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Leonard Tabugbo Onwuzuligbo, Hilda E. Osisioma & Audu, Yakubu Philemon, 2023,6 (1):7-20

Impact of Value Innovation on Product Quality of Aluminium Extrusion Firms in North-Central Nigeria

[1]Leonard Tabugbo Onwuzuligbo, Ph.D, [2]Prof. Hilda E. Osisioma
[1&2]Department of Business Administration
Nnamidi Azikiwe University, Akwa, Anambra State, Nigeria

[3]Audu, Yakubu Philemon
(PhD Student)
[1]Department of Business Administration
Nnamidi Azikiwe University, Awka, Anambra State, Nigeria
Email: yakubu4audu@yahoo.com

Abstract
The study examines the relationship between Value innovation and Performance of Aluminum Extrusion Firms in North-Central Nigeria. The specific objective is to examine the relationship between value innovation strategy and product quality. The study was anchored on the Value Innovation Theory. To achieve the objective of the study, a survey research design was employed. The population of the study was the composite of Management and staff of the focused Aluminum Firms as well as Aluminum dealers otherwise known as customers made of up of 509 out of which 260 was the population of the Aluminum Firms and 249 was the population of the Aluminum dealers respectively. Primary data was the sources of data used for the study and was collected through self-administered questionnaire designed in five points Likert scale of strongly agree to strongly disagree. Data collected were analyzed with the aid of descriptive and parametric statistical tools. The descriptive statistic tools used were tables, percentages, mean scores and standard deviation to reduce the data into comprehensible form. The parametric instrument used to test the hypotheses formulated for the study was linear regression. Upon the test of the hypothesis, the study found a significant positive relationship between value innovation and product quality (r=0.879, P-value < 0.05). Based on the findings, the study recommends the adoption of Value innovation by Management of the Aluminum Extrusion Firms with a view to making competition irrelevant and improves their performance. Hence, the study concludes, that Value innovation if properly adopted in the Management of Aluminum Extrusion Firms will improve the performance of this all-important dying subsector of the Nigerian economy.
Keywords: *Value innovation, Product quality, Manufacturing firms.*

Introduction

Strategy and performance of Aluminum Extrusion firms are inseparable concepts (Mushin & Rajesh, 2020). One leads to the other. Strategy drives performance while performance measures the success of a strategy. Thus, the survival of and the performance of Aluminum extrusion firms depends on a sound strategy. The declining performance of the Aluminum extrusion firms and Manufacturing in general in Nigeria in recent time is a matter of concern to the government and private sector industrialists. In 2016 alone, according to Manufacturers Association of Nigeria (MAN) 270 Manufacturing Firms closed shop and some manufacturing concerns were operating at a loss while others are retrenching workforce to stay in business. The attendant economic and social challenges to the government and her citizenry can only be imagined. It leads to rising unemployment and social vices challenges to the government. Also, the poor performance of the manufacturing subsector has led to declining revenue of government, and high inflation due to importation. The contribution of

the subsector to Gross Domestic product is a pantry 4.5% (MAN, 2017). To the private sector industrialist, the effect is monumental loss of investment and its returns.

The above scenario, however, is a product of several factors such as poor investment environment in the country to strategy summersault by Managers of Aluminum Extrusion Firms. The changing business environment as a result of globalization driven by Information Communication Technology (ICT) comes with competition which requires change of tactics and strategy in line with the dynamics of the global business demand. No gain saying, therefore, that globalization is the driver of competition using ICT as the vehicle. This has led to intense scrambling for limited market share and demands extra-ordinary effort for sustainability and survival by firms in their chosen markets. As more competitors enter into the market space, market shares shrink, profit declines and survival become that of the fittest. Consequently, firms that cannot withstand the pressure quit the market and others remain marginally in the market space struggling to stay afloat. In the market, the strong eat up the weak (Mohammed, Ndinya, & Ogada, 2019). Being preoccupied by the pressure of competition, incentive to be innovative becomes less in a market with unprecedented high level of competition (Ozkaya, Droge, Hult, Calantone & Ozkaya, 2015). The futility in pursuing competitive strategy for growth and sustainability by Managers of the Aluminum extrusion Firms called for an alternative strategy of Blue Ocean. The Value innovation (BOS) represents a market where demand is created rather than being fought for and the rule of competition is of no consequence (Kim & Mauborgne, 2014, Uchenna & Audu, 2022).

