THE ROLE OF DESIGN IN THE CIRCULAR DESIGN ECONOMY IN EAST AFRICA

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ABSTRACT

Background: Every item around us begins with the thought process of a designer. The creativity, labour and energy that went into the creation of these products is not sustainable if they cannot be kept in circulation. This study aims to develop the environmental sustainability movement by exploring the meaning of Circular Design Economy. ***Problem:*** Products and materials used in the economic processes in East Africa do not have a sustainable lifecycle. Many items and materials are not able to go through a recycling process and instead pollute the environment. The problem arises from the environmental harm posed by products that have a design unable to be circulated. ***Objective:*** The main objective of this study was to identify the role played by the designer in the Circular Design Economy process. ***Design:*** Using qualitative research, the study applies the case study design research method. ***Setting:*** The study was carried out on the Circular Design Economy in East Africa. ***Subjects:*** The subjects of this study were designers in order to understand the role they play on the Circular Design Economy. ***Results:*** The results proved that designers play a crucial role on a multiple levels to eliminate waste and pollution by generating products and materials that can be circulated to be used over many product lifetimes. The results also proved that more than ever before, having this design strategy involved now would form a more resilient economy that can help designers address global challenges. ***Conclusion:*** In conclusion, the study showed the positive impact that would be created by having a stable Circular Design Economy in Eastern Africa. It also showed that without designers, it would not be possible to create a circular Africa.

Keywords: Circular Design Economy, designer, sustainability, environment, economy, East Africa

1.0 BACKGROUND

In the biological living world, there is a natural flow in the system. Energy is primarily provided by the sun which sustains all life. The sun allows for the growth of plants, which is food for a living organism, which is in turn food for another animal. The death of an animal does not result in any waste – it simply goes back to the ground where it decomposes into nutrients. It is a sustainable system that works.

On the other hand, humans have developed a linear system. According to a 2011 YouTube video by the Ellen McArthur Foundation, the concept we have adapted as humans is 'Take, Make, Dispose.' A good example is cell phones. They are easily replaced by buying new ones. The old ones are rarely ever properly recycled as they could be sold, disposed off, or left unattended. What we do not realize is that we add on to a supply of toxic waste that harms the environment by polluting it.

The aim of this study is to identify how we can imitate the circular method the natural world and apply it into our economy. It is important to identify how our waste can build capital rather than reduce it. Designers have a major role to play in this circular method. By having proper design thinking, designers are able to design products as well as packaging material that would add to environmental benefits as opposed to environmental harm.

As for items that are non-biodegradable, such as the previously mentioned phones, there would have to be design rethinking. Valuable resources such as metals can be recycled in order to maintain their quality for future reuse. The Ellen McArthur Foundation proposed the question, 'What if the goods of today, became the resources of tomorrow?' This brings forth the circular design strategy. Instead of the 'take and dispose' idea that we are conditioned to, designers could adopt a strategy whereby the product could be renewed instead for resale and usage (Ellen McArthur Foundation, 2011).

Designers are the backbone in the global circular economy. The functionality, aesthetics and most importantly the environmental impact of a product or service is determined by the designer. This study will go into detail on the role that a designer plays in the circular design economy.

1.1 Problem

The problem of this study arises from unsustainable design and its negative global and climate impact. According to the Africa Waste Management Outlook (2018), Africa is recycling only 4% of its waste. A prediction from the African Union was in hope that by 2023, African cities will be recycling at least 50% if this waste. A 2012 statistic showed that about 125 million tonnes of waste was generated by African countries – which was expected to double by the year 2025.

The above statistics show the extremely poor waste management system put into place in Africa. This could be as a result of poor design, aside from ignorance and carelessness of African citizens. The fact that the waste size is in terms of tonnes shows that there is a dire need for proper waste management as well as circular design that would reduce or completely eliminate environmental harm in Africa.

However, this study is specific to Kenya and will draw in to the impact on the country.

1.2 Research Questions

1. What is the meaning of a Circular Design Economy?
2. What is the status of Circular Design in Kenya?
3. What role do designers play in Circular Design?
4. In what ways is Circular Design applied in Kenya?

