

Product Design and Dependability Performance of Seahorse Lubricant in Ozubulu Anambra State

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Abstract: *The study examined the product design and dependability performance of seahorse lubricant in Ozubulu, Anambra State. A survey design was used as the research methodology in this study. It was used by the researcher to interview respondents and assess how convenient they were given their hectic schedules. In the inquiry, primary and secondary data sources were both used. All staff working for Seahorse lubricant in Ozubulu Anambra state makes up the population of interest. The population of the study consists of 321 staff. The population estimate was provided by the human resources department of the firm. The method for acquiring data in this study was structured questionnaires. Statistics including frequency counts, and multiple regression analysis were used in the data analysis to analyze the study's questions and hypotheses. From the Analysis the study found that product design has a positive significant effect on dependability performance of seahorse lubricant in Ozubulu, Anambra State. The study recommended that the lubricant firms should create a solid understanding of their opportunities by looking at the entire market based on their customer to determine the actual potential. The lubricant firms should have comprehensive parameters against which to screen new product and service ideas. The lubricant firms should sharing development activities, design decisions that involve interdependencies between functional specialists can be made more quickly and more effectively.*

Keywords: *product design, dependability performance, seahorse lubricant, innovation, total quality management.*

1.1 Introduction

Product design and development are critical business considerations in today's chaotic, dynamic world. Continuous product design and successful product development are now essential for any firm to succeed. As a result, throughout the past few decades, topics like Product design and product development have regularly come up in surveys. As opposed to a product being something that an organization sells to its clients, innovation is the process of creating certain guidelines for managing the development of new products. Depending on the context, it may be referred to as services or goods (physical, tangible objects). According to Ulrich and Eppinger (2007), Product design is a collection of operations that starts with the perception of a market opportunity and ends with the production, sale, and delivery of a product. The integration of numerous actors is necessary for product creation.

Any organization's main goals are to generate revenue, expand, and endure in the environment in which they operate. By imposing restrictions, the environment has a tendency to mold the organization's vision and goals (Derek, 2016). The rivalry that limits

the goals set by the business may be one of these restraints in the environment of the organization. Kareem (2017) asserts that an organization's effectiveness is based on how well it adapts its strategies to its environment, which is complicated and always changing. As a result, an organization's effectiveness is related to how it comprehends and reacts to environmental changes strategically.

George, Walker, and Monster (2019) note that organizations differ depending on the relative weight of a number of variables pertaining to both the organization's goal and the tools and techniques selected to achieve it. According to George, Walker, and Monster (2019), many organizations have tried to manage organizational performance using the balanced scorecard methodology, which tracks and measures performance along a number of different axes including financial performance, customer service, social responsibility, and employee stewardship. As a result, when an organization is working for a particular objective, it will automatically operate better. According to Pearce and Robinson (2012), organizations must adapt to their environment in order to fulfill their aims and objectives..

The environment's dynamic suggests that the company has continually revised its strategy in order to stay competitive. Tebrani (2016) found that strategic interventions were effective at helping an organization adapt to environmental changes. Such responses are changes that eventually occur to the policies and objectives of an organization. As a result, for an organization to function better, adjustments must be made and adjusted. According to Lee and Grewal (2014), the scale of the Seahorse lubricant in Ozubulu Anambra state response to new technology is reflected in the response's intensity and their product manifestation and design. Furthermore, the rate at which these firm embrace new technology can differ from firms, thus prompt answers should enable them to enhance performance. Due to the fundamental distinctions between organizational practices, commercial procedures, and resources it can therefore be argued that organizations are expected to differ in their strategic response on performance. From the above explanation the research choose to examine the product design and dependability performance of seahorse lubricant in Ozubulu, Anambra State

2.1 REVIEW OF LITERATURE

2.1.1 Theoretical Framework

The Ansoff matrix was invented by Igor Ansoff in 1965 and is used to develop strategic options for businesses. According to Ansoff (1965) there are four strategies. First, the market penetration strategy of existing markets occurs whenever an organization penetrates a market with its current products or offerings. Second, in the market development strategy the goal can either be to change an established product or change the customer segment of a more current product. Third, the product development strategy states that new products should be created so that the company can achieve growth and development. Fourth, diversification strategy involves moving simultaneously into new products and new markets.

