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Capacity Building in Waste to Wealth: Reusing of Discarded Tyres for Making Household Furnitures

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Abstract. This paper discussed capacity building and its relevance in the transformation of waste to wealth. The study enunciated that capacity building strategies in waste to wealth are anchored on harnessing creative skills for stimulating entrepreneurial opportunities. It emphasized that entrepreneurial ideas in the areas of waste to wealth contribute immensely to the economic growth of developing countries to create sustainable jobs. The paper noted that reusing tyres and other was items is more environmentally sustainable that recycling processes which pollutes the environment. However, the researchers skillfully reused discarded tyres in producing household furniture. Foam and Adire fabric was utilized as cover for the produced furniture for usability and attractiveness. Metal stands were affixed underneath the furniture to achieve balance and durability. The produced furniture is suitable for homes and public use.

Keyword: Capacity-Building Entrepreneurship Waste management Reuse

1. Introduction

Capacity building is the development of knowledge, skills and attitudes in individuals and groups of people relevant in the design, development and maintenance of institutional and operational infrastructures using processes that are locally meaningful. Entrepreneurial development is anchored on robust capacity building strategies which involves harnessing creative skills essential to create economic opportunities. The increasing population in Nigeria is an enabler for creative minds to deploy their skills in stimulating viable employment opportunities which provides means of livelihood for the growing labour force. Creative entrepreneurial initiative contributes immensely to the economic growth of developing countries in creating sustainable jobs. Apparently, Nigeria is confronted with the challenges of ineffective waste collection system, inadequate coverage of the collection system and poor management of collected wastes. Creation of regulatory frameworks to encourage private individuals to invest in waste collection, recycling and reusing are necessary to build capacity in waste to wealth. Used or expired items in the environments such as empty cans, containers, used/expired tyres can be transformed to objects of high premium value when recreated or reworked by creative minds. Recreating disposed items skillfully could be a major source of livelihood and income earning in a developing economy like Nigeria. Entrepreneurial prospects in the waste to wealth value chain are focused on transforming expired used objects into valuable functional items to generate sustainable livelihoods. The business model of a waste management venture involved in the reuse of waste materials should entail feasibility/cost-benefit analyses; returns on investment/pay-back analyses; branding, marketing and distribution networks; analysis of competitiveness. The easy access to unused or expired tyres spurs entrepreneurial drive into these areas and enables skillful creative individuals to explore the transformation of these into objects functional objects of value. Apparently, this creative method of managing disposed tyres preserves it for future reuse and more appropriate than the destructive way of recycling through burning.

1.1 Solid Waste Management in Nigeria

The rapid increase in global population has driven an upsurge in socioeconomic activities such as

industrialization, technological developments, changing lifestyles and consumption patterns. Daily human activities produces different kinds of waste constituting harmful environmental threat to residents of cities in developing nations across the world. Nigeria, with population exceeding 170 million, is one of the largest producers of solid waste in Africa (Bakare, 2019). Nigeria generates more than 32 million tons of solid waste annually, out of which only 20-30% is collected (Bakare, 2019). However, Nigerian federal government promulgated environmental 1988 to safeguard the public space from environmental nuisances that endangers the society. Adewole (2009) noted that, one of the few statues in Nigeria, which attempts to define waste is the Lagos State Environmental Edicts
1985, there in Section 32, waste is define as follows:
Waste includes:
i.) Waste of all description.
ii.) Any substance, which constitutes scrap materials or an effluent or other unwanted surplus substances arising
Sridhar (1996) defined waste any unavoidable material resulting from domestic activity or industrial operation for which there is no economic demand and which must be disposed of Adewole (2009) further classified municipal solid wastes classified in terms of three major sources of generators: residential, commercial, and industrial. In Nigeria, municipal waste densities generally range from 250–370 kg/m3 (Amber, Kulla & Gukop, 2012).The enormous investment opportunities in waste management offers high return on investments for public and private sectors. Developing countries like Nigeria, have challenges with the management of solid wastes that varies from the industrialized nations in the aspect of composition, density, political and economic frameworks, quantity of waste, access to waste for collection, awareness, and attitude. Inappropriate disposal of solid waste in most Nigerian cities contribute enormously to the unattractive state of major Nigerian cityscape and the deepening low quality of lives. Frequently practiced waste disposal methods in Nigeria, such as burial, open-air burning, and open dumping, have shown to be ineffective and detrimental to public health and the environment. The environmental effects of poor waste management also include water and air pollution. An improperly disposed waste block waterways and drains resulting into fatal flooding and create a fertile environment for mosquitoes to breed.

1.2 Used and Expired Tyres in Nigeria

Tons of used plastic products and rubber products like worn tyres litters the Nigerian environment. It is estimated that 259 million tyres are discarded annually in Nigeria (foraminifera, 2018). Disposed tyres constitute a large chunk of the municipal solid wastes in Nigeria due to the country heavy reliance on road transportation. The discarded tyres are not fit to be used by vehicles because their continuous usage can cause accident leading to the loss of human lives. Often, waste tyres are retreaded for reuse, or processed into crumbs for making surfaces and into chips for use as a solid fuel (foraminifera, 2018). However, the unconducive business environment in Nigeria caused by poor infrastructure and multi-tax system hinders industries such as tyre production factories that can either retread or recycled for use. The previously available ones have relocated to neighboring countries. Used tyres are typically discarded, reused or burnt. Open air burning of tyres pollutes the air, contaminates the soils, alters their physical and mechanical properties and makes the soil prone to ecological disasters. Hence, this research reused discarded tyres to produce furniture suitable for home use.