1.3 Research Objectives

1. To explore the meaning of a Circular Design Economy.
2. To identify the status of Circular Design in Kenya.
3. To investigate the role of designers in Circular Design.
4. To study the application of Circular Design in Kenya.

1.4 Research Design

Using qualitative research, the study applies the case study design research method.

1.5 Setting

The study was carried out in Kenya.

1.6 Subjects

The subject of the study is Circular Design in Kenya.

2.0 RESULTS AND DISCUSSION

The results of this study thoroughly delve into what Circular Design Economy means. It shows the principles, benefits, as well as the role of designers. It then focuses on the Kenyan Circular Economy and the challenges occurred to integrate it.

2.1 Definition of Circular Design Economy

The circular economy is a systems solution framework for building a resilient economy that delivers both long term prosperity and a means to address global challenges (Ritchie & Freed, 2021).
The Ellen McArthur Foundation is the leading force behind this cause. The foundation says that in the current global economy, the system for waste management is linear. This means that there is a 'take and throw' system, whereby products are used and disposed as toxic waste. A circular economy on the other hand ensures that the life cycle of a product or service is 'circular', meaning that it can be recycled or reused without any environmental harm.

The image below shows the difference between a linear economy as compared to a circular economy:

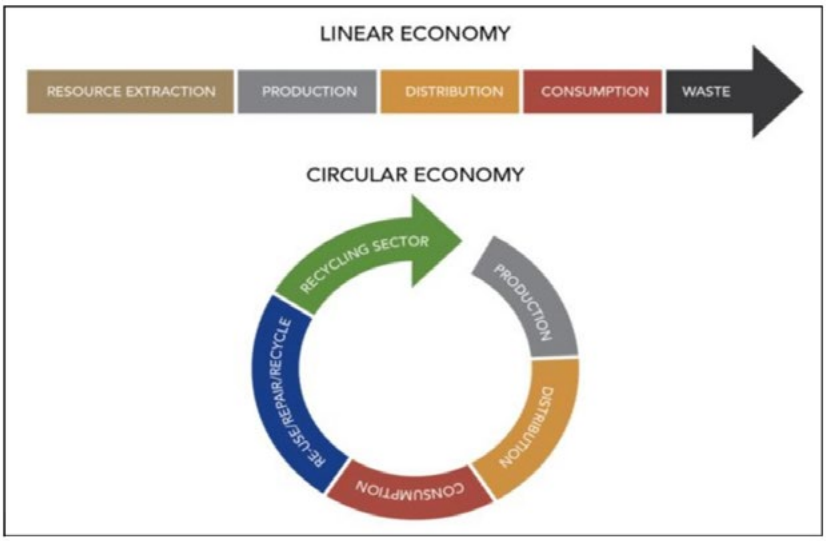

Figure 1: Linear Economy vs. Circular Economy
Source: (www.reserachgate.com, Retrieved 18/01/2022)

2.1 Principles of Circular Design Economy

The following three are the principles that guide a Circular Design Economy:

2.1.1 Waste and pollution elimination

The core of a Circular Design Economy is based on the fact that there will be zero waste generated from any process whatsoever. In order to accomplish this goal, it is crucial that products are built to last. This is heavily dependent on the materials that are used for building a particular product. The use of sustainable materials is absolutely necessary in order to attain circular design.

Another aspect that is imperative when it comes to waste and pollution elimination is creation of products that are easy to disassemble. For example, a modern cell phone can easily be disassembled for repair to avoid purchasing a new one which could collectively have a negative environmental impact. In terms of economic impact, this system would save resources as well as labour.

Fig. 2. An iPhone 11, disassembled
Source: www.ifxit.com, Retrieved 17/01/2022

The figure above shows the various parts taken to assemble a phone. These could be replaced or recycled in the case where the phone ceases to work, therefore saving resources made for a new one as well as having a positive environmental impact. This is what is meant by waste and elimination reduction in Circular Design.