The product development strategy is employed when firms have a strong understanding of their current market and are able to provide innovative solutions to meet the needs of

the existing market. This theory is relevant to the study as it shows that an organization can invest in research and development to develop new products to cater to the existing market. In addition, acquire a competitor's product and merging resources to create a new product that better meets the need of the existing market and carry out strategic partnerships with other firms to gain access to each partner's distribution channels or brand.

2.2 Product Design and Dependability

According to Gopinathar, et al., (2016), product design has its major features as packaging and labeling, which provides vital information to the customer regarding the product contents. This is because they communicate how to handle, use, transport, recycle or dispose of the package or product. An organization's conscious and sound product design meets or exceeds the requirement and expectations of customers better than those of their competitors. It is indeed one of the most important TQM factors which determines the success of a product (Lakshmi, 2008). Labeling and packaging perform several functions such as identifying the product or brand, describing and promoting the product through attractive graphics (Kotler, 2002).

Krishman and Ulrich (2001) see product design as cross-functional, knowledge-intensive work that has become increasingly important in today's fast-paced, globally competitive environment. It is a key strategic activity in many firms because new products contribute significantly to sales revenue. Therefore, when the firms are able to develop distinct products, they have opportunities to command premium pricing and patronage, they noted. They remarked further that product design is a critical factor in organizational success because it sets the characteristics, features and performance of the product or service that consumers/customers demand. Thus, the objective of product design is to create a product or service with excellent functional utility and sales appeal at an acceptable cost and within a reasonable time, they concluded.

In a related development, product design has been defined as the process designers use to blend users needs with business goals to help brands make consistently successful products. Those concerned in an organization, work to optimize the user experience in the solutions they make for their users and help their brands by making products sustainable for a considerably long period of time. Product design consists in imagining and creating objects meant for mass production. The definition encompasses the physical aspects as well as the functionalities products should possess. It has equally been defined as the idea generation, concept development, testing and manufacturing or implementation of a physical object or service (Bagshaw, 2017).

Focus on product design as one of the dimensions of total quality management is also very important because it contributes to the realization of enhanced operational performance of organizations. Gopinathar et al (2016) posit that product design has its major features as packaging and labeling, which provides vital information to the customer regarding the product contents. They state that it communicates how to handle, use, transport, recycle or dispose off the package or product when need be. According to them, product design is one of the most crucial factors in quality management as it determines to a large extent, the success of the product. Lakshmi (2008) posits that

labelling and packaging perform several functions, including product or brand identification, description and promotion of the product or brand through attractive graphics.

Product design appeals to the customer as the first point of contact, when it is properly done, it meets or exceeds the requirements and expectations of the customers thereby leading to an increased market share of the organization (Zang et al, 1999). In fact, packaging is an important form of promotion for the brand. With pharmaceuticals, food, medicals and chemical products, some types of information are required by government legislation. World Health Organization (WHO) (2002) emphasized that packaging is an essential source of information on medical products. Such information are provided by labels and package inserts for patients. According to the organization, all finished drug products should be identified by labelling as required by the national legislation, bearing information such as the name of the drug (product), a list of the active ingredients showing the amount of each present and a statement of the net contents, the batch number assigned by the manufacturer; the expiry date in an uncoded form; any special storage conditions or handling requirements/precautions that may be necessary; the directions for use and any warnings and precautions that may be considered necessary; the name and address of the manufacturer or the company or person responsible for placing the product on the market.

