Research Paper

Raw Materials and Locational Decision of Selected Foreign Manufacturing Firms in South West Nigeria

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Abstract
Locational decisions are important and challenging strategic decisions faced by domestic and international firms. The study was conducted to ascertain the influence of raw materials on foreign firms' location decision of selected manufacturing firms in South-West geopolitical zone of Nigeria. The study is guided by three research questions and hypotheses. A sample size of 229 from a population of 352 made up of the top management staff of the study multinational firms determined using the Taro Yammeh's formula was used in the study. The study applied both descriptive statistics and Somer's delta (Somer's d) and gamma statistic with the aid of SPSS version 25.0 at 0.05 significance level for data analysis to examine the influence of raw materials on foreign firms' location decision. Reliability statistics was conducted to determine the level of reliability of the test instrument. The result shows a cronbach alpha of 0.736. Findings show that availability of quality raw materials (d = .145, p < 0.05) and nearness of raw materials (d = .098, p < 0.05) were statistically significant which indicated a positive relationship. Similarly, proximity to market (d = .000, p < 0.05) presented no relationship which was statistically significant. It was recommended among others that manufacturing firms should improve their local sourcing of raw materials by partnering with farmers and intermediary companies to reduce the importation of raw materials. The study concludes that availability of quality raw materials (d = .145, p < 0.05) and nearness of raw materials (d = .098, p < 0.05) were statistically significant with a positive relationship.
Keywords: *Location, Firm, Decision, Raw Material, Market.*

I.   Introduction

In the recent past, the rise of emerging economies has led to a significantly increased demand for raw materials. Hence, providing a sustainable and reliable supply of raw materials at economic prices has become essential to industrialized economies.

Crescenzi (2018) posits that what attracts flow of investment around the world is not only about countries, but something on a much more local level. These firms according to Crescenzi (2018) are less interested in what a country offers them, but what they get from an individual city or country.

Manufacturing a product successfully is not sufficient. It is also necessary that the output should find ready market and that the product is sold at a price to yield reasonable profit. This is however, possible only when the market is not far away (Sinha 2020). Raw materials are important and one of the factors of production in addition to labor and capital. Raw materials play an important role in the production process to a great extent as the success of the economy of a country is determined by the amount of natural resources held by a country within its borders (Sinha 2020).

One of the most important considerations involved in the selection of manufacturing location has been the availability of quality raw materials required. Raw materials are materials or substances used in the primary production or manufacturing of goods. The biggest advantage of availability of raw material at the location of manufacturing firm is that it involves less cost in terms of transportation cost (Towhidur, 2020).

Access to raw materials is a dominant factor in the location of an industry, especially the industry which uses bulky raw material that is expensive to transport and loses weight in the manufacturing process. A manufacturing unit or company requires that the source of raw materials should be accessible to the company because transportation will be significant if raw materials are distantly located. High transportation charge will increase the cost of production and thus can reduce profitability (Garg, 2020).

Usually, manufacturing units where there is the conversion of raw materials into finished goods, should be located in a place where the raw materials availability is maximum and cheap (Sinha, 2020). For Unilever, these raw materials include palm oil, paper and board, soy, sugar, tea, dairy, rapeseed, cereals, vegetables, cocoa, herbal infusions and vanilla. They make up around two-thirds of Unilever total volume of agricultural raw materials and 88% of these were sustainably sourced in 2019 (Guardian,2020).

1.2   Statement of the Problem

The use of raw materials is affected by many variables beyond geological availability (socio-economic and geo-political factors) that can constrain the access to such materials. If these raw materials become difficult to acquire, market forces may shift demand to other goods and therefore other supply chains. Irrespective of one's specific business, such shifts can lead to irreparable economic harm.

Specifically, available studies assessed was mostly on regional location factors and made used of some regression tools like logit or nested models without conducting some diagnostic test in this area. For example, Sinha (2020), Towhidur (2020) and especially the work done by Garg (2020) on the factors affecting industrial location in Chandigarh in 2017, the researcher examined location factors such as access to market, access to raw materials, access to labour supply, access to sources of energy, access to transportation and communication facilities, government policy, access to agglomeration economies/ links between countries, and other miscellaneous factors like water using a mixed logit model for data analysis. Result shows that locations of most modern industries were not guided by a single factor due to its complex nature and, that the validity or importance of a factor also changes with time and space.

None of these studies assessed compared results obtained with another statistical tool for comparison to assure quality of their results. This may still not fit into Nigeria's industrial location decisions. Thus, this study is undertaken to contribute to an improvement and enhancement of our understanding of this important locational decision variable especially in the Nigeria context.

1.3 Objectives of the Study

The main objective of the study is to examine the influence of raw materials on locational decision of selected foreign manufacturing firms. The specific objectives include to:
1.   ascertain the relationship between quality raw materials and location decision of a firm.
2.   determine how access to raw materials influences location decision of a firm.
3.   Examine how proximity to market affects location decision of a firm.

