International Journal of Maritime and Interdisciplinary Research
©2025 IJMIR/Volume 7(3) SE (1) | ISSN: 2734-3286.
Journal homepage: www.ijmir.edu.ng

EXPLORING WOODEN BOAT BUILDING AS A SMALL AND MEDIUM SCALE ENTERPRISE IN THE NIGER DELTA REGION OF NIGERIA

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ABSTRACT

This study investigated the prospects and challenges of wooden boat building as a small and medium-scale enterprise (SME) in the Niger Delta region of Nigeria. Data collated from structured questionnaire were analysed using descriptive statistics, simple linear regression and analysis of variance. Statically, 64.4% of wooden boat builders are above 40 years of age and 91(68.94%) out of the 132 of those surveyed in the industry have only primary school education and below, while less than 3% have tertiary education. Tested hypotheses reveal a lot of challenges (2.78 mean variance, higher than the benchmarked 2.5), very low prospect level (mean variance of 1.96) and very low contribution to rural poverty alleviation at its current rate of operation (2.06 mean variance). Mean variance of 3.0303 signifies probable solutions which can turn the industry around. To achieve its rural poverty alleviation goals, it is recommended, among others, that the government should incorporate wooden boat building into its skill acquisition programmes as well as provide access to modern tools and equipment to improve the efficiency of the builders.

Keywords: Wooden Boat; Construction; Niger Delta; Poverty Alleviation; Skill Acquisition.

1.0 INTRODUCTION

Boats are humanity's oldest means of transport, employed by riverine dwellers for communication over long distances and the efficient exploitation of aquatic resources. Before the invention of the wheel and cart, or of transport by animal, boats had been used in the colonisation of islands and even continents. (Wikipedia; Vigne et al. 2014). Wooden boats can be classified into three categories – dug-out canoes, half-dugouts and plank-built. A dugout canoe is a boat made from a hollowed tree. It is also referred to simply as a dugout or log boat. The half-dugout, also known as extended dugouts, has a dugout base with planks added to raise the freeboard. The plank-built is made up of planks nailed to each other with "u-shaped metal fasteners to form a boat. According to Babatunde (2010), out of about 1,000 canoes counted on the Lagos Lekki Lagoon as at 2010, planked construction accounted for 54%, dugouts for 24%, and half-dugouts for 21%. Of the three categories, the dugout canoe is believed to be the oldest. According to Hope Byers (2021), dugout canoes have been used by indigenous peoples worldwide for thousands of years. Specimens recovered in the northeast United States have been found dating as far back as 6,000 years before the present. They were undoubtedly being constructed thousands of years earlier. The Dufana dugout canoe discovered on May 4^{th,} 1987, in North-East of Nigeria is believed to be about 8,000 years old and the third oldest dugout canoe in the world (Wikipedia; Gumnior, M. and Thiemeyer, H (2003); Breunig, Peter (1996). In Nigeria, as in other parts of the world, rural maritime dwellers rely on the wooden boat as a means of transport within the riverine environment. The Niger Delta riverine environment of Nigeria, for example, is predominantly water and the only means of travel from one community to another is by boat. Boats are also the only means of movement for fishermen into the creeks and back home. While the travel to and from the cities could be undertaken by fiberglass outboard engine boats, the wooden boat, especially the dugout canoe, remains the main means of rural riverine occupational travel for the indigenous people. In the semi-urban areas like Lekki Lagoon in Lagos, the plank-built wooden boats are more dominantly used because of the absence of big trunked hardwood trees from which dugout canoes are built. The rapid loss of wetlands and mangrove swamps to development affects the fishery productivity of this area, which in turn leads to a decline in the wooden boat business and availability. For instance, between 2006 and 2007, the number of fishing canoes on Lekki Lagoon decreased from 1,027 to 995 -- a loss of 3% (Babatunde, 2010). With the increasing occurrence of yearly flooding

since 2012, to the devastating floods of 2018 and 2022, the importance of wooden boats in Nigeria has drastically increased as they are needed as shuttle boats to navigate flooded areas hitherto travelled as dry land. With this increased demand, it is expected that the construction of wooden boats will also receive a boost. Construction of wooden boats as a business in Nigeria, especially in the Niger Delta region of Nigeria, has been under studied. A closer look at the industry would reveal that those engaged in wooden boat construction business are usually indigenous riverine dwellers who learnt the art crudely over the years from local apprenticeship. An in-depth study of their craftsmanship can further reveal how this important segment of Small and Medium Scale Enterprise (SMEs) can be improved upon to create more value for the economy in the areas of job creation, poverty alleviation and rural infrastructural development. This of course is the focus of this study. Four specific objectives leading to four related questions and four hypotheses were formulated as follows:

