

## Wood Carving in South-Western Nigeria a Techno-Economic Analysis of Tree Species Utilization

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**Abstract:** The wood carving industry prevailed in many West African communities of the forest zone where both hard and soft wood abound for thousands of years. The industry has passed through many stages of development, from a purely primitive structure to a near-modern business concern. Wood Carving is an important and long established traditional artifact industry in Lagos and Ibadan metropolis which are the study Area. The wood carving industry has a very rich cultural background that has influenced in no small way, its organization, products and survival. An investigation of the various wood species used in carving wood work was carried out and the specific gravity of prime species estimated. The Benefit-Cost analysis was carried out for the business as well as the rate of returns on investment. Wood species such as *Khaya ivorensis*, *Terminalia ivorensis*, *Tectona grandis*, *Nauclea diderrichii*, *Azizelia africana*, *Celtis zenkeri*, *Mansonia altissima* and *Alstonia congensis* have specific gravity of 0.85, 0.74, 0.71, 0.67, 0.66, 0.62, 0.52 and 0.36, respectively. The beautiful thing about this is that such wood species with low specific gravity that are often rejected in construction and joinery have a place in carving industry. The benefit-cost analyses are in the ratio of 3.33:1 for smaller products and 1.32:1 for bigger products. This makes the business viable since the ratio is greater than one in both cases. Further more, the rate of returns on investment for the smaller products is 233% and 31.58% for the bigger products at 14% discount rate. This makes the business profitable since the values obtained are higher than the discount and/or the lending rate. The wood carving industry is a business concern with good prospects given the necessary assistance and proper direction. Thus, this research of art that serves as a national heritage must continue from one generation to the other.

**Key words:** Wood carving, techno-economic analysis, tree species utilization

### INTRODUCTION

Wood, generally speaking is the toughs, fibrous supportive water conducting substance beneath the bark of tree and shrubs. Wood is one of the most abundant renewable raw materials in the forest. It is in the fore-front of the world's industrial raw materials and it is the real wealth of nations. Its ability to have different physical, mechanical and chemical properties as well as diverse colours have made wood the most versatile raw material for various uses<sup>[1]</sup>. Wood is preferred to other forms of craft whether it be Architecture, sculpture, painting or metal work in carving industries. This is because the grain, fiber and natural colour give it a surface texture that distinguishes it from other crafts. Wood carving industry is one of the industries whose raw materials input and output are predominantly made of wood and the production process is manual or at most with little automation<sup>[2]</sup>. It is a craft which has long been practiced in Africa for many centuries. Wood carving is

indigenous to all part of Africa. In West Africa, wood carving is especially prominent in Coted'ivoire, Sierra Leone and Nigeria. Thus, in Nigeria wood carving has been used traditionally in the production of the traditional items such as tool, bowl or cups, spoons, knife sheath, wooden pestle, beer trough, handle and shafts, beaters, zithers and other musical instruments, walking sticks, dishes, stools, dog and cow bells, vases and wooden pot; honey barrels, beehives, weaving bobbins, fly brushes, combs, drums, masks and sculptures<sup>[3]</sup>. There are; however, many other carved wooden form that serve useful and decorative functions all over Africa. Doors are carved; large trees are hallowed out to form grains mortals, drums and canoes. All these are careful hand carved according to tradition and need; and all are hand finished and sometimes decorated<sup>[4,3]</sup>. Size varies greatly from doors to combs. Masks and sculptures may also vary from huge pieces of six to eight feet tall to small delicate ancestor figures and small finely carved masks.

Masks belong to a costume and are associated with a particular role in a particular ceremony. The size and shape of mask and all its attachments are given meaning through movement and rhythm and the mood of the ceremony.

