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Author
Donwald Pressly

Contact details
Telephone: (011) 482-7221
e-mail: info@irr.org.za
website: www.irr.org.za

Circular economies – Turning waste into worth

INTRODUCTION

Significant economic and environmental benefits could accrue to South Africa and to poor communities, in particular, if waste policy was more effective in helping to extract the 'dead capital' to be found in waste products. The wealth to be found in waste could also generate a host of jobs and viable new enterprises, so helping to counter the country's unemployment crisis. An existing public-private partnership for managing tyre waste shows how much could be achieved if this approach were to be replicated more widely. However, both present and potential gains are at risk from recent legislative changes that are more likely to undermine than promote effective waste management.

The context

Many economic indicators in South Africa – from GDP growth rates to direct investment and consumer spending – have turned sharply downwards in recent months. Weak economic performance is now exacerbating structural unemployment, which has already been high for many years. The jobless crisis is particularly acute among young people aged 15 to 25, where the unemployment rate exceeds 50%. Youth unemployment in South Africa is also worse than that experienced in many other emerging markets, for the country is home to 0.7% of the world's young people but has almost 2% of the world's unemployed youth. Overcoming the unemployment crisis and opening up opportunities for young people is important in itself. It is also vital to social and economic stability, as the Government recognised in its National Development Plan in 2012.

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In response to deteriorating economic indicators, more and more economists are beginning to call for changes to economic policy. There is no single policy shift that can suffice to speed up economic growth or overcome the long-term unemployment crisis. However, there are short- and medium-term solutions within the Government's grasp that could immediately start to lessen the burden of joblessness in poor communities. One of the most attractive solutions is to use the concept of the 'circular economy' to help turn 'waste into worth' for the benefit of the disadvantaged, in particular.

One of the most attractive solutions is to use the concept of the 'circular economy' to help turn 'waste into worth'.

The concept of the circular economy

In a linear economy, human beings extract basic resources, turn them into products, and then jettison these resources as 'waste' once they have fulfilled their initial purposes. By contrast, a circular economy recognises the economic value to be found in waste products that would normally be discarded. Hence, a circular economy seeks to 'repurpose' products, by disassembling, refurbishing, and re-using them. This helps create fresh value, new jobs streams, and new waste management enterprises. It also brings considerable environmental benefits.

The concept of a circular economy represents a paradigm shift in economic thinking. A circular economy is based on the idea of a 'closed loop' and employs a 'cradle-to-cradle' approach to production. In this process, waste is limited, if not eradicated. This 'cradle-to-cradle' philosophy is the polar opposite of the 'cradle-to-grave' (or landfill) process.

Interest in the 'circular economy' is growing internationally. In June 2015, for instance, the European Commission (the executive body of the European Union, which proposes legislation, enforces current rules, and sets objectives and priorities for action within the EU) held a conference in Brussels on the circular economy. This conference in turn drew on a recent international study, entitled *Growth Within*, which has been compiled by the McKinsey Center for Business and Environment, among other organisations.

Growth Within describes a circular economy as one that is restorative by design, and aims to keep products, components, and materials at their optimum utility and value at all times. According to the study, the circular economy offers Europe (and other regions too) 'a major opportunity to increase resource productivity, decrease resource dependence and waste, and increase employment and growth'.

A circular economy seeks to 'repurpose' products, by disassembling, refurbishing, and re-using them.

According to *Growth Within*, the economic benefits of introducing a circular economy approach in Europe would be considerable and would include:

- an increase in projected GDP growth from the 4% by 2030 currently anticipated to 11% over the same period;
- an increase in average disposable income for EU households by €3 000, or 11% higher than the current development path; and

- a major reduction in CO_2 emissions.

Interestingly, South Africa is already ahead of the EU in some respects in seeing the value of a circular economy. In particular, it has already started implementing the idea within the tyre industry, where its experience has generated a globally recognised case study, as further described below.

A circular economy also draws on the concept of 'dead capital'.

Dead capital

The idea of a circular economy also draws on the concept of 'dead capital', as developed by Hernando de Soto Polar (better known as De Soto), a Peruvian developmental economist.

