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# From informality to formality: Perspectives on the challenges of integrating solid waste management into the urban development and planning policy in Johannesburg, South Africa



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## ABSTRACT

Informal waste recycling has become an important activity in the urban South Africa. In the city of Johannesburg for example, informal waste pickers have now become part of the waste management landscape and are involved in municipal waste collection, sorting and recycling of economically viable recyclable materials such as paper, Polyethylene Terephthalate (PET) and ferrous metals. Using empirical data collected through the tradition of participatory research, the findings suggest that waste pickers play a vital role in municipal solid waste management and make a significant contribution to the city's economic growth as well as environmental wellness. Despite their contribution, the findings also suggest that, the institutional and policy framework in Johannesburg has continued to not positively integrate the informal sector into the formal systems of solid waste. It is therefore, suggested in the paper that for the city of Johannesburg to effectively and efficiently manage solid waste, it is important that the city managers look for avenues through which they can integrate the two systems of solid waste practices prevalent in the city. The perspective has been analysed within the broader sustainability discourse.

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## 1. Introduction

Informal solid waste recycling is a survival strategy for the low-income urban residents who have found themselves vulnerable and squeezed on the side-lines due in part, to the process of rapid urbanisation and accompanied by serious economic stagnations being faced by many countries of the developing south (Simelane & Mohee, 2015; Chimuka & Ogola, 2015; Oguntoyinbo, 2012; Troschinertz and Mihelcic, 2009). Unable to cope with the pressure of a capitalist system that is based on individualism and that of

higher market demand and competitiveness, most of the urban poor residents in the developing world have resolved to operate informally in the sector of waste management and recycling for their survival. The South African Institute of Race Relations [SAIRR] (2013), and supported by the World Bank (2013), for example, makes reference to the higher demographic pressure observed in the cities of the developing world which have created a situation where urban authorities are unable to adequately provide services and need the aspirations of their residents in terms of delivering socio-economic amenities and facilities. The disadvantaged and marginalised groups of people now increasingly have to adapt to the pressure of the capitalist system. One of these strategies is resort to other forms of livelihood for survival, among which include informal solid waste management and recycling (Sentime, 2014; Simatele & Etambakonga, 2015).

The South African population has, over the last few years, experienced unprecedented growth which has had an impact on the country's urbanisation, waste production and management (see Department of Environmental Affairs, 2016). A survey by World Bank for example, revealed that about two-thirds of the population in South Africa resides in urban areas (South African Institute of Race Relations, 2013). In 1990, for example, an estimated 52% of

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people lived in urban areas and this increased to 62% in 2011 (South African Institute of Race Relations, 2013). This increase in the urban population, as observed by Samson (2010) has overwhelmed the capacity of city authorities to provide adequate and equitable waste management services (See also Ezeah, Fazakerley, & Roberts, 2013; Sentime, 2011; Simatele & Etambakonga, 2015). In many cities the rapid population growth has overwhelmed the capacity of municipal authorities to provide even basic services. Urbanisation directly contributes to waste generation, and unscientific waste handling causes health hazards and urban environment degradation. In many cities the rapid population growth has overwhelmed the capacity of municipal authorities to provide even basic services. Urbanisation directly contributes to waste generation, and unscientific waste handling causes health hazards and urban environment degradation.

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The deterioration in the solid waste infrastructure coupled with stagnations in the urban economy has further worsened the ability of urban managers to effectively manage solid waste (Katsiimeh, Burger, & Mol, 2013; Afon, 2012; Kubanza & Simatele, 2015). Karani and Jewasikiewitz (2007) and supported by Muzenda, Ntuli, and Pilusa (2012), for example, observe that although South African cities exhibit a good model for economic development and effective urban institutional framework, many of these cities are now struggling to provide effective systems for solid waste management. They are of the view that, “the increase in affluence [due to the increase in the African Middle class] has increased the amount of waste generated and has also led to more complex waste flows” (Muzenda et al., 2012, p. 151). In the context of this state of affairs, there is an urgent need to formulate and implement effective waste management strategies that will contribute to the development of an equitable municipal solid waste management system and strategy for urban South Africa (see Dlamini & Simatele, 2016).

In order to attain an operative and sustainable municipal solid waste management system, there is need to rethink the current model of municipal solid waste management in sub-Saharan African countries. The contemporary model has tended to ignore the activities of the informal actors despite the contribution they make to solid waste management within cities (Jerie & Tevera, 2014). In addition to this, informal waste management and recycling acts as a livelihood strategy to a considerable number of urban household (Sentime, 2011, 2014;; Samson, 2008). Sentime (2011) for example, is of the view that as many as 48% of the poor urban dwellers in the city of Johannesburg are now actively engaged in informal waste management and recycling and depend on this sector for their livelihoods and incomes.