Sculpture can be huge, medium-sized or small memorials to the dead. Carvings are used on ritual post, on chief's thrones; door posts; lintel and post that hold up roofs. Elaborate carvings also are on the big drums that were kept in the centre of villages to act as telegraph system. These existed in West Africa long before the Europeans arrived on the scene<sup>[5]</sup>. Carving is a man's trade filled with ceremony. The wood carvers is a highly trained craft man and understand the character of wood, use of tools and the tribal stylistic languages. Most important about the carver is the automatic, spontaneous or instructive way he expresses the spiritual aspects of his carving<sup>[4]</sup>. Wood carving provides a thorough training in those mental and physical processes which call for sustained effort and attention. It provides thought and criticism and tests in a practical manner the value of such thought. It develops the power of imagination and visualization, more particularly the creative and inventive facilities, along with the powers of artistic expression it does all these things but only on one condition that craftsmanship be thought for its own sake and not merely as a narrow form of practical education or as a pleasant recreation of dullards<sup>[6]</sup>. If we adopt these points of view, we are provided with an aim which is truly educational to possessing the power to appreciate beauty of lines, form, proportion, colour an achievement in not only wood works but in every forms of craft or any other of the creative forms of human activity. In Nigeria some families were noted for their artistic prowess. For instance, in Benin Edo State, the traditional carvers belong to the Igbesawen family Guide while in the history of Yoruba woodcarving, the Fakeye Family of Ila-Orangun in Osun State takes pride of place. In this place; the right to carving is hereditary. In societies east of the Niger such as the Kalabari and the ethnic groups in the Benue valley, carving depends on personal choice and aptitude. There is no strict apprenticeship<sup>[2]</sup>. However, among the Igbo, the impetus to carve depends on the area and the type of carving. In Awka, the wood carver is invariably the smith. But any interested Igbo man can carve masks particularly after initiation into the masking societies<sup>[2]</sup>.

This study investigated the various wood species used in carving work and assessed the physical property (specific gravity) of the prime species. The viability and profitability of the carving business were also determined.

## MATERIALS AND METHODS

The study was restricted to Ibadan and Lagos metropolis and focused on some wood carving industries in the cities.

Data on the above parameters were collected by the use of questionnaires administered through personal interviews. The specific gravity of prime species was determined in the departmental wood laboratory. The weight of saturated wood was taken for each of the sampled wood species and then oven dried at 103°C. The oven dry weight was also taken.

The formula for specific Gravity (G) is represented by;

$$G = \frac{1}{\frac{W_s - W_o}{W_o} + 1.53}$$

Where, G = Specific gravity

Ws = Saturated weight of wood

Wo = Oven dry weight of wood

The viability of the business was determined using the Benefit-Cost analysis at 14% discount rate. The formula is represented by;

$$B/C = \frac{\sum_{t=0}^{t=n} \frac{R_t}{(1+r)^t}}{\sum_{t=0}^{t=n} \frac{C_t}{(1+r)^t}}$$

Where, R<sub>t</sub> = revenue over time t

C<sub>t</sub> = cost over time t

r = discount rate

1 = constant

The profitability of the business was determined through the Rate of Returns on Investment (RORI). The formula is represented by;

$$RORI = \frac{TR - TC}{TC} \times \frac{100}{1}$$

Where, TR = Total Revenue

TC = Total Cost.

## RESULTS

Wood Species Utilized by Wood Carvers Table 1

Some of the tools used in woodcarving are locally made by indigenous blacksmith and some are imported. The basic tools are the knife, machetes, chisels, sharpening stone, hand axe, tape rule, clamp, Adze, V and U gouges and wood hammer.

Table 1: Wood species utilized by wood carver and their botanical names.

Trade name	Botanical name
Ebony	<i>Diospyros species</i>
Iroko	<i>Milicia excelsa</i>
Omo	<i>Cordia millenii</i>
Opepe	<i>Nauclea diderrichii</i>
Oro	<i>Antiaris africana</i>
Mahogany	<i>Khaya ivorensis</i>
Mansonia	<i>Mansonia altissima</i>
Teak	<i>Tectona grandis</i>
Afara	<i>Terminalia ivorensis</i>
Gmelina	<i>Gmelina arborea</i>
Obeche	<i>Triplochiton scleroxylon</i>
Ayunre	<i>Albizia zygia</i>
Ayo	<i>Oleifolia species</i>
Sida	<i>Guarea odorata</i>
Ahun	<i>Alstonia congensis</i>
Ita	<i>Celtis zenkeri</i>
Kokoigbo	<i>Sterculia tragachanta</i>
Asin	<i>Chenopodium ambrosioides</i>
Erinmado	<i>Ricinodendrum heudelotii</i>
Emi	<i>Butyrospermum paradoxum</i>
Ire	<i>Funtumia elastica</i>

