

## Reduce Strategy: A Tool for Sustainable Packaging in Nigerian Bottling Company, Imo State

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### Abstract

**Research Objectives:** This work focuses on reducing options as a sustainable tool of packaging in Nigerian Bottling Company, South East, Nigeria. It aims to ascertain the extent of the relationship between reduced options and the packaging functions of protection, convenience and promotion. This study was necessitated by the need to develop more environmentally friendly product packaging having seen the damages done by climate change.

**Methodology:** To carry out this research, three questions were raised and three hypotheses formulated which were subjected to test. Descriptive survey design was adopted as data were gathered through questionnaire and observation. The sample unit of the study was drawn from Nigerian Bottling Company distributors in Imo State made up of 38 members. The hypotheses were tested using Pearson correlation coefficient with the help of Statistical Package for Social Sciences.

**Findings:** There is a strong and positive significant relationship between reduce option and the protective and promotional functions of packaging; reduce option has a positive and moderately significant relationship with user convenience.

**Conclusion:** Reduce is a viable option for sustainable packaging as it helps firms to save cost, reduce environmental waste as well as ensures societal wellbeing.

**Recommendations:** NBC should place more emphasis on the use of minimal materials while maintaining protective quality of packaging. Firms that are into the business of manufacturing packages should avoid multi-layer packaging as this would promote environmental friendliness.

**Key words:** *Reduce, Protection, User Convenience, Promotion.*

## 1.0 INTRODUCTION

The Nigerian physical environment is generally subjected to various forms of abuse and debasement resulting in water, air pollution and soil degradation as evidenced by the large number of heaps of domestic and industrial wastes in major and minor towns of the country (Ndu and Nkamnebe, 2013).

Surya and Vijaya (2014) defined green marketing as the process of producing and selling products and services based on their environmental benefits. Furthermore, Inyanga and Anyanwu (2006) defined green marketing as a movement initiated by firms to develop and market environmentally friendly products, whose bottom-line is to reduce, reuse or recycle wastes from such products.

Reduction or minimization involves all actions aimed at decreasing the amount of waste production. Sustainability in packaging refers to the sourcing, development, and use of packaging solutions that have minimal environmental impact and footprint. Packaging is the process of providing a wrapper or container for a product. Alex (2020) stated that reducing packaging materials and minimizing waste are two big components of sustainable packaging.

Lesley (2019) opined that the concern of Green marketing appeared as the after effect of human's negative impact on its planet. In green marketing, he said that brands launch eco-friendly products, which involves making product packaging that minimizes waste.

NBC has a wide range of products including Coke, Fanta, Sprite, Schweppes, Five Alive juice, Five Alive Pulpy Orange Fruit drink and two energy drinks, Monster and Predator which are packaged in one material or the other. Among the materials used in their packaging are plastic bottles, glass bottles, aluminum cans and cardboard bottles. The sustainability Director for the Coca-Cola Company Africa, David Drew (<https://ng.coca-colahellenic.com/>), said the beverage giant plans to achieve a world without waste by ensuring reduction of plastic in secondary packaging, reduction of weight of bottles. Hence the management of NBC is at the forefront in this fight.

As the rate of pollution keeps increasing, the call on business firms to go green becomes stronger. Hence; to properly carry out this study, the researcher made use of reduce which is a component of green marketing. Packaging functions of protection, promotion as well as enabling comfort of handling (user convenience) as outlined by Zeman (2005) Kacenska (2001) in Lou Canova, Jan and Kalamarova (2016) were adopted as indices of packaging.

### 1.1 Statement of Problem

Product packaging is one of the major causes of environmental pollution; this is because most of these packages are not returnable packages which are thrown away as wastes. It is therefore unacceptable that packages end up in the wrong places (Inyanga, 2002 in Inyanga and Anyanwu, 2006).

