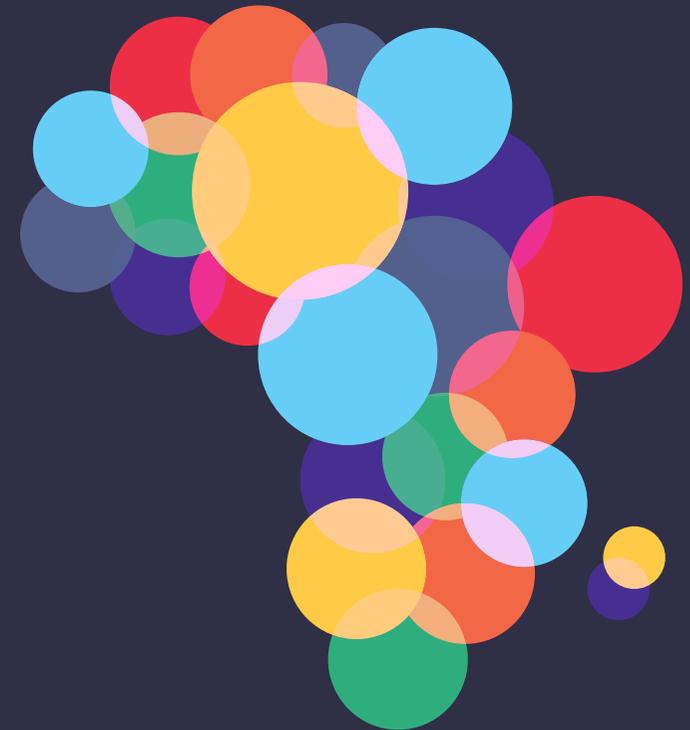


Circular economy in Africa: examples and opportunities

AUTOMOTIVES



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This article is part of a collection of insights on the circular economy in Africa. The goal of this collection is to explore the potential of the circular economy in a selection of key economic sectors in African countries and highlight examples of the circular economy in action. The sectors explored in this study are: food and agriculture; fashion and textiles; plastics; e-waste; automotive; and the built environment. The collection also considers the key role of public policy and the financial sector in creating the conditions needed for the transition to a circular economy.

The collection is the result of a joint effort led by four organisations: Chatham House; the Ellen MacArthur Foundation; ICLEI Africa; and the University of Lagos, who worked closely to combine their complementary knowledge and expertise on this broad topic. While the collection was curated by the Ellen MacArthur Foundation, it reflects a plurality of views and analyses.



Acknowledgments

We are very grateful for the support we have received in producing this article.

Special thanks go to the many leading circular economy practitioners and experts who provided invaluable perspectives in interviews and reviewed this article.

Their contribution to the article, or any part of it, should not necessarily be deemed to indicate any kind of partnership or agency between the contributors and the Ellen MacArthur Foundation, nor an endorsement of its conclusions or recommendations.

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Context

A circular system for automotives is characterised by five innovations: **sharing, electrification, automation, materials evolution, and system level integration of transport modes**. Leveraging a combination of these approaches would mean fewer, better-utilised vehicles – resulting in benefits such as reduced congestion, a decrease in the amount of land and investment tied up in parking and roads, and less air pollution. This is especially pertinent for Africa’s cities, where rapid urbanisation is increasing demand for safe and efficient transport to link the growing urban population to economic opportunities. Added to this, car ownership on the continent is on the rise as the middle class expands and incomes increase accordingly. Currently, congestion is hampering the movement of people and goods in many African cities, consequently hindering socio-economic progress.

There are many opportunities to invest in the development of alternative transportation infrastructure in African cities. Projects such as the Gautrain in Johannesburg, Dar es Salaam’s Bus Rapid Transit System, and Addis Ababa’s Light Rail Transit all stand as beacons of the pioneering efforts being made in many African countries to build effective transport solutions for residents. Moreover, with the highest percentages of commutes by foot or bicycle in the world, African cities can build on their existing active mobility culture to become frontrunners in the circular mobility transition. **Although the potential for a broad transformation of the mobility system in Africa is significant, this chapter specifically focuses on the circular economy opportunities for automotive remanufacturing as an important transitional step in this broader transformation.**

Introduction

Africa's population is greater than 1 billion people - amounting to around 17% of the global population - and yet it accounts for only 1% of total new car sales globally.¹ The African automotives market is dominated by used vehicle imports from Europe and North America. In fact, 40% of a total 14 million used light-duty vehicles exported from Europe, USA, and Japan between 2015 and 2018 went to Africa.² This demand for used automotives is driven by a rapidly growing middle-income class that needs to access low cost and convenient means of mobility, and with road transport accounting for at least 90% of passenger transport in Africa, a car is the obvious choice for many.³ However, the production rate of new vehicles in Africa is low and has dropped by 4% from 1.5 million in 2015 to 1.1 million in 2020, with South Africa, Egypt, Algeria, and Morocco accounting for most of the vehicle production on the continent.⁴ Although other African countries like Nigeria, Kenya, and Angola, operated automotive assembly factories in the last two decades, most of the factories could not compete against growing international competition. Due to this combination of these factors, used vehicles continue to dominate the African market and are therefore important to the automotive industry's circular economy transition.