Although many studies in municipal solid waste management and recycling have focussed on the challenges of waste management, little or no significant attention has been paid to understanding how informal waste pickers can potentially be integrated and incorporated into formal structures within municipal solid waste management. A study by Dlamini and Simatele (2016) revealed that local municipal authorities in the city of Johannesburg were sceptical about incorporating informal solid waste actors into formal systems. This is because they believed that there are number of unique socio-economic and political circumstances that may complicate the integration of the informal sector into contemporary and established systems of waste management (Dlamini and Simatele 2016). Such perceptions have thus; restricted and limited discussions on the contributions of waste pickers to boardroom conversations and no concerted efforts have

been made to mainstream these activities into official waste management strategies (Dlamini & Simatele, 2016). The lack of policy integration and ultimate neglect of this important sector in urban waste management has resulted in compromising the financial wellness and working conditions of the waste pickers.

In view of the above observations, this paper engaged with contemporary processes and mechanisms that account for the continued exclusion, marginalisation and non-integration of informal systems of solid waste management into formal structures in Johannesburg, South Africa. It is argued in the paper that in a bid to search for alternative, sustainable and more effective systems of waste management, it is important that urban managers in Johannesburg identify local solutions that match local needs and possibilities. One such novel idea is identifying avenues through which those that are engaged in recycling from the informal sector are supported and integrated into formal systems.

## 2. Contextualising municipal solid waste management in Sub-Saharan African cities

Many cities in Sub-Saharan African countries experience high rates of population growth due to increased processes of migration, urbanisation, industrialisation and modernisation (Nzeadible, 2009; Masocha, 2006; Kofoworola, 2007; Simelane & Mohee, 2015). The above processes have not only contributed in the increased numbers of urban residents, but also increased the generation of solid waste. These changes have unfortunately taken place in a context of rapid economic stagnation and deterioration coupled with weak institutional and policy frameworks. The lack of financial resources, as observed by Liyala (2011) and Simatele and Etambakonga (2015) have not only made it difficult for local authorities to effectively manage solid waste, but have prevented people from solving urban based problems and challenges. Kubanza and Simatele (2015) for example, are of the view that the available resources have to a large extent contributed to the deteriorations in the maintenance of roads, sewerage and water systems, infrastructure for waste management, all which are important elements in solid waste management.

As African cities continue to grow, Scheinberg (2012) and supported by Okot-Okumu (2015) argue that due to the declining economic situation of many of the African cities, the supply of basic infrastructure is dramatically deteriorating. The breakdown in the provision of public transport services and road maintenance for example, has negatively impacted refuse collection and recycling (Dlamini & Simatele, 2016). Increased deterioration in the national and local economies has resulted in increased informalisation of employment and settlement patterns, a combination that has led to the horizontal growth of urban areas (Henry, Yongsheng, & Jun, 2006; Mbuligwe & Kassenga, 2004). This contemporary growth pattern in most African cities has tended to spread and stretch existing services, facilities and infrastructure even more thinly (Samson, 2010; Simelane & Mohee, 2015). Tukahirwa and Lukooya (2015) are of the view that adequate socio-economic facilities and amenities in African cities which are essential to improving the lives of the poor and raising urban productivity are now extremely inadequate and deteriorating making it difficult for local authorities to manage urban processes.

The deleterious economy is having pronounced effects on all sub-sectors of the urban economy, particularly on the urban poor. Gumbo and Simelane (2015) observe that in most African cities, provision for the regular collection and disposal of household refuse is highly inadequate, especially in poor neighbourhoods. Within these cities, waste is dumped on open spaces and is hardly collected (Simelane & Mohee, 2015). In 2014 for example, only 15 per cent of solid waste was collected in Lusaka, 17 per cent in Dar es

Salaam and 13 per cent in Kinshasa due to poor infrastructure and a lack of refuse trucks (Simatele & Etambakonga, 2015; Simelane & Mohee, 2015). As a result of the afore-mentioned, low income areas in sub-Saharan African cities, not serviced by accessible roads, have tended to wallow in stinking waste, since municipal vehicles cannot access these areas (El-Khattam, Hussein, & Abdel-Rahman, 2011; Cheru, 2002).

A review of existing literature reveals that developed cities in developed countries have formulated specific procedures for the management and disposal of solid waste in a more socially and environmentally accepted way and this has in a way ensured that the bills associated to waste are managed and controlled effectively (see Jerie & Tevera, 2014). This has been achieved, for example, through the formulation of legislation, regulations and action plans that are tailored towards addressing issues related to waste management. On the contrary, many cities in Africa, lack the appropriate infrastructure and systems for effective waste treatment and disposal and in most cases best practices of waste management are non-existent (Adegbola & Oladeji, 2012; Sentime, 2014; Simatele & Etambakonga, 2015). For instance, the City of Masvingo in Zimbabwe dumps 60 per cent of its solid waste, while the City of Lagos in Nigeria dumps 84 per cent of solid waste generated on any available space on the city's periphery (Simelane & Mohee, 2015; Mangizvo, 2008). Furthermore, countries such as Nigeria receives up to 2400 metric tonnes of waste each day and dumps it at Olisosun landfill, an area that is not officially gazetted as a landfill (Adegbola & Oladeji, 2012; Kofoworola, 2007).

