

COOPERATIVES IN WASTE AND RECYCLING: A RECIPE FOR FAILED WASTE HIERARCHY IMPLEMENTATION?

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ABSTRACT

In post-apartheid South Africa, cooperatives appear to be the government's SMME model for driving job creation. Unfortunately, the mortality rates of cooperatives in all sectors is very high with a reported 12% survival rate of cooperatives in general and an 8.1% survival in the waste sector. This paper provides some preliminary findings from a 2016 CSIR study of waste and recycling cooperatives in KZN. The study is underpinned by the qualitative paradigm comprising interviews with SMMEs (including cooperatives) and stakeholder organisations (in both private and public sector) which support these SMMEs. The study finds that cooperatives (in contrast to other SMME models like Pty's, and close corporations) in the waste and recycling sector are typically slow adapters to technological innovation, and hence are likely to experience challenges in harnessing the opportunities that the fourth industrial revolution presents. The cooperatives are also under pressure because of reduced access to export markets. Overall, cooperatives in the waste recycling sector in KZN are underperforming compared to other forms of SMMEs which are having a positive impact on waste and recycling, and indeed on implementing the waste hierarchy.

KEYWORDS: Waste hierarchy, cooperatives, Job Creation, fourth industrial revolution, China Recyclables Ban.

1 INTRODUCTION

South Africa is losing potential resources to landfill due to poor implementation of separation at source initiatives. Conversely, South Africa is also exporting packaging recyclate (including paper and plastics) which is finding its way to processing facilities in China (News24, 2013). This includes recyclate which has the potential to drive local economic growth and stimulate job creation¹ in the country if processing capacity is created locally.

Globally, waste management literature acknowledges the positive impacts that SMMEs in general (and cooperatives in particular) can have on recycling (Smit and Watkins, 2012; Johnson, 2015; Taiwo, Venter and Oso, 2016). Besides job creation, and other economic benefits (recyclate to drive a circular economy), there is also a potential for climate change co-benefit, through the reduction of greenhouse gas emissions from primary production and from landfill sites, especially where garden waste or food waste is diverted (ECSIP Consortium, 2013; Marks and Hidden, 2017). Of the roughly² 59.35 million tonnes of general waste recorded in South Africa during a 2011 National baseline study, organics were estimated at approximately 3 023 600 tonnes. However, only 1 058 260 tonnes or 35% of these total organics were recycled. Paper was estimated to be 1 734 411 tonnes, of which 57% were diverted. Metals were estimated to be 3 121 203 tonnes (the highest percentage recovered at 80%), while 959 816 tonnes of glass were generated with only 32% diverted from landfill. Plastics and tyres (estimated at 1 308 637 and 246 631 tonnes of the waste generated respectively) were recorded to have the least diversion rates of 18% and 4% respectively (Department of Environmental Affairs, 2012).

This paper presents some preliminary findings from an ongoing study investigating the sustainability of SMMEs (including cooperatives) in KwaZulu-Natal (KZN). The study examines the contributions of these small businesses to the green economy, their ability to adapt to changing technology and their impacts on material flows both locally and globally. This is followed by a discussion on the role of SMME's and cooperatives in the waste hierarchy, and the circular and green economy.

Section two of the paper examines the role of cooperatives and SMMEs in the waste management sector. In section three, we explore the history of cooperatives in South Africa with a particular focus on their potential for job creation. Section four reviews the constraints to technology adoption by cooperatives in the waste sector. In section five, we present some preliminary findings from the ongoing study followed by some concluding statements.

¹ A 'local beneficiation' discourse that has been described by some economists as "poor industrial strategy".

² This figure is based on available data from a 2011 national study. See also a discussion regards on this in "Waste management reform and the green economy: When will they meet?" (von Blottnitz, 2016)

2 ROLE OF SMALL BUSINESS AND COOPERATIVES IN WASTE MANAGEMENT

The waste hierarchy³ is a prioritisation tool (i.e. avoid it, reuse it, reduce it, recycle it, try and recover energy from it, and if all of the above fails, then only dispose of it) for waste management and is the cornerstone for waste management legislation in South Africa (Van Ewijk and Stegemann, 2016; Godfrey and Oelofse, 2017; McNeill, Barraket and Elmes, 2017).

Small and medium-size enterprises (SMMEs) and cooperatives, in particular, can contribute towards bringing about the realisation of the waste hierarchy especially in separation at source programs (collection activities), initial processing (sorting and bailing), manufacturing and recycling activities (Maia et al., 2011). These distinct but sometimes related roles are better illustrated in the circular economy.

Figure 1 illustrates the concept of circularity (diversion of useful materials) showing material flows, recycling, and job creation, including the different actors who facilitate these roles (i.e. SMMEs and cooperatives, the public, private sector and informal collectors). Different resources including plastics, metals, glass, as well as the nutrients contained in food and green waste circulate in this process. The illustration also shows the different instances where jobs can potentially be created (see [Jobs 1 – Jobs 6](#)).