2.1.2 Keeping products and materials in use

Rethinking a material's life cycle has an impact on a real possibility of waste reduction. It is important to realize the current uses of a material and how/if it is capable of waste generation. In a linear economy, valuable materials are lost to landfills once their use is over, meaning that they are not recycled properly. It is an unfortunate scenario as the material could be saved to serve another purpose.

However, this stratgey does not only apply to use of sustainable materials. It is a system that advocates the circulation of existing products as opposed to getting new ones, for example, food packaging tins.

An example of such an organization is an LA-based company, Replenish. The organization has invented a multi-purpose and reusable bottle that replaces single-use plastic bottles. They offer products that can be refilled in the same bottle by attaching them to pods to refill them. This creative design reduces plastic footprint by both the user and the organzation.

The system of the spray bottle has a pod at the bottom that can be filled with concentrate, be it detergents or skincare. Water is added to the top part of the bottle and the pod is then pushed down to release concentrate into the water which can be sprayed.

Below is the look of the multi-purpose, reusable bottle:

Fig. 3. Replenish spray bottle
Source: www.myreplenish.com, Retrieved 17/01/2022

2.1.3 Regenerate natural systems

Waste is a non-existent concept in the natural world. The biological world can survive instinctively without any additional support system. One organisms waste is another's meal. This makes it a circular system. However, in the human world it is quite the opposite. There is a linear system whereby the aforemetioned 'take-make-waste' philosophy is applied.

This principle of Circular Design Economy aims to eliminate waste as a by-product of design and replace it with the need to rethink product and material life cycles for resiliency, recylability and reusability. Therefore, it is crucial to develop systems that are as natural and harmless as possible.

An example of this sort of system is The Balbo Group in Brazil that grows organic sugar. The aim of the organization is to reduce the impact of sugar-cane farming on the environment. They do this by reusing all the organic matter to act as natural fetilizer for the soil while elminating chemical fertilizer. They also produce their own thermoelectric energy from sugarcane baggase. This is a natural production process that poses zero environemntal harm.

2.2 Benefits of Circular Design Economy

There are numerous benefits to developing a Circular Design Economy. These are explained below:

2.2.1 Environmental benefits

Measures taken to obtain a circular economy would result in lower carbon gas emissions as well as a minimal plastic footprint. It will also push forward beneficial and efficient waste management measures. The circular economy model is a system of actions that would greatly reduce precarious climate change. It would also increase the security and value of raw materials.

2.2.2 Economic benefits

New materials are costly. The usage of materials readily available in the environment would reduce the cost required to create or invest in new resources. It is important to note that waste disposal is also expensive, therefore, when it is eliminated it would increase the profit margin.

Ritchie & Freed (2021) in their book 'Circular Economy for Dummies' say that organizations that integrate Circular Economy in their systems experience about 5% gains in their performance.

The integration of a Circular Economy would also create employment opportunities and therefore, create an increase in gross domestic product.

2.2.3 Consumer satisfaction

There would be a positive impact on customer satisfaction when the quality and durability of a product would improve by integrating the principles of Circular Economy. In 2022, a majority of global population is behind the sustainability cause. This means that there would be an admiration and support to a business which is committed to sustainable design and climate change prevention (European Parliament, 2021).

2.2.4 Creative benefits

The design sector is one of the sectors that would heavily benefit from a Circular Design Economy. Increased competitiveness would impact innovation in design, therefore benefit the design thinking and growth of designers involved in different organizations (Ritchie & Freed, 2021).

2.3 Circular Economy in Kenya

According to a UNEP report in 2021, Kenya is the leading country in East Africa in the fight against plastic pollution. It is amongst the first countries in Eastern Africa that has made a tremendous effort to eliminate single-use plastic. It is also one of the first African countries to sign the Clean Seas Initiative to get rid of plastic waste in waterways.

Kenya was applauded by Juliette Biao, the Regional Director for Africa for the United Nations Environmental Program (UNEP) for the plastic bag ban as well as the plastic cutlery ban in national parks. She congratulated the country for investing in a move that would recognize Kenya's environmental stewardship.