As pointed out above many countries in sub-Saharan African countries lack appropriate policies and legislation that would support investments in waste management and recycling (Simelane & Mohee, 2015). In instances where these policies and legislative instruments exist, their application has proven to be inconsistent (Sentime, 2014). In the eThekweni municipality in South Africa for example, while appropriate technology for waste management has been adopted in order to reduce waste management costs, the technology is electricity intensive and costly to run. This situation as observed by Chimuka and Ogola (2015) has created a scenario in which the local municipality is increasingly turning to donors for financial help in order to continue operating and running the technology. Thus, the lack of comprehensive policies which are well aligned has resulted in the fragmentation of strategies which, if properly developed would contribute towards reducing associated costs and bring out effective and sustainable resource management and socio-economic service delivery (Chimuka & Ogola, 2015; Sentime, 2014; Simelane & Mohee, 2015).

In view of the above observations, it can be argued that the lack of comprehensive policies and technical 'know-how' have in part contributed to failure in devising the appropriate strategies, approaches and technologies that would have resulted in effective municipal solid waste management in sub-Saharan Africa (Mudhoo, Mohee, & Simelane, 2015). Muniafu and Otiato (2010), observe that the combination of the factors have and continue to compromise the ability of the local authorities to effectively manage urban change and processes.

Despite the strides that the city of Johannesburg has made in its municipal solid waste management, challenges on how to integrate a burgeoning number of informal waste actors remain unaddressed. Part of the reason for this state of affairs is a lack of knowledge on how to align and integrate formality and informality into urban development and planning policy. Chimuka and Ogola (2015) for example, are of the view that in many cases, the lack of skilled labour and skills, as well as apathy at managerial level, corruption and mismanagement of municipal resources have combined against the creation of a sustainable approach to urban solid waste management (see Samson, 2008).

Simatele and Etambakonga (2015) and Samson (2008), argue that to understand and appreciate the current challenges faced by urban authorities in sub-Saharan Africa in waste management, it is critical to examine the entire urban solid waste management system. They argue that the persistent implementation of colonial and out-dated urban development and planning policies by city authorities have limited the scope in which to imagine the future of African cities as well as the scope in which the talents of all urban dwellers can be captured (Sentime, 2014; Simatele & Etambakonga, 2015). Furthermore, poor urban governance, marred with corruption, bureaucratic harassment of the poor and a lack of checks and balances have not only ignored the actions of the poor but has harmed the growth and everyday lives of the poor (Sentime, 2014; Binns, Dixon, & Nel, 2012; Simatele & Etambakonga, 2015).

Simelane and Mohee (2015), and supported by Oguntoyinbo (2012) and Masocha (2006) argue that the development of effective municipal solid waste management systems in sub-Saharan African cities, will depend on looking for African urban management strategies and this will ultimately depend on the theoretical sharpness and practical abilities of both state and local authorities to adapt formal institutions to new and changing urban realities.

### 3. Research approach

This paper is informed by data collected in the city of Johannesburg during the months of September to November 2015. Participatory methods of data collection were employed in order to have a clear understanding of the challenges that are faced both by the waste pickers and urban solid waste managers. A total number of Seventy-three (73) waste pickers were selected using a systematic sampling method and drawn from three purposely selected locations. These areas included three (3) buy-back centres namely; Maningi scrap metals, Far-point recycling and Remade recycling. A purposive sampling method using a systematic interval of five (5) was employed to identify and select the waste pickers for inclusion in the study. The first waste picker was purposively selected and then the interval of five (5) was applied to identify the subsequent research participants.

In addition to discussions with waste pickers, three (3) senior officials and nine (9) general workers from the three (3) buy-back centres were identified and included in the study using a snowball technique. Furthermore, interviews through discussions and personal interviews with ten (10) key informants drawn from the Environmental and Infrastructure Services Department, the Department of Agriculture and Rural Development (Waste Management), Pikitup, Geza Jozi and Bathopele co-operative were conducted.

The key data collection tools were semi-structured interviews, informal conversations and discussions, as well as participant observations. The research questions sort to collect data on the challenges faced by the waste pickers and city officials, the contribution of waste pickers to waste management and the challenges that are usually encountered in integrating formal and informal systems of municipal solid waste management. These questions provided the basis on which to assess the role played by waste pickers as well as argue for development and adoption of an effective and integrative model for sustainable municipal waste management in the city of Johannesburg.