The additional arrows in blue show the return of recyclables (material flows) by SMMEs, cooperatives and waste pickers after separating recyclate rich waste streams from households and sometimes specifically meant for cooperatives or other SMMEs incorporated into municipal separation at source programs, or alternatively retrieved from landfill sites (City of Johannesburg, 2014). Additional players in this illustration are the buy-back centres and material recovery facilities (MRFs) with the additional potential for intensive job creation through sorting and bailing activities.

Packaging South Africa (2014 cited in Godfrey et al., 2016) reports that the majority (reportedly 80-90% by weight) of post-consumer paper and packaging waste (recyclate) is recovered by the informal sector. Informal waste pickers (operating at landfills, in suburbs or commercial areas) are characterised by high levels of poverty and low education levels (Tirado-Soto and Zamberlan, 2013; Viljoen, Blaauw and Schenck, 2016). These informal pickers form the basis of governments' drive to transition informal collectors into formal SMMEs especially using the cooperative model. Despite the intent of the government, some South African and overseas scholars (Simelane, 2016; Aparcana, 2017; Jang and Park, 2018) have indicated that some of these individuals have no desire to be formalized⁴. This trend to formalisation is also apparent with a number of South African municipalities which have deliberate programs to formalise informal collectors (Department of Environmental Affairs, 2013, 2016; Muswema and Oelofse, 2016). However, because of the extensive incubation that is required, these programs championed by municipalities inevitably result in disappointment for both the SMMEs and the municipal officials involved. Officials complain of excessive 'hand-holding' after the cooperatives have been formed, and sometimes even provided with an area to work within. Cooperatives and informal waste pickers complain of unhelpful municipal officials and empty promises (Godfrey et al., 2017).

³ The waste hierarchy has origins in Lansink's Ladder, initially conceptualised in the Netherlands by Ad Lansink (1979) as a response to the challenge of limited landfill space for that nation, and thus has at its heart the diversion of useful materials away from landfill sites.

⁴ Formalisation was reported to result in loss of work flexibility and autonomy, especially with regards to the informal sector.