What impact is this sector having and why is it critical to shift to a circular economy?

The impacts of Africa's reliance on imported used vehicles are significant. Within the first year of usage, 60% of these imported automotives are expected to reach their end-of-life (EoL), resulting in challenges for sustainable material management. Major components such as batteries, gearboxes, and tyres often fail and are subsequently improperly disposed of. Emissions from old, poorly maintained automotives are a major contributor to many cities in Africa exceeding World Health Organization air quality guidelines. Currently, about 50% of the vehicles in use in Africa contribute to elevated concentrations of carbon emissions in the continent, with some vehicles emitting 40 times more nitrogen dioxide and nitrogen oxides than recommended levels.⁴ Additionally, hazardous substances such as oils, lubricants, transmission fluids, and antifreeze are often disposed of directly into water and drainage systems, exacerbating pollution.

The sector urgently needs to transition to a system based on the principles of a circular economy in order to improve its material management strategies, increase resource recovery, and minimise pollution and waste generation. **One critical and positive factor is that Africa's automotive industry is by no means new to the principles of circular economy. There is a thriving culture of repair and refurbishment on the continent, aimed at keeping vehicles in use for as long as possible. Automotive refurbishment clusters have existed in countries like Ghana, Angola, and Rwanda since as early as 1960 and an estimated 85% of all of the vehicles on African roads have been subjected to some degree of repair or refurbishment.⁵ Therefore, the transition to a circular economy needs to build on the existing knowledge and practices.**

USED VEHICLE SECTOR

CIRCULAR ECONOMY STRATEGIES

1

Leveraging repair and refurbishment to keep vehicles in use and create employment

2

Recovering materials from ELVs for secondary applications to tap into new economic opportunities

3

Implementing product stewardship to invest in local industries

1

Leveraging repair and refurbishment to keep vehicles in use and create employment

African automotive clusters are agglomerations of small-scale automotive enterprises providing diverse products and services in the maintenance, repair, refurbishing, recovery, and sales of automotive material within their local geographical area. Through clustering, the automotive enterprises are able to reduce the constraints faced by individual businesses in developing capital, skills, technology, and access to markets for the industry. The cluster accelerates their constituent's growth by sharing machinery, encouraging knowledge, and harnessing technology for specialisation in different value chains within the industry. They leverage local comparative advantage to achieve collective efficiency for economic growth.⁶

One example is the Suame Magazine Automotive Centre in Ghana, which is the largest cluster for vehicle repair and manufacturing in Africa. Set up in the 1930s, the Suame cluster now has more than 100,000 members who provide interdependent skills and services in relation to different aspects of dismantling, refurbishing, repurposing, and remanufacturing for the local automotive industry.⁷

In Nigeria, the Nnewi automotive cluster started as a local apprentice scheme for four villages – Otolo, Umudim, Uruagu, and Nnewichi – in the South East of Nigeria over four decades ago. It is now estimated that the cluster generates 80% of all locally fabricated automotive spare parts in Nigeria. Popularly referred to as the “Taiwan of Africa”, due to the transfer of Taiwan technology to some of its cluster members, the cluster is known as Nigeria’s self-industrialised hub.⁸ The Suame and Nnewi clusters provide jobs for over 30,000 people and handle over 560,000 tons of automotive materials annually.

Investing in the creation of formal automotive refurbishment and repurposing cluster centres will improve the recovery rate of materials from end-of-life vehicles (ELVs) and enable local material feed-in mechanisms to prolong the lifespan of vehicles and remanufacturing of spare parts. These clusters also play a vital role in the transfer of technical knowledge for the repair, maintenance, and repurposing of vehicles within the Africa automotive industry.

2

Recovering materials from ELVs for secondary applications to tap into new economic opportunities

ELVs (end-of-life vehicles) are potential resource banks of secondary raw materials: electronics, metals, plastics, and batteries recovered from them can all be innovatively reintroduced into the economy, either within the automotive industry or in other applications. With an estimated 4.8 million vehicles reaching EoL in Africa per annum, this is a significant potential material resource that can be harnessed and kept in use within the system.

Currently in many African countries, investment and policies aimed at a sustainable automotive industry are geared towards increasing capacities in the assembling and upgrading of new automobiles, rather than harnessing the diverse opportunities for automotive circularity presented by the dominant used automotive market.⁹ The opportunity to recover materials from ELVs for secondary applications at scale remains to be captured by the public and the private actors.

3

Implementing product stewardship to invest in local industries

The African automotive industry could provide significant resources needed by automotive manufacturing companies to close the material loop of their products and reduce the use of virgin raw materials. Large volumes of vehicles reach EoL in Africa, however, there are little or no facilities or capabilities to accept these materials for remanufacturing. There is an opportunity to effectively divert automotive materials away from dumpsites through product stewardship take-back schemes run by international manufacturers. Product stewardship by the manufacturers could support the infrastructure and capacity needed for automotive dismantling, assembling, and material recovery in the African automotive industry. Doing so would increase automotive material circularity, lower the cost of production, and expand the automotive market size. A global tracing and credit system between automotive manufacturers and the local African automotive industry could deliver direct and indirect infrastructural finance to facilitate closing the material loop within the industry.