The wisdom that underlies the Value innovation is that it makes Manager's look ahead to create a market in which competition cannot have influence on the growth, survival, sustainability and performance of the organization. It's characterized by the creation of new markets; new demand and the company leverage on value innovation to create something distinctively different that can add value to consumers. Value innovation through value innovation drives cost down and at the same time drives value up for buyers (Brady, 2005).

BOS is aimed at making competition irrelevant, creating new demand, differentiation and cost, breaking value cost trade-off and creating new uncontested market (Kim & Mauborgne (2014) and Mohammed *et al.,* (2019). It represents a leap in value for both the company and consumers and therefore a win-win situation.

A well driven Value innovation has the capacity to deliver a sound organizational performance. The metric of performance could be financial or non-financial (Thabet & Ramadan, 2022). It could be product quality, profitability, market share, sales volumes, and customer retention and customer satisfaction among others.

To make competition irrelevant, and to attain customer satisfaction, the Value innovation driven by value innovation helps to drive value up which enable consumers to benefit maximally from their purchases. Equally, Value innovation which leads to the increase of the firm size confers on the firm economies of scale which reduces cost of production and increase profitability. Cost leadership as a variable of the Value innovation provides a firm with strategic competitive superiority well above other similar or same firms by an offering that is comparably cheaper than others thereby engendering customer loyalty. More importantly, creative differentiation of offerings which differentiates a firm from others for outstanding product offering conveys dominance of the market and consequently increase market share. Also, product innovation strategy as a variable of the Value innovation enables

a firm to venture into new market to explore completely new industry and garner new customers with an outstanding quality offering which can lead to sales growth.

However, in spite of this measure, the aforementioned problems persist, hence the need for a study of this nature to examine the relationship that exists between Value innovation and the performance of Aluminum Extrusion Firms in North-Central Nigeria.

Objective of the Study
To examine the relationship between value innovation strategy and product quality.

Research Question
Following the research objective stated above, the study generated the research question thus:
What is the relationship between value innovation strategy and product quality?

Statement of Hypothesis
The study is guided by the hypothesis stated in its null form:
H_1: There is no significant relationship between value innovation strategy and product quality

Concept of Value Innovation
Value innovation is a concept that is acclaimed to be the corner stone of Value innovation (Hamra & Gassabi, 2021; Kim & Mauborgne, 2014; Odera, 2017 and Rebbouh, 2019, Malik & Audu, 2023). It is a simultaneous effort to pursue cost reduction and increase in value delivery to customers. The reduction in the cost gives the organization the competitive edge beyond the level of rival organizations and thereby renders competition irrelevant. Rebbouh (2019) submitted that value innovation is the simultaneous pursuit of differentiation and low cost leading to the creation of a quantum leap in value for the organization and buyers. In value innovation, costs and value have an inverse relationship such that while costs are decreasing, value for the buyers increases. Rebbouh (2019) posited that over the course of time, costs are reduced as a result of the organization enjoying economies of scale due to increase sales volume and superior value. To this end, the author contended that for an organization to enjoy value innovation, such organization must be operating in the region where its actions influences both cost structure and its value proposition to consumers.

Costs are saved from eliminating and reducing the factors that the industry competes on and raise as well as create those factors that are necessary to achieve competitive advantage (Rebbouh, 2019). This makes competition irrelevant. It is the submission of experts that value innovation places equal emphasis on value and innovation. The two words are inseparable because none of them can make any meaningful contribution without the other (Basri, Ghazali & Ismail, 2011, Hamra & Gassabi, 2021 and Rawabdeh *et al.,* 2012,).