De Soto has long argued that the poor and the marginalised in many emerging countries often informally 'own' houses, land, and other assets with significant economic value. However, this value is not recognised because their ownership is not properly registered or otherwise acknowledged by the formal economy. This situation turns their assets into 'dead capital' which they cannot easily sell or use as collateral for business start-ups, for example. Moreover, it is often very difficult for the poor to transform their unrecognised assets into 'live capital' because the relevant policies and regulations are difficult and costly to navigate.

De Soto's concept of 'dead capital' has particular salience for South Africa. Millions of South Africans own their RDP (Reconstruction and Development Programme) or other houses, but cannot easily prove their ownership because this has never been properly registered in the Deeds Registry. Millions more have customary law rights to occupy and use plots of land in mainly former homeland areas. However, under customary law rules, they have no individual or secure ownership of these plots, even though this land might have been in their families for many years. These houses and plots are effectively 'dead capital', which cannot either be sold at an appropriate market price or used as collateral for loans to start up micro-businesses.

Another source of 'dead capital'

Waste is another (but insufficiently recognised) source of 'dead capital'. Waste is a generic term for the wide variety of waste products that are generated in a modern society and are generally discarded once they have served their initial purposes.

Often these waste products are simply cast aside to litter streets, streams, and open areas. In urban areas, most waste products are collected by municipalities and find their way to landfills or dumps. Very often, these dumps are located in poor communities, who find themselves with little choice but to live in close proximity to waste that is often smelly and unsightly and can also be hazardous to human health. Increasingly, the volume of waste being generated in our linear economy is thus becoming a major environmental challenge.

Waste is another (but insufficiently recognised) source of 'dead capital'.

However, if South Africa were more fully to embrace the idea of a circular economy, it would be possible to unlock much of the value to be found in waste products. It would also be possible to generate many more jobs through a process that might be termed 'working from waste'. This would have major environmental benefits too, as waste would no longer be discarded but would rather be 'repurposed' wherever possible.

However, if the 'dead capital' in waste is to realise its economic and environmental potential, two things need to happen. First, the Government needs to create an enabling policy environment which promotes and encourages the collection and repurposing of waste. Secondly, the private sector needs to be empowered to drive and manage the waste economy.

In 2012 very few spent tyres (only 4%) were being recycled. The rest were being dumped or burnt.

The circular economy in action

In South Africa, as earlier noted, the tyre industry has already generated an important case study of how the circular economy can successfully turn 'waste into worth'. Tyres lend themselves to this initiative because they are generally exchanged at dealerships and not at homes. This means that the collection points where the waste arises are known, which eases the 'first mile' collection task. In addition, some 240 000 tonnes of tyres are sold in South Africa each year, whereas in 2012 very few spent tyres (only 4%) were being recycled. The rest of the waste tyre mountain were being dumped in landfills or burnt.

These factors helped give impetus to a public-private initiative called the Recycling and Economic Development Initiative of South Africa (REDISA). REDISA is a registered public benefit organisation (PBO), which operates under a national waste tyre management plan developed under the National Environmental Management: Waste Act of 2008. The organisation was licensed to implement its recycling plan in 2012. In the past two years, it has succeeded in generating thousands of new jobs, establishing a number of viable small businesses, and recycling a growing percentage of South Africa's waste tyres.

The REDISA model

The REDISA model works essentially this way. Since most spent tyres are exchanged at dealerships, REDISA puts these dealerships into contact with transporters, who pick up the waste tyres from the dealers and take them either to storage depots or, if possible, directly to recyclers or processors. Tyres are also sourced from pickers, who collect tyres either from municipal dumps or from informal settlements (which generally lack municipal waste services). Recyclers receive the tyres free of any charge, which makes reprocessing more cost effective and saves them the expense and inconvenience of having to locate, buy, and transport the tyres themselves. In addition, for the first two years of their operation, REDISA provides recyclers with a fee of R310 per tonne of waste tyres processed to help them start on a sound financial footing.

REDISA is financed by a management fee, which is paid by tyre manufacturers and importers and goes directly to it.

REDISA makes the entire operation possible by funding and managing it. It also helps the pickers organise themselves into co-operatives, generates jobs for the transporters, sets up the necessary storage depots as new small businesses, and gives financial and other help to many of the recycling plants needed to repurpose the spent tyres.