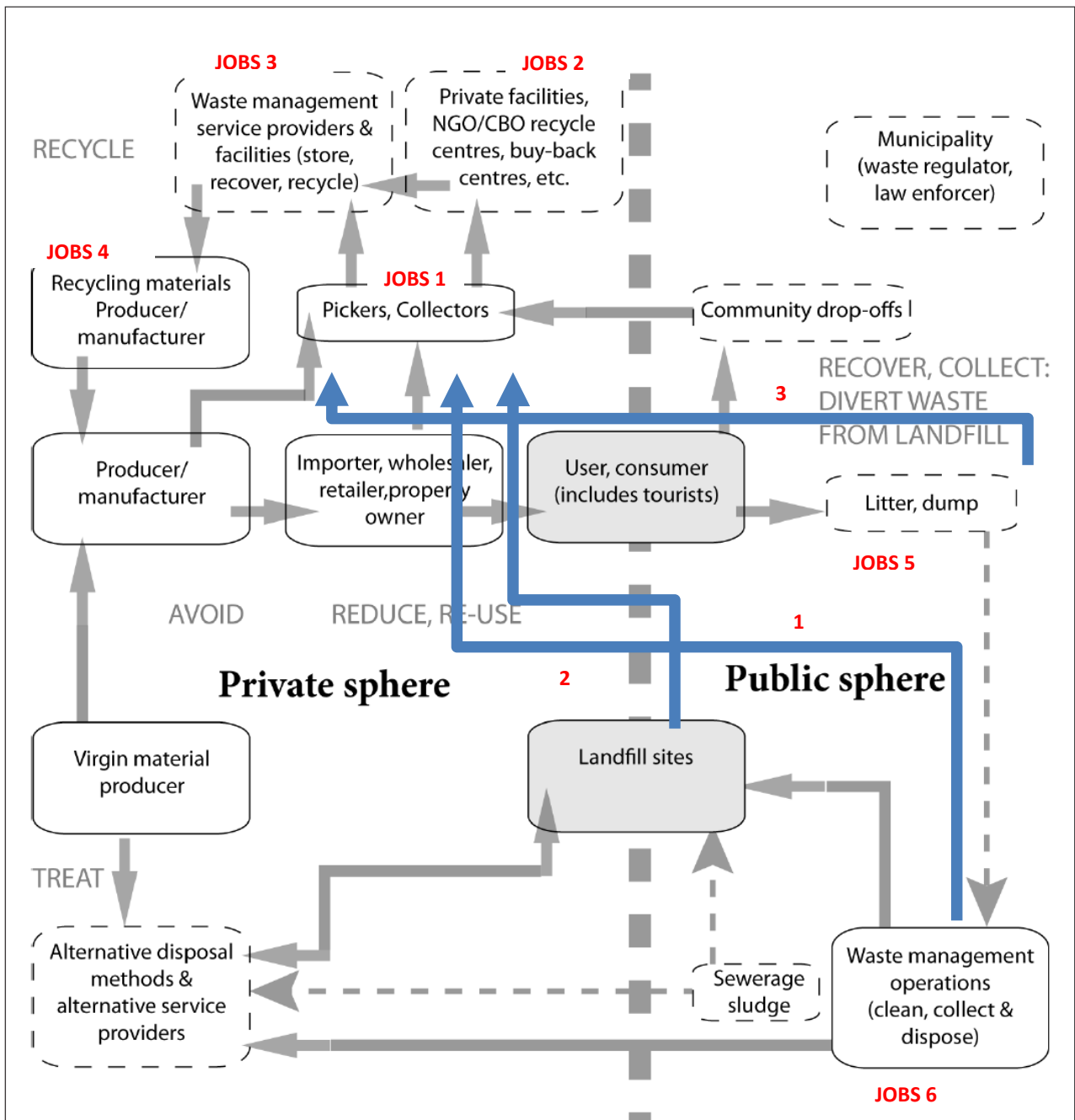


Figure 1: Coetzee's complex illustration of circularity, articulating material resource flow paths and actors involved (von Blottnitz, 2016)

Material flows facilitated by SMMEs, cooperatives and the informal sector occur within complex systems, in a circular manner as illustrated by the arrows in Figure 1 (this may also have a temporal and spatial dimension). The movement of resources is from point of generation (i.e. post-consumer packaging as one example) to industrial consumption i.e. from households to a processing or manufacturing plant (von Blottnitz, 2016). The 'system' may be defined to include a neighbourhood, a city, a province, or a country (spatial flows) where elements of generation and manufacture might exist. Beyond this, recycle also moves across international boundaries within

an additional layer of actors and factors impacting on these flows, for instance, geopolitical influences (trading blocks and affiliations) in a circular economy (Grinin, Devezas and Korotayev, 2014; Guibrunet, Sanzana Calvet and Castán Broto, 2017).

Figure 2 illustrates how the waste hierarchy, and the circular and green economy concepts are related. Moving up the waste hierarchy (towards prevention see figure) is considered to be more in keeping with ensuring that industry (including households, and communities) operates within the limits of current ecosystems, and at the same time reducing the burden on existing natural resources, and future generations (for instance, towards achieving resource efficiency). These steps should be the focus of the circular economy. The green economy, which also includes a strong focus on the transition of energy systems to renewables, is complementary to sustainability in the broad sense and has at its basis our continued existence within the ecosystems we occupy and share with other organisms.

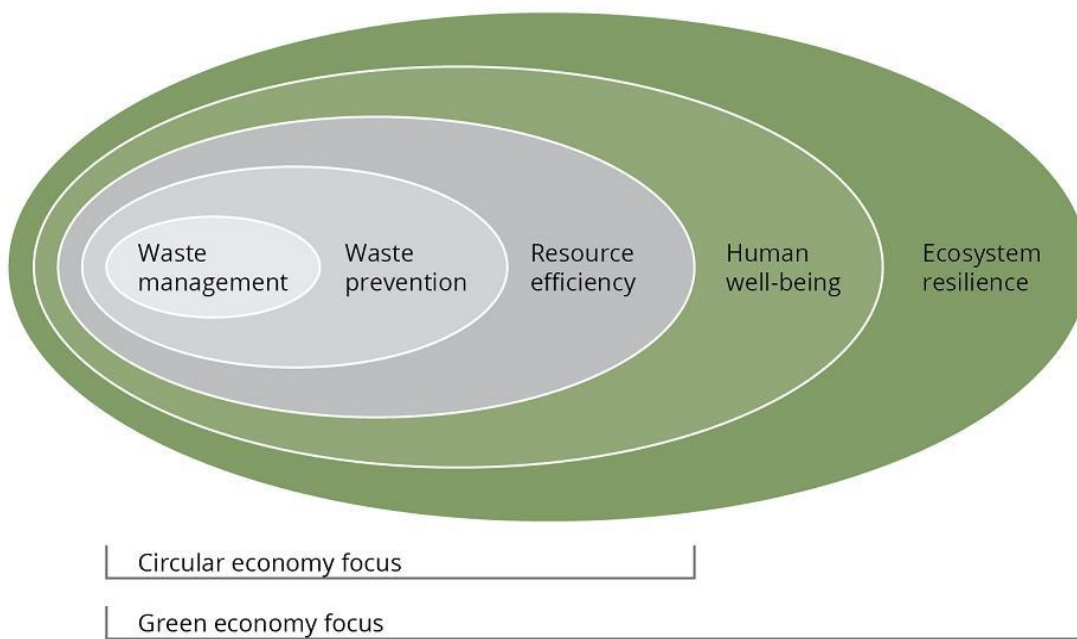


Figure 2: Relationship between the waste hierarchy, circular economy and green economy (Ronchi, 2015)

3 COOPERATIVES IN SOUTH AFRICA

Cooperatives can potentially contribute to job creation especially given their close ties to community⁵, but they face a number of challenges including high mortality rates, limited support from the government which also exhibits a lack of understanding of how the cooperative model functions (The dti, 2012, 2013).