Value innovation imposes obstacles to imitation in the market arena. Stressing further, creating a value-innovation strategy puts organizations in a vantage position of reaping from economy of scale. Consequently, organizations that adopt value innovation enjoy and placed in a long-term vantage position of cost advantage that barred imitators due to their disadvantage cost position in the market (Bologna, 2015, Harianto & Lookman, 2021). Value innovation is a central pillar of the 'market creating' strategy. It should be understood however, that value innovation does not start and end with technology but extends to any innovation that increases added value for buyers which has not been offered by the industry before (Hanifah, 2015, Harianto & Lookman, 2021).

Concept of Extrusion Firms Performance

Aluminum Extrusion Firm's performance is a multidimensional concept whose indicators are many and varied (Atalay, Anafarta & Sarvan, 2013). These indicators can be objective or subjective in measuring Performance (Dawes, 1999; Harris, 2001; Atalay *et al.,* 2013). What constitutes Manufacturing Firm Performance is not definitive but describable. The metric of performance according to Ziyaminyana and Pwaka (2019) include the level of customer satisfaction as measured by the numbers of complaints about the organization's product, number of returns made by customers, the level of customer retention among others. Other metrics of performance are level of customer loyalty, customer satisfaction, product quality, and market share as well as customer retention. Extrusion firms' performance is a measure of the level of how resources of the organization are utilized to achieve the desired goals. In measuring manufacturing firm's performances, mostly subjective measures are preferred to objective measure (Atalay *et al.,* 2013, Gunday, 2015). The authors argued that the reason for the predominant use of subjective measure of manufacturing performance is that firms are not willing and are reluctant to disclose exact performance records, and managers of manufacturing firm are less willing to share the objective performance of their organizations. Also, objective measures limit the compatibility and accuracy of responses (Dess & Robinson, 1984; Gunday, 2011 and Porter, 1979). Equally, Atalay *et al.,* (2013) shared the same view when they held that subjective measures of performance received more attention of researchers than objective measures because of the difficulty involved in gathering hard financial data from private companies. These companies are not required by law to publish their accounts for public consumption thus makes it difficult for researchers to lay hand on reliable financial data for analysis (Dawes, 1999; Harris, 2001).

More concernedly is, where such data are made available, such figures are manipulated to deceive the investing public as is the case of banks in Nigeria prior to its consolidation in 2005.

In this study, given the fact that Aluminum manufacturing firms in North Central Nigeria were not on the stock exchange, they majorly remain private businesses that give privacy to the owners. Thus, their records of activities are not in public domain thus, in secrecy which made this study to adopt subjective measures of performance. The subjective measures adopted in the study are: Customer satisfaction, customer retention, cost reduction, product quality and market share.

Product Quality

Product quality is one of the several key attributes that customers require from manufacturers. It is the fundamental qualities that customers are looking for or expect to get from a product they purchase (Rahayu, Asim, Nurminingsih & Robert, 2022, Uchenna & Audu, 2021). Quality from the standing of American society for quality is the totality of a product or service's qualities and attributes that influences its ability to satisfy the purpose for which such product was purchased whether stated or implied.

According to Kotler and Keller (2012) product quality is the formation of attributes and features possessed by a product or service that has the capacity to meet and satisfied implied need.

Kotler and Armstrong (2010) submitted that product quality is encapsulated in the characteristics of such product or service which enabled the product or service to meet and satisfy customer's needs. Product quality has seven dimensions which were highlighted as follows: It could be performance related in which case attention is focused on the functional perspective of the product. Performance is the fundamental characteristic that customers look forward to when buying a product. The second

dimension of quality is the product features and it adds to basic functionality with respect to options and development. Features can come in diverse degrees in a product and it forms the basis for product acceptance in the market place. Also, reliability is an adjunct of quality of a product. It relates to or measures the degree to which a given product successfully functions in a given period under certain conditions. Another dimension of quality is the level of product conformance to set standard specifications in line with customer demand and desires.

Equally, durability of a product which measures the life time of a product, its serviceability, speed, politeness, competence, convenience, and accuracy all influences durability of a product and a major determinant of product quality.