The challenge of packaging firms is to provide eco-friendly product packaging. Though reduce is not new, however in the recent times, a trend has been observed away from reusable packaging towards single-use (disposable) in all countries without strict legislation (Golding, 1999). Here in Nigeria, most of the soft drinks that were offered in refillable packaging (glass) are gradually being replaced by single-use packaging (plastic). This development has resulted in increased materials use, a rapidly increasing waste volume and environmental impacts related to materials use (both in the production and at the end of life).

Despite the call and the awareness of sustainability, only recently has the world started (again) to pay attention to reduction. It is worrisome that a change to reduce options may pose varieties of challenges to the product capacity, structural change in terms of reducing brand visibility on the label, light weighting of packages which often lead to stressing and squeezing of products etc. Hence, it's still in doubt if the reduce option is a feasible and more sustainable alternative for all supply chains and packaging. Majority of the past works have been carried out outside Nigeria. Therefore this study has been embarked upon to address all these problems.

**INDEPENDENT VARIABLE  
VARIABLES**

**DEPENDENT**

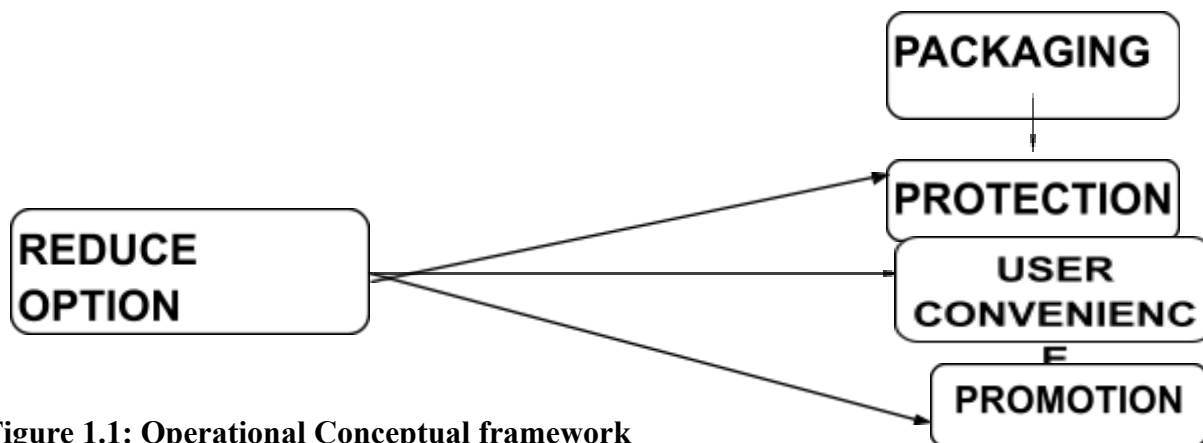


Figure 1.1: Operational Conceptual framework

Source: Researcher’s Desk, 2025.

**1.2 Objectives of the study**

The general purpose of this study is to ascertain the extent to which reduced options influences the packaging of non alcoholic beverages in Nigerian Bottling Company.

The specific objectives include the following; to

1. Determine the level of relationship between reduced option and the protective function of packaging.
2. Evaluate the extent of the relationship between reduced option and user convenience of product packaging.

3. Investigate the degree of relationship between reduced option and promotional aspect of packaging.

### 1.3 Research Questions

1. What level of relationship exists between reduced options and the protective function of packaging?
2. To what extent is the relationship between reduced options and user convenience of product packaging?
4. What is the degree of relationship between reduced options and the promotional function of packaging?

### 1.4 Hypotheses

1. There is no significant relationship between reduced options and the protective function of packaging.
2. The Reduce option has no significant relationship with user convenience of product packaging.
3. There is no significant relationship between reduced options and the promotional function of packaging.

### 1.5 Scope of the Study

This research work focused on the extent to which green marketing may influence the packaging of Nigerian Bottling Company. This work was restricted to the operations of NBC in Imo State, Nigeria. The unit of the sample was drawn from the distributors of NBC in this location.