Labelling and packaging are contained in product design. As a result, labelling performs several functions such as identification of the product/brand, description and promotion of the product through some attractive designs (Katter, 2002). According to the USA Food and Drug Administration (FAD, 2013), all labels printed for use in the pharmaceutical and healthcare industry are required to be designed and applied so they can remain in place and be read in different environments through distribution, storage and use. Poor label design can contribute to medication errors by making it difficult for healthcare professionals, caregivers and/or patients to readily locate and understand critical safety information. According to Gopinathar et al (2016), the key to successful product design is understanding the end-user customer, the person for whom the product is being made. Product designers attempt to solve real problems for real people by using empathy and knowledge of their prospective customers' habits, behaviours, frustrations, needs and wants. They reiterate that good product design practices thread themselves throughout the entire product life-cycle. Product design, in their opinion, is essential in creating the initial user experience and product offering, from pre-ideation user research to concept development to prototyping and usability testing.

2.3 Empirical studied

Abdirahman. & Wanjira, (2021) determine the effect of product design on performance of commercial banks in Garissa County, Kenya. An organization's superior performance mostly results from its strategic choice that provides the firm a better positioning in the industry structure. As a result of dynamic environment banks face arising from high competition posed by the other commercial and non-commercial banks. Therefore, in a highly uncertain and changing environment, strategic managers need to have the strategic flexibility to respond to problems speedily. This study employed a descriptive

survey research design. The population for this study was four commercial banks namely: Kenya Commercial Bank, Equity Bank, Cooperative Bank and National Bank in Garissa County, Kenya. The respondents were managers in top, middle and low level management employees. A census of 82 respondents was carried out. Primary data was collected using a structured questionnaire. Quantitative data was analyzed using descriptive statistics. The study further carried out multiple regressions to determine the effect between variables. The study found that product design had a positive and significant effect on the performance. The study concluded that the banks have a very effective product design implementation that has enhanced their performance by attracting more consumers, providing ease, and making services available to their customers. The study recommended that the commercial banks should create a solid understanding of their opportunities by looking at the entire market based on their customer to determine the actual potential.

Adebayo, Eluka, and Robinson & Bananda, (2018) evaluated the effects of innovative design on superior performance of telecommunication firms in Nigeria. Innovation process is working and cranking out the new products that need to grow the business. But the reality is that over half of the companies out there are dissatisfied with their innovation. Often, the response is to install new product development processes hoping to see big gains. But the result is usually just bureaucracy, more overhead, and frustration leading to a process those entrepreneurs is constantly searching for a way around. To achieve the spelt objective, the study employed survey design, and data was extracted through a self-administered questionnaire from the study respondents of 383 been a sample size drawn from the population for this study which comprised of the top and middle-level management staff of the telecom operators across the south-west states in Nigeria. The findings inter alia revealed that: there is a significant relationship between innovative designs and firm's superior performances in organization. Therefore, the work among other things recommends That telecommunication firms need to utilize innovative designs strategy. In order to gain from this strategy, the telecommunication firms should pay attention to the market segment which is sustainable so as to avoid the dangers encountered with innovative design strategy because of the problem of imitation.

Nwokah, Elizabeth Ugoji, and Ofoegbu, (2009) examined product development and corporate performance in the Nigerian brewing industry. Product development is an important element of the marketing arsenal of any organization. Unfortunately many firms do not seem to realize it. Consequently, they develop strong arteries to innovation which rubs their performance really rough. Data were gathered from 32 officials drawn from marketing, R&D and production departments in four breweries in the south-south and south east geographical regions of Nigeria through the use of questionnaire. The data were analyzed using appropriate statistical tool (spearman rank order correlation coefficient). The data revealed among other things that product development facets of product quality and product lines/ product mix were positively and significantly correlated with the corporate performance facets of profitability, sales volume and customer loyalty. The study also revealed that the relationship between product size, product design and profitability, sales volume and customer loyalty was not significant. The study concludes that a positive and significant relationship exists between product quality product lines/product mix and profitability, sales volume and customer loyalty. To this end, it was

recommended among other things that high product quality should be maintained and that the breweries should continuously develop new market segments and develop appropriate product accordingly.