1.4   Research Questions
1.   What is the relationship between of quality of raw and location decision of a firm?
2.   To what extent does access to raw materials influence location decision of a firm?
3.   To what extent does proximity to market affect location decision of a firm?

1.5   Hypotheses
Ho_1: Quality of raw materials has no significant influence on location decision of a firm.
Ho_2: Nearness of raw materials has no significant influence on location decision of a firm.
Ho_3: Proximity to market does not significantly affect location decision of a firm?

II.   Review of Related Literature

In this section, the researcher reviews existing literature related to the determination of the influence of raw materials on foreign firms' location decision.

Fig. 2.1 Operational Conceptual Framework
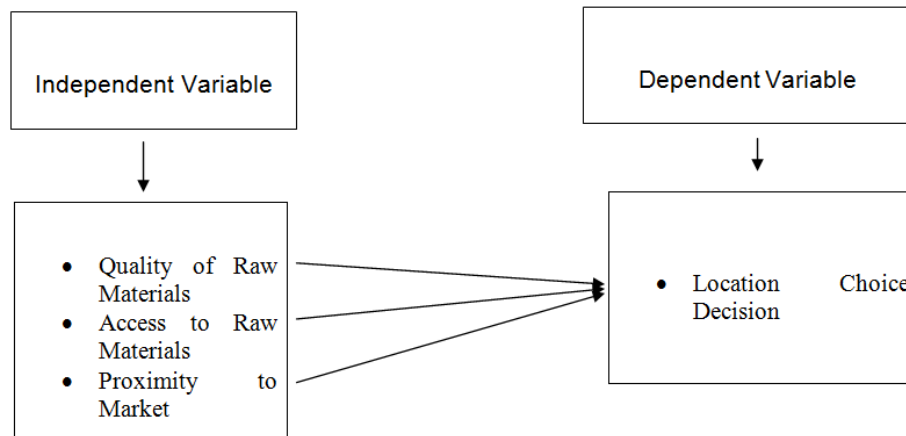
Source: Researchers' Desk 2021.

2.1.1 Availability of Quality Raw Materials

Areas abounding in industrial raw materials obviously exert greater pull on location of industrial undertaking. The influence of raw materials on selecting the location depends on the bulk and quality of materials and their use in the manufacturing process. Quality raw materials are classified into two categories for the purpose of assessing their influence on location. They include the gross or weight losing materials and the pure materials. Gross materials are those which lose their weight in the process of their transformation into finished products, example, iron ore, coal, sugarcane, limestone, timber, among others. Pure materials are those that add their weight to the finished product in the process of manufacture (Sinha, 2020).

2.1.2 Access to Raw Materials

Access to the source of raw material is of special importance particularly when this material is bulky in relation to its value and when the volume and weight are greatly reduced during the processing. Also raw materials that are rendered less perishable by the manufacturing firm operation are nearly always produced near their source. Pure materials add to the weight of the finished product, which would be bulkier and hence costlier to transport to markets than the raw materials. Hence industries in this kind of production are pulled towards market centres to enhance their way of entering or reaching the needed resources (Garg, 2020, Sinha, 2020).

2.1.3 Proximity to Markets

Proximity to markets is an important factor which the top management and location analysts must take into consideration as it expresses the state of being near in time and distance. Multinational firms producing perishable or bulky commodities which cannot be transported over long distance are generally located in close proximity to markets. Industries located near the markets could be able to reduce the costs of transport in distributing the finished product as in the case of food products. Accessibility of markets is more important in the case of industries manufacturing consumer goods rather than producer goods (Curran, Gerard-Lynn & O'Gorman, 2016).

Probably the most dynamic link in the supply chain dealing with market proximity is "last mile" - that movement of goods from a distribution center to the final destination in the home. Similarly, if finished products are perishable, they will be located at the centres of their consumption, example, cotton textiles, woolen, silk fabrics whose materials are 'Pure' adding itself into the heart of the markets. Bakeries, ice factories etc. whose finished product is perishable are also established nearer the markets. To calculate the raw materials inventory, add the cost of the direct materials in production with the manufacturing overhead (Towhidur, 2020, Sinha, 2020).

2.1.4 Raw Materials and Location Decision

One of the most important considerations involved in selection of manufacturing location has been the availability of raw materials required. The biggest advantage of availability of raw material at the location of manufacturing firms is that it involves less cost in terms of transportation cost (Sinha 2020, Garg, 2020). Akanwa & Ohiri (2003) assert that the environment provides resources and opportunities to the organization which it needs for its existence. Hence the significance of raw materials in manufacturing industry is so fundamental that it needs no emphasizing. Indeed, the location of manufacturing enterprises is sometimes

determined simply by location of the raw materials. Most modern firms are so complex that a wide range of raw materials is necessary for its growth.