In order to register a cooperative a minimum of five or more individuals are required, hence formation of a primary cooperative (RSA, 2013). Additionally, some cooperatives in the waste and recycling sector may employ (formally or informally) other individuals through their activities i.e. in collecting, sorting or processing recyclables from households. Furthermore, groups of (primary or worker) cooperatives may band together to form secondary or tertiary cooperatives (Godfrey et al., 2015; Manzhura, 2018). In doing so, they create employment in the provision of other services often unrelated to the core business of the primary cooperatives. There are potentially three levels of cooperatives (Figure 3). Tertiary cooperatives are at the apex of a pyramid and provide services to either the primary or secondary cooperatives i.e. medical insurance, savings and credit, or advocacy (The dti, 2009). In this way, the different levels of cooperatives have the potential to contribute to employment either directly or indirectly.

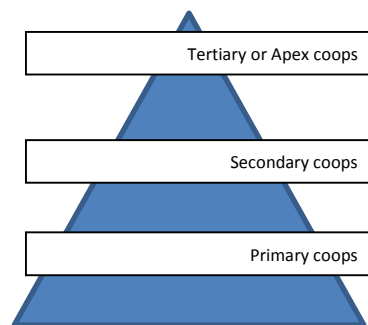


Figure 3: Forms of co-operatives (Modified from Godfrey et. al., 2015)

Prior to 1994, cooperatives existed in South Africa mainly under the national Department of Agriculture (The dti, 2009). Following a consultative process in 1997 the mandate⁶ was transferred to the Department of Trade and Industry (The dti) (The dti, 2004; Okem, 2016). This was informed by the growing emphasis and a deliberate attempt to support and encourage the growth of other forms of cooperatives besides agricultural cooperatives. In 2014, the responsibility for SMMEs and cooperative development was transferred to the Department of Small Business Development (DSBD) (Balkaran, 2017). In South Africa, government departments (at the national, provincial and local levels) provide various forms of support to cooperatives. The cooperative incentive scheme (CIS) is one form of government (financial) support to cooperatives (Okem, 2016). This scheme was previously initiated through The dti and included a 90:10 grant of up to R300 000 for cooperatives. In 2014, the management of this scheme was transferred to the DSBD as the new

⁵ They are based on principals of voluntary and open membership, democratic control, member's economic participation, autonomy and independence, education, training, cooperation with other cooperatives and a concern for the community.

⁶ The responsibility for co-operative development (The dti, 2004; 2005). The primary aim of this was to provide wider access to this successful business model to the broader populace and also to different sectors of the economy following the first democratic elections.

custodian of cooperatives in South Africa. The 90:10 formula of the grant was also amended to a 100% grant of R350 000 requiring no contributions from the cooperative.

The number of cooperatives registered on a year on year basis has grown almost exponentially since 2003. This reached 107 266 new registrations of all cooperative types (and different sectors) in 2015 compared to just 4 652 registrations for new cooperatives in 2005 (Figure 4). The explosive growth in the number of newly registered cooperatives has been attributed to various factors including wider accessibility of citizens to this ‘successful’ business model (Schoeman, 2006), enactment of the 2005 Cooperative Act (RSA, 2005), policy in terms of Cooperative Development Policy of 2004 (The dti, 2012), Broad-Based Black Economic Empowerment (BBBEE) and access to various grants i.e. the Empowerment Investment Grant). However, this exceptional growth scenario is misleading, especially due to the high mortality rates of cooperatives across all sectors reported (discussed below) (The dti 2009; Godfrey et al., 2017).