### 4. Results and discussions

Research findings suggest that waste pickers contribute significantly into municipal solid waste management and recycling in Johannesburg. Collected and recycled solid waste materials range from paper to carton boxes as well as scrap metals. Discussions

**Table 1**  
Averages of solid waste collected per week in the three research sites.

Recycling Plant	Type of solid waste and estimated amounts in KGs							
	Glass/bottles	%	Plastics/bottles	%	Paper/boxes	%	Scrap metals	%
Far-point recycling	200	47	120	47	80	46	25	21
Remade recycling	230	53	134	53	93	54	18	15
Maningi recycling	–	–	–	–	–	–	78	64
Total	430	100	254	100	173	100	121	100

Source: Field based materials, 2016.

with waste pickers as well as key informants from waste recycling plants revealed that although the motive behind collecting waste was purely economically driven, a significant amount of recyclable materials were usually collected and recycled (see Fig. 1).

Table 1 and Fig. 2 for example, shows the different types of recycled solid waste, including the estimated average amounts that each waste picker collects in a working week.<sup>4</sup> It is suggested that informal solid waste pickers contribute significantly to the collection of waste in the city of Johannesburg. An estimated 53% of recyclable glass or glass bottles and 64% of scrap metals received at Maningi recycling plants respectively are a result of the activities of the informal waste pickers.

It is important to note that these contributions must be understood within the context of frequent instabilities in the formal systems of waste management in Johannesburg. A discussion with one of the waste pickers who sells his waste to Far Point Recycling Plant for example stated:

*“It works very well for me when pickitup workers go on strike. If they are on strike, it means that all the waste is not collected and I can take my time and collect as much I want. When Pickitup workers are working, it becomes a race against time and they always beat us as they have vehicles that they use to collect waste. We walk and it is difficult to get there before they do. So it's always good for us when they are striking”* (Pers.com, 2015a).

Further discussions with officials at the three recycling plants revealed that a significant amount of recyclable waste is usually delivered by informal solid waste pickers who normally trade it at a fee. An official from Far-point Recycling Plant for example, stated:

*“A lot of the waste that you are seeing here was brought in by waste pickers. We usually buy these from them and we also sale it to the manufacturing industry who then transform it into reusable materials”* (Pers.com, 2015b).

In view of this observation, it was important to identify demographic features of the waste pickers and these are illustrated in Table 2.

Table 2 suggests that 95% of the solid waste pickers were men, while only 5% were women. What is interesting with the information in Table 2 is the high representation (60%) of the age group between 26 and 35 years. This state of affairs is indicative of the fact that informal waste collection and recycling is predominately characterised by the youth and is a reflection of the current high unemployment rate (25%) that the country is facing (SSA, 2015). The most affected by this development are the youth who increasingly are not being absorbed in the formal sector. Thus, the

lack of formal employment opportunities in the context of rapid urbanisation has resulted in compelling the youth to search for alternative employment avenues in order to obtain their livelihoods and incomes necessary for the procurement of other services and amenities.

According to Statistics South African (2015), it is argued that urban population growth in South Africa is estimated at 2.4% and if not addressed will result in 71% of the urban population living in urban areas by 2030, and 80% by 2050 respectively. An official from the local government in the City of Johannesburg stated during interviews that:

*“The current rapid urbanisation in the city of Johannesburg has in a way led to economic, social and physical problems and this definitely requires and will continue to require the attention of both legislators and policy makers. If we leave it to spiral out of control, it will have devastating impacts on the urban areas”* (Pers.com, 2015c).

It is important to note that rapid urbanisation in the city of Johannesburg is occurring as a result of the rural and urban divide in resource allocation and coupled with increasing economic stagnation and low productivity in rural areas (Samson, 2008; Sentime, 2014). The growth in urban population, as pointed out by a city official has brought with it a number of challenges among which include; high levels of unemployment, increased demand for housing and this has resulted in increased deteriorations in the urban infrastructure and service delivery capacity, overcrowding and acute environmental degradation.

Furthermore, Simatele and Etambakonga (2015) and Ezeah et al. (2013), for example, observe that in most sub-Saharan African countries, urban explosion has tended to co-exist with an economic base that is inadequate to cater for job provisions or provision of urban services to the population. In view of this observation, it was important to identify factors that have contributed to influencing the waste pickers' involvement in solid waste collection and recycling. These views are reflected in Table 3.