Objectives:

1. To examine the prospects and viability of the wooden boat construction industry in the Niger Delta region of Nigeria.
2. To identify the challenges faced by wooden boat builders in the Niger Delta Region of Nigeria
3. To proffer solutions to the challenges faced by wooden boat builders in the Niger Delta Region of Nigeria.
4. To examine the overall impact of the wooden boat construction industry in rural poverty alleviation in Nigeria.

Questions

1) What are the prospects of the wooden boat construction industry in the Niger Delta Region of Nigeria and how viable are they?
2) What are the major challenges faced by wooden boat builders in the Niger Delta Region of Nigeria?
3) What are the solutions to the challenges faced by wooden boat builders in the Niger Delta Region of Nigeria?

4) To what extent does the wooden boat construction industry impact on rural poverty alleviation in Nigeria?

1.1 RESEARCH HYPOTHESES

$H_{1:}$ There are no significant prospects of the wooden boat construction industry in the Niger Delta Region of Nigeria.

$H_{2:}$ There are no significant challenges faced by wooden boat builders in the Niger Delta Region of Nigeria.

$H_{3:}$ There are no solutions to the challenges faced by wooden boat builders in the Niger Delta Region of Nigeria?

$H_{4:}$ There is no significant impact of the wooden boat construction industry on rural poverty alleviation in Nigeria?

2.0 LITERATURE REVIEW

Wooden boat construction is a significant sector of Nigeria's economy, especially in the coastal regions where water transportation is essential for trade and fishing. Several studies have been conducted to examine the traditional methods used in boat construction, the challenges facing the industry, and prospects for development. Souppez (2023) in his study, 'Structural Design of Wooden Boats' averred that the contemporary environmental challenges faced by the maritime industry have triggered a regain of interest in wood as a sustainable material. Emmanuel (2010) in a study of fishing craft characteristics and preservation techniques in Lekki lagoon, Nigeria, affirmed that "wooden canoes have had a wide acceptance by the fishermen and will continue even if a new material for construction is introduced". He suggested further that the quality and safety of planked canoes can be improved by an increase in hull size and stiffness, water tightness of deck by appropriate coating, caulking and fastening, as well as enforcing adequate provision and use of life jackets. Shantanu and Vijith (2012) emphasised the overall "Green" impact of using

traditional wood over other materials in terms of reducing both carbon emissions and energy consumption. Bruno et al (2023) postulated that the art of building wooden boats, which is a secular cultural heritage of the Amazonian peoples, has lost importance over the last few decades, resulting in a loss of knowledge about the cultural practice of building wooden boats. Most traditional marine carpenters have little education, with a mean average age of 43.2 years. Atojunere et al (2010) affirmed that Canoe construction has been a traditional skilled occupation of the Ilaje people of Ondo State, Nigeria, from time immemorial, and the canoes form the only means of transportation of goods for the settlers whose means of livelihood is Agriculture and fishing. The literature reviewed pointed out some prospects, challenges and solutions in the wooden boat construction industry in various regions of the world, but none has specifically addressed this subject in the Niger Delta region of Nigeria which is the gap that this study set out to fill. This included identification of challenges faced by the industry in the Niger Delta, proffering solutions, as well as examining the overall impact of the industry in rural poverty alleviation in Nigeria.

3.0 MATERIALS AND METHODS

The population of this study comprised of wooden boat builders, users and riverine rural dwellers in selected riverine locations within the Niger Delta region, where wooden boat construction is prevalent. It targeted 50 persons each from drawn from 4 locations in Ughelli South, Ethiope West and Warri South-West Local Government Areas of Delta State of Nigeria, making a total study population of 200 persons.