The study covers reduced options of green marketing and packaging functions of protection, user convenience and promotion. These became the focus due to the observed gaps that were established after thorough review of relevant literature.

### 1.6 Significance of the Study

This study will be of benefit to different groups of people, including the following:

1. Members of the board of directors and management of NBC Plc will benefit from this study as it will guide production in the use of materials, enable engineering design and eco-friendly packaging and also ensure that marketing communicates this eco-friendliness to the consumers.
3. It will guide customers on the need to patronize light weighted packaging.
5. It will enhance the researcher's knowledge of the subject matter and future researchers will also benefit from this study as it will serve as a foundation or guide to any researcher who intends to carry out a study of this nature.

## 1.7 Definition of Terms

Reduce means to minimize or eliminate the number of items bought, created, or used.

Protective function means ensuring the product's sound condition during the transporting process to avoid physical damage and climatic extremes at all times (Palmer, 2000).

User convenience: It also involves ease of handling, adaptability and movement during the process of distribution (Palmer, 2000).

Promotional function: it is the ability of a product packaging to disclose basic information about the product ([www.economicsdiscussion.com](http://www.economicsdiscussion.com))

## 2.0 REVIEW OF RELATED LITERATURE

### 2.1 Conceptual Review

#### 2.1.1 Reduce option

Lesley (2019) opined that the world is concerned with environmental issues now more than ever; air pollution, plastic in oceans, global warming and food waste. According to Ndu and Nkamnebe (2013), the Nigerian physical environment is generally subjected to various forms of abuse and debasement resulting in water, air pollution and soil degradation as evidenced by the large number of heaps of domestic and industrial wastes in major and minor towns of the country.

Lesley (2019) further stated that the concern of Green marketing appeared as the after effect of human's negative impact on its planet. In green marketing, he said that brands launch eco-friendly products or create a corresponding environment around them by using eco-friendly packaging, make product packages recyclable and reusable, use green energy for production of products, design products from recycled materials to reduce waste etc.

Inyanga and Anyanwu (2006) therefore defined green marketing as a movement initiated by firms to develop and market environmentally friendly products, whose bottom-line is to reduce, reuse or recycle wastes from such products. Reduce as one of the options of green marketing means to use fewer resources in the first place (Colleen, 2013). It takes resources to manufacture, transport, and dispose of products, so reduction minimizes the use of new resources. According to Luis (2017), reduction or minimization involves all actions aimed at decreasing the amount of waste production. Waste reduction or source reduction refers to the collective strategies of design and fabrication of products or services that minimize the amount of generated waste or reduce toxicity of the resultant waste. Therefore, there is the need to reduce the cost of bottle production without compromising your products and while protecting the environment at the same time (MJS packaging, 2014). By simply reducing the weight of the packaging you use for your product, you can make a major impact. A reduction of the overall weight of your product by even a tenth of an ounce quickly adds up. Reduced weight means saving resources, from the

product itself to the way it's wrapped, helps with everything from less consumption of non-renewable resources to smaller carbon footprints.

Reduction conserves valuable resources and contributes to a decrease in collection and treatment (equivalent to reduction in gas emissions, consumption of fuel and other items vehicles and cost savings by the collection; a reduction in treatment requirements also saves energy and, in some technologies, reduces emissions).

Light weighting bottles are being used to control wasteful packaging thereby reducing production costs without compromising the product. There are further reductions in freight costs and shelf optimization.

### **2.1.2 Protection**

According to Palmer (2000), the protective function of packaging is ensuring the product's sound condition during the transporting process to the consumer, as well as, protecting the product from breakage and deterioration. Dube (2020) simply stated, protective packaging supplies are materials built to protect and buffer a product from potential harm or destruction during shipping or warehousing.

Packaging provides physical protection (shields beverages from mechanical damage), biological protection against microorganisms and chemical protection which minimizes compositional changes triggered by environmental influences, such as exposure to gases or light.