According to Garg, (2020), and Sinha (2020) firms which use heavy and bulky raw materials in their primary stage in large quantities are usually located near the supply of the raw materials. This however is true in the case of raw materials which lose weight in the process of manufacture or which cannot bear high transport cost or cannot be transported over long distances because of their perishable nature. This has been recognized since 1909 when Alfred Weber published his theory of location of industry. Raw materials can be explained as substance or material used in the manufacturing or primary production of goods. These raw materials include palm oil, paper and board, soy, sugar, tea, dairy, rapeseed, cereals, vegetables, cocoa, herbal infusions and vanilla. They make up around two-thirds of our total volume of agricultural raw materials and 88% of these were sustainably sourced in 2019 (Sinha, 2020).

Aligning with government's backward integration policy, Unilever Nigeria Plc has intensified efforts to improve its local sourcing of raw materials by partnering with farmers and intermediary companies (guardian, 2020).

Under its 'Partner to Win'initiaive, Unilever will be investing in capabilities of intermediary companies to enable the company to convert farm produce to usable goods that will be sourced by the company locally as part of its raw materials. The organization believes this will enable it to achieve a significant reduction in the importation of raw materials by working with local partners (guardian, 2020).

2.2   Theoretical Review
2.2.1 Theory of Comparative Advantages- (Factor Endowment Theory)

The traditional basis for analysis of international economic activity is the neoclassical theory of international trade. The theory, known as the factor endowment theory of international trade, is developed by Heckscher and Ohlin from Ricardo's theory of Comparative advantages (Krugman & Obstfied, 1997 cited in Sinha, 2020). It explains international trade in terms of comparative advantages of participating countries based on the assumption of perfect competition in which certain resources or factors are immobile, production functions and consumer preference are identical and specialization is incomplete.

The basic premise is that countries should specialize in producing and exporting products that utilize their abundant and cheap factors of production and import products that utilize the countries scarce factors. The trade theory suggests that location of international production is based on comparative advantages of factor costs. If firms use FDI to minimize costs, they will move to the location where production costs are lowest. The concept of location advantages as reviewed by Cave (1982), Dunning (1993) and Brainard (1997) in Sinha, (2020) cover many aspects, including production costs and factors endowments, market size and taxation policies to attract foreign investment.

Therefore, low-wage locations with good transport and trade links to other parts of the corporation will be the favoured locations of foreign investors (Barba, Navaretti & Venables, 2004 cited in Crescenzi,2018).

2.2.2   Resource Based-View

The view was published by Wernerfelt and supported by Barney, Hermel & Prahalad in the 1980's and 1990's. Resource-based view (RBV) is a model that sees resources as key to superior firm performance. Resource-based view is also an approach to achieving competitive advantage. The supporters of this view argue that organizations should look inside the company to find the sources of competitive advantage instead of looking at competitive environment. According to RBV proponents, it is much more feasible to exploit external opportunities using existing resources in a new way rather than trying to acquire new skills for each different opportunity.

The two assumptions of RBV are that resources must also be heterogeneous and immobile. Heterogeneous: the first assumption is that skills, capabilities and other resources that organizations possess differ from one company to another. If organizations would have the same amount and mix of resources, they could not employ different strategies to outcompete each other. What one company could do, the other could simply follow and no competitive advantage could be achieved. This is the scenario of perfect competition, yet real world markets are far from perfectly competitive advantage and some companies, which are exposed to the same external and competitive forces (same external conditions) are able to implement different strategies and outperform each other. Therefore, RBV assumes that companies achieve competitive advantage by using their different bundles of resources.

The competition between Unilever and Colgate-Palmolive, Procter & Gamble and Kimberly-Clark manufacturing companies is a good example of how companies that operate in the same industry and thus, are exposed to the same external forces can achieve different organizational performance due to the difference in resources. Unilever PLC competes with Colgate-Palmolive, Procter & Gamble and Kimberly-Clark companies in household, healthcare, pet food, personal care products and other consumer goods, where Unilever sells its

products of much higher prices and, as a result, reap higher profit margins. Why Colgate-Palmolive, Procter & Gamble and Kimberly-Clark companies do not follow the same strategy? Simply because these companies do not have the same brand reputation or are capable of designing very user-friendly products like Unilever does (Heterogeneous resources).

Immobile: the second assumption of RBV is that resources are not mobile and do not move from company to company, at least in short-run. Due to this immobility, companies cannot replicate rivals' resources and implement the same strategies. Intangible resources, such as brand equity, processes, knowledge or intellectual property are usually immobile. Thus, the resource-based approach to entry mode choice incorporates the core notion of strategic management: the notion that a firm competes well in a setting in which there is a fit between the firms' resources and external opportunities.

