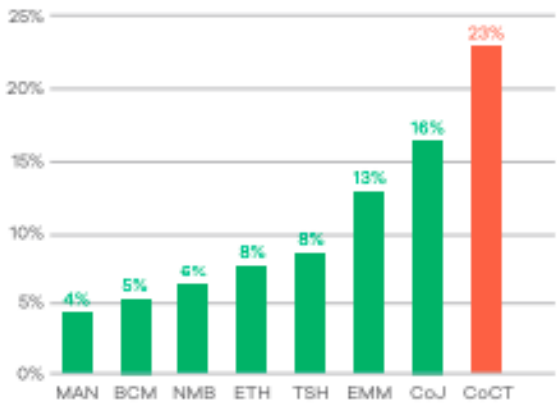


Figure 4: Household separation by metro (2015)

Figure 6 Recycling Stats by Province (Greencape , 2019)

PESTEL	- ***Change Factor***	- ***Opportunity***	- ***Threat***
P*olitical*	- Regular strike action & Labour Union powers driving wage demands - Political Instability	- Create employment through small industries and encourage worker and employer collaboration	- Affordability of companies to pay workers
E*conomic*	- Increased income pressures impacting affordability - Coronavirus impacting economic stability - Country & global markets in a recession	- Offer a service at no cost to the consumer to provide some consumer relief	- Inability to meet financial obligations
S*ocial*	- Coronavirus impacting health and no cure has yet been found - Income gaps between middle class, rich and poor are ever-increasing	- Ensure increased cleanliness methods - Offer affordable services that meet a broad spectrum of needs	- Coronavirus having a long-lasting socialite impact
T*echnology*	- Fourth Industrial Revolution requires to increase technology adoption - Need for technological waste and recycling platforms - Challenge in digitizing waste management	- Opportunity to use platforms such a YouTube & LinkedIn to provide educational services to a segment - App adoption in the recycling sector	- Technology reach may be limited to middle- and upper-income earners
E*nvironment*	- Landfill space for waste disposal is running out - Illegal dumping and littering are a massive problem with no consequences to the offenders and consumer communication	- Divert waste to landfills by offering rigorous recycling programmes - Impose legislation that punishes illegal dumping and littering	- Lack of adoption and interest in recycling programmes

***L**egal*	- Cost of business and waste risk and compliance is high, and processes are a mission - S@S is now included in the NWMS and NEM Act	- Partner with Pikitup as a service provider to drive S@S	- Partnerships may be lacking in finances to support external supplier needs

Table 2 PESTEL

Target Market

RecycledWasteZa has the following target markets;

1. Residential Estates and Complexes
2. Municipalities
3. Pikitup
4. Property Development Companies

Residential estates and complexes situated in the northern suburbs are the targeted areas that RecycledWasteZa aims to roll out their programme by offering separation at source waste collection and resident educational programmes. The company also aims to work with lifestyle property developers and estate management companies in the identified areas to offer consultative services on how to incorporate separation at source into their buildings.

Municipalities within the northern suburbs are essential partners and customers to secure the success of this company. Cities can engage the company to provide waste management services in selected areas, thereby increasing RecycledWasteZa's revenue prospects. The aim is to expand the business' offering into other regions.

Pikitup is potentially the most prominent partner and customer that RecycledWasteZa can offer their services. A partnership with Pikitup would afford to RecycledWasteZa the opportunity to tap into additional resources and opportunities. RecycledWasteZa can use their knowledge, expertise and partnerships with estate managers to drive the accelerated S@S educational needs and implement programmes at no additional costs to the residents. These programmes would increase the mining and separation effort to drive Pikitup's S@S target of 1,7 million tonnes (Pikitup, 2019).

Competitor Analysis

The waste management competitive landscape is characterised by large players such as; Collect-a-Can, Mpat, The Glass Recycling Company, and PET Recycling Company. These large players have industry experience and generally focus on one material. Then there are those medium to small companies such as City Recycles and Phepha whose services include the broader spectrum of waste. Their services range from waste collection, sorting, disposing and other services. These companies focus primarily on the commercial sector as this sector has higher volumes of waste and requires more frequent waste services. However, this may need to be reviewed further, considering that more organisations are working towards “working from home”, increasing the waste generated from households. These companies typically stay away from household separation at source as Pikitup is the primary provider of this service. However, in Pikitup’s 2019/2020 business plan, it is stated that they are now looking for small companies to assist them in the waste management services provided to residential areas (Pikitup, 2019).

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Company			
Strengths	- New fresh ideas - Focused strategy on the S@S - Supplies their own bins through bin manufacturing partnership - Extensive knowledge in household S@S	- Established in 1984, has decades of experience in the waste industry. - Partnership with 13 municipalities with a strong focus on the East Rand - Offers waste sorting services for commercial companies	- Strong customer value proposition - Services are diversified - Recycling rebate on customer fees
Weaknesses	- Young company - Operational issues - Lacking in healthy relationships and partners	- It is not clear what they do; website information does not give much detail - Separation at source only focused on the commercial sector	- Grew too quickly and is now unable to service clients efficiently - Located in Johannesburg Metro
Opportunities	- Partnerships with municipalities, estate managers and property developers - Educational initiatives using digital platforms and various strategies - Collection of recyclables at no cost (make money from the sale of waste)	- Use their decades in experience to scale their business across the COJ - Extend services to cater for household separation at source App adoption in the recycling sector - Educational Initiatives	- Service delivery and relationship management improvements - Educational Initiatives
Threats	- Inability to act upon an opportunity	- Small players with new ideas and technologies -	- Smaller companies taking on their strained business partnerships