Aesthetics which represents a subjective feature of the beauty of the product is related or personal considerations and reflection of the preferences of individual customers. It is one of the seven dimensions of quality. The last one is the perceived quality which is also subjective in nature and it relates to the measurement of customer's feelings in consuming a given product.

Theoretical Framework

There are several theories underlying the study of Value innovation and the performance of organizations. However, this study examines the value innovation theory because of its relevance to the study.

Value Innovation Theory

Value innovation was developed by E.M Rogers in 1962 and it is the pillar upon which Blue Ocean Concept rests. It is primed to provide a leap in value for the customer as well as the organization by enabling business differentiation, reducing competition relevance and creating market that is uncontested (Kim & Mauborgne, 1997).

It is the driver of any success in the market place (Hajar *et al.,* 2022). The term value innovation provides a nexus between the capacities of an organization to create value added offerings and the ultimate satisfaction of customers with a view to enhancing the patronage for the company's product and improves its performance. For companies to survive the turbulent rivers of the red ocean, they need to be creative and innovative in their processes and resourceful management in order to achieve an enduring superior performance and sustainable growth (Hajar, 2022; Katoch & Mehta, 2012; Kim & Mauborqne, 1997).

Kim and Mauborque (2005) submitted that value innovation is a business strategy that encompasses the harmonization and cooperation of the entire system with a view to attaining a leap in value for customers and competitive advantage as well as profitable growth of the firm. Value innovation is the re-conceptualization of a business model or the redefinition of a company's business, or the redesigning of value conceptions or modes of delivery with the final goal of creating something new and superior customer value (Hajar, *et al.,* 2022; Lindgreen*, et al*., 2008; Mathyssens *et al.,* 2006; Rouning *et al*., 2014,).

In this study, it is hypothesized that innovation has a significant relationship with product quality in the manufacturing organizations. Value innovation provides a model for which this hypothesis could be tested and justified. Value innovation which is the disruptive-attractive quality is a mechanism of providing total solution, with extraordinary experiences, and cost reductions through product, service, and delivery platforms to satisfy customers and improve the performance of the organization

(Carli *et al.,* 2022; Hajar, 2022; Setijouo, 2011). Thus, value innovation theory model would be used to anchor the proposition that innovation has a relationship with product quality of the manufacturing firms.

Research Methodology

Research Design

In this study, a descriptive survey research design was applied. This type of research design allows the description of existing state of research phenomena (Abalaka, 2016, Njuguna, 2021). The descriptive survey research approach gives room for respondents to present their observations, experiences, values and perceptions relating to the subject matter. It involves a conscious attempt and effort to the discovery of the nature of relationships or links as it relates certain variables without attempt or whatsoever to alter the prevailing environmental conditions. The approach is relevant to this present study as it sought to establish the nature of relationships that exists between Value innovation as independent variable and the Performance of Aluminum Extrusion Firms in North-Central Nigeria as the dependent variable

Population of the Study

Population of the study comprised of the group of Units with similar attributes that were of interest to the researcher and can be subjected to a study (Njuguna, 2021, Otto & Longnecker, 2015). In this study, two sets of respondents were of interest to the researcher as the target population. The two sets of respondents that were of interest in this study are: The Management and Staff of the Aluminum Extrusion Firms and Dealers in Aluminum products that serve as customers to the Aluminum Extrusion Firms in the North-Central Nigeria. The reason for the choice of two sets of respondents was that the Management and staff of the Aluminum Extrusion Firms formulates strategy to enhance performance in the market place and the customers who are the second set of the respondents determines the effectiveness of the strategy through patronage. This will forestall the Management and Staff of the Aluminum Extrusion Firms from becoming judges in their own case.

Since strategy issues are the prerogative of top management and their foot soldiers, the populations of the study were the management and employees of the Aluminum Extrusion firms in the North-Central Nigeria which was made up of 260 respondents. On the other hand, dealers in Aluminum products in North-Central Nigeria who are customers to the Aluminum Extrusion Firms were the second categories of respondents and they comprised of 249 respondents from 83 Dealers (customers) and were therefore part of the population of the study.