III.   Methodology

This section covers the design procedure and methodology of the work. It presents the steps that will be taken by the researcher to arrive at the results of the study. These steps include the survey research design which involves the use of such tools as personal interviews, questionnaires and observations. A sample size of 229 was determined from a population of 352 top management staff of the study multinational enterprises using the Taro Yammeh's formula. The questionnaire was subjected to supervisor's corrections and used a pilot study to determine the validity by selecting a few respondents from the study organizations. In measuring **a** pilot study was conducted to enable determine the level of reliability for the instrument. The data gotten from the pilot survey was subjected to test of reliability using Cronbach alpha technique. The result shows a Cronbach alpha of 0.736 for structured questionnaire designed for the study thereby confirming the instrument reliable.

The researcher applied both descriptive statistics, and Somers' delta (Somer's d) and gamma statistic for analysis of data. The findings of Somer's d and gamma statistics were compared to that of spearman correlation statistic obtained to assure quality result.

Somers' d Formula

$$D = \frac{P - Q}{P + Q + T}$$

Where P is the count of concordant instances, Q is the count of discordant instances and T is the count of tied instances

Gamma statistic
Gamma is a measure of association for ordinal variables. Gamma ranges from -1.00 to 1.00. Again, a Gamma of 0.00 reflects no association; a Gamma of 1.00 reflects a positive perfect relationship between variables; a Gamma of -1.00 reflects a negative perfect relationship between those variables.

Gamma Formula

$$\gamma = \frac{P - Q}{P + Q}$$

Where P is the count of concordant instances and Q is the count of discordant instances
Decision Rule: The decision rule of the test statistic will be to accept the null hypothesis, when p-value is greater than or equal to significance level at 0.05. Alternatively, accept the alternative hypothesis when p-value is less than or equal to significance level at 0.05.

IV.   Data Analysis & Presentation

In this section, the presentation was organized based on the research questions then the hypotheses. Illustrations with tables and charts were used to enhance the presentation while decisions were taken based on the results. Data were analyzed using computer aided package such as IBM SPSS version 25.0 statistical package. The significant level was set at 0.05. Somers' delta (Somers' d) and gamma statistic are then compared to spearman correlation statistic obtained, and descriptive statistics was applied in testing of the hypotheses and answering the research questions.

This study investigated the influence of raw materials on locational decision of selected foreign manufacturing firms in South West Nigeria. This study examined how raw materials influence foreign firms' location decision. More specifically, this study was primarily conducted to address the following research questions:
a)   ascertain the relationship between quality of raw materials and location decision of a firm.

b) determine how access to raw materials influence location decision of a firm.
c) examine how proximity to market affect location decision of a firm.

4.1 Presentation of Data
4.1.1 Questionnaire Distribution Outcome

The researcher with the aid of proportionate random sampling method was able to collate the exact sample size from the population studied that were properly filled and returned. With the aid of simple random sampling technique, the researcher was able to gather sufficient information from the population. The study further had to use the two hundred and ninety-nine (299) questionnaire properly filled and returned for study. This serves to give the data substance and credibility.

Table 4.1.1: Respondents responses and ranking as regards to quality of raw materials

S/N	Quality of Raw Materials	5	4	3	2	1	N	Mean	Stand. Dev.	Ranking
16	Loss of weight	159	70	0	0	0	229	3.69	0.462	5th
17	Production dimension	0	229	0	0	0	229	4.00	0.000	3rd
18	Temperature/Weather	0	161	68	0	0	229	3.70	0.458	4th
19	Material management	112	100	17	0	0	229	4.41	0.627	1st
20	Storage facilities/Cost	103	100	23	3	0	229	4.31	0.758	2nd
	Grand Mean				4.02		0.255		of great importance	

Source: Researcher's Fieldwork, 2021

The result in table 4.1.1 presents the respondents responses and ranking as regards to the variable quality of raw materials. The result presents a grand mean of 4.02 and a standard deviation of 0.255 which indicates that the respondents highly viewed quality of raw materials as of great importance. The result shows that material management (mean of 4.41 and a standard deviation of 0.627) ranked 1st; storage facilities/cost (mean of 4.31 and a standard deviation of 0.758 respectively) ranked 2nd; production dimension (mean of 4.00 and a standard deviation of 0.000) ranked 3rd; then temperature/weather (mean of 3.70 and a standard deviation of 0.458) ranked 4th and finally loss of weight (mean of 3.69 and a standard deviation of 0.462) ranked 5th are all of great importance in location decision as regards raw materials influence on firms' decision .

This result indicates that firms consider material management, storage facilities/cost, production dimension, temperature/weather and finally loss of weight as being of great importance in location decision as regards the variable, quality of raw materials influence on firms' decision.