A careful scrutiny and examination of the information in Table 3 and Fig. 3 reveal that the key reason for involvement in solid waste management by the waste pickers is mainly economic and financial gains. An estimated 68% of the responses for example, suggested the need for employment and income generation as the basis for engaging in solid waste management and recycling. An additional 17% argued that solid waste recycling affords them an opportunity to be recognised and respected in their respective communities. These findings are consistent with the findings from other studies which have suggested that the increases in urban poverty and unemployment have combined in triggering the heavy reliance of many urban poor households on the informal sector, one of which is solid waste recycling (Sentime, 2014; Simatele & Etambakonga, 2015; Simelane & Mohee, 2015) (see Fig. 4).

From the information collected in the three research locations as well as discussions with officials from solid waste recycling plants,

<sup>4</sup> A working week refers to the number of days that each waste picker engages in solid waste collection. There is no definite number of days as some will work seven (7) days a week while others will for four (4) days.

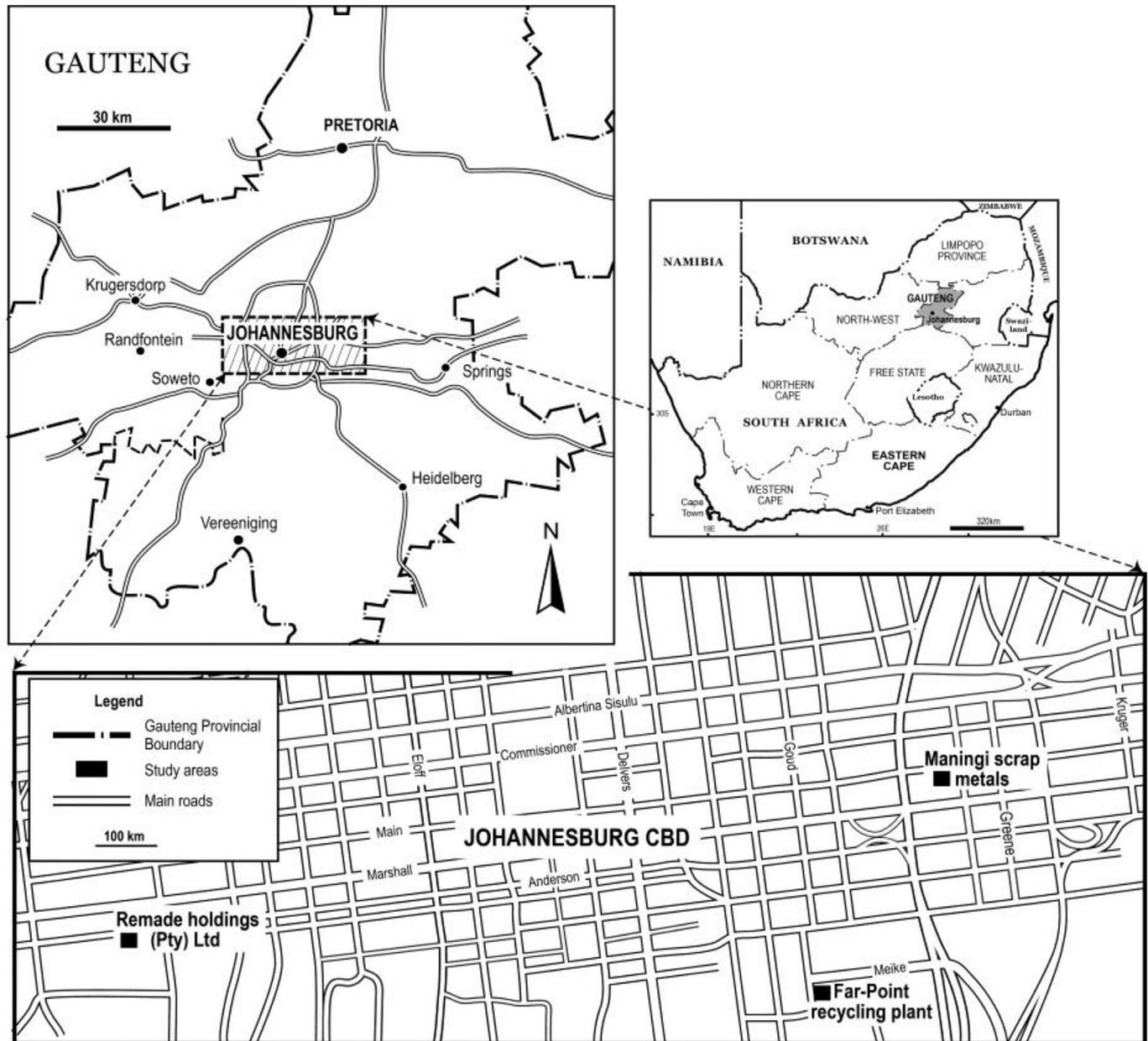


Fig. 1. Geographical location of the study sites.  
Source: Drawn by the Cartographic Unit, University of Wits, (2016).