Ecological packaging has been expected to be less harmful to the environment by reducing layers of packaging, shrinking package size or alternating old material using eco-friendly resources.

### **2.1.3 Promotion**

Another important aspect of product packaging is how it promotes and displays the product within. According to White (2019), many products, particularly food products, include a description of ingredients and nutritional information on the packaging as well as displaying important instructions explaining how to set up and use the product. According to Palmer (2000), manufacturers communicate with consumers directly (through brand name) or indirectly by attaching manufacturer's brand, name and image with distinctive shape, type and colour of packaging. Product packaging works as a silent salesman because consumers often make a psychological connection with it.

### **2.1.4 User convenience**

Beside the role above, the shape of packaging is considered as being conducive to stock convenience in different locations as on the shelves, at home and in office (Palmer, 2000). Packaging provides convenience in the carriage of the product from one place to another, in stocking and in consuming. For example, the new pet bottles of NBC make the carriage and stocking of their products easier. In the food industry, to meet specific industrial requirements,

fulfilling principal functions in safety as well as reducing harmful impacts on environment, food-covering packaging is strictly required to contain additional information relating to product identification, preparation, usage, nutrition date, storage date, product life and opening instructions. To conclude, besides fulfilling primary functions as protection and promotion, a packaging which is comfortable in shape will become a critical factor in the purchasing process and moreover, a key to the success of product marketing.

## **2.2 Theoretical Review**

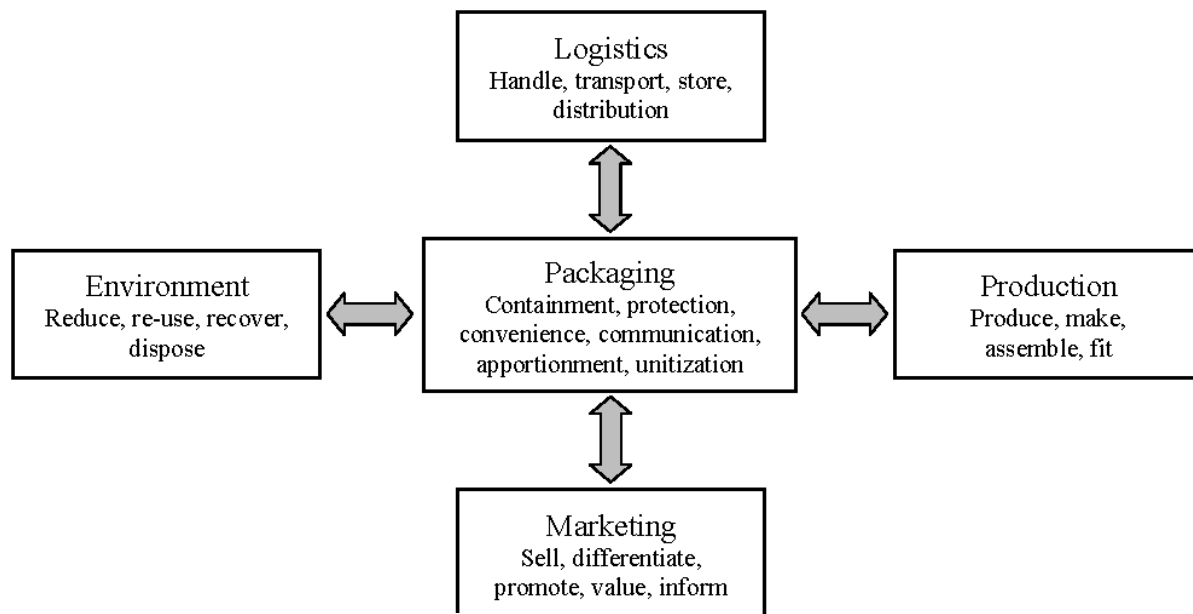
### **2.2.1 The 3Rs of Environmentalism**

According to Gordon (2015), Wisconsin Senator Gaylord Nelson spearheaded the first national Earth Day on April 22, 1970. Nearly 20 million Americans celebrated together at fairs, festivals and other community events organized to raise awareness on environmental issues. As citizens continued to raise concerns about conservation, the federal government formed the Environmental Protection Agency (EPA) which led to the passing of the Resource Recovery Act by Congress. Thus, the Three R's were born (reduce, reuse and recycle).