The Taro Yamane sampling technique was further used to determine the sample size. Using its mathematical formula:

$$n = \frac{N}{1 + N(0.05)^2}$$

Where,

n = Sample Size

N = Population Size, and

5% error of significance (0.05),

The sample size (n) of 133 was obtained.

For even distribution, 33 copies of a structured five-point (Likert scale) questionnaire were administered to each of the 4 selected sites, making a total of 132 questionnaires administered and returned. Its options were strongly agreed (SA), agreed (A), disagreed (D), strongly disagreed (SD) and Undecided, Neutral or Don't Know (DN). It was designed in such a way that every question in it was related to the research questions and hypotheses of the study to provide answers to the research questions and test the relevant hypotheses.

A mean score rating method, presented in tables, was used to analyse the data based on the 2.5 acceptance region format to answer the research questions, while to address the research hypotheses, the simple linear regression and analysis of variance were used. SPSS version 21 was used for the analysis.

A linear regression equation is represented as:

$y = a + bx$

Where:

y: is the predicted or dependent variable.

a: is the y-intercept (the value of y when x is 0).

x: is the explanatory independent variable.

b: is the slope (the change in y for every unit change in x).

4.0 RESULTS AND DISCUSSIONS

Table 1 shows respondents' ages. The majority of the boat builders are over forty years old. That age range constitutes 85 persons, representing 64.4 percent of the population. The youngest age group has only 2 persons and constitutes just 1.5 percent of the population (those below twenty years of age). The final age group is those between twenty-one and forty years old. This age range constitutes 45 persons, representing 34.1 percent of the population.

Table 1: Age Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<20	2	1.5	1.5	1.5
	21-40	45	34.1	34.1	35.6
	>40	85	64.4	64.4	100.0
	Total	132	100.0	100.0	

Source: Authors' Research Data

Respondents' educational attainment is depicted in Table 2. 91 respondents, representing 68.94 percent of total respondents, have only primary education, while 38, representing 28.79 percent have secondary education. Only 3 respondents (2.27 percent) have a tertiary education.

Table 2: Educational Qualification Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	91	68.94	68.94	68.94
	Secondary	38	28.79	28.79	97.73
	Tertiary	3	2.27	2.27	100.0
	Total	132	100.0	100.0	

Source: Author's Research Data

The distribution of Invariant data was investigated, with each variable compared to its corresponding dimensions and indicators. The mean and standard deviation responses were used to provide answers to research questions. The verdict rule is to accept if the $\bar{x} \geq 2.5$ and to discard if the $\bar{x} < 2.5$. All the mean values in Table 3, as generated from responses to the four (4) relevant questions, are less than (<) 2.5, which leads to discarding the perception that the wooden boat construction industry has good prospects. The standard deviation values are above 1, which also indicates a high level of disagreement by the respondents. Results are presented in Table 3 below:

Table 3: Data Distribution for Prospects of the wooden boat construction industry

	Descriptive Statistics					
	N	Min	Max	Mean	Std. Dev.	Level of Disagreement
The wooden boat construction industry has great prospects for growth	132	0	4	2.02	1.115	High
There are growth potentials of the wooden boat construction industry in the Niger Delta region	132	0	4	1.90	1.097	High
The wooden boat construction industry is a viable business venture	132	0	4	2.08	1.130	High
The wooden boat construction industry will continue to exist for a very long time	132	0	4	1.86	1.057	High
Valid N (listwise)	132					

Source: Authors' Research Data (2023) - SPSS version 21 output extracts

The mean values in table 4 as generated from the four questions are above 2.5, ranging from 2.83 to 2.87 while all the standard deviation values are greater than 1 indicating a high level of agreement to the argument that there are challenges faced by the wooden boat building industry. It shows therefore that a large segment of the respondents agreed to the existence of all the above itemised challenges faced by the wooden boat construction industry in the study area.

Table 4: Data Distribution for challenges of wooden boat construction industry

	Descriptive Statistics					
	N	Min	Max	Mean	Std. Dev.	Level of Agreement
Unavailability of the right wood species in our forests	132	0	4	2.84	1.222	High
Lack of sufficient capital	132	0	4	2.83	1.180	High
Little patronage	132	0	4	2.58	1.019	High
Unfavorable competition from fiber boat manufacturing industry	132	0	4	2.87	1.087	High
Valid N (listwise)	132					

Source: Authors' Research Data (2023) - SPSS version 21 output extracts

In table 5, the mean of 3.27 and a low standard deviation of 0.799 indicate a very high agreement to the suggestion that wooden boat construction should be incorporated in Government Skills Acquisition Programmes. Investment funding (2.98), controlled deforestation (2.98) and training and retraining of operators in the industry (2.89), all show that a large segment of the respondents agreed to the proffered solutions to challenges faced by the wooden boat construction industry.