A UN statistic in 2021 identified that Mombasa creates about 3.7 kilograms of plastic into water bodies annually. However, the fight against plastic will gradually decrease the statistic.

Kenya is one of the most green-conscious countries in East Africa. Long before the plastic ban, the country adopted the 'Green University' initiative about a decade ago - which is a movement that aims to make university campuses greener (UNEP, 2021).

Since then, the country has made a conscious effort to eliminate plastic and move to sustainable design options.

2.4 The Role of Design in Kenya's Circular Economy

2.4.1 What is the current situation?

'Design sits prominently at the heart of the circular economy' (Ellen McArthur Foundation).

To be realistic, most of the design being created in Kenya at the moment is still linear in nature. In order to create circular design, there would need to be plenty of design rethinking and innovation to turn the system around. Design requires critical thinking from the process, manufacture, materials and usage.

Although the Circular Economy concept is new to Kenya, the country has made significant effort to integrate it in the system. The Kenyan government has put in policies to enable the transition from a linear to a circular economy. Kenya is currently following the route to circular design which will result in a sustainable economic system that allows for proper waste management and recycling. It will also create employment opportunities especially for individuals in the design sector whose input would be highly valuable to develop a new design system (Netherlands Enterprise Agency, 2021).

2.4.2 What is the role of the designer?

"Designers, they have control of what raw materials they will use, how the products will be manufactured, how the product or material will be used, how it will be perform" (David Oakey).

Designers are the backbone of the Circular Design Economy. They are the brains behind the operation and it would be impossible to creative innovative and efficient solutions without the designer. The following are some of the crucial roles played by the designer to develop a Circular Economy:

2.4.2.1 Materials

In Circular Design, there is a sustainability objective to be achieved. Sustainability in design is heavily dependent on the materials being employed for design. Designers have knowledge about various materials, their characteristics, strengths and weaknesses. This enables them to make the best decision

when selecting a material for a particular product or service needed for circular design. Designers are able to pick out non-toxic and sustainable materials for a circular economy.

2.4.2.2 Creativity and innovation

Designers are artistically inspired to have an imaginative mindset. Owing to this fact, designers are an essential tool to developing circular design in Kenya. They would be able to create advanced design that can support sustainability of the material as well as the product. Kenyan designers develop a design foundation in higher learning institutions that integrate use of raw and locally-available materials to develop design-thinking. This knowledge assists the designer to create innovative solutions.

2.4.2.3 Redesigning

To create the major shift from linear design to circular design in Kenya, designers have the responsibility to redesign. This includes the redesign of business models, products and services. Most design systems in Kenya are linear, meaning that redesigning is a pivotal aspect to integrate circular design. For example, packaging of a certain product could move from plastic to brown boxes.

The section above explained why designers are crucial in circular design in Kenya. However, below are some of the design strategies in Kenya that have already adapted circular design.

2.5 Examples of Circular Design in Kenya

The following are strategies that show how circular design has been applied in Kenya:

2.5.1 UoN BikeShare by Circular Design Nairobi

This is a circular design transportation system that provides bicycles for use by anyone within the designated area. This idea was to cater for University of Nairobi campuses which may prove to be too far to walk to or to get local transportation. The idea is to create an efficient and cost-friendly transport system that makes the school accessible and easy to travel around (Circular Design Nairobi, 2017).

The UoN Bike Share concept applies circular design by application of reusability and environmental conservation. Instead of an individual using a transport system that would release harmful smoke to the biosphere, this method is healthy for both the environment as well as the individual that it staying active by biking.

Below is an image of the 15 bikes.

Fig. 4: UON BikeShare Project
Source: www.circulardesignnairobi.com , Retrieved 18/01/2022

2.5.2 Milk ATMs in Kenya

Another significant element of circular design in Kenya is milk ATMs. These vending machines are an excellent waste management system as they eliminate packaging material from the environment. Other circular design aspects that are depicted are elimination of packaging costs and reduction of plastic milk bags from being disposed off carelessly in the environment. The milk is also sold at a cheaper rate since the middleman is eliminated from the supply chain (Schmidt, 2021).