The population from the side of Aluminum Extrusion Firms who were the management and staff of the firms responded to questions on Value innovation (BOS) formulation and implementation on the independent variable while dealers in Aluminum Extrusion products who are customers responded to questions on the dependent variable. This was to enable the researcher get an independent opinions of strategy formulators and implementers and the suppose impact feelers of the strategy who are customers.

Data Collection Instrument

The study adopted the use of a semi-structured questionnaire as the instrument of data collection. The questionnaire was prepared in a five-point Likert scale of strongly agree (5), Agree (4), Neutral (3), Disagree (2) and strongly disagree (1) to elicit information from the target respondents. The choice of questionnaire as instrument of data collection was informed by its numerous advantages.

It makes objective and unbiased response possible aside from the facts that it is easy to administer as well as cost effective relative to other methods of data collection. The instrument was tested for reliability and validity to ensure consistency and usefulness of information collected in answering the research questions (Njuguna, 2021).

Method of Data Presentation and Analysis
The methods of data presentation and analysis in this study were descriptive and parametric statistics.

Descriptive Statistics
Descriptive statistics was employed for preliminary statistical treatment of data collected into meaningful form. Instruments such as Likert scales, tables, mean scores, charts as well as percentages was applied in the analysis of raw data collected from the respondents into meaningful form.

Parametric Statistics
The parametric Statistics that were used in the study is simple linear regression. These was employed in testing the hypothesis formulated for the study.

Data Presentation
Data Analysis Based on the Questionnaire
This section analyzes responses to Likert scale questions. The key and the decision rules are as stated below: SA= 5, A =4, U = 3, D = 2, SD= 1 where S A is strongly Agree, A is Agree, U = Undecided, D IS Disagree and SD is strongly disagreed. The decision rule is that the mean value of less than 3.00 is low, mean value between 3.00 and 3.49 is moderate, and mean value of 3.50 and above is high. This is in line with the submission of Kocoglu and Kirmaci (2012); Adefila (2014); Audu (2018). Indicate the level to which you agree with the following statements with respect to Value innovation of the Aluminum Extrusion firms.

Table 1. Descriptive Statistics on Value Innovation Strategy

S/N	Value Innovation Strategy	5 SA	4 A	3 U	2 D	1 SD	Mean	Standard Deviation
1.	The company is always the first to introduce new products at affordable prices to the market.	96 (40.9%)	72 (30.6%)	47 (20%)	14 (6%)	5 (2.1%)	4.03	1.02
2.	The products of the Aluminum Manufacturing Firms are designed to always meet the need of customers.	87 (37%)	76 (32.3%)	48 (20.4%)	15 (6.4%)	8 (3.4%)	3.94	1.07
3.	The company has excellent technology for serving customers promptly	30 (12.8%)	37 (15.7%)	60 (25.5%)	87 (37%)	20 (8.5%)	2.94	1.23
4.	The product of the company is top most in quality in the market.	98 (41.7%)	52 (22.1%)	46 (19.6%)	17 (7.2%)	21 (8.9%)	3.81	1.30
5.	The Number of quality products produced by the Aluminum manufacturing firms has no rival in the market	13 (5.5%)	30 (12.8%)	35 (14.9%)	139 (59/1%)	17 (7.2%)	2.63	1.10
	Average mean/SD						3.47	1.14

Source: Field Survey, 2023

Table 1 shows the responses to the likert-scale questions, the computed mean and standard deviation. For the question on whether the companies are always the first to introduce new products at

affordable prices to the market, the responses show that 96 respondents representing (40.9%) strongly agreed that their companies are always the first to introduce new products at affordable prices into the market arena while 72 respondents made up of 30.6% agreed that their company are always the first to introduce new product at affordable prices into the market. However, 47 respondents representing 20% were undecided on whether their companies are the first to introduce new products into the market at affordable prices while 14 representing 6% disagreed with the proposition that their companies are the first to introduce new products at affordable prices into the market with 5 respondents made up of 2.1% strongly disagreed that their companies been the first to introduce new product at affordable prices into the market. The mean value of the responses is 4.03 and standard deviation is 1.02 which means that most respondents strongly agreed that the company is always the first to introduce new products at affordable prices to the market since the mean value >3.00.