Table 4.1.2: Respondents responses and ranking as regards to access to raw materials

S/N	Access to Raw Materials	5	4	3	2	1	N	Mean	Stand. Dev.	Ranking
21	Supply and demand characteristics	115	84	30	0	0	229	4.37	0.705	2nd
22	Utilities- water, electricity	79	125	19	3	3	229	4.20	0.75	4th
23	Environmental regulations	93	106	8	18	4	229	4.16	0.944	5th
24	Cost of transportation	127	102	0	0	0	229	4.55	0.498	1st
25	Climatic conditions	101	95	20	9	4	229	4.22	0.893	3rd
	Grand Mean				4.30		0.385		of great importance	

Source: Researcher's Fieldwork, 2021

The result in table 4.1.2 presents the respondents responses and ranking as regards to the variable access to raw materials. The result presents a grand mean of 4.30 and a standard deviation of 0.385 which indicates that the respondents highly viewed access to raw materials as of great importance. The result shows that cost of transportation (mean of 4.55 and a standard deviation of 0.498) ranked 1st; supply and demand characteristics (mean of 4.37 and a standard deviation of 0.705 respectively) ranked 2nd; climatic conditions (mean of 4.22 and a standard deviation of 0.893) ranked 3rd; then utilities- water, electricity (mean of 4.20 and a standard deviation of 0.750) ranked 4th and finally environmental regulations (mean of 4.16 and a standard deviation of 0.944) ranked 5th are all of great importance in location decision.

This result indicates that firms consider cost of transportation, supply and demand characteristics, climatic conditions, utilities- water, electricity, and finally environmental regulations are of great importance in location decision as regards the variable, access to raw materials influence on firms' decision.

Table 4.1.3: Respondents responses and ranking as regards to Proximity to Market

S/N	Proximity to Market	5	4	3	2	1	Total	Mean	Stand. Dev.	Ranking
26	Distribution cost	107	107	15	0	0	229	4.4	0.611	3rd
27	Availability of labour	146	76	7	0	0	229	4.61	0.549	1st
28	Community relations	23	99	14	40	53	229	3.00	1.394	5th
29	Material handling cost	123	76	30	0	0	229	4.41	0.711	2nd
30	Cultural barriers	56	99	7	52	15	229	3.56	1.261	4th
	Grand Mean						0	4.00	0.5112	of great importance

Source: Researcher's Fieldwork, 2021

The result in table 4.1.3 presents the respondents responses and ranking as regards to the variable proximity to market. The result presents a grand mean of 4.00 and a standard deviation of 0.5112 which indicates that the respondents highly viewed proximity to market as of great importance. The result shows that availability of labour (mean of 4.61 and a standard deviation of 0.549) ranked 1st; material handling cost (mean of 4.41 and a standard deviation of 0.711 respectively) ranked 2nd; distribution cost (mean of 4.40 and a standard deviation of 0.611) ranked 3rd; then cultural barriers (mean of 3.56 and a standard deviation of 1.261) ranked 4th and finally community relations (mean of 3.00 and a standard deviation of 1.394) ranked 5th are all of great importance in location decision.

This result indicates that firms consider availability of labour, material handling cost, distribution cost, cultural barriers and finally community relations as of great importance in location decision as regards the variable, proximity to market.

Table 4.1.4: Respondents responses and ranking as regards to firm's location decision

S/N	Location Decisions	5	4	3	2	1	Total	Mean	Stand. Dev.	Ranking
31	Influence of raw materials on location Decision	99	112	18	0	0	229	4.35	0.622	2nd
32	Proximity to market effect on location decision	61	168	0	0	0	229	4.27	0.443	4th
33	Access to raw materials influence on location Decision	101	103	21	1	3	229	4.30	0.761	3rd
34	Quality of raw materials relationship with location Decision	127	102	0	0	0	229	4.55	0.498	1st
	Grand Mean							4.36	0.3251	of great importance

Source: Researcher's Fieldwork, 2021

The result in table 4.1.4 presents the respondents responses and ranking as regards the firm's location decision. The result presents a grand mean of 4.36 and a standard deviation of 0.3251 which indicates that the respondents highly viewed location decision as of great importance. The result shows that the respondents viewed availability of quality raw materials (mean of 4.55 and a standard deviation of 0.498) ranked 1st; influence of raw materials on location decision (mean of 4.35 and a standard deviation of 0.622 respectively) ranked 2nd; nearness of raw materials influence on location decision (mean of 4.30 and a standard deviation of 0.761) ranked 3rd; and finally, proximity to market effect on location decision (mean of 4.27 and a standard deviation of 0.433) ranked 4th are all of great importance in firms location decision.

This result indicates that firms consider quality of raw materials, nearness of raw materials and proximity to market as of great importance in location decision of a firm.

4.2 Analysis of Data
The data collected with the aid of the questionnaire are presented below according to the various study research questions and hypotheses. In presenting and analyzing the data, the decision rules stated below are used.

