WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Examining the Efficiency and Competitiveness of Retail Food Vendors Using Different Techniques as Fuel in Iyaba City and the Surrounding Area

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A B S T R A C T

This study aimed to explore the competitiveness of retail food vendors using cooking gas (LPG) and firewood. Primary data was collected through social media questionnaires, as well as by reviewing journals, papers, and online sources related to the topic. Statistical tools like frequency distribution tables and the Chi-square method were used to analyze the data, which covered aspects such as quality, time, sales, and profit. The results of the hypotheses showed that using cooking gas (LPG) can positively influence competitive advantage and profitability in food businesses. However, the efficiency and importance of cooking gas are not fully recognized by Nigerian food vendors, and it has not been widely adopted for gaining a competitive advantage. Those who have embraced cooking gas technology, particularly vendors at Yaba Metropolis and beyond, have gained a competitive edge in the food industry. The study recommended that food vendors adopt cooking gas with appropriate safety precautions, especially considering consumer expectations. Additionally, cooking gas should be considered by food businesses focused on food quality rather than quantity, and regular checks should be conducted to ensure efficiency

Keywords: Liquified Petroleum Gas, Firewood, Food Retail Business

Background of the study

Numerous cooking methods have been known since ancient times, including the use of cooking gas (LPG) and firewood, each with varying degrees of heat, moisture, and cooking times that significantly impact the outcome of dishes. With the increasing popularity of the food industry, many cafes, restaurants, and online food grocery stores have emerged. However, not all food enterprises can withstand competition and endure in the market. Poor cooking techniques have been identified as one of the primary reasons for many businesses failing and closing. Considering these challenges, food vendors aiming to remain relevant and successful have recognized the importance of choosing the best cooking method. This study aims to explore the competitiveness among retail food vendors using cooking gas (LPG) and firewood.

Competition plays a vital role in any market, driving businesses to enhance product quality, offer affordable prices, and stay attentive to changes to stand out from rivals, all with the aim of gaining customer loyalty. Zelga (2017) defines competition as the capacity of a country or company to generate more wealth than its competitors in the global market. This underscores the importance of competition in helping organizations achieve long-term goals such as survival, expansion, and increased market share. The food industry in Nigeria is experiencing rapid growth, with an increasing number of indigenous businesses emerging or expanding to meet the demands of Nigerian consumers who seek regional flavors. According to Investment & Survey (2020), Nigerians allocate around 73 percent of their income to food and beverage items. The food and grocery retail industry in Nigeria has seen significant progress, generating $44.9 billion in gross revenue, with a cumulative annual growth rate (CAGR) of 8.7% over the past eight years (Food, 2020).

Using LPG in cooking

According to Sepp (2014), a basic LPG cooking system consists of a steel cylinder, a pressure regulator, a hose connecting the regulator to a burner, and the burner itself. LPG stoves typically have an efficiency rate ranging from 55 to 60 percent and cost between N12,600 to N25,200, with a projected lifespan of 5 to 8 years. LPG is commonly sold in cylinders of various sizes, including 2.7 kg to 6 kg, 12 kg to 16 kg, and up to 47.2 kg, with 6 kg or smaller cylinders being the most used in a study of 20 countries. Ihemtuge, T.U Aimikhe (2020) defines Liquefied Petroleum Gas (LPG) as a mixture of three or four carbon atom hydrocarbons. It is also known as cylinder gas or LP-gas. LPG is considered one of the most environmentally friendly fossil fuels and is widely used by consumers, businesses, and industries.

Comparing LPG and Firewood for Cooking

According to Agboola et al. (2010), traditional fuels commonly used for cooking include fuel wood, sawdust charcoal, agricultural waste, as well as petroleum products like kerosene and methane. Among these, fuel wood is widely used, but it poses environmental challenges, contributing to greenhouse gas emissions and depleting essential CO2 sinks in the country. As described by Sepp (2014), firewood refers to rough wood obtained from tree trunks and branches, used as fuel for cooking, heating, or power generation. Firewood is harvested from various sources such as tree fallow, shrub fallow, woodlots, tree planting sites, reforestation sites, agroforestry systems (fruit trees or dispersed trees), and shrubland regions. In underdeveloped countries, most of the firewood is gathered rather than actively managed as a common property resource in terms of management inputs.