For the question on whether the products of the Aluminum Manufacturing Firms are designed to always meet the need of customers 87 respondents made up of 37% strongly agreed that the product of the company is designed to always meet the need of customers and 76 of the respondents representing 32.3% agreed that the product of the company is designed to meet the need of customers. Also, 48 of the respondents representing 20.4% were undecided on whether the product of their companies is designed to meet the need of customers with 15 of the respondents made up 6.4% total disagreed that the products of their companies are designed to meet the need of customers while 8 of the respondents representing 3.4% strongly disagreed to the statement that the product of their companies are designed to meet the need of customers. This implies that most of the respondents agreed that product of the Aluminum Manufacturing Firms are designed to always meet the need of customers since the mean value and standard deviation of the responses are 3.94 and 1.07 respectively justify mean > 3.00.

The question on whether the companies have excellent technology for serving customers promptly 30 respondents representing 12.8% strongly agreed that their companies have an excellent technology for serving customers promptly while 37 respondents made up of 15.7% agreed that their companies have an excellent technology for serving customers promptly. However, 60 respondents representing 25.5% were undecided as to whether the technology of their organizations have the capacity to serve customers promptly with 87 respondents made up of 37% disagreed with the assertion that their companies have an excellent technology to serve customers promptly while 20 respondents representing 8.5% strongly disagreed with the proposition that their companies have an excellent technology for serving customers promptly. Thus, it means that most of the respondents disagreed that the companies have excellent technology for serving customers promptly since the mean and standard deviation of the responses shows 2.94 and 1.23 respectively which is < 3.00.

More so, for the question on whether the product of the company is top most in quality in the market 98 respondents representing 41.7% strongly agreed that the products of their company is topmost in quality in the market while 52 respondents made up of 22.1% agreed to the fact that the product of their companies are topmost in quality in the market place. Meanwhile, 46 respondents comprised of 19.6% of the target respondents were undecided about the quality of their product been topmost in quality in the market. However, 17 respondents comprised of 7.2% of the target respondents disagreed with the proposition that the product of their company is topmost in quality in the market place while 21 respondents made up of 8.9% strongly disagreed that the product of their company is topmost in quality relative to others in the market place. This shows that most of the respondents agreed that the product of the company is top most in quality in the market since the mean score of 3.81 and standard deviation of 1.30 > 3.00.

Finally, for the question on whether the number of quality products produced by the Aluminum manufacturing firms has no rival in the market, 13 respondents representing 5.5% strongly agreed that the product of the company has no rival in the market while 30 respondents comprised of 12.8% agreed that the quality of the products of the company has no rival in the market place. Another set of 35 respondents made up of 14.9% were undecided as to whether the quality of products of the company has no rival in the market with 139 respondents representing 59.1% disagreed with the assertion that the quality of the products of their companies has no rival in the market while 17 respondents representing 7.2% strongly disagreed. This means that most of the respondents disagreed that there is adequate production control since the result shows the mean value of 2.63 and standard deviation of 1.10 respectively justifying mean value < 3.00. Therefore, on the average, the mean value is 3.47 and standard deviation for work value innovation is 1.14 indicating that overall responses on value innovation strategy are accepted.

Table 2 Descriptive Statistics on Product Quality

	Product Quality	**SA 5**	**A 4**	**U 3**	**D 2**	**SD 1**	**Mean**	**Standard Deviation**
6	The Aluminum extrusion Firms products are durable.	118 (50.2%)	56 (23.8%)	46 (19.6%)	1 (0.4%)	7 (3%)	4.21	0.99
7.	The characteristics we are looking for when buying Aluminum products are satisfied	94 (40%)	53 (22.6%)	34 (14.5%)	40 (17%)	7 (3%)	3.82	1.23
8.	Aluminum products company are manufactured with modern technology whose output can compare favourably with any product in the Country	146 (62.1%)	53 (22.6%)	4 (1.7%)	15 (6.4%)	10 (4.3%)	4.36	1.09
9.	Aluminum extrusion products conforms to the customer desires when buying the product	42 (17.9%)	56 (23.8%)	16 (6.8%)	51 (21.7%)	63 (26.6%)	2.84	1.51
10.	The aesthetic value the Aluminum products has no rival	33 (14%)	20 (8.5%)	45 (19.1%)	66 (28.1%)	64 (27.2%)	2.53	1.36
	Average mean/SD						3.55	1.24