Table Competitor Analysis

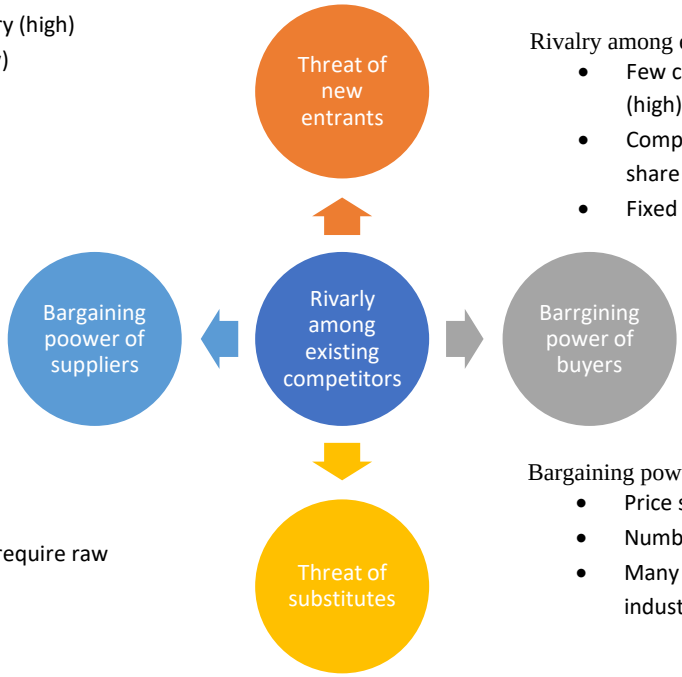
Barrier to Entry

Threat of new entrants:

- Time and setup cost of entry (high)
- Specialized knowledge (low)
- Economies of scale(high)

Bargaining power of suppliers:

- Many suppliers (low)
- Cost of changing (low)



Rivalry among existing competitors:

- Few competitors, but large in size (high)
- Competitors have a large market share (high)
- Fixed costs are high (high)

Threat of substitutes:

- Few substitutes (low)
- Cost to change, would require raw materials (high)

Bargaining power of buyers:

- Price sensitivity (high)
- Number of buyers (low)
- Many small- scale suppliers in the industry (high)

Regulation

The national Department of Environmental Affairs regulates the waste management sector in South Africa. It is constituted into law by the National Environmental Management Waste Act (NEMWA) 59 of 2008 and updated in 2019. The NEMWA is further broken down into a strategic implementation plan known as the National Waste Management Strategy (NWMS). In addition to the above mentioned, RecycledWasteZa would need to adhere to the following regulations due to their line of business; (Department of Environmental Affairs, 2016):

1. National Policy for the provision of Basic Refuse Removal to indigent households, 2011
2. List of waste management activities, 2009
3. Waste information regulation, 2012
4. National domestic waste collection standards, 2011
5. National norms and standards for the storage of waste, 2013

The regulation requires every waste operator classified under the following categories to register and obtain licencing for their operations; "*storage and transport of waste, recycling and recovery of waste, treatment of waste, disposal of waste, waste transporters, waste processors, waste recyclers, waste collectors and all those trading in waste"* (Department of Environmental Affairs, 2016).

Management Of The Organisation

The company is owned by two females who both participate in the running of the company. The proposed organisational structure of the entity is as presented below.

Roles & Responsibilities

1. Managing Director: the overall strategic direction of the organization, financial results
2. Chief Operating Officer: day to day management, appointments, contractual agreements

3. Human Resources Manager: managing recruitment and selection, developing and implementing organizations HR strategies
4. Finance Manager: budget forecasting, reporting and analyzing
5. Site Manager: operational oversite, quality control and checks, employee schedules
6. Sales, Marketing & Relationship Manager, maintain relationships, acquiring
7. New business, building new relationships



Figure 7 Organigram

Operational Plan

This section focuses on the proposed operational plan that RecycledWasteZa can adopt. The plan is based on the findings of “How to Start a Recycling Collecting Business” (National Recycling Forum , 2016).

The company would require a home base that would primarily be used as a sorting and operations hub. The waste that will be collected will be further sorted into the different components, compressed using a waste compressor. The premises will also be used as an official site for the company. The premises' proposed location is the Kyasands Industrial area since the company wishes to begin its operations in the Northern Suburbs of Johannesburg with a primary focus on Fourways, Lonehill and Ruimsig. This will allow for greater accessibility to these areas as the distances are not too far apart. The company will also need to establish the infrastructure, non-infrastructure requirements and human resources requirements. These are detailed below:

1. Infrastructures Requirements

1. Two Collection Vehicles
2. Two Baler (used to compress waste into small manageable sizes)
3. One Forklift
4. Computers/Laptops
5. Bulk Bags (used to store and transport waste)
6. Sorting conveyors

2. Non- Infrastructures Requirements

1. Licensing and business registration
2. Recycling Education and training
3. Health & Safety training and requirements
4. Engagements with Estate Managers, Local Municipalities and Pikitup
5. Security
6. Protective clothing

3. Human Resources Requirements

1. Managing Director
2. Chief Operations Officer
3. Two Site Managers
4. Human Resources Manager
5. Finance Manager
6. Two Sales, Marketing & Relationship Manager

7. Site managers
8. Four drivers Safety
9. Administrator
10. Ten Sorters
11. Two General workers/cleaners

Products And Services

The primary recyclable products that RecycledWasteZa will focus on are listed in the table below. These products can be profitable if collected in large quantities.