Decision Rule:

Coefficient Range	Strength of Association
+/-.91 - +/-1.00	Very High
+/-.71 - +/-.90	High
+/-.51 - +/-.70	Moderate
+/-.21 - +/-.50	Low
+/-.00 - +/-.20	Very Low

Reject the null hypothesis if p-value ≤ 0.0005 significance level

Research Question 1: What is the relationship between quality of raw materials and location decision of a firm?

Table 4.2.1: SPSS descriptive statistics for relationship between quality of raw materials and location decision of a firm

Descriptive Statistics

	Mean	Std. Deviation	N
Quality of raw materials	4.02	.2550	229
Location Choice	4.36	.3251	229

Source: SPSS 25 Descriptive Statistics Output

The result in table 4.2.1 presents the descriptive statistics for quality of raw materials and location decision of the firm. The result has shown that location decision by the firm accounted for a mean of 4.36 and a standard deviation of 0.3251 while the result for quality of raw materials accounted for a mean of 4.02 and a standard deviation of 0.2550. This result indicates that the majority of the respondents were of the opinion that the availability of quality raw materials is of great importance in location decision of a firm.

Table 4.2.2: SPSS Asymmetric/Directional Measures Result for Quality of raw materials and firms' decision of location

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	.141	.051	2.753	.006
		Quality of raw materials Dependent	.137	.050	2.753	.006
		Location Decision Dependent	.145	.052	2.753	.006

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: SPSS 25 Asymmetric/Directional Measures Analysis Output

As seen above in table 4.2.2 (i.e.: Directional Measures), Somer's d is primarily an asymmetric measure of association, meaning that whichever variable is treated as the dependent variables matters (though it can also be conceptualized as symmetric). Somer's d is a Proportional Reduction in Error (PRE) measure. It is interpreted as the improvement in predicting the dependent variable that can be attributed to knowing a case's value on the independent variable. A value of .145 for the crosstabulation above (treating the firm's decision on location decision as dependent) indicates that an improvement in the firm's decision of location by 14.5% as regards the variable, availability of quality raw materials.

Table 4.2.3: SPSS Symmetric Measures result for quality of raw materials and location decision

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.176	.063	2.753	.006
	Spearman Correlation	.179	.064	2.734	.007[c]
Interval by Interval	Pearson's R	.191	.059	2.925	.004[c]
N of Valid Cases		229			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.

Source: SPSS 25. Symmetric Measures Analysis Output

The result in table 4.2.3 presents the symmetric measures output result showing SPSS providing three common symmetric measures of association which can be used to compare the results as produced by SPSS for the analysis while considering their various assumptions. Since both dependent and independent variables are in

ordinal form, the result can be produced by "ordinal by ordinal". The spearman correlation analysis result is compared to that of gamma statistical analysis. The result as shown in table 4.2.3 shows that the result from spearman correlation which is 0.179 and that of gamma statistic is for 0.176. Both showed that there is a very low level of relationship between quality of raw materials and firms' decision of location. The gamma statistic and spearman correlation statistic result indicates that the quality of raw materials available in that area has a very low relationship with the firm's decision on choice of location by 17.6% and 17.9% respectively. This is a very low level of relationship between quality of raw materials and firms' decision on location.

Hypothesis 1:   Quality of raw materials has no significant influence on location decision of a firm.

The result in table 4.2.2 presents the Somers' *d* result which presented in the "Location Decision Dependent" row of the "Value" column and is 0.145. This indicates that the availability of quality of raw materials in the targeted area increases the decision in making the area location decision for the firm by 14.5%. Furthermore, the "Approx. Sig." column shows that the statistical significance value (i.e., *p*-value) is .006, which means $p < .0005$. Therefore, the association between the ordinal dependent variable, "location decision", and ordinal independent variable, "quality of raw materials", is statistically significant.

Thus, having run Somers' d statistic to determine the relationship between quality of raw materials and location decision of firms amongst 229 participants, there was a very low level of association though a positive relationship existing between quality of raw materials and location decision of firms, which was statistically significant (d = .145, p < .0005).

Research Question 2: To what extent does access to raw materials influence location decision of a firm?

Table 4.2.4: SPSS descriptive statistics for access to raw materials and location decision of a firm

Descriptive Statistics

	Mean	Std. Deviation	N
Access to Raw Materials	4.31	.3846	229
Location Decision	4.36	.3251	229

Source: SPSS 25. Descriptive Statistics Output

The result in table 4.2.4 shows the descriptive statistics for access to raw materials and location decision of the firm. The result has shown that the decision of location by the firm accounted for a mean of 4.36 and a standard deviation of 0.3251 while the result for access to raw materials accounted for a mean of 4.31 and a standard deviation of 0.3846. This result indicates that the majority of the respondents were of the opinion that the raw materials access in this area is of great importance and so is the location decision of the firm.