Onikoyi, (2017). investigate the impact of product innovation on organizational performance. The data was collected from the production department, research and development department, sales department, marketing department, and quality and control department, which have been involving greatly in product innovation process. A total of 340 copies of useable questionnaires were completed. The results of the study were interpreted using SPSS package for the analysis of some appropriate statistical methods such as regression and correlation. The findings show that the impact of product innovation on organisational performance was higher in the company when consumers perceive product innovation as stronger, more favourable and more unique. Creativity/quality of the innovation process exerts a positive influence on product and organizational performance. The study has supported previous studies on product innovation and performance especially in developing economies such as Nigeria, Malaysia, Ghana, and among others. Therefore, it was recommended that creative/quality innovations should be maintained continuously to develop appropriate product continually and increase the organisational performance.

Gligah, & Zaidin, (2023). Nexus of Government Support, Product Innovation Capability, and Organizational Performance of Manufacturing SMES in Ghana The study is premised on unveiling the role of government support, innovation capability, and firm performance. This study aimed at examining the relevance of government financial and non-financial support and SME performance. The moderating role of innovation capability was also examined in the study. The data was gathered through convenience sampling method. Using a self-administered questionnaire, 400 SME operators in five major business cities in the Eastern Region of Ghana were understudied. Using PLS Structural Modelling, analyses were conducted. It was revealed that both governments financial and nonfinancial support is significantly linked to organizational performance, while product innovation capability is strongly linked to organizational performance. Meanwhile, product innovation capability exhibited a mixed result for its mediating role in the relationship between government financial support and non-financial support and organizational performance. The study thus reveals the relevance of government support and innovation capability on SME organizational performance.

3.1 METHODOLOGY

A survey design was used as the research methodology in this study. It was used by the researcher to interview respondents and assess how convenient they were given their hectic schedules. In the inquiry, primary and secondary data sources were both used. All staff working for Seahorse lubricant in Ozubulu Anambra state make up the population of interest. The population of the study consists of 321 staff. The population estimate was provided by the human resources department of the firm. The method for acquiring data in this study was structured questionnaires. Statistics including frequency counts, and multiple regression analysis were used in the data analysis to analyze the study's questions and hypotheses.

4.1 DATA PRESENTATION AND INTERPRETATION

This research question wants to establish whether product design element of the total quality management has any effect on operational performance of firms in the Seahorse lubricant in Ozubulu Anambra state, Nigeria. Accordingly, the opinion of the respondents on the issue is presented in Table \ below.

Table 4.11: Effect of Product Design on Operational Performance of Firms

S/N	Items of the Questionnaire	Alternative Responses					Total
		SA	A	D	SD	UND	
1.	Before new product is introduced into the market, we normally carryout market research to determine acceptability.	127 (40.0)	138 (43.0)	24 (7.5)	20 (6.2)	12 (3.7)	321 (100)
2.	We work in teams, with members from a variety of areas (Research & Development, marketing, production, engineering, etc) to introduce new products.	130 (40.5)	151 (47.0)	15 (4.7)	15 (4.7)	10 (3.1)	321 (100)
3.	The customers' requirements are often considered in new products' design.	121 (37.7)	163 (50.8)	15 (4.7)	12 (3.7)	10 (3.1)	321 (100)
4.	New products design are thoroughly reviewed before the product is produced and sold.	119 (37.1)	167 (52.0)	20 (6.2)	10 (3.1)	5 (1.6)	321 (100)
5.	Because we know the important role packaging and labeling plays in marketing of products, we are usually very careful in all our designs.	125 (38.9)	165 (51.4)	19 (5.9)	7 (2.2)	5 (1.6)	321 (100)
Total		622	784	93	64	42	1605
Percentage of Total		(38.8)	(48.8)	(5.8)	(4.0)	(2.6)	(100)

Note: (SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree and UND = Undecided).
: (Figures in parentheses are percentages)

The analysis on Table 4.11 shows that 38.8 percent of the respondents on the average strongly agreed with all the items, 48.8 percent of them merely agreed, 5.8 percent disagreed, 4 percent strongly disagreed while 2.6 percent of them had no opinion on all the issues surrounding the phenomenon under investigation. As could be seen from the table too, there are variations across the items apart from the averages.