Harnessing the enabling role of information and digital technologies

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Research-based evidence for automotive circularity

Although there are existing small informal automotive markets creating reuse and refurbishment for EVs within most countries in Africa (for example the Nnewi and Ladipo market in Nigeria, and the Suame magazine in Ghana), the lack of empirical data on the size and impact of these contributions to the automotive industry reduces their significance. Indeed, one of the major challenges that needs to be addressed to accelerate the transition to automotive circularity in Africa is the limited research-based evidence on the potential benefits of embracing the circular economy within the industry.

Digital hubs to improve automotive circular supply chains

Presently, there are information gaps between stakeholders in the supply chains of automotive circular systems regarding product availability, quality, and specifications. Leveraging digital hubs to improve the distribution of circular supply chains for automotive materials and products will improve transboundary resource management for the circular economy model. Using such technology will promote effective information sharing on materials availability and verified specifications among automotive stakeholders - from manufacturers and second-hand dealers to end-users.

Technical skills acquisition for automotive circularity

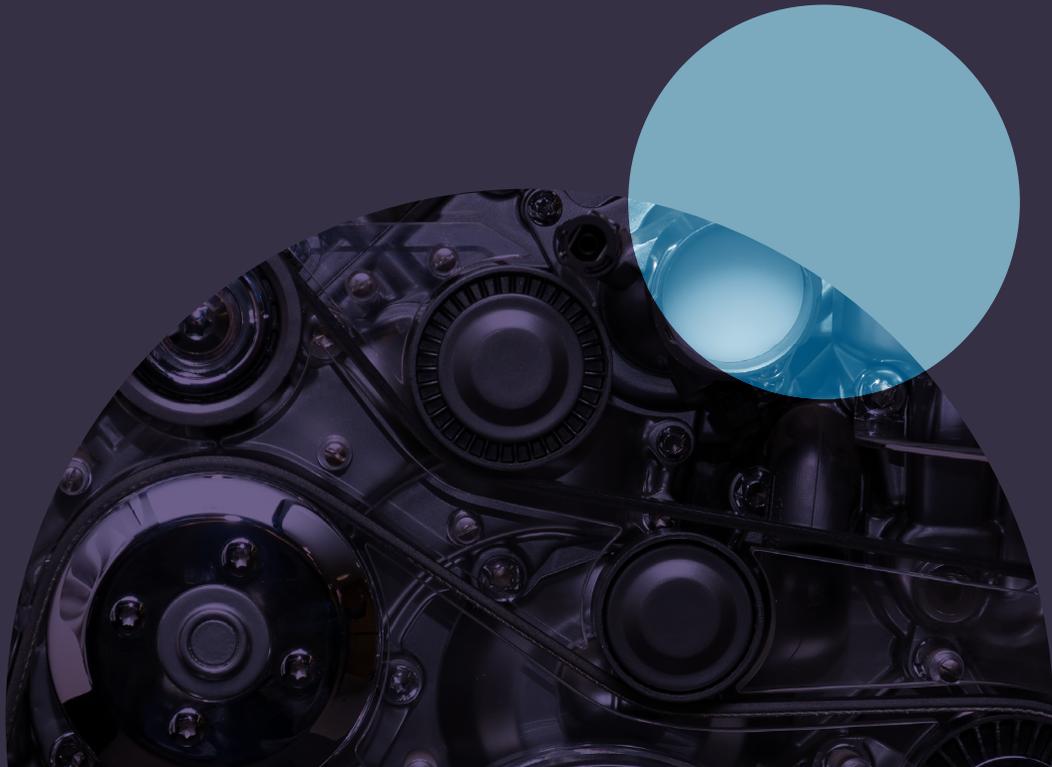
There is also an existing deficit in the skills and technology required to drive a sustainable automotive circular economy among a lot of the current players in Africa. The current techniques used for maintenance, repair, and refurbishment are mostly manual and could be optimised. Investment in human capital, capacity development, and awareness and technology training networks would upgrade automotive technical skills and drive the interest of new players in circular materials management and data gathering within the African automotive industry.



Case study

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Sergey Kohl via Adobe Stock

Suame Magazine Automotive Centre Ghana: creating employment by keeping materials in use



The Suame Magazine Automotive Centre is an ingenious automotive refurbishing cluster established over 60 years ago. This cluster system is one of Africa's largest industrial clusters. It comprises over 100,000 members who provide interdependent skills and services on different aspects of dismantling, refurbishing, repurposing, and remanufacturing for the local automotive industry. The large array of cluster members reduces the constraints in capital, skills, and local technology peculiar to most automotive markets in Africa. The cluster has an automotive circular activity index of 20% vehicle repairs and refurbishment, 25% maintenance, 10% metal work refabrication, 25% sales of materials and vehicle accessories, and 20% sales of spare parts. It provides services, technical skills, and employment, and it supports the cascading of automotive materials for three neighbouring countries.

Endnotes

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