Source: Field Survey, 2023

Table 2 shows the responses to the likert scale questions, mean and standard deviation. For the question on whether the Aluminum Extrusion Firms products are durable, 118 respondents comprised of 50.2% strongly agreed that the Aluminum Extrusion Firms products are durable while 56 respondents made up of 23.8% agreed that the Aluminum extrusion Firms products are durable. However, 46 respondents representing 19.6% were undecided as to whether the Aluminum Extrusion Firms products are durable and 1 respondent which constituted 0.4% disagreed that the Aluminum Extrusion Firms products are durable while 7 respondents made up of 3% strongly disagreed that the Aluminum Extrusion Firms products are durable. The mean value of 4.21 and standard deviation 0.99 > 3.00 means that most of the respondents agreed that the Aluminum Extrusion Firms products are durable.

For the questions on whether the characteristics respondents are looking for when buying Aluminum products are satisfied, 94 respondents made up of 40% strongly agreed that the characteristics they are looking for when buying Aluminum products are satisfied with 53 respondents representing 22.6% agreed that the characteristics they are looking for when buying Aluminum products are satisfied. However, 34 respondents constituted 14.5% were undecided as to whether the characteristics they are looking for when buying Aluminum products are satisfied. Meanwhile, 40 respondents representing 17% disagreed that the characteristics they are looking for when buying

Aluminum products are satisfied while 7 respondents comprised of 3% strongly disagreed that the characteristics they are looking for when buying Aluminum products are satisfied. The mean value is 3.82 and standard deviation of 1.23 > 3.00 showing that most of the respondents agreed that the characteristics they are looking for when buying Aluminum products are satisfied.

For the questions on whether Aluminum products are manufactured with modern technology whose output can compare favourably with any product in the Country, 146 respondents representing 62.1% strongly agreed that Aluminum products are manufactured with modern technology whose output can compare favourably with any product in the Country with 53 respondents comprised of 22.6% agreed that Aluminum products are manufactured with modern technology whose output can compare favourably with any product in the Country. In another breathe, 4 respondents representing 1.7% were undecided as to whether Aluminum products are manufactured with modern technology whose output can compare favourably with any product in the Country and 15 respondents which constituted 6.4% of the target respondents disagreed that Aluminum products are manufactured with modern technology whose output can compare favourably with any product in the Country while 10 respondents made up of 4.3% strongly disagreed that Aluminum products are manufactured with modern technology whose output can compare favourably with any product in the Country. The mean value of 4.36 and standard deviation of 1.09 > 3.00 indicating that most of the respondents agreed that Aluminum products are manufactured with modern technology which output can be compared favourably with any product in the Country.

In addition, for the question on whether the Aluminum Extrusion products conforms to the customer desires for buying the product, 42 respondents representing 17.9% strongly agree that Aluminum Extrusion products conforms to the customer desires for buying the product while 56 respondents made up of 23.8% agreed that Aluminum Extrusion products conforms to the customer desires for buying the product. Sixteen (16) respondents comprised of 6.8% were undecided as to whether Aluminum Extrusion products conforms to the customer desires when buying the product. However, 51 respondents which constituted 21.7% disagreed with the view that Aluminum Extrusion products conforms to the customer desires when buying the product while 63 respondents representing 26.8% strongly disagreed that Aluminum Extrusion products conforms to the customer desires for buying the product. Therefore, with the mean value of 2.84 and standard deviation of 1.51 which is < 3.00 indicating that most of the respondents disagreed that Aluminum Extrusion product conforms to the customer desires for buying the product.

