



Returning the 'spark' to electronic waste

Repair and redistribution of electronic waste in the retail sector

1 Key Insights

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According to the e-Waste Association of South Africa (eWASA), South Africa (SA) generates ~ 6.2 kilograms of e-waste per capita annually and only 12% of that is recycled.

2

The repair and resale of used electronic goods provides an opportunity for skills development and income generation.

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The Appliance Bank recruits unemployed men (most often fathers) and equips them with the technical skills needed to repair damaged and customer-returned small appliances that are received from retail partners.

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The Appliance Bank is an example of how waste can become a resource and how a circular economy can preserve and extend the life of what is already made.

2 Purpose

This case study, which focusses on electronic waste (e-waste), is written to demonstrate how organisations that repair and refurbish e-waste contribute to a circular economy in a developing country, such as SA. A circular economy keeps products, components, and materials at their highest level of use and/or value for as long as possible.

A circular business model is one in which a business creates a supply chain that would ultimately take back the product that it had placed on the market at its end of life. The product and/or its components could then be reused, repaired, recycled or repurposed into new products, reducing the reliance on extractive industries and allowing resources to extend their useful lives.

A circular business model is attractive for products such as electronics, which in most instances, have a high residual value. In many instances, a circular business model requires a systems change by large corporations, which necessitates strategic planning and time. To fill this gap, there have been several organisations that work to recover value from e-waste through repair and refurbishment.

A non-profit organisation, The Appliance Bank, identified a gap in the market: a need for an intermediary to link the retail supply chain, which has small electrical appliances which are broken and cannot be sold, with unemployed men from under-resourced communities.

The case study discusses:

- How waste can be used as a resource to drive economic growth and skills development.
- How intermediaries can reduce risk and complexity in the retail supply chain.
- How a circular business model can address economic and social imperatives in a developing country context.
- How a circular business model can create meaningful jobs and stimulate local economies.
- How a circular business model can improve access to technology products.

It is written for:

- Businesses in the electronics sector wanting to transition to a circular business model and/or contribute to poverty alleviation and social upliftment.
- Organisations wanting to understand how circular economy initiatives can be successfully implemented in a developing country context.
- Organisations and individuals wanting to participate in the reuse and repair economy.

3 Challenge

Electronic Waste Generation

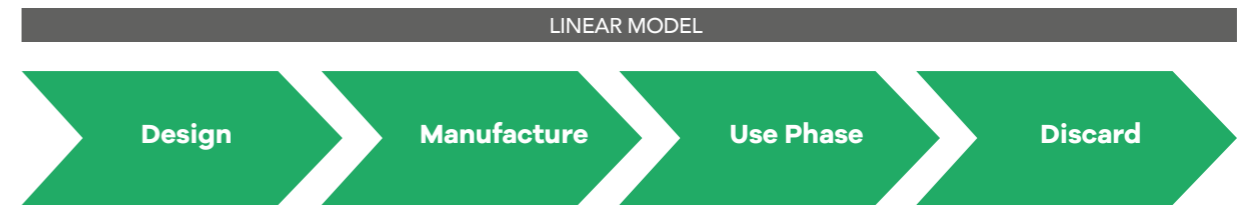
Electronic devices such as laptops, smartphones and tablets have transitioned from wants to being a necessity, with all businesses and individuals reliant on these devices to carry out their operations. Approximately 22 million people in SA use a smartphone today, which equates to more than one third of the country's population¹. An increased demand is often coupled with an increase in waste generation.

At a household level, the concentration of e-waste differs across developed and developing countries. In developed countries, e-waste is generally more evenly distributed across income levels. Consumers are able to dispose of e-waste at retailers and local government facilities which is then collected by manufacturers for safe disposal or recovery of materials. Furthermore, various devices are available through alternative ownership models such as a lease or subscription that have contracts for the product's quality and collection at end of use.