Beyond that, the company will offer sales and rentals of 240-litre wheelie bins, household kitchen separation bins and educational workshops (appendix).

Products & Pricing Table

Products	Price
Paper (R700/tonne)	R700/tonne
Tins (R17 / 1000 tins)	R17/1000
Card board paper (R360/tonne)	R360/tonne
PET bottles (R17/1000)	R17/1000
Plastic (R200/ tonne)	R200/tonne

Figure 8 Product & Pricing Table

Sales Strategy

RecycledWasteZa aims to implement a sales strategy according to the below-listed sales objectives;

1. Increase customer penetration through buy-in from Estate Managers and Developers
2. Increase Recycling education that enables customer participation
3. Target Developers with the sale of kitchen recycle bins

4. Participate and collaborate with municipalities and Pikitup to drive increased market penetration

The company must build and maintain good relationships with stakeholders to keep informed of any new property developments, new recycling opportunities, and be top of mind when stakeholders require a company that can offer full waste management services.

Funding Requirements

The initial capital expenditure for RecycledWasteZa's operations is R1,5 million. The cost is divided in terms of once-off start-up cost and on-going monthly costs, including staff members' salaries in the first month. The once-off start-up costs amount to R840 750, and the on-going costs amount to R 593 100. However, the company will require the on-going costs to be funded for the first three months amounting to R1 779 300 while they ramp up the business operations. This requirement will drive the initial funding costs to a total of R2,6 million.

There are several funding avenues that RecycledWasteZa can explore. The "Recycling Training Manual" compiled by the Department of Environmental Affairs has highlighted some critical small business funding providers (Department of Environmental Affairs, 2016). The document outlines the following providers of funding: The Department of Trade and Industry which is a government-owned department that assists in funding new and existing businesses; The Isivande Women's Fund (IWF) which is managed by the Industrial Development Corporation and aimed at funding female-owned new and existing businesses. The funding granted range from as little as R30 000 to R2 million. Lastly, RecycledWasteZa can seek funding from the Department of Small Business Development, a government-owned institution that funds new and existing small businesses (Department of Environmental Affairs, 2016).

Once-off Costs		
Item	Cost	
Vehicles	R	310 000,00
Balers(used)	R	190 000,00
Forklift (used)	R	201 250,00
Computers	R	30 000,00
Sorting tables/conveyors (used)	R	80 000,00
Licensing costs	R	20 000,00
Protective gear	R	9 500,00
Total Costs	R	840 750,00

On-going Costs		
Item	Cost	
Rental Space	R	58 000,00
Bulk bags @ R70/bag	R	2 100,00
Feul	R	10 000,00
Sundry Costs	R	50 000,00
Water & Electricity	R	100 000,00
Salaries	R	373 000,00
1 Managing Director	R	45 000,00
1 Chief Operations Officer	R	42 000,00
2 Site Managers	R	60 000,00
1 Human Resources Manager	R	28 000,00
1 Finance Manager	R	28 000,00
2 Sales, Marketing & Relationship Manager	R	38 000,00
1 Site managers	R	17 500,00
4 drivers Safety	R	36 000,00
1 Administrator	R	7 500,00
10 Sorters	R	60 000,00
2 General workers/cleaners	R	11 000,00
Total Costs	R	593 100,00

Table 3 Initial Start-up Costs

Financial Plan And Financial Projections

For RecycledWasteZa to reach the below financial projections, they would need to acquire a recycling contract with all the Summercon and Balwin properties in Northern Johannesburg.

Summercon has 103 properties that host 10 883 units, and Balwin has 23 planned developments that will host 28 419 units. The revenue table below does not include a collection fee charged for the collection of waste. This has been intentionally excluded from

determining whether resale of recyclables would be enough to sustain this company. Additionally, the revenue assumption below has been discounted by 50% based on the premise that RecycledWasteZa may not acquire business with all the above-listed properties.

Together, these units generate about 35 864 tonnes of waste per year. This assumption is based on the 2,5grams of waste generated by households daily (Greencape , 2019). Additionally, the below assumptions have been applied;

Products	Price	Generated Tonnes/Year	Percentage Contribution/Year	Revenue/Year
Paper (R700/tonne)	R700/tonne	35864	10%	R 2 510 480,00
Tins (R17 / 1000 tins)	R17/1000	35864	20%	R 121 937,60
Card board paper (R360/tonne)	R360/tonne	35864	10%	R 1 291 104,00
PET bottles (R17/1000)	R17/1000	35864	30%	R 182 906,40
Plastic (R200/ tonne)	R200/tonne	35864	30%	R 2 151 840,00