it is evident that in as much as solid waste collection contributes significantly to the livelihoods of waste pickers, it also contributes extensively to municipal solid waste management in the form of collecting, sorting, trading and processing. Secondly, waste pickers not only support themselves and their families through their work, but make crucial contributions to waste minimization and management, keeping the city clean and ensuring environmental protection. Evidence from other leading municipalities in the developing world particularly those in Asia and Latin America; have demonstrated that the most effective municipal solid waste management systems are those that have tended to incorporate informal systems and strategies of waste management created by waste pickers (Medina, 2000). (see Fig. 5)

The above argument is supported by an official from the Remade recycling plant who argued that waste pickers have developed sophisticated solid waste management systems which can

contribute significantly to contemporary solid waste management strategies if harnessed and aligned properly with formal approaches. He further observed that:

*“Waste pickers usually do the bulk of the work in the recycling process because by the time the waste reaches us; it has already been processed and sorted as well as grouped in different waste categories. All we do at this plant is to sell it to the manufactures. For us, the activities of the waste pickers in processing the waste, is a huge cost saving measure”* (Pers.com, 2015d).

Another discussion with an official from the City of Johannesburg revealed that solid waste pickers have become important players in waste management. He argued that in the context of increased and prolonged episodes of strikes by workers from formal organisations and institutions (e.g. Pickitup) mandated to



Fig. 2. A waste picker pulling a trolley. Photo by Danny Simatele, 2015.



Fig. 4. Recyclable bottles sorted at point of collection. Photo by Danny Simatele, 2015.

Table 2 Demographic characteristics of research participants.

Gender	Category	No. Respondents	%
Male		69	95
Female		4	5
Age range	15–25	13	18
	26–35	44	60
	36–45	11	15
	46–55	4	6
	56–65	1	1
Total			100

Source: Field based materials, 2015.



Fig. 5. Solid waste pickers in the city of Johannesburg. Picture by Smangele Dlamini, 2015.

Table 3 Research participants reasons for participating in solid collection and recycling.

Reasons	Frequency in citation <sup>a</sup>	No. Citation	%
Self-employment		35	40
Source of livelihood		24	28
Respected in the community		15	17
Raise money for school		10	12
Other		3	3
Total		87	100

<sup>a</sup> Frequency of citation refers to the number of times an item was mentioned or referred to during interviews.

Source: Field-based materials, 2015.

manage waste, the informal waste pickers have demonstrated an ability to be flexible in dealing with waste management challenges. He stated:

*“The activities of the informal waste pickers in Johannesburg are organically grown and as such these activities are highly adaptable and flexible and as a result they are very responsive to the waste challenges that the city faces. We can actually argue that the activities of the waste pickers in Johannesburg do not exist in a vacuum but are highly demand driven”* (Pers.com, 2015e).



Fig. 3. Reasons for Involvement of waste pickers in waste collection and recycling. Source: Based on Table 3.

A senior official from Maningi Scrap Metals pointed out that, *“Informal waste pickers and recyclers are constantly active in devising adaptive strategies to facilitate their access to waste and circumvent challenges that may impede them from obtaining the waste. They are actively involved in developing and integrating new approaches and systems as they emerge”* (Pers.com, 2015f).

From this observation, it can be argued that solid waste pickers are actively engaged and involved in adapting their methods to ensure that their income and livelihoods are not impacted negatively. What is interesting from the observations made above is that as much as the activities of the waste pickers provide an income, they also serve in recovering municipal solid waste and protecting the natural resources and the environment (see Simatele & Etambakonga, 2015; Sentime, 2011). Further informal discussions with local government authorities from the City of Johannesburg revealed that the informal waste pickers account for an estimated 80% recovery rate of recyclable waste because the ability to recycle

is intrinsically linked to their incomes and livelihoods.

Despite the contribution of the informal sector in municipal solid waste management and recycling, they are faced with extremely hazardous working and living conditions. Table 4 for example, shows some of the challenges that waste pickers face in the city of Johannesburg. It is suggested in the table that two major challenges faced by waste pickers in Johannesburg include: harassment at different scales of society and the lack of physical infrastructure, represented at 37% and 29% respectively. Many waste pickers pointed out that harassment at the point of waste collection and during the transportation stages are very prevalent as residents always consider them as actors who remove waste from the bins and scatter it indiscriminately.

As a result of this perception, residents are always of the view that waste pickers are more of a nuisance and must be stopped from collecting waste. Furthermore, waste pickers were of the view that the lack of infrastructure such as secure road networks was a serious challenge as they have to use the same roads with motorists and this usually results in a number of waste pickers being involved in fatal accidents.

A further 22% of the responses identified ill health as a major concern that they faced and is connected to the lack of appropriate equipment and attire necessary for ensuring the waste pickers safety and protection from hazardous waste. Waste pickers operate without any personal protective equipment and hence handle waste directly, thereby getting exposed to health risks. They argued that the lack of appropriate safety clothing subjected them to hazardous waste and often resulted in ill health. The combination of different challenges, it was argued compromised their ability to effectively engage in solid waste management and recycling.