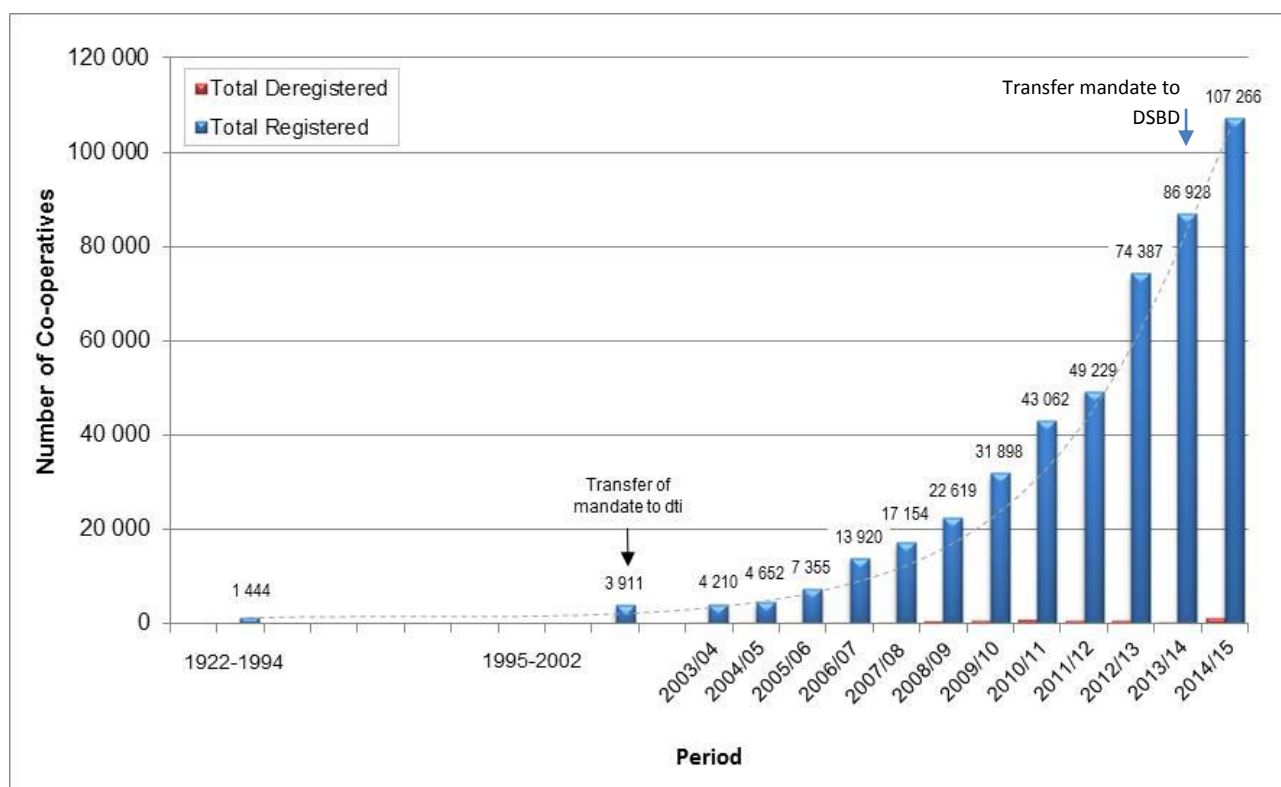


Figure 4: Trends in all co-operative registrations and de-registrations (Source: Godfrey, Muswema, Strydom, Mamafa & Mapako, 2015a)

Table 1 below provides data on the survival rates⁸ of cooperatives across the different provinces, i.e. Northern Cape, Eastern Cape, Western Cape and Free State were all reported to have the highest mortality rates when compared to the national average of 88% (i.e. these cooperatives no longer existed). The mortality rates in KwaZulu-Natal and Mpumalanga were similar to the national

⁷ The cooperative business model prior to 1994 was seen as ‘successful’ due to its growth in the agricultural sector.

⁸ The survival rates were calculated based on the number of cooperatives registered by the registrar of companies in 2009, compared to the surviving and active coops in the 2012 dti Baseline Study, and compared across province and sector.

average (i.e. mortality rate of 88%). From Table 1, it is also apparent that KZN had the highest number of cooperatives registered (both registered and surviving).

Table 1: Comparative Analysis of Registered Co-operatives in CIPC and The dti Baseline Study, Mortality and Survival Rate (modified from The dti, 2012)

	Number of Registered Co-operatives ⁹	Number of Surviving Co-operatives ¹⁰	Number of Dead Co-operatives	Survival Rate	Mortality Rate
				%	%
National Picture	22 619	2 644	19 975	12	88
Northern Cape	798	20	778	3	98
Eastern Cape	No data	287	3 957	7	93
Western Cape	No data	69	934	7	93
Free State	900	71	829	8	92
KwaZulu-Natal	8 697	1 044	7 653	12	88
Mpumalanga	1 496	187	1 309	13	88
North West	1257	167	1 090	13	87
Gauteng	2 365	394	1 971	17	83
Limpopo	1 879	405	1 474	22	78

A similar situation of high mortality rates is noted across the different economic sectors in which cooperatives participated (Table 2). The mortality rate for cooperatives engaged in trading, transport, multipurpose activities, recycling and waste management and the service industry is higher than the national average of 88%.

Table 2: Sector analysis of co-operatives as at 2009 (modified from The dti (2012))

Type of Co-ops	CIPC 2009 data	The dti, Baseline Study	Survival rate (%)	No. of dead cooperatives	Mortality rate (%)
Trading	2 708	47	2	2 661	98.30%
Transport	856	50	6	806	94.20%
Multipurpose	3 160	187	6	2 973	94.10%
Recycling & waste management	85	7	8	78	91.80%
Services	4 209	357	9	3 852	91.50%
Consumer	128	11	9	117	91.40%
Food and agriculture	6 086	671	11	5 415	89.00%
Manufacturing	1 093	137	13	956	87.50%
Mining	78	12	15	66	84.60%
Financial/Credit Services	233	36	16	197	84.50%
Construction	1 280	202	16	1 078	84.20%
Textiles	1 247	272	22	975	78.20%
Home industry (Baking)	334	83	25	251	75.10%
Other	328	89	27	239	72.90%
Social	311	90	29	221	71.10%
Burial	65	19	29	46	70.80%
Arts and crafts	340	103	30	237	69.70%
Housing	78	25	32	53	67.90%

⁹ 2009 Data from the CIPC Register.

¹⁰ Data for survival and dead cooperatives taken from The dti 2009 Baseline Study.