Table 4 Revenue Projections

5 Year Income Projections

Revenue/Ronne	First Year		Second Year		Third Year		Fourth Year		Fifth Year	
Total Income	R	6 258 021,00	R	6 633 502,26	R	7 031 512,40	R	7 453 403,14	R	7 900 607,33
Paper (R700/tonne)	R	2 510 200,00	R	2 660 812,00	R	2 820 460,72	R	2 989 688,36	R	3 169 069,66
Tins (R17 / 1000 tins)	R	121 941,00	R	129 257,46	R	137 012,91	R	145 233,68	R	153 947,70
Card board paper (R360/tonne)	R	1 290 960,00	R	1 368 417,60	R	1 450 522,66	R	1 537 554,02	R	1 629 807,26
PET bottles (R17/1000)	R	182 920,00	R	193 895,20	R	205 528,91	R	217 860,65	R	230 932,29
Plastic (R200/ tonne)	R	2 152 000,00	R	2 281 120,00	R	2 417 987,20	R	2 563 066,43	R	2 716 850,42
Total Expenses	R	5 159 200,00	R	5 516 692,00	R	5 721 117,92	R	6 112 514,64	R	6 537 723,64
1 Managing Director	R	540 000,00	R	563 400,00	R	589 464,00	R	618 373,44	R	650 325,54
1 Chief Operations Officer	R	504 000,00	R	525 840,00	R	550 166,40	R	577 148,54	R	606 970,51
2 Site Managers	R	720 000,00	R	751 200,00	R	785 952,00	R	824 497,92	R	867 100,72
1 Human Resources Manager	R	336 000,00	R	350 560,00	R	366 777,60	R	384 765,70	R	404 647,00
2 Sales, Marketing & Relationship Manager	R	456 000,00	R	475 760,00	R	497 769,60	R	522 182,02	R	549 163,79
1 Site managers	R	210 000,00	R	219 100,00	R	229 236,00	R	240 478,56	R	252 904,38
4 drivers Safety	R	432 000,00	R	450 720,00	R	471 571,20	R	494 698,75	R	520 260,43
1 Administrator	R	90 000,00	R	161 400,00	R	75 600,00	R	148 176,00	R	223 896,96
10 Sorters	R	720 000,00	R	751 200,00	R	785 952,00	R	824 497,92	R	867 100,72
2 General workers/cleaners	R	132 000,00	R	137 720,00	R	144 091,20	R	151 157,95	R	158 968,47
Rental Space	R	696 000,00	R	726 160,00	R	759 753,60	R	797 014,66	R	838 197,37
Bulk bags @ R70/bag	R	25 200,00	R	69 192,00	R	111 592,32	R	155 910,07	R	202 357,62
Fuel	R	120 000,00	R	125 200,00	R	130 992,00	R	137 416,32	R	144 516,79
Water & Electricity	R	100 000,00	R	108 000,00	R	116 640,00	R	125 971,20	R	136 048,90
Sundry Costs	R	50 000,00	R	54 000,00	R	58 320,00	R	62 985,60	R	68 024,45
Revenue	R	1 098 821,00	R	1 116 810,26	R	1 310 394,48	R	1 340 888,50	R	1 362 883,68
Discounted Revenue	R	549 410,50	R	558 405,13	R	655 197,24	R	670 444,25	R	681 441,84

Table 5 Income Statement

Conclusion

RecycledWasteZa has the advantage of capturing this market before their competitors as most waste management companies do not focus on household recycling. A majority of these waste management companies place their efforts on commercial recycling and leave the households to Pikitup and informal waste pickers.

RecycledWasteZa needs to build partnerships with the intended stakeholders and showcase their skills in addressing the market need. Because the market is competitive and filled with large competitive companies, it would be best for RecycledWasteZa to focus on the part of the market that has not yet gained attention. This applied focus will give them enough time to get their house to build a brand presence and strong relationships within the industry.

6.CONCLUSIONS AND RECOMMENDATIONS

Conclusion

RecycledWasteZa has the advantage of looking at solutions from an outside lens, therefore meeting the needs of all those impacted. The proposed solutions are straightforward and innovative. The proposed solutions aim to be light on property owner pockets and encourage a culture of recycling through S@S.

Two recommendations are proposed, and both will give RecycledWasteZa experience and exposure. Recommendation 1; partnering with Pikitup through their Flagship Programme that supports small enterprises. Recommendation 2; work directly with property developers and estate managers. Working with these industry players would give the company the freedom to be innovative and potentially influence recycling in the residential property sector. Both recommendations are discussed below with the second recommendation being the preferred option.
In addition to the above recommendations, RecycledWasteZa should consider developing an educational programme. The programme should be delivered through body corporate meetings which are now being conducted through Zoom due to the impact of Covid-19.

Recommendations

This section focuses on the recommendations established by the data collected. This reveals alternatively methods of implementing S@S solution driven by RecycledWasteZa through the various recommendations detailed below. For RecycledWasteZa to properly play in this sector and become an industry leader in the waste sorting at source, they should consider two options; (1) forming a contractual partnership agreement with Pikitup, (2) forming a strong working relationship with property developers and their appointed estate management companies.

The partnership between the City of Johannesburg, Pikitup

Pikitup has detailed in their business plan that they need assistance from small enterprises in achieving their S@S goals" *We work with co-operatives and small*

enterprises to collect and sort the recyclable waste collected from households and businesses. These initiatives create additional jobs, businesses and income for the unemployed residents within the City" (Pikitup, 2019).

This option is a recommended stepping stone and an opportunity for a foot in the door. The below pros and cons need to be considered based on the amount of exposure and direction the company wants to take.