REDISA is financed through a management fee, which is currently set at R2.30 for every kilogram of new tyres either manufactured in South Africa or imported into the country. This fee is paid by tyre manufacturers and importers and goes directly to REDISA. In return, REDISA

provides the crucial network that links tyre dealers and pickers with transporters, storage depots, and recyclers.

The fee serves various purposes. First, it provides the capital to set up the storage depots and purchase the equipment they require. Each storage depot currently costs between R1 million and R3 million to establish.

Typically, a tyre transporter earns a gross amount of some R50 000 a month.

Second, the fee is used to pay the transporters who collect the waste tyres from tyre dealers or the pickers and bring them to the storage depots or recyclers. All tyre dealers are required by law to register with REDISA, while the registration process automatically puts them in touch with the transporters. At the same time, a sophisticated IT system (as further described below) helps identify the transporter best suited to the particular dealer's needs. Transporters are paid in accordance with the weight of the waste tyres they collect and the distances they transport them. Typically, a transporter who provides this service earns a gross amount of some R50 000 a month.

REDISA has invested some R100 million in its sophisticated IT system, through which it maintains a comprehensive database of transporters, co-operatives, depots, and recyclers. This IT system enables it to manage the entire collection and distribution process, with near real-time, geo-located data on every transaction. Among other things, the transporters most readily available for a waste tyre pick-up are given the pick-up details, along with advice on the optimal route for delivering the goods to the nearest storage depot or processing plant. This in turn allows waste tyres to be collected efficiently and at short notice.

From the storage depots, waste tyres are taken to processors of various kinds. Some of these are cement kilns, in which waste tyres can be substituted for up to 20% of the coal that would otherwise be needed as fuel. This reduces coal usage and may also diminish air pollution, as tyres burn more cleanly than coal in the correct controlled environment. The use of waste tyres in these kilns also reduces their operating costs, making for cost savings that can be passed on to consumers.

Processors also include the producers of tyre 'crumbs': a material from which rubber-infused products, such as playground surfaces, roof tiles, plates, dustbins, and even wall screedings, are made. There are currently seven crumb manufacturers in South Africa, most of them in the Western Cape and Gauteng.

REDISA has also helped establish and incubate a number of small waste enterprises operating on a limited scale. At times, it has also helped set up recycling plants, a process that can cost from tens of millions to hundreds of millions of rands to fund, depending on the cost of land and how much money is needed to provide warehouses, vehicles, and tyre-moving equipment.

REDISA has also helped establish a number of small waste enterprises.

As earlier noted, a crucial element in the REDISA model is that waste tyres are provided to recyclers and other processors free of charge. This cuts out the costs to the processors of having to find, buy, and then transport waste tyres to their premises. This, in turn, makes recycling more cost-effective and helps unlock the residual

value in waste tyres that would otherwise be dumped or burnt.

The environmental benefits of repurposing tyres in this way are clear, while the economic advantages are also considerable. In its two years of operation, REDISA has created 79 transport businesses, 52 co-operatives, 46 waste depots, and 2 505 jobs. It has also processed close on 136 300 tonnes of tyre waste.

In its first two years, REDISA created 79 transport businesses, 52 co-operatives, 46 waste depots, and 2 505 jobs.

Before REDISA began, only about 4% of South Africa's tyre waste was collected for recycling. By contrast, in 2014 REDISA collected 32% (more than 56 700 tonnes) of the 177 400 or so tonnes of tyre waste that year. In 2015 its target is to collect some 88 700 tonnes or 50 percent of all waste tyres. By 2017, the entire tyre waste stream is targeted to be collected.

The fiscus pays nothing for REDISA's operations. Nor does it subsidise the businesses that REDISA has helped establish. The revenue stream from the tyre levy – which amounts to some R500 million a year – goes straight from the manufacturers and importers of tyres to REDISA, which uses it to pay the transporters and co-operatives, develop the storage depots, create and maintain the IT system, and provide spent tyres free of charge to the processors, in the manner earlier outlined. Administration and related costs come in at around 20% of the fees that REDISA receives.

By bringing the entire value chain together in this way, REDISA is able to provide the economies of scale that make the overall enterprise efficient and economically worthwhile. At the same time, the REDISA system ensures that ever more tyre waste is collected and recycled, thereby reducing environmental degradation.