Table 5: Data Distribution for Solutions to the challenges faced by wooden boat construction industry

	Descriptive Statistics					
	N	Min	Max	Mean	Std. Dev.	Level of Agreement
Incorporation of wooden boat construction in skill acquisition programs by government	132	0	4	3.27	0.799	High
Investment funding should come into the wooden boat construction industry	132	0	4	2.98	1.101	High
Deforestation should be controlled in order not to extinct right wood for the industry	132	0	4	2.98	0.973	High
There should be proper training and retraining of those in the industry	132	0	4	2.89	1.154	High
Valid N (listwise)	132					

Source: Authors' Research Data (2023) - SPSS version 21 output extracts

The low mean values (all <2.5) of all four (4) questions analysed in Table 6 reveal that a large number of the respondents disagree with the notion that the wooden boat construction industry generates wealth. The relatively low Standard Deviation (0.976) of the fourth question could mean that the majority of the respondents did not strongly disagree but only disagreed with the fact that the wooden boat is indispensable, but would not see it necessarily as a means of wealth creation. It could be a reflection of their depth of understanding of the question. However, the overall result of the analysis of the responses shows that the wooden boat construction industry is not an effective means of rural poverty alleviation.

Table 6: Data Distribution for Poverty alleviation

	Descriptive Statistics					
	N	Min	Max	Mean	Std. Dev.	Level of Disagreement
I earn enough from my Wooden Boat Construction business to sustain me and my family.	132	0	4	2.14	1.186	High
The wooden boat industry has the potential to create wealth to its builders and investors, thereby lifting them from poverty.	132	0	4	2.23	1.222	High
Without the wooden boat, movement and subsistence economic activities in the rural riverine areas will be paralyzed.	132	0	4	1.96	1.037	High
The use of the wooden boat creates wealth for the rural riverine dwellers by providing indispensable means of transportation to and from their sites of sustainable occupational livelihood.	132	0	4	1.91	0.976	High
Valid N (listwise)	132					

Source: Authors' Research Data (2023) - SPSS version 21 output extracts

Table 7 indicates that there are no Significant prospects (Pros) of the wooden boat construction industry as the mean is below 2.5 (1.9640). This implies that we accept the first null hypothesis. Secondly, there are a number of challenges (Cha) faced by the wooden boat construction industry. With a mean of 2.7822 (which is higher than the 2.5 benchmark), the second null hypothesis that states that there are no significant challenges faced by the wooden boat construction industry is rejected. Hence, we say that there are significant challenges faced by the wooden boat construction industry. As regards to the solutions (sol) to the challenges faced by the wooden boat construction industry, a mean of 3.0303 indicates that there are solutions that are statistically significant so the third null hypothesis is rejected. Finally, the wooden boat construction industry does not alleviate the poverty level (poval) of the Niger Delta region as indicated by a mean value of 2.06 which is lower than the 2.5 bench mark hence the fourth hypothesis is accepted.

Table 7: Hypothesis Test

Statistics		Pros	Cha	sol	poval
N	Valid	132	132	132	132
	Missing	0	0	0	0
Mean		1.9640	2.7822	3.0303	2.0625
Std. Deviation		.65099	.57410	.36943	1.04725

Source: Authors' Research Data (2023) - SPSS version 21 output extracts

Tables 8 to 10 show the result of the regression analysis. The R-Square value of 0.558 indicates that prospects, challenges and solutions of the wooden boat construction industry account for 55.8% of the wealth generated by the industry. The Adjusted R-Square value of 0.548 suggests that 54.8% of the contributions of the wooden boat construction industry is determined by the industry's prospects, challenges and solutions. The F-statistic has a probability value of 0.000, which indicates that the prospects, challenges and solutions of the wooden boat construction industry, all taken together are statistically significant. If the wooden boat construction industry were to be left alone, it would run into bankruptcy as it has a negative coefficient (5.144), and this is statistically significant at a probability value of 0.000. The challenges and solutions to the

challenges faced by the wooden boat construction industry are both statistically significant, with the same probability value of 0.000. However, the prospects of the wooden boat construction industry are not statistically significant with a probability value of 33.3 percent which is greater than 5 percent.