Table 4.2.5: SPSS Asymmetric/Directional Measures Result for Access to raw materials and firm's decision of location

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	.099	.049	2.032	.042
		Nearness of Raw Materials Dependent	.100	.049	2.032	.042
		Location Decision Dependent	.098	.048	2.032	.042

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: SPSS 25 Asymmetric/Directional Measures Analysis Output

As seen above in table 4.2.5 (i.e.: Directional Measures), Somer's d is primarily an asymmetric measure of association, meaning that whichever variable is treated as the dependent variables matters (though it can also be conceptualized as symmetric). Somer's d is a Proportional Reduction in Error (PRE) measure so it is interpreted as an improvement in predicting the dependent variable. A value of .100 for the crosstabulation above (treating the firm's decision on location decision as dependent) shows the improvement in the firm's decision of location by 10% as regards the variable, raw materials access in that area of decision.

Table 4.2.6: SPSS Symmetric Measures result for Access to raw materials and location decision

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.118	.058	2.032	.042
	Spearman Correlation	.131	.063	1.990	.048[c]
Interval by Interval	Pearson's R	.125	.056	1.898	.059[c]
N of Valid Cases		229			

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.
c. Based on normal approximation.
Source: SPSS 25 Symmetric Measures Analysis Output

Table 4.2.7 presents the symmetric measures output result showing SPSS providing three common symmetric measures of association which can be used to compare the results as produced by SPSS for the analysis while considering their various assumptions. Since both dependent and independent variables are in ordinal form, the result can be produced by "ordinal by ordinal". The spearman correlation analysis result is compared to that of gamma statistical analysis. The result as shown in table 4.2.6 presents that the results from spearman correlation which is 0.131 and that of gamma statistic which accounts for 0.118 indicate that there is a very low level of relationship between access to raw materials and firm's decision on location. The gamma statistic and spearman correlation statistic result indicates that knowing the access to raw materials has a very low relationship/contributory factor over our prediction of firm's decision on decision of location by 13.1% and 11.8% respectively. This shows a very low level of relationship between access to raw materials and firm's decision on location.

Hypothesis 2:   Access to raw materials has no significant influence on location decision of a firm.

The result in table 4.2.5 presents the Somers' *d* result which presented in the "Location Choice Dependent" row of the "Value" column and is 0.098. This indicates that the state of access to raw materials in the targeted area increases the firm's decision in making the area location choice for the firm. Furthermore, the "Approx. Sig." column shows that the statistical significance value (i.e., *p*-value) is .042, which means $p < .0005$. Therefore, the association between the ordinal dependent variable, "location choice", and ordinal independent variable, "access to raw materials", is statistically significant.

Thus, having run Somers'd statistic to determine the relationship between the presence of access to raw materials and location choice of firms amongst 229 participants. There was a very low level of association though a positive relationship existed between access to raw materials and location choice of firms, which was statistically significant (d = .098, p < .0005).

Research Question 3: To what extent does proximity to market affect location decision of a firm?

Table 4.2.8: SPSS descriptive statistics for Proximity to market and location decision of a firm

Descriptive Statistics

	Mean	Std. Deviation	N
Proximity to market	4.31	.3846	229
Location Decision	4.36	.3251	229

Source: SPSS 25. Descriptive Statistics Output

The result in table 4.2.8 presents the descriptive statistics for proximity to market and location choice of the firm. The result has shown that the choice of location by the firm accounted for a mean of 4.36 and a standard deviation of 0.3251 while the result for proximity to market accounted for a mean of 4.31 and a standard deviation of 0.3846. This result indicates that the majority of the respondents were of the opinion that proximity to market is of great importance in location decision of the firm.

Table 4.2.9: SPSS Asymmetric/Directional Measures Result for Proximity to market and firm's decision of location

Directional Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal Somers' d	Symmetric	.000	.050	.004	.996
	Proximity to market Dependent	.000	.052	.004	.996
	Location Choice Dependent	.000	.048	.004	.996

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: SPSS 25 Asymmetric/Directional Measures Analysis Output

As seen above in table 4.2.9 (i.e.: Directional Measures), Somer's d is primarily an asymmetric measure of association, meaning that whichever variable is treated as the dependent variables matters (though it can also be conceptualized as symmetric). Somer's d is a Proportional Reduction in Error (PRE) measure so it is interpreted as the improvement in predicting the dependent variable. A value of .000 for the crosstabulation above (treating the firm's decision on location choice as dependent) indicates that proximity to market is not a condition for decision of firm's decision on location as the result shows 0% level.