REDISA is also helping to establish a significant number of new businesses. Its storage depots are projected to expand to some 120 in total, while each of these depots will in time become an independent and privately-owned enterprise. Already, the men and women who manage these depots are being trained in essential business skills. Each depot manager is also being encouraged to increase his or her share in the ownership of the depot. Ultimately, all depot managers should be able to buy these businesses and run them as their own.

Expanding the REDISA model

There is huge potential to expand the REDISA model to many other waste sectors. Its approach could successfully be used to recover and recycle plastic waste, along with waste from agriculture, organic chemical processes, and mining operations, to name but some examples. This would generate major socio-economic benefits, going far beyond what has already been achieved in the waste tyre sphere.

There is huge potential to expand the REDISA model to many other waste sectors, starting with plastics.

A whole battery of potential waste management areas needs to be explored, so as to assess their potential for converting dead capital into business opportunities. Plastic waste probably has the most potential in the short term, but there are many other types of waste that could also be tackled on the REDISA basis. This would bring all-round benefits in the form of many more jobs, many new businesses, and a significant increase in the sound environmental

management of the waste being generated in the country every year.

The Waste Amendment Act and its unintended consequences

However, the major economic and environmental benefits to be gained from expanding the REDISA model to plastics and other types of waste are being undermined by recent policy changes. These changes are reflected in the National Environmental Management: Waste Amendment Act of 2014, which came into effect in June 2014. These amendments could have serious negative, albeit unintended, consequences for the REDISA model and for the success of waste management across the country.

These amendments could have negative consequences for waste management.

The most worrying aspect of the new law is that it gives the minister of environmental affairs, acting in concurrence with the finance minister, the power to determine 'a pricing strategy' for waste management. In addition, the waste management charges thus laid down are to be paid into the National Revenue Fund. A Waste Management Bureau is also to be established and will be given oversight over all waste matters. This bureau will also be responsible for disbursing the funds derived from the new waste management charges, as decided by the ministers.

This is a complete departure from the REDISA model. The main difficulty is that the revenue needed to fund waste processes will no longer be ring-fenced to be used solely for recycling (and the community empowerment this can help promote). Instead, this revenue will go into the general coffers of the State. This means that it may not in the end be used for waste management at all.

In the waste tyre sphere, the Government has proposed the introduction of a new tyre levy, which is expected to come into operation late in 2015, and will replace the existing tyre levy. Revenue from the new levy will be collected by the South African Revenue Service and will go to the National Revenue Fund. From there, it will be allocated to the Department of Environmental Affairs and thence to the Waste Management Bureau, which will use the monies thus made available to pay for the recycling of waste tyres.

There is, of course, an important role for a regulatory body, such as the Waste Management Bureau, to oversee the overall sector and ensure that waste is being properly collected and processed or (where this is unavoidable) discarded. However, there are also risks in an often inefficient State assuming more control over the operational side of waste management. In addition, it is vital that any waste levy collected should be transferred to independent waste companies – and not into the general coffers of the Government where it may never be used for waste management at all.

The revenue needed to fund waste processes will no longer be ring-fenced for recycling

The Buyisa-e-Bag project

The example of the Buyisa-e-Bag project shows the dangers in the proposed approach. The Buyisa-e-Bag project was launched in 2003 by the then minister of environmental affairs, Mohammed Valli Moosa. Part of its objective was to reduce the scourge of littering: for the plastic bags then being provided free of charge by supermarkets for packing groceries were so easily and widely discarded that they had come to be dubbed South Africa's 'national flower'. By imposing a levy on plastic bags, the Government hoped to cut down on their use, encourage

shoppers to use the same bag more than once, and reduce the scope for littering. The funds thus generated were also to be used to create a recycling company that would collect and recycle spent plastic bags, so also creating jobs and empowering the youth.

As part of this scheme, the Government introduced a levy on the importing or manufacture of plastic shopping bags. This was initially (in 2004) set at 3c a bag, but in April 2009 it was increased to 4c a bag while in April 2013 it rose to 6 cents a bag. This levy is built into the price (currently around 40c per bag) that shoppers are asked to pay for plastic bags at supermarket tills. Making shoppers pay for what had previously been provided free of charge initially helped reduce usage quite sharply, but this has since crept up again as shoppers have become accustomed to paying for their plastic bags.