Table **8:** Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.747a	.558	.548	.70416

a. Predictors: (Constant), sol, cha, pros

Table **9:** ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	80.204	3	26.735	53.918	.000[b]
	Residual	63.468	128	.496		
	Total	**143.672**	**131**			

Source: Author's Field Survey (2023) - SPSS version 21 output extracts, Dependent Variable: poval

Table 10: Coefficients[a]

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	-5.144	.572		-8.990	.000
	pros	.098	.101	.061	.972	.333
	cha	.532	.112	.292	4.735	.000

Source: Author's Field Survey (2023) - SPSS version 21 output extracts, Dependent Variable: poval

4.1 DISCUSSION

The wooden boat construction industry does not have good prospects as depicted by the low mean values (<2.5) in Table 3, and its aggregated mean of 1.9640 in Table 7 shows there are no significant prospects. This is because the industry is faced with numerous challenges threatening its very existence, as indicated by the high mean value (2.7822) in Table 7. On the other hand, there are probable solutions as agreed by a majority of the respondents depicted by the high mean (3.0303). Its impact on rural poverty alleviation is also not significant, with a low mean value of 2.06. From the demographic analysis, it can be seen that 64.4 percent of those actively involved in the wooden boat construction industry are above forty years. This means that most people in this industry are past their prime years. Also, 68.94 percent of respondents have only primary education. A further 28.79 percent have secondary education. This goes to suggest that the wooden boat construction industry is not lucrative enough to attract first-degree holders and above. This corresponds with the submission of Bruno et al (2023) that most traditional marine carpenters have little education with a predominance of men, with a mean age of 43.2 years. From all indications, there is little or no hope of economic survival for the wooden boat construction industry as those inside are struggling with plans to seek better alternative means of livelihood. This is largely due to the fact that the wooden boat construction industry is being displaced by the fibre boat construction industry, and only fishermen and a few transportation businesses still use wooden boats. Again, the wooden boats have a very long life span; thus, the demand and sales turnaround is very low. Therefore, although respondents agreed that there are solutions to the problems facing the industry, the question is whether it will be worth it. One of the things that would, however, likely keep the wooden boat construction sustained is the traditional attachment of the locals who see it as their traditional heritage and would strive to keep its legacy alive.

5.0 CONCLUSION

After satisfactorily testing the hypotheses, the following conclusions were arrived at:

1. The wooden boat building business is not a viable investment for investors. Hence, it does not have good prospects. The business is gradually going into extinction in the Niger Delta region of Nigeria.

2. There are a lot of challenges faced by those who are into wooden boat construction. However, little or nothing is being done to remedy these challenges. This is because the business has very little demand.

3. Although there are some very obvious solutions to the challenges faced by wooden boat builders, stakeholders are more inclined to fibre boat construction, thus neglecting the wooden boat builders.

4. Due to the very low demand of wooden boats, wooden boat building is not a lucrative business and is not capable of alleviating poverty in the Niger Delta region of Nigeria.

5.1 RECOMMENDATIONS

1. Wooden boat builders should find ways of refining their production methods in order to add value and aesthetics to their end products in order to increase patronage and improve the economic prospects of their trade.

2. The government should incorporate wooden boat building in its skill acquisition programmes with regards to safety, leading to the building of higher quality boats, increased sales and reputation enhancement for the industry practitioners. This training aimed at increased knowledge, access to modern tools and equipment, will mitigate most of the challenges faced by the industry, leading to improved efficiency of the builders and timely project completion.

3. The use of locally built wooden boats within the Niger Delta region should be promoted and encouraged in order to increase demand and sales for wooden boat builders as well as preserve its

role in our riverine cultural heritage while serving as an alternative to the use of fossil fuel and avenue for rural poverty alleviation.

4. Practitioners should be encouraged to plant at least two trees in place of one felled to support afforestation.

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