In developing countries, such as SA, there is a strong hand-me-down culture. Electronics purchased and used by high and middle-income consumers are often given to those in lower income categories once it is no longer desired. This behaviour extends the life of the product and ultimately shifts the concentration of e-waste away from those that purchased it. Ultimately, these products become waste and there are inefficient systems for collection, infrastructure for processing, and education to ensure safe disposal.

Many of these items follow a linear consumption model and are improperly discarded which has a financial and environmental cost. The raw materials used in electronic products such as precious metals, hazardous chemicals and components are lost to landfill and, in most instances, exit the economy prematurely.

On the whole, the take-make-waste culture, high levels of consumerism due to rapid technological advances and a severe lack of recycling capacity, have led to large amounts of electronics being improperly disposed of by businesses and the public.



Informal Economy

With a 2019 World Economic Forum report indicating that there is 100 times more gold in a tonne of smartphones than in a tonne of gold ore globally, recycling of e-waste presents an economic opportunity.²

Across different sectors in a developing economy, activities involved in the extension of value chains are already prevalent in low-income communities, for example: in SA, the recycling of plastic packaging was supported by 52 100 informal waste collectors in 2020. These waste collectors form the backbone of the recycling sector in SA and work under harsh conditions, rummaging in municipal waste bins or landfills, with little or no protective gear. Their income is highly variable and depends on the quality and quantity of material available.



¹www.statista.com/statistics/488376/forecast-of-smartphone-users-in-south-africa

²www3.weforum.org/docs/WEF_A_New_Circular_Vision_for_Electronics.pdf



Similarly, in the case of the electronics sector, due to limited formal legislation and safe disposal systems, there are various individuals and small businesses that form the informal sector and collect old or broken electronics for repair, reuse or recycling.

E-waste varies significantly in composition, making it notoriously difficult to process. During recycling, electronics can emit highly toxic fumes, hazardous compounds and can ultimately contaminate groundwater, soil and air. These devices have the potential to cause serious harm to health if proper equipment and safety protective wear is not available for workers.

In addition to the health and environmental risks, the informal economy is fragmented and the expansion of the sector would not necessarily result in the development of sustainable end markets for any materials or products recovered.

Access to Feedstocks

The e-WASA states that SA generates about 6.2 kilograms of e-waste per capita annually and only 12% of that is recycled.

The Western Cape province of South Africa, for example, generated between 43 290 and 68 501 tonnes of e-waste in 2020. The market value is estimated at between R55.2 million - R109.8 million per year. At a municipal level, the greatest value lies in the City of Cape Town metropolitan area with an estimated market value of between R36.5 million - R77.4 million.

The lack of reliable data and co-ordination in the sector makes it difficult for producers and government agencies to access or plan for electronic waste. Capitalising on this gap, there are various organisations and informal traders that cherry-pick high value e-waste that is then often sold for scrap metal, which does not allow the true useful value of the item to be realised.