The Government introduced a levy on the importing or manufacture of plastic shopping bags.

A non-profit (Section 21) company, called Buyisa-e-Bag, was also created to manage the recycling programme. However, Buyisa-e-Bag soon ran into 'brick walls of red tape', as Hennie Neethling, chairperson of its board and a past president of the Institute of Waste Management, was later to put it. As Neethling describes it, land for recycling depots had to be identified and leased from municipalities, while environmental impact assessments had to be completed and permits granted. All of this took far longer than anticipated.

By 2005 roughly ten people had been appointed to administrative and managerial posts at Buyisa-e-Bag, but not a single recycling depot had been created. In time, however, the organisation was able to establish 15 plastic buy-back centres and to provide support to 25 existing facilities. It also established recycling facilities in two municipalities in Mpumalanga, which were set up in 2007 and 2009 respectively. However, in 2010/11 (following a review of its activities by the Department of Environmental Affairs), Buyisa-e-Bag was wound up and its functions absorbed into the department.

Apart from Buyisa-e-Bag's limited operational success, the main problem with the plastic bag levy is that its proceeds are paid into the National Revenue Fund and are not ring-fenced for the collecting and processing of spent plastic bags. Moreover, as a former finance minister, Pravin Gordhan, has recently explained, there is no mechanism through which monies paid into this fund can be identified and set aside for particular purposes.

The main problem with the plastic bag levy is that its proceeds are paid into the National Revenue Fund and not ring-fenced.

As Mr Gordhan notes, the National Revenue Fund is a general fund into which most revenue is paid and from which most appropriations are made. There is no system through which monies collected from different sources can be earmarked and distinguished from other monies in the fund. This makes it impossible to draw a direct link between the money collected under any specific levy and the way in which that money is ultimately spent.

This helps explain why the plastic bag levy has not succeeded in generating a comprehensive or efficient process for collecting and recycling waste plastic bags. The process of collecting the levy has worked well – so much so that an astonishing R1.1bn has been collected since

the start of the scheme in 2003. Yet only some R215m – or about 20 percent of this total – has been allocated to the Department of Environmental Affairs for recycling purposes. (These figures were provided by the minister of finance, Nhlanhla Nene, in reply to a parliamentary question by Democratic Alliance MP Tim Brauteseth in September 2014.)

The most positive spin-off from the plastic bag levy is that the public's use of plastic shopping bags has dropped from 10 billion a year to 4 billion a year. But the plastic bag scheme was not aimed simply at reducing the use of these bags. A crucial part of its purpose was to create jobs, alleviate poverty, and empower the youth by drawing them into recycling initiatives with the help of funding from the State. In practice, these important goals have mostly not been met. As a result, the major economic and environmental benefits that could and should have accrued to poor communities – and to the country as a whole – have not in fact been realised.

R1.1bn has been collected, but only R215m (roughly 20%) has been allocated to recycling.

Key factors for success in extracting wealth from waste

The contrast between the REDISA scheme and the Buyisa one helps identify the factors needed for success in extracting wealth from waste. These factors may be summarised as follows:

- The manner in which the levy is collected and distributed is critical. If the monies go to the national fiscus, they are unlikely to be used for their intended waste management purposes. Hence, they will make little significant contribution to either environmental clean-ups, or employment and socio-economic development. In addition, it is now clear that a waste levy can be ring-fenced for its intended purposes only if the monies in issue flow directly from those making the payments to the organisations responsible for waste collection and processing operations.
- The organisations collecting and processing waste should be independent private sector companies (including non-profit ones), as such entities are likely to be more efficient than the State in managing the operational side.
- The key to success lies in a public-private collaboration, where the State creates an enabling policy environment and the private sector is responsible for running day-to-day operations. Such co-operation is vital to the development of circular economies that successfully extract wealth from waste.
- The State needs to facilitate waste-processing operations. To this end, it should put in place a transparent, impartial, and cost-effective tender process through which private companies can compete to become part of a waste management chain. It should also be able to pull the plug on any participating business if it fails to achieve its waste management targets. The State should also lay down suitable environmental requirements for the management of wastes of different kinds.

The State should create an enabling policy environment, while the private sector runs day-to-day operations.