Below is an image of a milk ATM in Kenya. These also come in moving cars to allow accessibility for the consumer.

Fig. 5. Julius Kambi at his milk and cooking oil ATM
Source: www.businessdailyafrica.com, Retrieved 18/01/2022

2.5.3 Soko Fresh Kenya

According to a statistic by Soko Fresh Kenya, 50% of Kenyan agricultural produce does not make it to the market due to an unreliable supply chain.

Soko Fresh provide farm level cold-storage that is mobile and efficient. This allows farmers to store fresh produce until it is sold, therefore generating more income. Most importantly, it is an incredible solution to the agricultural waste issue in Kenya due to produce rotting away when not sold. This is why it is an incredible idea for circular design in the Kenyan economy.

The following is an image of one of the mobile containers that Soko Fresh Kenya provides for the Kenyan agricultural and horticultural sector.

Fig. 6. Soko Fresh container
Source: www.sokofresh.com , Retrieved 18/01/2022

2.5.4 Close the Gap Kenya

Close the Gap Kenya is an organization that strongly believes in making digital solutions accessible to everyone in order to improve the general livelihoods of everyone. They aim to support young entrepreneurs by making education and technology available for them.

They take part in the circular design movement by recycling, refurbishing and remarketing IT material such as computers. They then make the items and technology available for social and educational purposes.

This initiative reduces the toxic waste that is seen in landfills which cannot be recycled. This organization applies circular design by refurbishing and reusing what is already available instead of seeking out for new materials.

Below is an image of the employees at work with IT material.

Fig. 7:.Close the Gap Kenya Workshop in Mombasa
Source: www.closethegap.org , Retrieved 18/01/2022

2.5.5 Alisam Kenya by Newton Owino

Newton Owino is the Kenyan genius based in Kisumu who owns Alisam Products Development and Design. The organization uses fish skin to create fish leather. This material can then create different products such as leather jackets, belts, gloves, chairs and caps.

In his interview with Daily Nation, Newton says that the firm was created as a sustainable design solution for the waste created from fish industries along Lake Victoria (Maina, 2021).

The circular design aspect of this firm is that it manages waste aside from using a raw and natural material to create products. The products do not cause any harm to the environment even after years of usage as they are made of a natural material.

The following image is of Newton Owino, the man who created the 110 million KES organization solely from fish in his hometown.

The above text showed examples on how Kenyans have started to integrate circular design in the Kenyan economy.

The text below will show the challenges faced in doing so.

Fig. 8. Newton Owino with shoes made from fish leather
Source: www.pd.co.ke, Retrieved 18/01/2022

2.6 Challenges of Integrating Circular Economy in Kenya

Despite of Kenya making an effort to stay on the path towards circular design, there are some hindrances that come to play that deter circular growth. These are as follows:

Legal implications can be a hassle. Owing to the newness of circular design, the legal policies are still not fully implemented. Tax regulations are still developing which makes them vague and risky.

Financial limitations are a challenge. Coming up with new innovative design may be costly from the sketching, prototyping and testing.

People may not be willing to invest in a new product that is out of their comfort zone and likeness. They may prefer to stick to what they know and what they have used previously.

In Kenya, a design could easily be reciprocated and produced to sell to other people before your own design can fully take off. The intellectual property law is not a sector in Kenyan law that has not entirely developed.

Energy required for creation of new design could be costly. Electricity is expensive. Moreover, it is inaccessible or unavailable in other parts of the country.

Despite of these challenges, Kenyans are still head-strong about creating innovative circular design.

3.0 CONCLUSION

Being the most advanced specie on earth, we have the responsibility of taking care of our home. It is the duty of every human to make a conscious effort to treat the environment with the respect that it deserves. Instead of being trapped in the present, we can change our current state and futures with creativity and innovation. The circular design economy can help to create transformative ideas that can change our direction as a society to allow progression. By rethinking our design solutions, we can redesign our future as well as the future of the generations to come.

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