Food Vendors

As per Chukuezi (2010), street meals refer to ready-to-eat foods and beverages that vendors produce and/or sell, often found on streets and other public spaces. Vending sites vary and may include stalls, pushcarts, roadside booths, and hawkers, depending on the vendor's resourcefulness, available resources, the type of food being sold, and the presence of other amenities. According to the Global Forum on Food Security and Nutrition (2011), many vendors demonstrate a high level of entrepreneurship by creating and occupying specific market niches. These small-scale businesses are typically run by individuals or families and are highly adaptable, capable of adjusting to changing circumstances. Due to their flexibility and affordable startup costs, street vending has become a viable and accessible industry for poor rural residents, leading to its rapid and widespread expansion.

The theory of competitive advantage:

As stated by Chukuezi (2010), street meals encompass ready-to-eat foods and beverages produced and/or sold by vendors, predominantly located on streets and other public areas. The choice of vending sites can vary, including stalls, pushcarts, roadside booths, and hawkers, depending on factors like the vendor's resourcefulness, available resources, the type of food offered, and the availability of amenities. The Global Forum on Food Security and Nutrition (2011) highlights that many vendors exhibit remarkable entrepreneurship by carving out and occupying specific market niches. These small-scale businesses are typically operated by individuals or families and possess a remarkable adaptability to respond to changing circumstances. The low startup costs and adaptability make street vending an accessible and thriving industry for impoverished rural residents, leading to its rapid and widespread expansion.

The theory of performance:

According to Sonnentag & Frese (2005), high-performing employees are crucial for businesses to achieve their goals, deliver specialized products and services, and gain a competitive edge. Successful completion of tasks and excellent performance can lead to feelings of accomplishment, mastery, and pride. Conversely, low performance and failure to meet goals can result in dissatisfaction and may even be seen as a personal failure. Recognition of one's performance by others within the organization often leads to rewards such as monetary incentives and other benefits. Maria (2011) further emphasizes that the effectiveness, efficiency, quality, productivity, work quality, innovation, and profitability of an organizational structure are all interconnected aspects that need to be addressed. Meeting performance objectives directly impacts overall performance and success.

LPG and firewood cooking consumption in Nigeria:

As per Sepp (2014), accessibility remains a challenge for LPG usage. LPG is mainly available in urban areas in most countries, and rural regions often face supply issues. Additionally, due to the low cost of fuelwood and lack of awareness, expanding LPG consumption in rural areas of developing countries is currently not feasible. Analysis et al. (2017) indicates that in 2016, only 17% of the LPG produced in Nigeria was consumed in the domestic market, while more than 80% was exported. Lasisi (2021) points out that Nigeria's daily LPG consumption in 2012 was 3.4 thousand barrels (TB), which is comparatively low compared to countries with similar population sizes like Russia (404tb per day), Brazil (226tb per day), and Indonesia (160tb per day).

Competitiveness of each means of cooking*:*

According to WLPGA (2018), LPG is a more convenient and faster means of cooking compared to other conventional methods. Food vendors using LP gas can fulfill food orders quickly, resulting in higher sales volumes at a faster pace. Enea Consulting (2020) explains that home delivery of LPG cylinders enables expert delivery employees to properly install them, educate customers on safe cooking practices with LPG, and provide reassurance regarding safety, all while offering convenience to the buyers. The Norwegian Agency for Development Cooperation (2020) states that using LPG reduces cooking time significantly. Unlike fuelwood, which requires time for preparation and lighting, LPG can be instantly activated with a simple turn of a knob, saving valuable time.

Problem Statement

For many food vendors, starting up and remaining relevant in the market is relatively easy. They possess the necessary skill sets and resources to produce outstanding products that can dominate the market. As a result, the product itself becomes the most crucial aspect of their business, and how it is made greatly influences customer reactions. Food vendors typically use cooking gas or firewood for their cooking methods, depending on the type of food they sell. However, many food businesses fail because they are unaware of the appropriate cooking methods that suit the type of food they offer. To succeed in the market, attract more customers, and maintain their loyalty, food vendors must ensure that the products they offer meet the highest standards of quality.