In terms of reduce; the best way to manage waste is "not to produce it". Consumers should also avoid over-packaged goods, especially ones packed with several materials such as foil, paper, and plastic. Disposable goods, such as paper plates, cups, napkins, razors, and lighters should be discouraged.

It makes economic and environmental sense to reuse products and packages. Lastly, recycling is a series of steps that takes a used material and processes, remanufactures, and sells it as a new product.

### **2.2.2 Model of packaging in environmental waste management**



Source: **HYPERLINK**  
["http://www.intechopen.com"](http://www.intechopen.com)  
[www.intechopen.com](http://www.intechopen.com)

The above model shows the general functions of product packaging, packaging decision as well as the packaging aims. It also shows the eco environmental options such as reduce, reuse and recover or recycle. Its implication is that firms need to consider the environment in their packaging decision to ensure it meets the environmental concern and standard. Therefore, it is necessary for firms to imbibe the environmental options in the production of its packaging irrespective of the function their packaging aims to serve; protection, convenience, promotion etc.

The Model of packaging in environmental waste management was adopted for this study. This is because it captures the variables of interest as contained in the study.

### 2.3 Empirical review

Musa, Nasir, Ali, Al-Baraa, Ehab, Noor, Abdulrahman, Aminu and Muhammad (2021) investigated Modeling of 3R (Reduce, Reuse and Recycle) for Sustainable Construction Waste Reduction. The research methodologies adopted were both quantitative and qualitative in which 330 questionnaires were collected within six months of submission. Based on the result of R2 values of 0.83%, waste reduction was found to be significant.

Saman. Muhammad, Puneet and Amandeep (2021) examined Drivers of food waste reduction behaviour in the household context. Data analysis was conducted using IBM SPSS 24 and AMOS 24 using 515 U.S. household consumers. The result shows that anticipated guilt and awareness of consequences were significant drivers of the reuse and reduce food waste behaviours respectively.



Smith (2015) investigated the impact of environmentally friendly packaging on consumers' attitudes and patronage intentions towards apparel retail brands. The study was conducted as exploratory research using two hundred and twelve respondents. Simple linear regression was used to analyse the data. The results revealed that consumers' perceptions of environmentally friendly packaging positively impacted consumers' environmental consciousness.

Borishade, Ogunnaike, Dirisu and Onochie (2015) carried out a study to ascertain the impact of packaging on consumer purchase decisions. Samples were drawn from loyal customers while Regression was used to test the four hypotheses. The core findings from the result obtained revealed that labeling can create consumer awareness and that consumers are attracted to buy the product because of its shape, color and design of the product.

## **2.4 Research gap**

There were notable gaps in various dimensions of the study; in terms of perspectives, location, analysis, concepts, etc.

It was observed that the majority of the reviewed work was analyzed using regression and none was analyzed using correlation with a good number of the research conducted abroad, hence this research work is situated in Nigeria. Scholars have extensively focused on recycling and reuse behaviours while largely ignoring reduced options.

The current study aims to address the aforementioned gaps by examining the reduce option and its effect on packaging in Nigerian Bottling Company.

## **3.0 METHODOLOGY**

### **3.1 Research Design**

This research adopted the survey design; it is due to the fact that the researcher made use of questionnaires and observation in gathering the data for this study.

### **3.2 Population of the Study and Sample Size Determination**

The population of this study was drawn from distributors of NBC products in Imo State, Nigeria. The distributors' population is 41. Since this population size of 41 is not large, it will serve as the sample size.