Pros :

1. Operational experience and support from an established and knowledgable organisation
2. Brand affiliation can increase the brand perception for RecycledWasteZa
3. Access to markets, including establishing new relationships with industry players.
4. Increased reach and visibility

Cons:

The interviews indicated some negative feelings towards Pikitup and The City of Johannesburg's lack of service delivery. These negative perceptions could have an impact on RecycledWasteZa's brand and reputation. Some additionally identified cons are;

1. Potentially recognised as a subset of Pikitup, therefore, losing brand identity.
2. New ideas on how to tackle the household S@S problem could be seen as the intellectual property of Pikitup and The City of Johannesburg.

Consulting in the Property Sector

RecycledWasteZa can do consulting work with property development companies in the early stages of new property developments and existing properties. The consulting services will aim to integrate household waste S@S into residents' daily lives and the waste management of those residential developments. Build recycling bins into the kitchen cabinets; these bins usually have two or three compartments catering for general waste and recyclable waste. Supplementary to the enablement of kitchen recycling is a communal waste system that ensures that the separated waste remains separated in the specific communal bins.

A reward system should be considered. An example of a reward system is having a Reverse Vending Machine incorporated into new developments in a common area. These Reverse Vending Machines allow individuals to deposit recyclable bottles and cans for credit into your PayPal account or install a functionality that will reduce the resident's levies based on how much recycling has been done in their household. The Reverse Vending Machine is linked to a downloadable app that syncs to the machine just before any deposits are made (Reclay StewardEdge Inc., 2014).

Over and above consulting, RecycledWasteZa needs to ensure this programme's smooth implementation through estate managers. As indicated, property developers built the properties and hand them over to the body corporate to run. This body corporate will appoint an estate management company which will also be responsible for selecting an appropriate recycling system that meets the owner's pockets. RecycledWasteZa could have a foot in the door if property developers refer them to estate managers. The responsibility of estate managers is to lobby and drive what they believe will give the properties they manage increased value. RecycledWasteZa must have strong relationships with estate managers who can lobby for an increase in levies that cater to waste management's recycling component, an additional value-added service provided outside of Pikitup. This extra cost should be justifiable through incentives. RecycledWasteZa’s responsibility to the estate managers is putting together educational programmes for the residents on how to recycle waste properly and how the Reverse Vending Machine works(if one will be used). They also need to maintain sanitary communal waste premises, ensure that the vending machines are functioning well and recyclables are collected in time.

BIBLIOGRAPHY

Avfall Sverige. (2018). *Swedish Waste Management 2018.* Stockholm : Avfall Sverige.

Ahmade, P. A. (2013). *Impact of Solid Waste on Health and The Environment.* Delhi: Baba Ghulam Shah Badshah University.

Anderson, J., Feldman, B., & Sadlo, W. (2016). *Proposal for Strategic Planning for Solid Waste Management in Lewiston, ME.* Bates College SCARAB.

Andreas Jaron, C. K. (2018). *Waste Management in Germany 2018.* Germany: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU),.

Anita Hardon, C. H. (2004). *How to investigate the use of medicines by consumers.* Amsterdam: World Health Organization and University of Amsterdam 2004.

Annum, G. (2019, August 20). *RESEARCH_INSTRUMENTS_FOR_DATA_COLLECTION.* Retrieved from Academia: https://www.academia.edu/36865594/RESEARCH_INSTRUMENTS_FOR_DATA_COLLECTION_Updated_

Better Evaluation. (n.d.). *Equal Access Participatory Monitoring and Evaluation toolkit Module 5: doing qualitative data analysis.* Retrieved from Better Evaluation: https://www.betterevaluation.org/sites/default/files/EA_PM%26E_toolkit_module_5_QDA_for_publication.pdf

Bizcommunity . (2019, June 1). *Distell, Separation at Source launch Khayelitsha-based recycling programme*. Retrieved from Distell, Separation at Source launch Khayelitsha-based recycling programme: https://www.bizcommunity.com/Article/196/703/192610.html

Bryman, A. (2012). *Social Research Methods 4th Edition.* New York: Oxford University Press.

The city of Johannesburg. (, 2018). *About the City ECONOMIC DATA*. Retrieved from https://www.joburg.org.za/about_/Pages/About%20the%20City/About%20Joburg/Economic-Data.aspx

Criteria Corp. Pre-Employment Testing. (2005-2020). *criteriacorp.* Retrieved from criteriacorp.: https://www.criteriacorp.com/resources/glossary_predictive_validity.php

Department of Environmental Affairs . (, 2018). *State of Waste Report (SoWR) for South Africa.* Pretoria: Department of Environmental Affairs .

Department of Environmental Affairs . (, 2018). *SOUTH AFRICA STATE OF WASTE REPORT*. Pretoria: Department of Environmental Affairs .

Department of Environmental Affairs. (, 2016). *Recycling Training Manual.* Retrieved from Department of Environmental Affairs: https://www.environment.gov.za/sites/default/files/docs/publications/recycling_trainingmanual.pdf

Dhlamini, T. (2019, November 11). Resident in Lonehill. (T. Russon, Interviewer)

Drljača, D. s. (2015). *THE TRANSITION FROM LINEAR TO CIRCULAR ECONOMY (CONCEPT OF EFFICIENT WASTE MANAGEMENT).* Drljača, Dr. sc. Miroslav.