Despite the number of challenges faced by the waste pickers, empirical evidence suggests that they play a very significant role in municipal solid waste management. Their influence, as pointed out above is generally felt through their contribution in waste collection, recovery and recycling as well as merchandising the collected waste (Medina, 1997; Muzenda et al., 2012; Samson, 2008; Sentime, 2014). It must also be noted that while the activities of the informal sector contribute to environmental protection, they can also have negative impacts. Simatele and Etambakonga (2015), Gunsilius, (2010) and Oteng-Ababio, Melara Arguello and Cabbay, (2013) for example, observe that there is usually a high likelihood that waste pickers can contribute to scattering waste that might eventually contribute to soil and water pollution or even the environment. Furthermore, Kubanza and Simatele (2015) observe that in most cases, informal waste pickers tend not to have knowledge of environmental standards as they are only interested in merchandising the waste and not on environmental protection and can potentially contribute to pollution.

In view of the above observations, there is an urgent need to re-imagine myriad and different avenues through which informal solid waste management can be integrated into main stream systems of waste management in Johannesburg. Sentime (2014) and buttressed by Samson (2008) for example, are of the view that historically, the initial focus of municipal solid waste management [in South Africa] was on the 'basic waste management' which

included collection, transportation, storage and disposal. In 2011, however, the city of Johannesburg developed an integrated waste management strategy. The strategy promotes waste management through the adoption of the waste hierarchy principles, which includes: waste avoidance, minimization, reuse and recycle, treatment and disposal (Sentime, 2014). Although there is this policy development, informal waste management and recycling, has continued being viewed as an illegal activity and is not acknowledged by municipal authorities and not supported in the urban development and planning policy. In view of this state of affairs, there is now a need to search for alternative methods that can facilitate a process of aligning informality with formality in order to ripe the benefits of recycling the majority of the waste that is generated in the city of Johannesburg for example.

Although the general consensus is that the informal sector should be integrated, the question of how this can be done remains unanswered? There are also questions around the model of social inclusion of waste pickers that would be most appropriate for South Africa, given the country's policies that tend to focus more on promoting economic progress at the expense of environmental wellness and community sustainability. Despite these observations and arguments, there is evidence suggesting that waste pickers play a significant role in solid waste management and a framework within which their activities should be supported must be established. Table 5 illustrates an approach in which the integration of the informal solid waste management sector could potentially be imagined and aligned with the municipal solid waste management in South Africa.

The informal sector should be recognised but left largely to operate in its current form, with some level of increased control and monitoring (e.g. registration) and with increased support (e.g. access to recyclables through source separation programmes, and industry-provided buy-back centres to increase the tonnages collected. South Africa should support the integration of the informal sector through the establishment of co-operatives and small-medium enterprises. Such an agenda would not only contribute to an effective solid waste management and recycling system, but also to job creation as well as economic growth of the city (Chimuka & Ogola, 2015). Thus, it is important for local authorities to organise and train waste pickers on the potential negative and positive impacts of their endeavours the environment. This process will then facilitate the integration of the informal sector into municipal solid waste management system.

## 5. Towards a pro-waste picker agenda for Johannesburg

In order to realise, cultivate and capture the full contribution and potential of the informal sector in municipal solid waste management and recycling in Johannesburg, it is important to place special focus and emphasis on the integration of these informal actors into the wider urban waste management programme and

**Table 4**

Challenges encountered by waste pickers in the study sites.

Challenges	Frequency in citations	No. Citation	%
Harassment & lack of recognition	IIII IIII IIII IIII IIII II	27	37
Lack of infrastructure	IIII IIII IIII IIII I	21	29
Health issues & injury	IIII IIII IIII I	16	22
Other	IIII III	9	12
Total		73	100

Source: Field-based materials, 2015.

**Table 5**

Integration of the informal sector into the municipal solid waste management and recycling in Johannesburg.

Model:	Integration
Driven by:	Local government or municipality
Regulation:	Regulate and control
Financial support:	Give support
Legal framework:	Develop norms and standards or guidelines
Institutional arrangement:	Establish structure or body for waste pickers
Recognition:	Recognised role
Where:	Source separation
Collection system:	Competing

Source: Field-based materials, 2015.

strategy (Simatele & Etambakonga, 2015). Based on the empirical data informing this study, it is evident that waste pickers in the city of Johannesburg and the sector in which they operate in, have demonstrated the ability to function as efficient partners of the local municipality and other stakeholders in waste management and recycling. They have demonstrated the ability to collect and recycle significantly large amounts of solid waste. It is thus, important that appropriate policy intervention entry points are identified in order to support the undertakings of the informal waste collectors and enable them to obtain secure livelihoods and contribute to the sustainable development of Johannesburg.