2. Methodology

This research design is product development. The research population are eight unused and expired tyres packed from dumpsites around Ifo Ogun State. The materials utilized for this research include unused tyres, fabrics, dye, hydroSulphate, Soda, Foam, wooden plank, Binding wire

2.1. Procedure of Production

Production of Center Table
Tyres were washed and dried to remove dirts. The fabric was also washed and spread in the sun to dry, then dyed into red and blue using Adire technique (see Plate 2). Dyed fabric was ironed for smoothening. Foam materials with minimal thickness were wrapped and fixed firmly on the tyres using stapled gun to prevent removal of the foam from the tyre. Likewise, the dyed fabric with Adire patterns were laid and wrapped on the foam covering the exterior of the tyres (see Plate 3, and Plate 4). To create a seat, two wrapped tyres were fixed together using screwed steel plate (see Plate 5), short pieces of 2×3 planks were inserted into the joined tyres and nailed on wooden round shape base fixed underneath the lower tyres. A round glass piece was placed and affixed on the upper part of the joined tyres to produce the center table. Adhesives was applied to the edges of the wrapped foam and fabric to achieve good finishing.

Plate1: Retrieved discarded tyres

Plate 2: Dying of Fabric

Plate 3: wrapping of foam on the tyres

Plate 4: Affixing foam to the tyre with gun stapler

Plate 5: Affixing Adire fabric and foam to the tyres

Plate 5: Joining of wrapped tyres with metal the

Plate 6: Inserted 2×3 Planks placed on an underneath base

b)

Plate 7: Application of adhesives to the edges of the wrapped foam

Production of Seats with Back Rest

Some of the tyres were cut into two, using saw blade and small pieces square shaped plywood were inserted into the openings to brace and strengthen that section of the seat to provide the needed comfort when rested upon. These parts of the seat was wrapped and covered with foam and adire fabric. The back rest was placed on a complete tyre that has an underneath base affixed with 4pieces of 2×3 in the interior and covered on to the top with roundish based wrapped with foam and adire fabric which enables users to seat. Four sets of these seats were produced and each has aluminum steel attached underneath to create balancing for the seats and center table

Plate 8: Cutting of tyres into two to create a back rest

Plate 9: Insertion of plywood pieces into

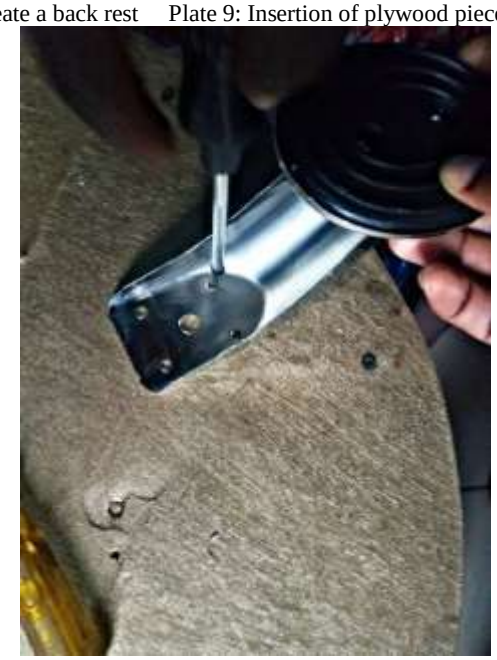

Plate 9: Fixing of metal stands to the furniture base

Plate 10: Seat wrapped with foam

Plate 11: Seat wrapped with foam and fabric

Plate 12: Complete Set of tyre made furnitures

3. Discussions and Results

The result shows that expired and used tyres can be skillfully reused to create objects of premium and functional value. The produced furnitures resonate comforts and style. Balancing and movability are the trademark of these creative items. The steel stands attached underneath the furniture's enhance balancing and movability. Adire fabric covers add richness and colourful socio-cultural embodiments to the furnitures. Also, the incorporated foam material enables easiness and usability. These furnitures fit for both indoors and outdoors due to the aesthetics and adaptability features. Therefore, they are suitable for offices, banks, hotels, public buildings, homes and others. Tyres are sturdy and non-degradable, hence the furnitures will be durable and long-lasting.

4. Conclusion

The transformation of expired and used tyres into home and office use furnitures showcases the entrepreneurial opportunities therein in the application creative skills to items of perceived little or no value. Capacity building in waste wealth leverages a sustainable means of livelihood across the value of production of in the reuse of discarded items. Also, this type of entrepreneurial venture can easily be setup because the primary materials are cheaply available. Creative reuse of discarded items such as tyres hitherto changes the perception of these items as being objects of no value that constitute an environmental nuisance which could endangered human lives. Reuse is environmentally friendly, safe and cost effective approach to disposing waste materials than other recycling methods.

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