### **3.3 Sampling Unit**

The sample unit was made up of distributors of NBC in Imo State, Nigeria.

### **3.4 Sources of Data**

Primary source was used in gathering the necessary data for this study. The primary data were gathered through the use of questionnaires and observation.

### **3.5 Sampling Techniques**

The questionnaire was distributed to the customers using a convenience sampling procedure which is a non probability sampling method. This method was used because the researcher administered the questionnaire to only accessible target respondents.

### 3.6 Validity & Reliability of Research Instrument

The validity of the research instrument for this study was achieved by ensuring that contents of the questionnaire were read by experts who made necessary inputs and corrections. All these ensured that it actually measured what it was intended to measure.

The reliability of the questionnaire was guaranteed by conducting a test-retest study which ensured that the questions were well understood and determined from the test results that the instrument produced the same results.

### 3.7 Method of data analysis

The data gathered through questionnaires were analyzed using simple percentages and frequency tables and the three hypotheses were tested using Pearson product moment correlation enabled by Statistical Package for Social Sciences (SPSS).

## 4.0 PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

### 4.1 Presentation and Analysis of Data

Table 4.1: Number of Questionnaires Distributed/Returned

Respondents	No distributed	No returned	Percentage of return
Customers	41	38	92.7%

Source: Field Survey (2025)

Table 4.1 shows that 38 out of the 41 questionnaires distributed to distributors were returned. This implies that 92.7% were returned while 7.3% were not returned.

### 4.2 Descriptive Analysis

Table 4.2: Paired Samples Statistics (Reduce and Protective packaging)

Variables	Mean	Std. Deviation	Sample size
Reduce	18.97	2.455	38
Protective Function	20.66	2.704	38
Valid N (listwise)			38

Source: SPSS 21.0 Output

The variable Reduce has a mean score of 18.97 and a standard deviation score of 2.455 while Protective Function averaged 20.66 and varied with a standard deviation score of 2.704. The variable protective function has the higher mean and standard deviation scores.

**Table 4.3: Paired Samples Statistics (Reduce and User Convenience packaging)**

Variables	Mean	Std. Deviation	Sample size
Reduce	18.97	2.455	38
User Convenience	19.63	2.624	38
Valid N (listwise)			38

Source: SPSS 21.0 Output

The variable Reduce has a mean score of 18.97 and a standard deviation score of 2.455 while the User Convenience function of packaging as a variable has a mean score and standard deviation score of 19.63 and 2.624 respectively. The variable user convenience function has the higher mean and standard deviation scores.

**Table 4.4 Paired Samples Statistics (Reduce and Promotional function of packaging)**

Variables	Mean	Std. Deviation	Sample size
Reduce	18.97	2.455	38
Promotional Function	20.87	2.723	38
Valid N (listwise)			38

Source: SPSS 21.0 Output

The variable Reduce has a mean score of 18.97 and a standard deviation score of 2.455 while the mean and standard deviation scores of the variable Promotional Function are 20.87 and 2.723 respectively. Hence, the variable promotional function has the higher mean and standard deviation scores.

### 4.3 Test of Hypotheses

#### Hypothesis 1

H<sub>0</sub>: There is no significant relationship between reduced options and the protective function of packaging.

H<sub>1</sub>: There is a significant relationship between reduced options and the protective function of packaging.

**Table 4.5: Result of Correlation Analysis Between Reduce and Protective Function of Packaging**

		Reduce	Protective Function
Reduce	Pearson Correlation	1	.709
	Sig. (2-tailed)		.015
	N	38	38
Protective Function	Pearson Correlation	.709	1
	Sig. (2-tailed)	.015	
	N	38	38

\*. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS Output

The Pearson Product Moment Correlation analysis revealed that the correlation between reduce and protective function of packaging is positive and strong. This is because the coefficient of correlation (r) between both variables is 0.709; which is both positive and close to one (1). Again, since the p-value of t-statistic is less than the agreed 5% level of significance ( $0.015 < 0.05$ ), the null hypothesis ( $H_0$ ) was rejected, while the alternative hypothesis ( $H_1$ ) was accepted. Hence it can be said that there is a strong and positive significant relationship between reduce and the protective function of packaging.