For this situation to occur there is need for improvements in urban governance systems. Improved governance will for example, result in the creation of self-confidence and trust amongst waste pickers, the government, Non-Governmental Organisations (NGOs) and the private sector. The development can potentially trigger and help facilitate the establishment of a forum through which common interests on solid waste and recycling can be expressed and strengthen collaboration among different actors. Through this increased interaction, there is a higher likelihood that cooperatives, associations, small enterprises and networks can be established and can be the main avenue where informal sector's activities can be supported and advocated for integration in the formal systems of waste management.

Secondly, improved governance, through the provision of solid waste infrastructure, equipment and protective clothing, can trigger a cultural transformation involving increased acceptance of the waste pickers' activities. It has been argued for example, that many informal waste pickers tend to come from very poor backgrounds with very low social status in the community. The provision of waste management infrastructure and associated factors would potentially result in the integration of waste pickers' activities in the broader urban policy. In Johannesburg, as is the case in other cities of the developing south, integration of informal sector activities tends to suffer from bureaucratic processes and subjected to public opinion (Simelane & Mohee, 2015). Solid waste pickers, for example, are always perceived by the public as vagabonds and criminals who are always a danger to society (Simatele & Etambakonga, 2015). There is an urgent need for improved governance to bring about a change in public perception in order to facilitate a situation where waste pickers will be perceived and understood within the context of the role that they play as environmental agents contributing to a common goal of environmental management and sustainable development (Samson, 2010). Improved governance is the key that will bring about the social recognition and acceptance, as well as integration of the informal waste sector into more formal systems of waste management.

Improved governance will also bring about the formulation or adoption of existing legislation and legal structures that will contribute effectively to the protection of the activities of the waste pickers. Improved legislation in this case will bring about the empowerment of waste pickers and will create a vibrant network and position the informal solid waste sector in a place where it can compete with other economic ventures within the city of Johannesburg. For this development to take place however, political will and transformation is a prerequisite. Sentime (2014) observes that political will is one of the major factors defining the level of integration of waste pickers. Simatele and Simatele (2014) are of the view that integration of any phenomena with formal urban development and planning systems is usually determined by the willingness and creativity of local decision makers (see Kubanza & Simatele, 2015).

Finally, it is important to consider the level of participation by Non-governmental Organisations (NGOs) and Community Based Organisations (CBOs). In most cases, the local government

recognises community organisations but this recognition is usually confined to political and policy statements. And as such many local authorities in African cities, Johannesburg included frequently fail to utilise different grass-root organisations in community mobilisation (Chimuka & Ogola, 2015). It is crucial for authorities to recognise that their role should be one of facilitating community initiatives in providing urban services and facilities (Ezeah et al. 2013; Scheinberg, 2012). In view of these observations, it is important for the city of Johannesburg to review the contemporary regulatory framework to ensure that government effectively interacts and builds effective, cooperative alliances with communities and other stakeholders. Local government authorities must also be in a position to provide training and funding to waste pickers in order to engage them in more meaningful waste collection and recycling activities.

## 6. Conclusion

It has been demonstrated in this paper that the informal waste sector play a significant position in municipal solid waste management in Johannesburg, particularly in waste collection and recycling. Despite this contribution, empirical evidence suggests that no significant progress has been made in addressing issues of how informal systems of solid waste management can be aligned and integrated with formal systems. Part of the reason for this state of affairs is rooted in the perception of the role of waste pickers as 'a nuisance' to the urban environment. For many local authorities, the activities of the waste pickers are usually considered as contributing to increase littering of solid waste which has the potential of triggering environmental degradation.

The findings of this study have however, shown that the informal solid waste sector in Johannesburg is not just for the urban poor but is intricately linked through casualization to formal firms with a circuitry that stretches nationally and even beyond in embedded hierarchies. Merchandising of the waste by waste pickers has facilitated a process that has linked the informal system to formal systems. To this end therefore, it is important that urban governance systems and structures in the city of Johannesburg become more flexible and local authorities must show keen interest in supporting and linking both horizontal and vertical exchanges of best practices in order to bring out effective and sustainable waste collection and recycling systems.

Given the interrelated nature of the informal solid waste sector to formal systems, local authorities must move away from narrowly focused sector perspectives towards more inclusive multidisciplinary approaches of waste management and recycling. This will require promoting and creating the much needed public-private partnerships and may result in increased investment in the development of solid waste management and recycling. Until a point where individuals and communities are empowered and their activities are integrated into urban development and planning policies, the contribution of the informal solid waste collection and recycling will remain neglected and unrecognised.

## Conflict of interests

There is no conflict of interests regarding the publication of this research paper.

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