Edugreen. (, 2007). *Health impacts of solid waste.* Retrieved from Edugreen: http://edugreen.teri.res.in/explore/solwaste/health.htm

Ellen MacArthur Foundation. (, 2017). *Concept What is a circular economy? A framework for an economy that is restorative and regenerative by design.* Retrieved from https://www.ellenmacarthurfoundation.org/circular-economy/concept

Firoz Qureshi. (2016, June 23). *Slide Share Firoz Qureshi.* Retrieved from Slide Share: https://www.slideshare.net/FIROZQURESHI/population-and-sample-63359946

Government of South Africa . (2009, March 10). *NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT. 2008.* Retrieved from https://www.environment.gov.za/sites/default/files/legislations/nema_amendment_act59.pdf

Greencape. (, 2019). *Market Intelligence Report.* Cape Town: Greencape. Retrieved from Greencape: https://www.greencape.co.za/assets/Uploads/WASTE-MARKET-INTELLIGENCE-REPORT-WEB.pdf

Guthrie & Theron Eiendome Properties . (2018, June 27). *Sectional titles: What is the role of the body corporate?* Retrieved from GT Property: https://www.gtproperty.co.za/news/16620/sectional-titles--what-is-the-role-of-the-body-corporate?/

hetgroene brein . (, 2019). *How is a circular economy different from a linear economy?* Retrieved from How is a circular economy different from a linear economy?: https://kenniskaarten.hetgroenebrein.nl/en/knowledge-map-circular-economy/how-is-a-circular-economy-different-from-a-linear-economy/

Hindley, H. (2020, March 19). Director at EasyLiving Complex and Estate Management. (T. Russon, Interviewer)

Ilyas, I. F. (2016, September). *Qualitative data cleaning*. Retrieved from Research Gate: https://www.researchgate.net/publication/309620745_Qualitative_data_cleaning

Kothari, C. (2004). *Research Methodology Methods and Techniques.* India: New Age International Publishers.

Leblanc, R. (2019). Recycling and New Job Creation The Role of Recycling Businesses in Opening New Employment Opportunities. *The Balance Small Business*.

Linnenkoper, K. (2019, August 12). *Latest recycling stats for South Africa*. Retrieved from Recycling International: https://recyclinginternational.com/business/latest-recycling-stats-for-south-africa/27327/

MacKenzie Corporation. (2014, March 27). *Clearly Define Your Research Strategy*. Retrieved from Clearly Define Your Research Strategy: https://www.mackenziecorp.com/phase-2-clearly-define-research-strategy/

Makhosazane Baker, S. M. (2016). *Empowerment of Waste Pickers in the City of Johannesburg, creating an enabling environment for the informal waste sector to participate in municipal waste service delivery.* Institute of Waste Management of Southern Africa.

Maluleke, R. (2002 - 2016). *GHS Series Volume IX Environment, in-depth analysis of the General Household Survey 2002–2016.* STATISTICS SOUTH AFRICA.

Mandevere, B. (2016). *AN INVESTIGATION INTO THE EFFECTIVENESS OF HOUSEHOLD SOLID WASTE MANAGEMENT STRATEGIES IN HARARE, ZIMBABWE.* Johannesburg: UNIVERSITY OF SOUTH AFRICA.

Manuel, Z. (2020, March 19). Miss. (T. Russon, Interviewer)

Mohajan, H. K. (2018). *Qualitative Research Methodology in Social Sciences and Related Subjects.* Chittagong, Bangladesh: Premier University, Chittagong, Bangladesh.

Muswema*AP, O. A. (2018). *Cooperatives in Waste and Recycling: A Recipe for Failed Waste Hierarchy Implementation?* KwaZulu Natal: School of Life Sciences, University of KwaZulu-Natal (UKZN).

National Recycling Forum. (, 2016). *HOW TO: Start a Recycling Collection Business.* Retrieved from National Recycling Forum: http://www.recycling.co.za/downloads/How-to-start-a-collection-business.pdf

Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches.* Harlow: Pearson.

Ockleford, K. W. (2009). *An Introduction to Qualitative Research.* Yorkshire.

Oladebeye, J. a., (2010). *Assessment of Awareness, Attitude and Willingness of People to Participate in Household Solid Waste Recycling Programme in Ado-Ekiti, Nigeria.* Nigeria: Mechanical Engineering Department, School of Engineering, The Federal Polytechnic, Ado-Ekiti, Nigeria.

Pikitup . (2019, September). *2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf 1 / 70* . Retrieved from 2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf 1 / 70 : http://www.pikitup.co.za/wp-content/uploads/2019/09/2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf

Pikitup . (, 2019). *Separation@Source programme*. Retrieved from http://www.pikitup.co.za/seperationsource/

Pikitup. (, 2013). *Tariff Refuse Removal Services.* Retrieved from Pikitup: http://www.pikitup.co.za/wp-content/uploads/2015/09/TARIFF_REFUSE_REMOVAL_SERVICES_2013-2014-1.pdf

Pikitup. (2015, November). *WASTE MANAGEMENT GUIDELINES FOR BUILDING PLAN SUBMISSION.* Retrieved from Pikitup: http://www.pikitup.co.za/wp-content/uploads/2015/11/Waste-Managment-Guidelines.pdf

Pikitup. (2019, September). *2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf 1 / 70* . Retrieved from 2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf 1 / 70 : http://www.pikitup.co.za/wp-content/uploads/2019/09/2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf

Pikitup. (, 2019). *Pikitup*. Retrieved from http://www.pikitup.co.za/about-pikitup/

Pikitup. (2019, September). *Pikitup.* Retrieved from Pikitup: http://www.pikitup.co.za/wp-content/uploads/2019/09/2019_20-Pikitup-SOC-Ltd-Business-Plan_Approved-by-BoD.pdf

Property 24. (2013, May 23). *Roles of a trustee in a body corporate*. Retrieved from Property 24: https://www.property24.com/articles/roles-of-a-trustee-in-a-body-corporate/17721

Qistina, J. (2016, September 4). Data Processing Cycle.