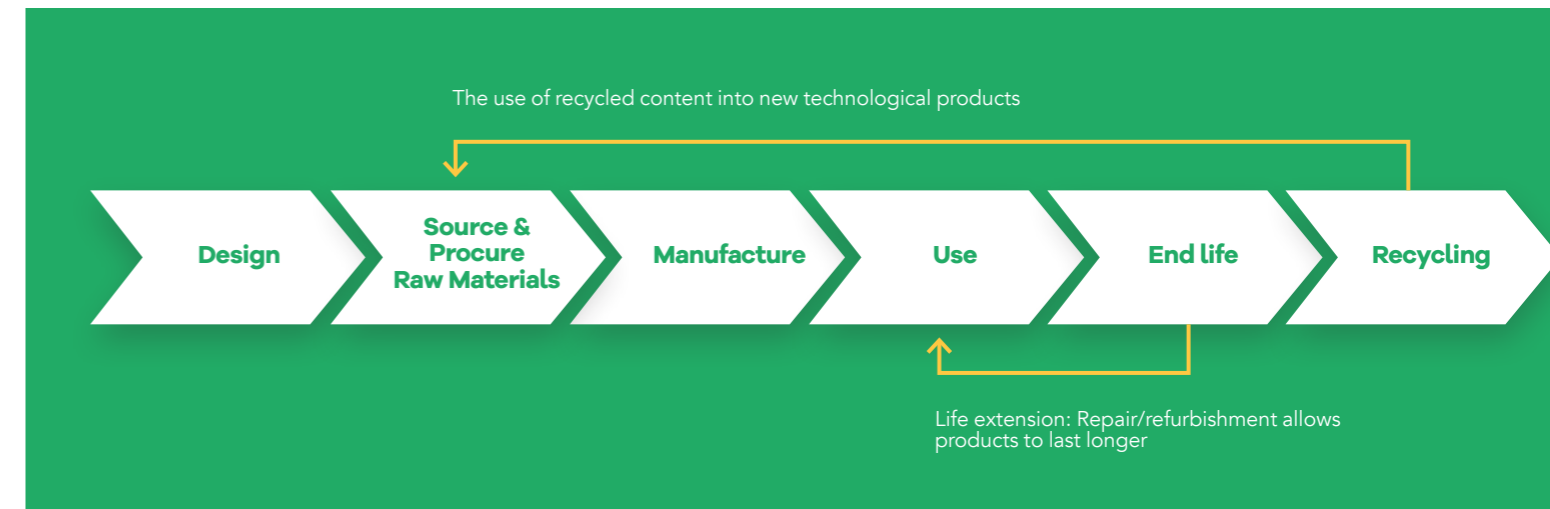
High Unemployment

SA's formal unemployment rate stands at over 30%³, with slow economic growth and a lack of education, training and available opportunities attributed as the root causes of unemployment. Not only does this result in a heavy reliance on government grants by many families, it also greatly affects the mental health of young men and women that are unable to provide for their dependants.

4 Solution

A circular business model, in most instances, extends the value chain of a product's life cycle, thus increasing the number of active participants in the value chain.

Circular model for electronics:



As with all value chains, it is important to note that waste is generated at each stage. Many used electronic goods that are being disposed of are in a functional condition and can be resold as is, while others may need repairs or, at minimum, can be salvaged for parts. Along the value chain, some may be damaged or stock may not be sold. Electronic products have both a high residual and financial value, which makes recovery and processing feasible.

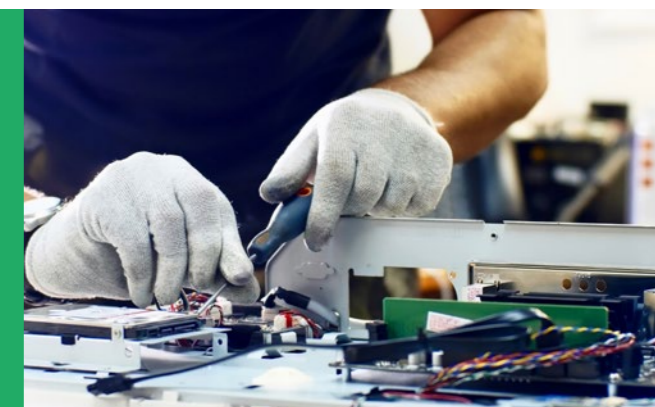
The repair and resale of used electronic goods provides an opportunity for skills development and income generation. Several organisations have leveraged this opportunity: One such example in SA is presented below.

The Appliance Bank

The **Appliance Bank** recruits unemployed men (most often fathers) and equips them with the technical skills needed to repair damaged and customer-returned small appliances that are received from retail partners across SA. In addition to repairing these items, the participants of the programme are trained to sell the products to generate an income.



In this way, The Appliance Bank is able to act as an intermediary linking multiple partners in the retail supply chain to unemployed men that are able to process their waste. In 2018, The Appliance Bank developed a two-year technical training programme covering all aspects of electronic and small household appliance repair. Due to demand, the programme was expanded in 2020 to include training modules covering large household appliances such as microwaves, stoves and fridges. In the future, The Appliance Bank plans to collaborate with the University of Johannesburg to formalise the training and reach a broader audience that can participate in the programme.