- Also vital to success is an efficient system for appointing, paying, assisting, and overseeing the transporters and co-operatives that pick up and deliver waste to recyclers and

other processors. Done correctly, this process has enormous potential to generate jobs, particularly for the youth. It can also help establish and incubate a range of successful businesses in poor communities, and so play a major part in lifting poor people out of poverty.

Generating wealth from waste will help the poor through the jobs created and businesses established.

Policy recommendations

There is huge potential in South Africa to create circular economies that generate wealth from waste. If this can be achieved, it will have particular value for the poor and marginalised, who will benefit enormously from the jobs created and the businesses established. However, the creation of successful circular economies requires the following policy steps:

- The Government has already identified a host of sectors where wealth could be extracted from the 'dead capital' of waste products. The Department of Environmental Affairs should now build on the REDISA waste tyre management model – which has worked well in practice and helped unlock an entrepreneurial spirit – by replicating it in various other sectors, starting with plastics.
- The 2014 amendments should be repealed, while fresh legislation should allow for independent operators (not owned or even indirectly controlled by the State) to run clean-up and processing operations in the different waste management sectors. Wherever this is economically feasible, more than one operator should work in each sector, so as to encourage competition and promote efficiency.
- The State should lay down appropriate environmental guidelines, and manage the appointment of these operators through an open and competitive tender system. Any concerns about monopolistic practices within a given sector should be referred to the Competition Commission.
- Any levy or management fees introduced to help fund waste management should not be paid to the fiscus, but should go directly to the appointed operator(s) in the various sectors. Hence, the tyre levy should be paid to the tyre waste management operator(s), while the fees paid by the zinc and copper thermal metallurgy sectors, for example, should go the relevant waste operator(s) there.
- Given the vital importance of public-private co-operation, the State should provide an enabling policy environment while the private sector should be responsible for day-to-day implementation of waste management. The success of the REDISA model, contrasted with the failure of the Buyisa-e-Bag one, shows that this is the most effective way in which the Government can achieve its environmental, employment, and empowerment priorities.

The potential environmental benefits of efficient waste management are enormous.

The economic and environmental benefits to be gained from efficient waste management, based on the REDISA model, are enormous. South Africa currently generates close on 110 million tonnes of waste each year. In addition, another R17bn worth of waste products are presently being discarded in landfills. Yet there is great value to be extracted from this waste,

while the process of collecting, transporting, and recycling it could generate hundreds of thousands of sustainable jobs and viable small businesses.

Instead, however, little of the waste being generated within the country is being recycled at all. In addition, a small but growing percentage of that waste is now being exported for processing abroad. This is largely because of the weakening rand-dollar exchange rate, which makes it cheaper for foreign companies to buy up South African waste. This is true in the plastics industry, for instance, where 7% of the plastic waste recovered in 2013 was exported for processing abroad. It is also the case in the e-waste sphere – covering waste from discarded computers, fridges, toasters, and the like – where Chinese entities are increasingly willing and able to buy e-waste at a premium. Says Keith Anderson, chairman of the e-Waste Association of South Africa: '[Chinese processors] need huge amounts of e-waste. They will pay a premium for that e-waste and because the exchange rate works in their favour, they can come into South Africa and, if our local recyclers are paying R4 for a laptop to recycle it, they might pay R8… It's bad because we're exporting job opportunities – and we're [also] exporting wealth.'

By exporting waste, we're exporting job opportunities and we're also exporting wealth.

If the new approach in the 2014 amendment act is implemented, and all waste levies are paid into the National Revenue Fund, South African waste managers will be at even more of a disadvantage. As the story of the plastic bag levy shows, much of the money collected for waste management is then likely to be diverted to other purposes. Being cut off from necessary funding will make it harder for South African processors to compete with foreign ones. By contrast, if the REDISA model were to be extended to plastics, e-waste, and a host of other spheres, the local waste management companies active in those areas would be given an important boost. This in turn would make it possible for them to draw hundreds of thousands of poor South Africans into new jobs and new small businesses focused on the collection, transporting, and processing of different kinds of waste. The 'dead capital' to be found in these waste products would then be brought to life, while the environmental benefits would also be enormous.

— **Donwald Pressly**

* **Pressly is a journalist and was a parliamentary correspondent for many years.**

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