For the question on whether the aesthetic value of the Aluminum products has no rival, 33 respondents made up of 14% strongly agreed that the aesthetic value of the Aluminum products has no rival while 20 respondents which constituted 8.5% of the respondents agreed that the aesthetic value of the Aluminum products has no rival with 45 respondents representing 19.1% were undecided that the aesthetic value of the Aluminum products has no rival. However, 66 respondents comprised of 28.1% disagreed that the aesthetic value of the Aluminum products has no rival while 64 respondents made up of 27.2% strongly disagreed that the aesthetic value of the Aluminum products has no rival. The mean value of 2.53 and standard deviation of 1.36 < 3.00 indicating that most of the respondents disagreed with the view that the aesthetic value of the Aluminum products has no rival. Finally, the average means value of 3.55 and standard deviation 1.24 > 3.00 indicating acceptance of the overall response on product quality.

Data Analysis and Results

The study tests one hypothesis using the linear regression with the aid of Statistical Packages for Social Sciences (SPSS). The independent variable is value innovation while the dependent variable is performance and the decomposed variable is product quality. In order to enable the study, juxtapose the variables towards making valid inferences the regression results presented and analyzed include model summary, analysis of variance (ANOVA) and coefficients. The decision rule is to accept P. value if the alpha value is ≥0.05 otherwise the null hypothesis be rejected.

Test of Hypothesis

Hypothesis 1

Ho: There is no significant relationship between value innovation and product quality.

H_1: There is a significant relationship between value innovation and product quality.

Table 3

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.879[a]	.772	.771	.85955	.157

a. Predictor: (constant), value innovation
b. Dependent variable: product quality

The model summary table reports the strength of relationship between the independent and dependent variables. The result of R stood at 0.879 indicating a strong positive relationship between the dependent variable product quality and the explanatory variable value innovation. The coefficient of multiple determinations R^2 measures the percentage of the total change in the dependent variable that can be explained by the independent or explanatory variable. The result indicates a R^2 of .772 showing that 88% of the variances in product quality is explained by the value innovation while the remaining 12% (i.e. 100 – 88) of the variations could be explained by other variables not considered in this model.

The adjusted R-square compensates for the model complexity to provide a fairer comparison of model performance. The result is supported by the value of the adjusted R which is to the tune of 77% showing that if the entire population is used, the result will deviate by 10.7% (i.e. 87.9 – 77.2), with the linear regression model, the error of the estimate is considerably low at 0.85955. The result of Durbin Watson test shows .157 therefore it shows that there is no auto correlation.

Table 4 ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	53.493	1	53.493	72.402	.000[b]
	Residual	166.976	226	.739		
	Total	220.469	227			

a. Dependent Variable: product quality
b. predictors: (constant), value innovation

The ANOVA table confirms the results of model summary, analysis of the result revealed that F = 72.402 which is significant at (0.000) < 0.05. Hence, since the P-value < 0.05 (critical value), the null hypothesis that there is no significant relationship between value innovation and product quality is rejected.

Table 5 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.197	.244		.210	.000
	value innovation	.495	.058	.493	8.112	.000

a. Dependent Variable: Product quality

The coefficient provides information on how the explanatory variable (the estimated coefficient or beta) influences the dependent variable. The result shows that the regression constant is 2.197 giving a predictive value of the dependent variable when all other variables are zero. The coefficient of value innovation is 0.058 with p-value of 0.000 less than (0.05%) critical value. Therefore, it can be concluded that the null hypothesis that there is no significant relationship between value innovation and product quality is rejected.

Conclusion

Strategy and performance are found to be two complementary concepts that drive each other. Thus, the study was conducted with a view to finding the nature of relationship between Value innovation and the Performance of Aluminum Extrusion Firms in North-Central Nigeria. The study was conducted and guided by a set of hypotheses derived from the research problem and set of objective and research question. The motivation for the study was to find solution to nagging challenges that confronted the Manufacturing subsector in Nigeria with specific focus on the Aluminum Extrusion Firms through Value innovation.

Recommendations

On the strength of the findings of this study the research recommends that Aluminum Extrusion Firms should invest in up-to-date production equipments that will deliver high quality products at low cost.

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