RecycledWasteZa. (2019). *RecycledWasteZa*. Retrieved from RecycledWasteZa: www.recycledwasteza.co.za

The Republic of South Africa. (, 2014). *National Environmental Management: Waste Amendment Act 26 of 2014.* Cape Town: Republic of South Africa.
Research, A. I. (2009). *An Introduction to Qualitative Research.* Leicester: Department of Health Sciences, University of Leicester.
Russon, T. (2019, November 6). Resident /Owner of Cedar Lofts. (T. Russon, Interviewer)
Schenck, C. J. (2019). *Exploring the Potential Health Risks Faced by Waste Pickers on Landfills in South Africa: A Socio-Ecological Perspective.* Johannesburg.
Sichiweza, E. (2017). *PARTICIPATION OF HOUSEHOLDS IN SOLID WASTE MANAGEMENT AND CIRCULAR ECONOMY TOWARDS SUSTAINABILITY: A CASE STUDY OF KABWE TOWN, CENTRAL PROVINCE OF ZAMBIA.* Zambia: UNIVERSITY OF TWENTE.
South African Waste Information Centre . (, 2019). *South African Waste Information Centre* . Retrieved from http://sawic.environment.gov.za/?menu=60
Springer Nature. (2020). *Nature.Com*. Retrieved from Nature.Com: https://www.nature.com/subjects/data-processing
Statistics South Africa . (2018). *NATIONAL WASTE INFORMATION BASELINE REPORT.* Department of Environmental Affairs .
Stats SA. (2018, September 5). *Only 10% of waste recycled in South Africa* . Retrieved from Stats SA: http://www.statssa.gov.za/?p=11527
Statistics South Africa . (2019, May 15). *Youth graduate unemployment rate increases in Q1: 2019*. Retrieved from Youth graduate unemployment rate increases in Q1: 2019: http://www.statssa.gov.za/?p=12121
Tavares, R. (2020, March 12). Construction Manager at VTC Africa Properties. (T. Russon, Interviewer)
The Solar Garden . (2019). *WASTE SEPARATION AT SOURCE*. Retrieved from http://www.thesolargarden.org/waste-separation-at-source/
The University of South Africa. (2014). *Research methodology.* Retrieved from UNISA: http://uir.unisa.ac.za/bitstream/handle/10500/1450/04chapter3.pdf
VTC Africa. (2019). *Earth Series*. Retrieved from VTC Africa: https://vtcafrica.co.za/earth-series/
Wen, H. Z.-G., & Zhang, W. (2014). *Residents' Household Solid Waste (HSW) Source Separation Activity: A Case Study of Suzhou, China.* China.
Western Cape Government Department of Environmental Affairs and Development Planning Directorate. (2019). *A Guide to Separation of Waste at Source.* Cape Town: Western Cape Government Department of Environmental Affairs and Development Planning Directorate.
Whyte, C. (2014, July 8). *Jobs in Recycling: From Global to Local and Back Again.* Retrieved from https://www.recycling.co.za/downloads/Gauteng%20RF%20seminar%20presentation%208%20July%202014.pdf
Windridge, B. H. (2009). *An Introduction to Qualitative Research.* (Leicester: The NIHR RDS for Yorkshire and the Humber.
Wyk, D. B. (2019). *Research design and methods Part I.* Cape Town: University of the Western Cape.
Xu Chu, I. F. (2016). *Qualitative Data Cleaning.* Retrieved from University of Waterloo: http://www.vldb.org/pvldb/vol9/p1605-chu.pdf
Yee, A. (2018, September 21). *In Sweden, Trash Heats Homes, Powers Buses and Fuels Taxi Fleets*. Retrieved from

https://www.nytimes.com/2018/09/21/climate/sweden-garbage-used-for-fuel.html

APPENDICES

Appendix 1.1: Separation at Source Materials



Figure 9: 240 Litre Wheelie Bin



Figure 10: Double Barrel Kitchen Recycling Bin



Figure 11: Drawer Kitchen Recycle Bin

RECYCLEDWASTEZA
Keep our environment clean

Figure 12: RecycledWasteZa Logo



Figure 13: Earth Series (VTC Africa, 2019)



Figure 14: Pikitup S@S Bags (Pikitup, 2019)



Figure 15: Reverse Vending Machine

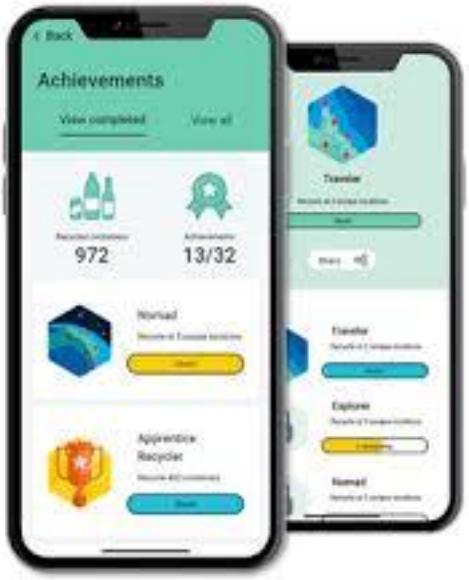


Figure 16: Reverse Vending Machine App

Appendix 1.2: Data collection instrument(s)