³Reported as 34.9% in the third quarter of 2021 by Statistics SA



5 Outcomes and Impact

Professional Development and Income Generation: The transition to a circular economy requires transferable skills that are able to adapt as sectors adopt alternative business models. The technical training offered by The Appliance Bank empowers unemployed men with knowledge and practical experience that can be used to generate an income. More generally, it enables the development of skills that can support a circular economy for electronics.

In December 2020, 154 active businessmen in The Appliance Bank network made R4.1 million in profit overall from the repair and sale of household appliances. In total 110 917 units were received and repaired and an additional 22 000 units were sent to e-waste recyclers.

Scalability: The Appliance Bank has grown to have operations in Cape Town, Johannesburg and Durban and can support 150 men in the programme per intake.⁴

The implementation of Extended Producer Responsibility (EPR) regulations implemented in November 2021 for South Africa's Waste Electronic and Electrical Equipment (WEEE) is expected to spur the industry to localise recycling and processing capabilities, which will create jobs that, in some cases, require specialised skills that many of the beneficiaries of The Appliance Bank acquire and practice through the programme. This may enable further economic and social upliftment of participants, possibly through inclusion in the formal economy.

Driving Resource Efficiency and Access: Between 2016 and 2020, The Appliance Bank received over 412 000 appliances from three retail suppliers. Appliances that cannot be repaired are sent to e-waste recyclers. In this way the Appliance Bank beneficiaries are intercepting and diverting a waste stream that would most likely have gone to landfill and enabling the recovery of valuable resources

Repair and refurbishment prolongs the life of products that are already made and reduces consumption. These items are often sold in peri-urban areas and allow for low-income groups to access electronic products at more affordable prices.

6 Circular Economy

The initiatives undertaken by The Appliance Bank unlocks various circular economy strategies in line with the elements defined by **Circle Economy** as illustrated on the right

CORE ELEMENTS



Use waste as a resource



Preserve and extend what's already made

ENABLING ELEMENTS



Strengthen and advance knowledge



Rethink the business model



Collaborate to create joint value

⁴The Appliance Bank recruits men, who in most instances are fathers. The programme serves as an empowering experience that fosters a renewed sense of dignity, respect for others and respect for self. The Clothing Bank recruits unemployed women, exclusively mothers.

Summary

The Appliance Bank is an example of how waste can become a resource and how a circular economy can preserve and extend the life of what is already made. This demonstrates how the elements of a circular economy can be used to create social and economic value.

The drivers and enablers for the implementation of a circular economy in a developed versus developing country context can differ considerably.

The key drivers for circularity in a developed country are typically environmental factors and high disposal costs, thus businesses are able to adapt their existing value chains to encourage and incentivise the collection of electronic waste for recycling and reprocessing.

In a developing country, such as SA, job creation and poverty alleviation are imperatives. Business models have yet to adapt to take back schemes at the end of a product's life, and even in cases where they have, there is a considerable lack of collection systems and infrastructure to enable processing of electronic waste. However, The Appliance Bank is able to demonstrate that solutions to address the end of life of goods or under-utilised resources from the retail value chain and social and economic upliftment can be mutually beneficial.

The solution provided by organisations such as The Appliance Bank enable the implementation of Extended Producer Responsibility (EPR) regulations to offer both environmental benefits and enterprise development opportunities to the participants within the electronics value chain. As the e-waste sector progresses and more investment and opportunities become available, the men trained by the Appliance Bank would be able to redirect their new skills and specialisations to the formal economy and contribute to a circular economy for electronic products. The Appliance Bank is thus contributing to and building the foundation for circular electrical and electronic value chains by enabling its beneficiaries' to be well placed to serve the wider market as skilled workers or independent solution providers.