The baseline survey of 2012 provides some insights into some of the challenges faced by cooperatives (The dti, 2012). These challenges are summarised below:

Support from national government:

- Lack of statistics on the social and economic impact of the cooperative sector.
- Poor coordination between the different government spheres on their roles and lack of clarity.
- Limited and unfocused/uncoordinated support for cooperatives.
- Limited understanding by development funding institutions on the cooperative business model and what support it requires.
- Poor accessibility to registrations at province and local levels, leading to delays (i.e. delays and red tape to swap out inactive members).
- Limited understanding of the value of (community-based enterprise) and how the cooperative model works.
- Red tape and administrative requirements which discourages informal groups (i.e. stockvels) from registering as cooperatives.
- Poor access to finance because development finance institutions do not understand the cooperative business model (i.e. the sharing of surpluses).
- Limited access to appropriate technologies for their businesses to improve their outputs (scales, bailers, compactors).
- Lack of business premises, with cooperatives operating from their homes rather than a business or commercial address.

Lack of understanding of the cooperative business model amongst members:

- Poor business and management skills amongst members, since most cooperatives are started by the unemployed and low skilled individuals with no previous business experience and located in impoverished areas. The cooperative members lack sector-specific training, business skills, fiscal management, and information communication and technology (ICT) computer skills (which are integral to taking advantage of opportunities offered by the fourth industrial revolution (4IR) discussed later) and marketing.
- Poor financial trust between members, no shared vision and strong social cohesion, no shared approach.
- Poor and sometimes undemocratic decision making, boards failing to communicate with members resulting in unnecessary tensions.
- Limited cooperation between different cooperatives resulting in isolation, missed opportunities to collaborate and learn from each other.
- Strong and overriding individual interests, greed and moving away from servicing the collective interest.
- Poor self-reliance, there is a need for support in the early stages but the cooperatives need to work towards self-sufficiency.
- Poor compliance with legislation, for instance, less than 1% submit financial reports.

Cooperatives across all sectors in South Africa (especially the waste and recycling sector) face several challenges including poor access to and being slow adapters of technology, challenges associated with poor support from the different levels of government, a lack of understanding of the cooperative business model amongst cooperative members and (local and national) government (Dlamini, 2010; DST, 2012; Okem, 2013), lack of information (Gadzikwa, Lyne, and Hendriks 2007;

Mthembu, 2008; Ortmann and King, 2007), lack of marketing skills and access to market (DST, 2009; Mthembu, 2008), lack of financial resources (Dlamini, 2010; Department of DAFF, 2011), and dependence on donor or government support (Kanyane, 2009: Parliamentary Monitoring Group, 2010; Okbandrias and Okem, 2016).

4 PRELIMINARY FINDINGS – CHALLENGES FACING COOPERATIVES

Preliminary findings indicate that the DSBD has changed focus from supporting primary cooperatives to supporting cluster or tertiary cooperatives. Primary co-operatives, where they survive, still face challenges with acquiring basic equipment and are therefore unlikely to capitalise on the opportunities that the 4IR is likely to provide as well as issues affecting global material flows. For instance, the Chinese operation Green Fence which came into effect in 2018 is having a significant impact on South African material flows (export of recycle). The discussions below are the result of ongoing research into the sustainability of SMMEs and cooperatives in KZN.

4.1 Focus on cluster and tertiary cooperatives

The DSBD is responsible for the development of cooperatives, since the transfer of this mandate from The dti in 2014. A record of the annual budget vote by department relating to the CIS between 2014 to 2018 and a forecast of future support for cooperatives for the next three years is summarised in the Table 3 (National Treasury, 2018). The total number of cooperative enterprises supported by the DSBD has declined from 2014 to present (2018). If it is assumed that each cooperative across the different sectors accessed 100% grant (R350 000 CIS grant), the total expenditure by the DSBD on cooperatives for each year of support can be calculated (see Table 3). Over the period 2014/15, the DSBD has spent R151 million on cooperatives. The annual grant reduces from R151 million to R95 million in the latest period (2017/18). In the current 2018 budget vote (National Treasury, 2017), the DSBD has indicated a shift from supporting primary cooperatives to supporting cluster cooperatives. The total support for each cluster cooperative will increase to a maximum of R10 million per application.

Table 3: Comparison of enterprises supported (on CIS) for period 2014-2021 (National Treasury, 2018)

Period (years)	No. of cooperatives financially assisted through the cooperative incentive scheme	Estimated Value of Support (R)
2020-2021	33 ¹¹	
2019-2020	71	
2018-2019	122	
2017-2018	270	R 94 500 000.00
2016-2017	370	R 129 500 000.00
2015-2016	350	R 122 500 000.00
2014-2015	431	R 150 850 000.00

¹¹ This is what is projected/targeted, reportedly for enterprises going forward for the periods 2020-2021, 2019-2020, and 2018-2019. It has been reduced to change the implementation model, which going forward will support cluster (or secondary) cooperatives instead of individual (primary) cooperatives.