Table 4.1.2: Summary of ANOVA for Dependability Performance

ANOVA ^b					
Source of Variation	df	Sum of Squares	Mean Squares	F-ratio	Sig.
Regression	4	401.753	100.438	41.300	0.000 ^a
Residual	145	352.615	2.432		
Total	149	754.368			

a. Predictor: (constant), product design.

b. Dependent variable: Dependability Performance

The ANOVA result concerning dependability performance shows that F-Statistic has a value of 41.300 which indicates that the model is statistically significant given that $P_{0.000}$ is less than $P \leq 0.05$. Consequently, the model is considered valid and fit for predictions.

Table 4.13: Summary of Regression Results for Dependability Performance

Model	R	R ²	Adjusted R Square	Standard Error of the Estimate	Durbin Watson Stat.
1	0.717	0.695	0.643	0.56892	2.019

a. Predictor: (constant), product design

From Table 4.33, regression coefficient R with the value of 0.717 shows that 71.7 percent relationship exists between the dependent and independent variables. The table shows equally that the coefficient of determination represented by 'R²' in the table shows that 69.5 percent variation in the dependent variable can be explained by the independent variables. Similarly, the Durbin Watson Statistic of 2.019 shows there is no presence of serial autocorrelation.

Table 4.14: Coefficients of the Predictors, t-values and Significance Levels

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	Beta		
1 (Constant)	-.586	.205	-	-.689	.526
Product Design	.601	.109	.527	2.116	.000

a. Dependent Variable: Dependability Performance

The results in Table 4.34 shows that all the coefficients have positive signs thus indicating the confirmation of the a priori expectations. The coefficients are also significant judging from the t-values and the corresponding probability levels in which case each is less than 0.05.

In a similar vein, the results of regression analysis presented in Table 4.33 showed that 69.5 percent of the variation in dependability as a measure of operational performance in the studied firms, can be explained by the elements of the total quality management as identified in this study. The implication is that the remaining 31.5 percent may be attributed

to other factors that could influence dependability but were not captured in the model. The result of the test which led to the rejection of null hypothesis is in line with that of Shegaw (2019) when she found that total quality management critical success factors have significant positive effect on operational performance measures, especially the dependability of pharmaceutical manufacturing firms in Ethiopia.

For an organization to be dependable, the organization must have been sure/certain that it measures up in many fronts, which includes quality of products/services, customers' satisfaction among others. Dependability as it were, enhances economies of scale due to greater efficiency that is at work in the organization. It is equally enhanced by delivering orders to customers on time so that the organization can earn more of such trusts. Customers' loyalty to organization's brand is a function of trust that has been built over a period of time and the only way to sustain it is for the organization to continue to improve on its processes, continue to maintain quality, continue to remain customer focus with strong support from top management to win the confidence of the customers the more so that they continue to find the organization as a dependable ally in time of need.

5.1 CONCLUSION AND RECOMMENDATION

The study concluded that the Seahorse lubricant in Ozubulu Anambra state have a very effective product design implementation that has enhanced their performance by attracting more consumers, providing ease, and making services available to their customers. Seahorse lubricant firm enhanced their performance as a result of having a product that was widely embraced, resulting in an increase in their customer base. Customers' complaints are minimized, and time to market for new products and services is shortened. The study found that product design has significant and positive effect on operational performance with respect to dependability performance of firms in the Seahorse lubricant. The study recommended that the lubricant firms should create a solid understanding of their opportunities by looking at the entire market based on their customer to determine the actual potential. The lubricant firms should have comprehensive parameters against which to screen new product and service ideas. The lubricant firms should sharing development activities, design decisions that involve interdependencies between functional specialists can be made more quickly and more effectively.

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