### Hypothesis 2

$H_0$ : Reduce has no significant relationship with user convenience of product packaging.

$H_1$ : Reduce has a significant relationship with user convenience of product packaging.

**Table 4.6: Result of Correlation Analysis Between Reduce and User Convenience**

		Reduce	User Convenience
Reduce	Pearson Correlation	1	.722*
	Sig. (2-tailed)		.028
	N	38	38
User Convenience	Pearson Correlation	.622*	1
	Sig. (2-tailed)	.028	
	N	38	38

\* Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS Output

Table 4.6 is correlation analysis revealed that there is a positive and moderately strong correlation between reduce and user convenience. This is because the correlation coefficient here is 0.622, which is a positive number and is closer to 0.5 than 1. Also, the value of t-statistic is 0.028, which falls below the level of significance, 5 percent (0.05). As such, it follows that the null hypothesis was rejected and the alternative accepted and it was therefore concluded that reduce has a positive and moderately significant relationship with user convenience function of product packaging.

**Hypothesis 3**

H<sub>0</sub>: There is no significant relationship between reduce and the promotional function of packaging.

H<sub>1</sub>: There is a significant relationship between reduce and the promotional function of packaging.

**Table 4.7: Result of Correlation Analysis Between Reduce and Promotional Function**

		Reduce	Promotional Function
Reduce	Pearson Correlation	1	.863
	Sig. (2-tailed)		.003
	N	38	38
Promotional Function	Pearson Correlation	.863	1
	Sig. (2-tailed)	.003	
	N	38	38

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output

The result shows that there is a strong and positive correlation between reduce and promotional function of packaging. This is because the coefficient of correlation (r) is 0.863 which is positive and close to one (1). Again, since the p-value of t-statistic is less than the agreed 5% level of significance (0.003 < 0.05), the null hypothesis (H<sub>0</sub>) was rejected, while the alternative hypothesis (H<sub>1</sub>) was accepted. Hence it was concluded that there is a strong and positive significant relationship between reduce and the promotional function of packaging.

The above finding is in agreement with Musa, Nasir, Ali, Al-Baraa, Ehab, Noor, Abdulrahman, Aminu & Muhammad (2021) where reduction was found to be significant when ranking reduce, reuse and recycle.

## 5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

### 5.1 Summary

Findings from the study revealed that;

- There is a strong and positive significant relationship between reduced options and the protective function of packaging.
- The Reduce option has a moderately strong and positive significant relationship with user convenience of product packaging.
- There is a strong and positive significant relationship between reduced options and the promotional function of packaging.

### 5.2 Conclusion

It is obvious that protective and promotional functions of packaging seem to be highly valued more than the user convenience function.

It has been established that reduce is a viable option for sustainable packaging as it helps firms to save cost, reduce environmental waste as well as ensures societal wellbeing as advocated by societal marketing concept. The Reduce option is a necessity as it helps a firm to spend less on packaging materials. It also cuts the cost of shipping which is often tied closely to the volume or weight of products. It goes on to reduce the negative impact packaging has on the environment.

Based on the foregoing, it was evidenced that reduce is a sustainable option for the packaging of Nigerian Bottling Company in Imo State, Nigeria.

### 5.3 Recommendations

Based on the findings of this study and the conclusions drawn, it is recommended that NBC should place more emphasis on the use of minimal materials while maintaining protective quality of packaging.

Firms that are into the business of manufacturing packaging should invest more in materials with lower weight in order to ensure user friendliness.

Avoidance of multi-layer and secondary packaging which will promote a firm as environmentally friendly.

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