Table 4.2.10: SPSS Symmetric Measures result for proximity to market and location choice

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Gamma	.000	.059	.004	.996
	Spearman Correlation	.000	.066	-.003	.997[c]
Interval by Interval	Pearson's R	.010	.065	.154	.878[c]
N of Valid Cases		229			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Source: SPSS 25. Regression Analysis Output

The result in table 4.2.10 presents the symmetric measures output result showing SPSS providing three common symmetric measures of association which can be used to compare the results as produced by SPSS for the analysis while considering their various assumptions. Since both dependent and independent variables are in ordinal form, the result can be produced by "ordinal by ordinal". The spearman correlation analysis result is compared to that of gamma statistical analysis. The result as shown in table 4.2.10 shows that the results from spearman correlation which is 0.000 and that of gamma statistic which is 0.000 both showed that there is no relationship between proximity to market and firm's decision on location. The gamma statistic and spearman correlation statistic result indicates that proximity to market has no effect on the firm's decision on location. Therefore, there is no relationship existing between proximity to market and firms' decision on location.

Hypothesis 3:   Proximity to market does not significantly affect location decision of a firm.

The result in table 4.2.9 presents the Somers' *d* result which was presented in the "Location Decision Dependent" row of the "Value" column and is 0.000. This indicates that the state of proximity to market in the targeted area does not increase the firm's decision in making the area location decision. Furthermore, the "Approx. Sig." column shows that the statistical significance value (i.e., *p*-value) is .996, which means $p > 0.05$. Therefore, the association between the ordinal dependent variable, "location decision", and ordinal independent variable, "proximity to market ", is not statistically significant.

Thus, having run Somers' d statistic to determine the relationship between proximity to market and location decision of firms amongst 229 participants, there was no relationship existing between proximity to market and location decision of firms, which was statistically not significant (d = .000, $p < 0.05$).

4.3 Discussion of Results

The researcher made specific findings in this study. The findings can be discussed as follows:

1.   The availability of quality raw materials is of great importance and so affects the location decision of the firm. The firm's decision of location is improved by 14.5% by knowing that there is quality of raw materials available. There is low level of relationship between quality of raw materials and firms' decision on location. There was a very low level of association though a positive relationship existed between quality of raw materials and location decision of firms, which was statistically significant (d = .145, $p < 0.05$). The study conclude that

availability of quality raw materials was statistically significant in location decision. The study conclusion is in agreement with the study carried out by Trivikram (2020) which shows that labour intensive firms should select locations nearer to the source of resources.

2.   The state of access to raw materials in this area is of great importance and so is the location decision of the firm. The firm's decision of location is improved by 10% which shows a very low level of relationship between access to raw materials and firm's decision of location. The study concludes that there was a very low level of association though a positive relationship existing between access to raw materials and location decision of firms, which was statistically significant (d = .098, p < 0.05). This is in agreement with the study of Trivikram (2020).

3.   The raw materials proximity to market is of great importance in location decision of the firm. Proximity to market is not a condition for firm's location decision as the result shows 0% level. Proximity to market has no significant effect over prediction of firm's decision of location. Therefore, there is no relationship between proximity to market and firm's decision on location. Hence, no relationship existed between proximity to market and location decision of firms, which was statistically not significant (d = .000, p < 0.05). Thus this is in agreement with the study carried out by Trivikram (2020), and Sinha (2018).

4.4   Recommendations

1.   Companies should increase their market share through innovation, strengthen customer relationships, engage in smart hiring practices and acquire more competitors.

2.   Host countries should specialize more in producing and exporting products that utilize their abundant and cheap factors of production.

3.   Multinational Enterprises should increasingly seek locations which offer best economic and institutional facilities and locate where core competencies can be efficiently utilized.

4.   Manufacturing firms should improve their local sourcing of raw materials by partnering with farmers and intermediary companies to reduce the importation of raw materials.

5.   Manufacturing firms should stay relevant through innovation, respond to customer's ideas and be more flexible.

4.5   Conclusion

Locational decisions are important strategic decision challenges faced by domestic and international firms. Manufacturing a product successfully is not sufficient. It is also necessary that the output should find ready market and that the product is sold at a price to yield reasonable profit.

Raw materials are materials or substances used in the primary production or manufacturing of goods. These are commodities that are bought and sold on commodities exchanges worldwide. The biggest advantage of availability of raw material at the location of manufacturing firm is that it involves less cost in terms of transportation cost.

The study was guided by three research questions and hypotheses. The study applied both descriptive statistics and Somer's delta (Somer's d) and gamma statistic with the aid of SPSS version 25.0 at 0.0005 significance level for data analysis to examine the influence of raw materials on locational decision of selected foreign manufacturing firms.

Reliability statistics was conducted to determine the level of reliability of the test instrument. The results report a Cronbach alpha of 0.736. Findings shows that availability of quality raw materials (d = .145, p < .0005) and nearness of raw materials (d = .098, p < .0005) was statistically significant which reports a positive relationship. Similarly, proximity to market (d = .000, p < .0005) presented no relationship which was statistically not significant.

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