A concern is that if the underlying issues of sustainability of primary cooperatives are not addressed, this increased spend focused on tertiary or cluster cooperatives may also be wasted (see issues related to mortality of cooperatives referred to previously). The designation of the DSBD to support cluster or tertiary cooperatives is a step in the right direction to drive the cooperative agenda and contribute to the sustainability of cooperatives in the country. However, this will only work if primary cooperatives are sustainable. This could further be improved through additional research and statistics on the impacts of cooperatives in communities, government playing a coordinating function and driving policy interventions with development finance institutions. The DSBD is already playing a role in driving the training of cooperatives. Additional waste management specific sectoral training can be delivered through partnerships with stakeholders engaged in waste and recycling training. There should also be training sessions with municipalities to educate them about the cooperative business model, and how to apply and support it. However, it should be noted that cooperatives are not the only business model that can drive job creation. A balanced approach should, therefore, be taken in this regard particularly in terms of the understanding of other forms of SMME (e.g. Pty's, Close Corporations¹², Non-Governmental Organisations, Community Based Organisations and Joint Ventures which are reported in the literature, that can drive job creation (SEDA, 2009; UN Habitat, 2010).

4.2 Fourth Industrial Revolution and its implications for cooperatives and SMMEs

The fourth industrial revolution (4IR) is a term that has been gaining popularity in certain technology, industrial and financial circles in recent times¹³ (Bloem et al., 2014; Deloitte, 2015; Naudé, 2017). Considering the pervasiveness of the internet of things, there are many examples of how 4IR is impacting on everyday life (Bloem et al., 2014). Examples in the waste and recycling sector include tracking waste generated in industry and households by municipalities and the use of cloud-based platforms (India's online 'I Got Garbage initiative'¹⁴), creating jobs for the informal sector (Herweijer, 2017; Leape et. al., 2017); employing sensors to automate and improve the quality of recycle sorting in MRFs (Waste Management World, 2017). While the 4IR is imagined to bring with it new and improved ways of doing things, there are some concerns with regards to job losses especially since South Africa is a developing country and the government has identified that intensive employment opportunities are a priority¹⁵ to drive development (Williams et al, 2014).

Some SMMEs experience challenges in quickly making use of new forms of technology and indeed new ways of doing business (Funchall et. al., 2009; Cassim et. al., 2014). This is also unfortunately true for waste and recycling cooperatives in South Africa, which face severe challenges in the form of access to basic equipment (i.e. scales, compacting and bailing machines), innovation, basic managerial skills (i.e. submitting financial statements, and managing accounts), technical knowledge and skills (i.e. for the operation of basic machinery required to

¹² Even though discontinued, it is still possible to purchase shelf close corporation companies, and these business models have been found to still be operating in KZN.

¹³ The first industrial revolution was marked by mechanisation using steam and waterpower. The first documented mechanical loom was recorded in the United Kingdom at the end of the eighteenth century. The second industrial revolution was generally accepted to have occurred at the beginning of the 20th century and was marked by mass production powered by electricity (the conveyor belt and mass production). The third industrial revolution is driven by digital automation made possible through electronics, information and communication technologies and it can be traced to the 1970's and the integrated circuit.

¹⁴ See <https://www.igotgarbage.com>

¹⁵ See also New Growth Path, the National Development Plan, and the National Industrial Policy Framework and associated Industrial Policy Action Plans.

improve efficiency) (Godfrey et al., 2015, 2017). Given the rapid improvements in technology and processing power of cloud-based computing, these 4IR disruptions are also occurring at an ever-increasing rate. SMMEs and cooperatives need to innovate if they want to survive and capitalise on the opportunities that become available.

Cooperatives in South Africa are noted to be very slow adapters when it comes to technology. They operate without basic equipment like scales, bailing machines, and compactors which leads to inefficiencies and poor quality of recyclate which in turn leads to lower potential revenues. This study found that cooperatives reported a lack of these basic but also critical equipment mentioned earlier in this paper. Other authors have also noted the lack of innovation and entrepreneurship culture in the cooperative sector, which have been identified as threats to their sustainability (Urban-Econ, 2015). Waste-picker cooperatives in other countries (i.e. Brazil), although identified as a key link in the waste value chain, are also at the bottom of this structure because they cannot add value to recyclable materials because of the ability or unwillingness of cooperatives to invest in infrastructure, information technology and lack of public sector support through policy and legislation (Tirado-Soto and Zamberlan, 2013).

The situation appears to be worse for cooperatives constituted by municipalities. Cooperatives constituted by municipalities tend to be derived through a top-down imperative of government. This is unlike cooperatives formed through the initiative of community members where there is some prior association of the cooperative members. The latter often consist of family members or have evolved 'organically' from individuals who had previously worked together (Godfrey et al., 2017).