Number	Question
Section 1: Waste management methods in South Africa	
1	What are the existing waste management methods in South Africa?
2	Are these existing methods effective?
Section 2: Challenges Facing existing waste management methods	
3	What opportunities do you think exist in the waste management methods in South Africa
4	What challenges exist in current waste management methods?
5	How can these challenges be addressed?
Section 3: Proposed Interventions	
6	What interventions do you propose to curb the waste to landfill issue?
Section 4: Existing Government Policies and frameworks	
7	What are the gaps in the existing government policies?
8	What proposed changes would you include in the existing policies?
Section 5: Household separation at source	
9	Are you aware of what household separation at source is?
10	Do you think waste separation at source is a good initiative?
11	Do you think households would be interested in participating in this initiative?
12	Do you think households need to be incentivised to take part in this initiative?
Section 6: Participation of sectional titles	
13	Have local municipalities engaged with you in terms of driving household recycling or separation at source?
14	How have you responded to the government's efforts to implement separation at source?
15	Do you believe that sectional titles can play a more prominent role in efforts to drive household separation at source, and how?
16	In your opinion, what do you think would be the best solution to drive household separation at source?

18	Do you think home buyers would be more inclined to buy into an estate that practises separation at source initiatives?
19	Do you think households would have greater participation levels if separating waste as part of the complex rules?
20	Do you think households would participate if the incentive to recycle reduced their levies or rates?
21	Do you think sectional titles can be used as a lever to drive household separation at source?
22	Should property developers design sectional titles that have recycling and separation at source facilities?

Appendix 1.3: Biography of the researcher

Tshidi Michelle Russon

Roles and Responsibilities

Tshidi Russon is a Channel Manager for CVMx strategy & enablement at FNB, a division of First Rand. Tshidi's role encompasses data-driven digital campaign, composing and executing FNB's platform strategy, and using artificial intelligence and robotics to drive the data-driven customer approaches.

Background

Tshidi started her career in banking when she joined the Nedbank graduate programme in 2013. Her career quickly progressed, as she was appointed as a CVM Initiatives Manager after completing the graduate programme. Tshidi remained with Nedbank for over three years before moving onto join Standard bank as a Product Manager and later joining FNB as a Senior Product Manager.

Education

1. Bcom. Management at the University of South Africa
2. PDBA with Wits Business School
3. Candidate MBA with Wits Business School

Interest in this topic

I have always been interested in the waste pickers I often saw pulling large trolleys of wasting and frequently asked myself what they were doing, until in 2017 when I listened to a radio conversation about recycling. I immediately thought this was a great topic that could increase job opportunities and positively impact the environment by reducing waste to landfill. I began researching well before registering for the MBA. Part of the reason for taking up this programme is to have the opportunity to properly focus on this research topic.

Appendix 1.4: Ethics documentation

An Evaluation of Sustainable Waste Management Practices in Selected Households in Johannesburg: The Source Separation Outlook

Dear Participant,

I invite you to participate in a research study entitled: An Evaluation of Sustainable Waste Management Practices in Selected Households in Johannesburg: The Source Separation Outlook. I am currently enrolled in the MBA at Wits Business School and am writing my master's thesis.

The purpose of the research is to determine: This research aims to examine the separation of waste at source "households", focusing on sectional titles. The objectives are to determine whether waste separation implemented at sectional titles will minimise the effects of waste to landfills.

The questionnaire has been designed to collect information on the potential of sectional titles in implementing waste separation as part of their estate offerings and to make it a lifestyle for the residents that have bought into those estates.

Your participation in this research project is entirely voluntary. You may decline altogether or choose not to respond to any questions you don't wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your answers to this questionnaire.

If you agree to participate in this project, please provide your response over written communication, including email. I will schedule an appropriate time for an interview convenient for you. The interview should take approximately 1 hour to complete.

If you have any questions about this project, please contact me on tshidi.russon862@gmail.com or my Supervisor on 1565694@studebts.wits.ac.za.

Thank you for your assistance in this vital endeavour.

Sincerely yours,

Tshidi Russon

Appendix 1.5: Ethics Clarence Certificate

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

SCHOOL OF GRADUATE SCHOOL OF BUSINESS ADMINISTRATION ETHICS COMMITTEE
CONSTITUTED UNDER THE UNIVERSITY HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: WBS/BA1845285/806**
PROJECT TITLE	An evaluation of sustainable waste management practices in selected households in Johannesburg: The source separation outlook
INVESTIGATOR	Ms Tshidi Russon
SCHOOL/DEPARTMENT OF INVESTIGATOR	MBA (Research Article)
DATE CONSIDERED	11 February 2020
DECISION OF THE COMMITTEE	Approved unconditionally
RISK LEVEL	MINIMAL RISK
EXPIRY DATE	28 FEBRUARY 2021

ISSUE DATE OF CERTIFICATE 18 March 2020 **CHAIRPERSON** _____
(Dr MDJ Matshabaphala)

cc: Supervisor: Dr Oluwaseun Ajayi

DECLARATION OF INVESTIGATOR

To be completed in duplicate and **ONE COPY** returned to the Chairperson of the School/Department ethics committee.

I fully understand the conditions under which I am are authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee.

_____ _____/_____/_____
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES