

Trends in exchange rate of the Naira and the cost of roof coverings in Benin City

Bartholomew Obaedo¹, Isaiah Omoregie¹ and Thankgod Omongbale¹

Department of Building, Faculty of Environmental Studies

Ambrose Alli University, Ekpoma, Nigeria,

barth.obaedo@aauekpoma.edu.ng, bldrisaiahomorie@aauekpoma.edu.ng,

omongbale_thankgod@aauekpoma.edu.ng

Abstract:

The exchange rate has been noted as contributing to the price increase trend in building materials. This study looked at the relationship between the Naira exchange rate and the cost of various roof coverings in Benin City from 2017 to 2021. The price of the selected roof coverings was gathered via a survey in the study region. The exchange rate of the Naira values was sourced from the financial authority's database. The statistical relationship between the Naira exchange rate and the price of roof coverings was tested using correlation analysis, and the impact of the Naira exchange rate on the cost of roof coverings was tested using regression analysis. According to the findings, the exchange rate of the Naira and the price of 1m² of roof coverings had a substantial positive link. Furthermore, the exchange rate of the Naira and the cost of roof coverings have a positive linear relationship. It is imperative and suggested that a policy be implemented to allow the Naira to recoup its lost foreign exchange value. According to this study, the cost of roof coverings is influenced by movements in the Naira exchange rate over time.

Keywords:

Exchange rate, naira, Pearson coefficient, roof covering, regression equation

1 Introduction

Materials are a major component of construction cost. There has been an unbroken rise in the cost of building materials, which was a common trend in developed and developing countries (Danso & Obeng-Ahenkora, 2018). The Naira exchange rate has been identified as a factor that encourages the trend in building materials prices (Oladipo & Oni, 2012). This study examined trends in the exchange rate of the Naira and the price of roof coverings. It further investigates the connection between the Naira exchange rate and the roof coverings cost. The outcome of this study provides information on the influence of movements in the exchange rate of the Naira on cost of roof coverings. Section one of this study presents an introduction, rationale, possible outcome and outline of the study. Sections two and three present a literature review and the methodology adopted based on the research questions. Section four presents the findings and discussion, and section five concludes the study.

2 Literature Review

Fixed/pegged exchange rate systems and floating exchange rate systems were divided by Hamilton (2018) into two major categories. The Central Bank buys and sells currency in the foreign exchange market to manage the exchange rate in the former. The forces of demand and supply for foreign exchange determine the exchange rate for the latter and individuals, businesses, government, and the economy, are affected by fluctuations in the exchange rate.

In the recent past, the Naira has numerous exchange rates, including those for the parallel (black) market, the investors' window, and the Central Bank's (Kazeem, 2020). Despite their importance to the Nigerian economy, the magnitude of these various rates decreased. Furthermore, the Central Bank cannot set the black-market rate, which is an abnormality in a fixed exchange rate system. Businesses that rely on imports use the parallel market (which has the highest exchange rate) out of need rather than choice because of regulations that create bottlenecks in accessing foreign exchange via official sources.

Alley (2018) looked at the link between oil price, exchange rate, and non-oil export to see if diversification may help save the Naira. Naira lost 50% of its foreign exchange value during the 2014 oil price fall, and the Nigerian government has been unable to restore it. The study showed a direct association between oil price and exchange rate, implying that if the former falls, the latter will fall as well. It was also established that imports lower the exchange rate, whilst exports strengthen it. Ehikioya (2019) investigated the impact of exchange rate fluctuation on Nigerian economic growth. The analysis found that the country's economy relies on imports of raw materials and inputs from other countries. Idowu and Winston (2018) investigated the building industry's material production control. The survey found that most building materials are imported, except for a few made in the country. According to Rabiou et al (2020), depreciation of the Naira will increase the cost of importing raw materials and goods that require foreign exchange. As a result, raw materials will cost more, and the average consumer will see their purchasing power diminish and ultimately bear the brunt of the cost increase. Oladipo and Oni (2012) looked at the impact of macroeconomic factors on building material prices. It has been proven that the exchange rate considerably impacts the cost of construction materials.

The key causes of price increases in building materials on the Ghanaian construction market were highlighted by Danso and Obeng-Ahenkora (2018). According to the report, price increases in construction materials are a general tendency in both advanced and emerging economies. The main driver of growth need due to rising economic growth and heavy reliance on imported construction materials showed the strongest association among the variables affecting building material price increases. Oladiran (2015) researched the use of local materials in construction projects and concluded that the material resource is a critical feature of construction costs. As a result, lowering the cost of materials will lower the cost of building. To lower material costs, the study proposed a shift toward using local materials.

Akankali & Alibaba (2019) affirmed the fundamental elements required to construct buildings are the floor, the wall and the roof. The study verified that because these elements directly influence the thermal comfort of the space created by them, the materials used to create them equally play a major role in the thermal comfort of the space. A building's roof is its first line of defence against the weather. The roof is "vital to the sheltering functions of a building, yet it is singularly vulnerable to the destructive forces of nature" (Allen & Iano, 2009). Roofs are classified into Flat roofs and Pitched roofs (Emmitt, 2019). Roof covering is a component of Pitched roofs. Roof coverings resist the penetration of weather elements and convey surface water to the gutter at the eaves. (Chudley & Greeno, 2014; Emmitt, 2019).

3 Research Methodology

The Central Bank of Nigeria's website provided the monthly average exchange rate of the Naira from 2017 to 2021. The arithmetic average of the Naira's monthly exchange rates was calculated and used as the year's exchange rate. The roof covering's area was computed using a two-bedroom bungalow's roof plan. The price of the chosen roof coverings was verified through a market survey in the study area. Table 1 presents the roof coverings that were selected.

Table 1: The selected roof coverings

S/N	Roof covering	Abbreviation
1	Corrugated Galvanized Iron Roofing Sheet	CGIRS
2	Corrugated Galvanized Iron Roofing Sheet imported from Ghana	CGIRSG
3	Short span Aluminium Roofing Sheet	SARS
4	Longspan Coloured Roofing Sheet	LCARS
5	Longspan Stucco Aluminium Roofing Sheet	LSARS
6	Stone Coated Steel Roofing Tiles	SCSRT

Minitab was used to carry out Correlation and Regression analysis on the data. The existence, intensity, and direction of a statistical relationship between the Naira exchange rate and the price of the selected roof coverings were investigated using correlation analysis. The influence of the Naira exchange rate on the cost of the chosen roof coverings was determined using regression analysis. The cost of roof covering was the dependent variable, while the exchange rate of the Naira was the independent variable.

4 Findings and Discussion

Table 2 shows the monthly average Naira exchange rates from 2017 to 2021, as compiled from the Central Bank of Nigeria's website. The trends in the Naira exchange rate are shown in Table 3 and Figure 1. The Naira's exchange rate weakened from ₦305.79 in 2017 to ₦381 in 2021.

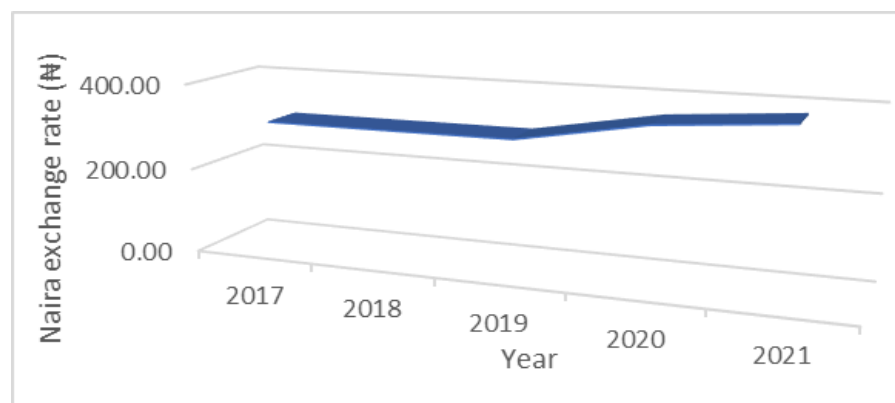
Table 2: Monthly Average Exchange rate of the Naira from 2017AD - 2021AD

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
2017	305.20	305.31	306.40	306.05	305.54	305.72	305.86	305.67	305.89	305.62	305.90	306.31
2018	305.78	305.90	305.74	305.61	305.83	305.87	305.81	306.06	306.27	306.50	306.71	306.92
2019	306.85	306.77	306.92	306.96	306.95	306.95	306.94	306.93	306.92	306.96	306.95	306.95
2020	306.96	306.96	326.63	361.00	361.00	361.00	377.19	381.00	381.00	381.00	381.00	381.00
2021	381.00	381.00	381.00	381.00	-	-	-	-	-	-	-	-

(Source: CBN, 2022)

Table 3: Annual exchange rate of the Naira

YEAR	Average Exchange Rate (₦)
2017	305.79
2018	306.08
2019	306.92
2020	358.81
2021	381.00

**Figure 1:** Exchange rate of the Naira trends from 2017 – 2021.

Tables 4, 5 and 6, and Figure 4 show pricing trends for 1m² of roof coverings. Between 2017 and 2021, the price of 1m² of the selected roof coverings increased across all the roof covering types. This finding is consistent with Danso & Obeng-Ahenkora (2018).

Table 4: Price of selected roof coverings

YEAR	24m ² of CGIRS (₦)	25.92m ² of CGIRSG (₦)	33.25m ² of SARS (₦)
2017	13500.00	7500.00	85000
2018	18500.00	11500.00	89500
2019	22500.00	15000.00	95500
2020	27000.00	19000.00	100000
2021	32000.00	23500.00	106000

Table 5: Details of selected roofing coverings

Roof Covering	Dimension (m)	Area of a sheet (m ²)	Quantity Sold (Nr)	Area of quantity sold (m ²)
CGIRS	1.8 X 0.72	1.296	20 Sheets	25.92
CGIRSG	2.0 X 0.60	1.2	20 Sheets	24
SARS	1.0 X 0.665	0.665	50 Sheets	33.25



Figure 2: A three dimensional model of the two-bedroom bungalow

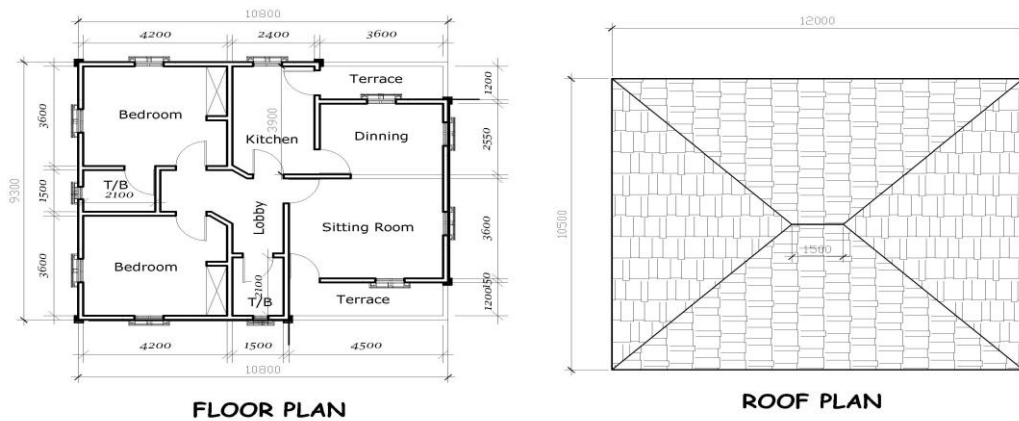


Figure 3: Floor and Roof Plan of the two-bedroom Bungalow

Table 6 shows the area of the roof covering estimated from the floor plan and roof plan of a two-bedroom bungalow in figure three.

Table 6: Price of one square metre of selected Roof coverings

Year	CGIRS (₦)	CGIRSG (₦)	SARS (₦)	LCARS (₦)	LSARS (₦)	SCSRT (₦)
2017	520.83	312.50	2556.4	2299	1720	2600
2018	713.73	479.17	2691.73	2450	1810	3200
2019	868.06	625.00	2872.18	2725	1920	3550
2020	1041.67	791.67	3007.52	3190	2100	3700
2021	1234.57	979.17	3187.97	3822	3690	4050

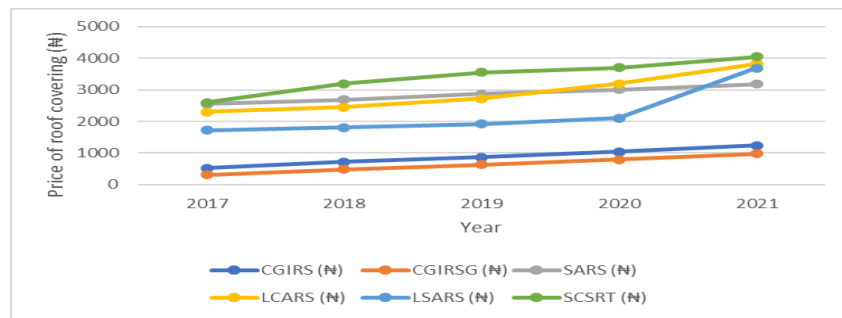


Figure 4: Price of 1m² of the selected roof coverings for 2017 – 2021

The cost of the specified roof coverings is shown in Table 7 and Figure 5. Between 2017 and 2021, the cost of the specified roof coverings rose. This agrees with findings of Danso and Obeng-Ahenkora (2018).

Table 7: Cost of selected roof coverings

Year	Area of Roof Covering (m ²)	CGIRS (₦)	CGIRSG (₦)	SARS (₦)	LCARS (₦)	LSARS (₦)	SCSRT (₦)
2017	189	98436.87	59062.50	483159.60	434511.00	325080.00	491400.00
2018	189	134894.97	90563.13	508736.97	463050.00	342090.00	604800.00
2019	189	164063.34	118125.00	542842.02	515025.00	362880.00	670950.00
2020	189	196875.63	149625.63	568421.28	602910.00	396900.00	699300.00
2021	189	233333.73	185063.13	602526.33	722358.00	472500.00	765450.00

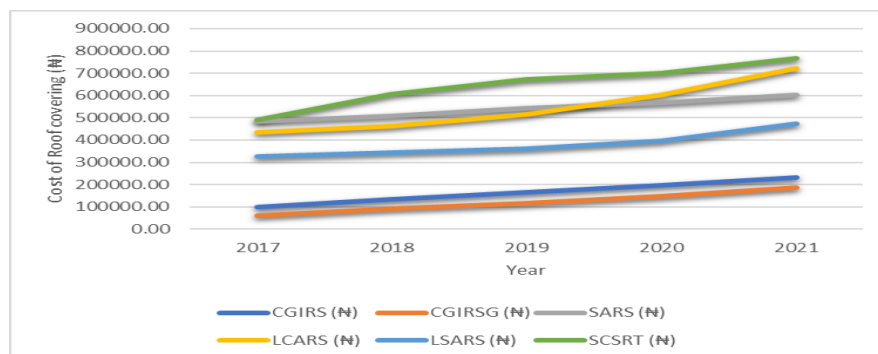


Figure 5: Cost of the selected roof coverings for 2017 – 2021.

The Pearson Product Moment Correlation Coefficients which tested the existence and strength of the relationship between the exchange rate of the Naira and the price of 1m² of the roof coverings are presented in Table 8. The exchange rate of the Naira was the independent variable while the price of 1m² of roof covering was the dependent variable. The Pearson Coefficient indicates that the exchange rate of the Naira and the price of 1m² of roof coverings have a strong and positive association. As the Naira's exchange rate rose, so did the price of 1m² of the chosen roof coverings, and vice versa.

Table 8: Pearson Correlation Coefficients for Exchange rate of Naira and price / m² of selected roof coverings

S/N	Variables paired	Pearson Product Moment Correlation Coefficient
1	The price of 1 m ² of CGIRS and the Naira exchange rate	0.900
2	The price of 1 m ² of CGIRSG and the Naira exchange rate	0.908
3	The price of 1 m ² of SARS and the Naira exchange rate	0.897
4	The price of 1 m ² of LCARS and the Naira exchange rate	0.959
5	The price of 1 m ² of LSARS and the Naira exchange rate	0.856
6	The price of 1 m ² of SCSRT and the Naira exchange rate	0.788

The impact of the Naira's exchange rate on the cost of the chosen roof coverings was also investigated. The regression equation for each roof covering is shown in Table 9, figures 6,7,8,9,10,10 and 11. According to the Regression equation, the cost of roof coverings increased by a set amount of Naira for every unit increase in the exchange rate of the Naira. Furthermore, there is a positive linear link between the Naira exchange rate and the cost of roof coverings. As a result, the cost of roof coverings grew in tandem with the Naira's exchange rate.

Table 9: Regression analysis

S/N	Fitted Line	Regression Equation
1	Cost of CGIRS versus Exchange rate of Naira	Cost of CGIRS = -273038 +1322 Exchange rate of Naira
2	Cost of CGIRSG versus Exchange rate of Naira	Cost of CGIRSG = -294567 +1251 Exchange rate of Naira
3	Cost of SARS versus Exchange rate of Naira	Cost of SARS = 147778 +1186 Exchange rate of Naira
4	Cost of LCARS versus Exchange rate of Naira	Cost of LCARS = -492856 + 3136 Exchange rate of Naira
5	Cost of LSARS versus Exchange rate of Naira	Cost of LSARS = -804038 + 3705 Exchange rate of Naira
6	Cost of SCSRT versus Exchange rate of Naira	Cost of SCSRT = -115801+2299 Exchange rate of Naira

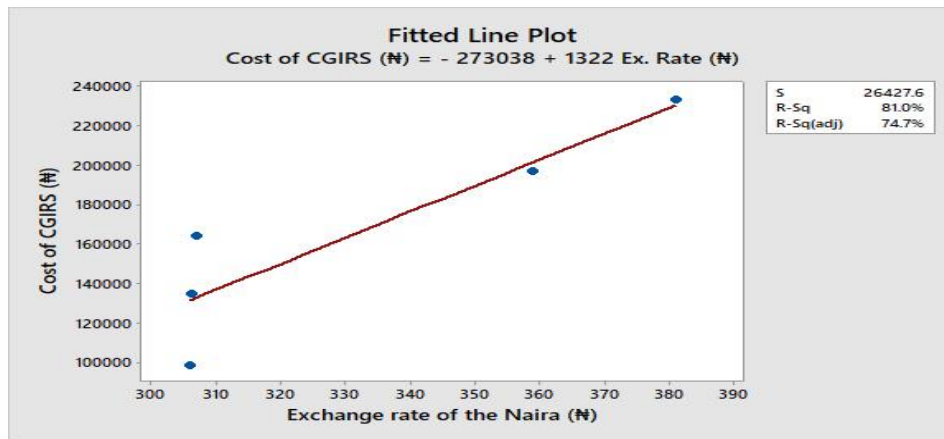


Figure 6: Cost of CGIRS versus Exchange rate of the Naira

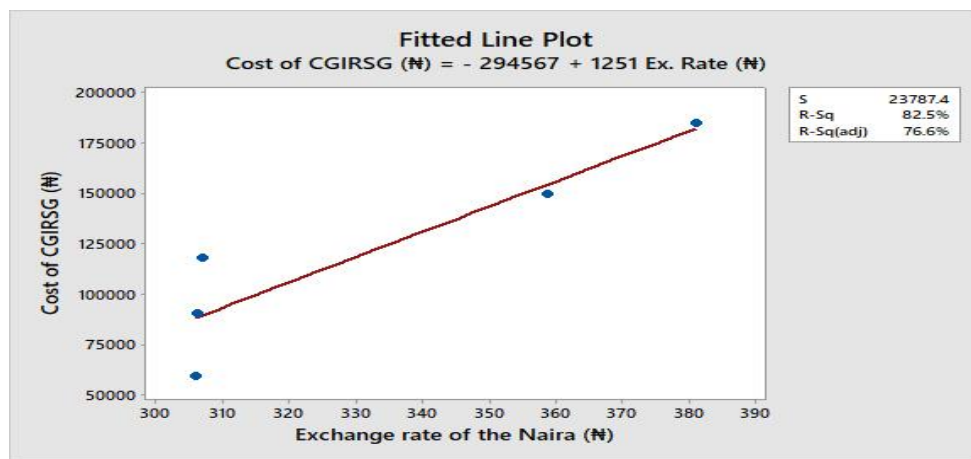


Figure 7: Cost of CGIRSG versus Exchange rate of the Naira

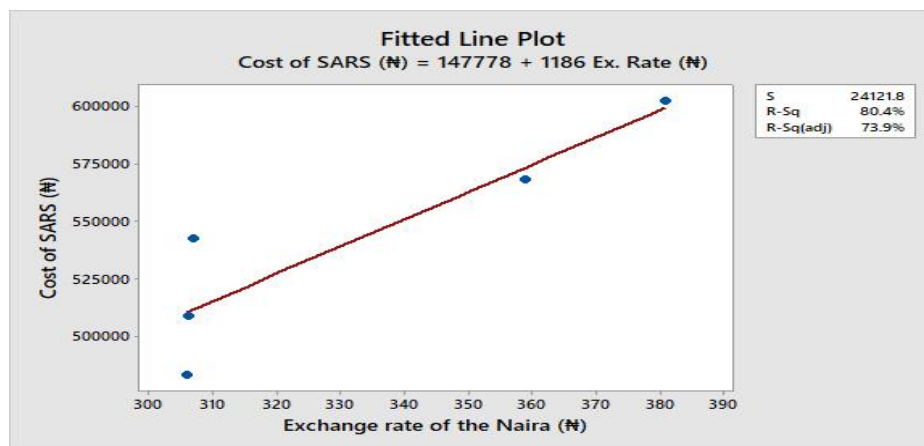


Figure 8: Cost of SARS versus Exchange rate of the Naira

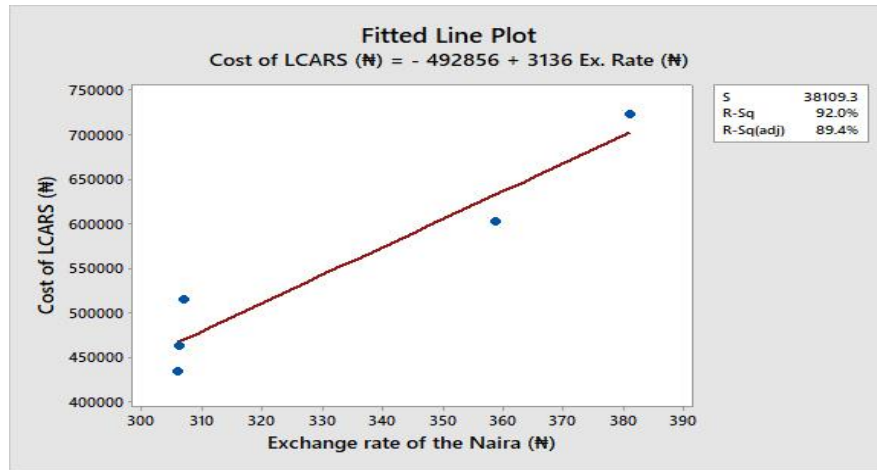


Figure 9: Cost of LCARS versus Exchange rate of the Naira

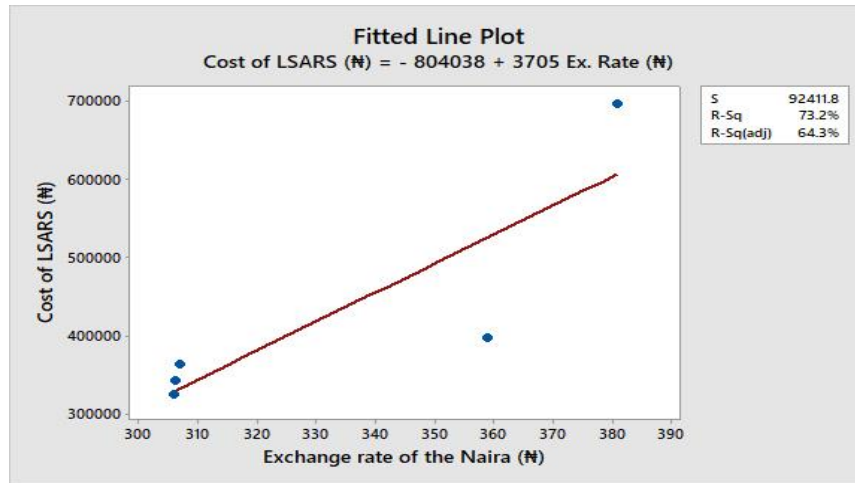


Figure 10: Cost of LSARS versus Exchange rate of the Naira

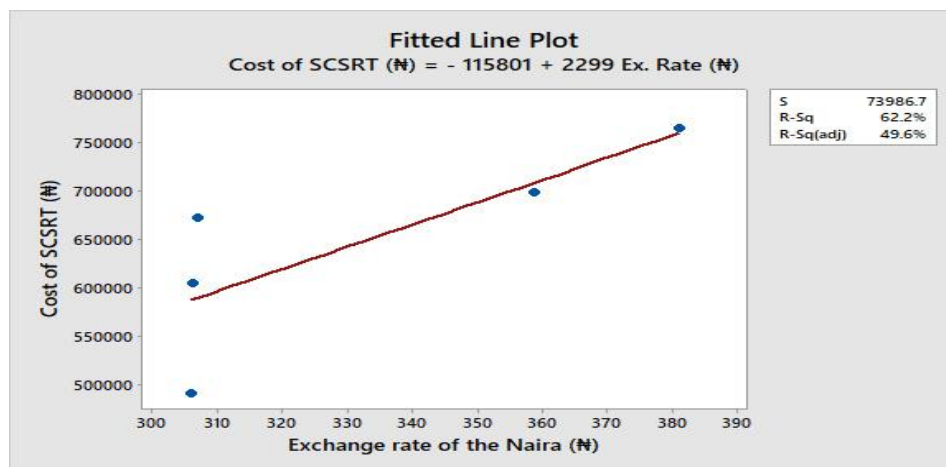


Figure 11: Cost of SCSRT versus Exchange rate of the Naira

5 Conclusion and Further Research

The existence, strength and impact of the relationship between the exchange rate of the Naira and the cost of roof coverings from 2017 to 2021 were examined. The study observed that as the Naira exchange rate increased, the price of 1m² of roof covering increased and vice versa. Furthermore, the exchange rate of the Naira has a positive linear relationship with the cost of the roof coverings. The study strongly appeals to the policymakers to implement a revival policy to enable the exchange rate of the Naira to regain its lost glory as affirmed by Alley (2018) and reduce imports from foreign countries.

6 References

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