Source: Field survey, 2005

Table 2: Wood species and products obtainable

Wood species	Products obtained
Ebony	Walking stick, hunter figure, carved stools, unity figure, fish figure,
Iroko	Jewel box, drummer, carved table, esu, mortar and pestle, carved doors
Ire	Ibeji figure, yemoja, osun, sango and ogun statutes
Omo	Carved doors, drum, walking stick, oba of benin figure hunter figure
Emi	Mortar and pestle, drum
Opepe	Palace poles, drum, carved doors, carved tools, chairs.
Mahogany	Carved doors, herbalist figure, walking stick, sango, tray
Teak	Walking stick drums, sango.
Afara	Drum, hunter figure, staff
Asin	Mortar and pestle
Erinmado	Ifa bowl, ifa tray
Gmelina	Walking stick
Oro	Gift items, doors
Obeche	Stools, panel
Apa	Panels
Mansonia	Portraits, figures
Ayunre	Panels, beds, status

Source: Field survey, 2005

Table 3: Specific gravity of some wood species used in carving

Wood species (sample)	Trade name	Saturated weight in gram (ws)	Oven dry weight at 103°C (WO)	Specific gravity
A	Afara	6.8	4	0.74
B	Apa	6.3	3.4	0.66
C	Mahogany	6.7	4.4	0.85
D	Ahun	5.6	1.8	0.36
E	Opepe	7.4	4	0.67
F	Teak	6	3.4	0.71
G	Ita	8	4.1	0.62
H	Mansonia	5.5	2.4	0.52

Source: Lab. Work 2005

**Wood species and products obtainable:** The beauty of the finished products may be further enhanced artificially by application of certain additives. Such finishing materials employed by carvers include sand paper for smoothening,

Table 4: Showing botanical names of species.

Wood species (sample)	Botanical name	Specific gravity
A Afara	<i>Terminalia ivorensis</i>	0.74
B Apa	<i>Azela africana</i>	0.66
C Mahogany	<i>Khaya ivorensis</i>	0.85
D Ahun	<i>Alstonia congensis</i>	0.36
E Opepe	<i>Nauclea diderrichii</i>	0.67
F Teak	<i>Tectona grandis</i>	0.71
G Ita	<i>Celtis zenkeri</i>	0.62
H Mansonia	<i>Mansonia altissima</i>	0.52

Source: Lab. Work 2005

glue, shoe polish, oil and paints. The choice of colours depends on the natural colours and the grain patterns of the tree species used. For instance, black shoe polish is used to shine Ebony products Table 2.

**Types and prices of products:** Products made by carvers in the study area vary from shop to shop and the prices of the products also vary from shop to shop. The costs of production range from as low as N 150 to N 38,000 while the prices of products range from N500 to N50, 000. The benefit-cost analyses are in the ratio of 3.33:1 for smaller products and 1.32:1 for bigger products. This makes the business viable since the ratio is greater than one in both cases. Further more, the rate of returns on investment for the smaller products is 233% and 31.58% for the bigger products at 14% discount rate. This makes the business profitable even when loan is obtained for the execution. Smaller products include; vases, trays, key holders, gift items while big products include doors, mortar and pestle and whole statutes.

**Specific gravity of some wood species used in carving:** From Table 3 above, it shows that the specific gravity of the various species used in wood carving differs. Wood species such as Mahogany, Afara, Teak, Opepe, Apa, Ita, Mansonia and Ahun have specific gravity of 0.85, 0.74, 0.71, 0.67, 0.66, 0.62, 0.52 and 0.36, respectively Table 4. The beautiful thing about this is that such wood species with low specific gravity have a place in carving industry. This is because the higher the specific gravity of a wood species the stronger the wood. Therefore species like *Alstonia congensis* that would have been a reject in construction and joinery companies has been fully utilized in carving industry. Mansonia is popular among furniture makers despite the low specific gravity due to its fine grains and colours.

## CONCLUSION

The wood carving industry has rich cultural heritage with strong tourist attractions and should be a pride to any nation. With all cultural achievement and custom re-wakening in the country, it is ironical that the

government has not taken any significant steps in modernizing the wood carving industry or providing any forms of financial assistance. Despite these shortcomings, the wood carving industry is a business concern with good prospects given the necessary assistance and proper direction. Thus, this work of art that serves as a national heritage must continue from one generation to the other.

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