In contrast, some other SMMEs (especially Pty Ltd and close corporations interviewed) in this study displayed some levels of innovation in their use of technology, and social media including the use of WhatsApp groups to synchronise availability and collection of recyclate from households and kerbsides or for the collection of bailed or compacted recyclate. Other SMMEs (Pty Ltd) also reported paying informal collectors for recyclate using e-wallet banking facilities (this negates the need to carry cash for these payments – which payment can be linked directly to a low-cost cell phone). Another opportunity that the 4IR presents is in the dissemination of information. Both SMMEs and cooperatives in this study reported having to play catch up with changing legislation and regulations that especially affect the waste and recycling sector. This is more so in the context of the 'Flood of Regulation' which appears to have been manifesting since 2008 with the promulgation of the Waste Act, and numerous provincial and local government statutes (Godfrey and Oelofse, 2017). Notifications of relevant legislation and policy could be disseminated through the online web-based platforms that distribute these notifications or information. However, this will be difficult if cooperatives cannot access these technologies, thus raising the question regards the sustainability and survivability of primary cooperatives (and therefore also the waste hierarchy) in the South African waste management sector. Unfortunately, there are also some external challenges in the international arena which also affect cooperatives, these are discussed below.

4.3 Material flows from local and global markets

An assessment of material flows within the KZN province indicates that there is processing such as pelletizing, crumbing, fibre extrusion and some manufacturing of relatively high-value packaging recyclate taking place (i.e. PET and polypropylene). Other materials found to be processed in KZN include waste oils and tyres. Processing of materials is typically confined to the economic hub of the province - eThekweni metro, although some processing was found taking place in other areas

which are traditionally also linked to high levels of industrial activities such as Newcastle, Pietermaritzburg and Richards Bay.

One concern is the material flows of glass packaging in the province. This is apparent from the 1-ton bags of glass which can be seen uncollected at intersections in various areas i.e. outside taverns, on roadsides in rural and peri-urban areas documented in Figure 5. The challenge appears to be the low Rand value of the collected material, and the distances to processing facilities and markets. There is currently no glass processing or recycling plant located in KZN, investment in this infrastructure locally may assist with driving demand for local glass recycle. Alternatively low profit margins for the different main line recyclables (including glass) can be countered if value is added to the recycle (new higher value articles are made) or better quality recycle is produced (superior quality granulated or extruded recyclables).



Figure 5: Evidence of uncollected glass stacked at intersections for prolonged periods

Besides local material flows, respondents also reported that some materials were exported to overseas markets citing China and South East Asia (Malaysia in particular) as destinations for recycle. However, China has recently instituted a ban on poor quality recycle (Ministry of Environmental Protection of the People's Republic of China, 2017). A similar ban was effected by the Chinese on plastics in 2013 with a major effect on US and European exporters of waste to China (Velis, 2013; Rucevska et al., 2015). This is likely to be followed up by additional bans and stricter imports in 2019 (China Council for International Cooperation on Environment and Development, 2017; Cole, 2017). The poor quality material reportedly requires further sorting of the recycle in China and high volumes of imported recycle being wasted and disposed to landfill.

As a consequence of the Chinese ban, some SMMEs and cooperatives in KZN reported a drop in the prices of mainline recyclables at the beginning of 2018. Plastics South Africa indicated in a 2015 report that the majority of plastic waste that is exported¹⁶ out of the country finds its way to China (PlasticsSA, 2015). This Chinese ban on low-quality imports could be seen in three ways: 1) it could be viewed as a disaster especially for SMMEs and cooperatives who through middle men are exporting these materials out of South Africa because of the lost foreign revenues; or 2) as an

¹⁶ Of the 31 0641 tonnes of plastic waste diverted from landfill in 2015, 17 724 tonnes were exported (78% of this exported to china).

opportunity to improve the quality of exported recyclate (and realise higher profits and better market access); 3) as an opportunity to develop the local recycling industry to process the materials locally which will drive local jobs. There is thus an opportunity for SMMEs and cooperatives. The better long-term solution would be to create local markets for superior quality materials by creating sustainable materials processing especially since there are likely to be additional bans on exported recyclate imposed by China in 2019 (Gu *et al.*, 2017). This would go a long way towards the sustainability of cooperatives.

5 CONCLUSIONS

This paper presented preliminary findings from an ongoing study on the sustainability of SMMEs and cooperatives in the waste and recycling sector in KZN. Following the high mortality rates of cooperatives (including in the waste and recycling sector), the Department of Small Business Development appears to have shifted focus to supporting tertiary and cluster cooperatives in the country. Although this is a step in the right direction, this effort may signal an end to unsustainable cooperatives operating in the recycling sector, where other underlying sustainability issues of primary cooperatives are not addressed.

Cooperatives (in contrast to other forms of SMMEs) have been described as late adopters of technology and require sector-specific training. Cooperatives may also not be able to capitalise on the opportunities that the transition to 4IR presents. After all, most recyclables in South Africa are recovered on the back of the informal sector which does an exceptional job in the presence of poor diversion of waste from landfill and separation at source programs. This presents opportunities for government and private sector to partner with the private sector to deliver entrepreneurship, waste and recycling sector skills and innovation training.

Lastly, the sustainability of cooperatives is affected by local and external market and political forces (the recent operation green fence in China is an example of this). Adding value to the recyclate collected is a possible hedge against these market fluctuations. However, cooperatives do not have the capital nor sector specific know-how to bring this about. This is an opportunity for both the private sector and the government to collaborate in terms of sector-specific training for cooperatives and SMMEs in the waste and recycling sector, which can assist towards the sustainability of SMME's in South Africa.

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