The Study Objective

The primary goal of this study is to investigate different means of cooking and determine which method provides a higher competitive edge. This will be achieved through the following objectives:

1. Define firewood and cooking gas and explore their respective applications in cooking.
2. Identify the more profitable cooking method that food vendors can adopt.
3. Analyze the strategies through which food vendors can sustain competitiveness when utilizing the identified profitable method of cooking.

Significance of the study

Both food merchants and the public will profit greatly from the study's conclusions. The study serves as a guide for food vendors, offering understanding into the importance of various cooking techniques in their day-to-day operations. Vendors can use it as a tool for reflection to evaluate their present practices and see whether any adjustments or enhancements are required. The correct cooking methods and competitive abilities may help food providers run more profitable operations. Food vendors, as the primary target audience of this study, must be able to implement the findings in their industry. When there is a potential to gain a competitive edge, it acts as a wake-up call, motivating vendors to invest more time in improving their culinary skills. For example, the use of cooking gas can increase the profit margin in the oil and gas sector of the national economy. This allows the government to recognize the critical aspect of generating national income by understanding the cooking methods adopted by food vendors. Furthermore, this study benefits the public as well, as high-quality food production methods can enhance an individual's overall well-being, leading to improved public health.

Research Method

Method

In this chapter, we will explore the components employed to describe the study's population, sample size, and data collection methods. The research aims to investigate the profitability of using either firewood or cooking gas for retail food sellers and determine if the method of cooking provides a competitive advantage. The primary focus of this study will be on two main groups within food vendor outlets: the entrepreneurs or sole proprietors, and the kitchen team. These groups play a significant role in the businesses' productivity and possess valuable insights into sales levels, which are essential elements in assessing a business's competitiveness. To gather data, surveys will be administered to both these groups within the businesses. The data obtained will be analyzed using simple frequency tables, SPSS (Statistical Package for the Social Sciences), and the Chi-square hypotheses testing tool. Through this analysis, we aim to draw conclusions on the most effective cooking method that food businesses can adopt to enhance their competitiveness and increase profit margins within the industry.

Research Design:

This research involves data collected via sampling. Surveys were administered to various food vendors within Yaba Metropolis and nearby area. Surveys were sent via social media with sources which include Instagram, WhatsApp, and Emails. Respondent’s food vendors are currently up and running or individuals who have experience running their own food business.

Population and sample design:

The study's population consists of both locally owned food vendors within Yaba Metropolis and businesses outside of this area. Surveys were conducted among various stakeholders within these businesses, including sole proprietors responsible for overseeing the risks associated with setting up the business, professional kitchen staff, and non-professional kitchen staff who work closely with the different cooking methods being investigated in this research. A total of 101 respondents participated in this study, selected from the sampling size, which includes online stores, side stands, and enclosed shop/restaurants.

Table of Population and sample of the study

S/N	Types of Store/shop	Population Sample
2.	Online stores	70
3.	Side Stand	18
8.	Enclosed shop/restaurants	13
	Total	**101**

Source: Researcher's Field Survey, 2022.

Sample Technique

Vendors of all sorts were noted individually and totaled folded. The folded papers were put into a container and stirred to mix up. One rolled paper was picked, the food vendors' type name on it was written down and the paper was refolded and put back. This was done to give every form of food vendors' equal probability of being selected. Where an already picked food vendors was picked again, it was not written; instead, the paper was folded immediately and put back into the hat. The same procedure was followed until the three types of food vendors were obtained.

Nature of source data/Instrumentation:

The data was obtained via primary sources for this research work with the use of surveys questionnaire designed by the researcher. There were three sections to the questionnaire. Sections A was designed to collect the respondent's personal data such as sex, marital status, educational qualification, position at work, age. Section B was arranged in Tables to obtain information about the various methods these food businesses use for cooking, the cost of obtaining that specific technique of cooking, which method of cooking takes less time to produce, which method produces greater food quality, moving from either method of cooking, the amount of weekly sales they experience, and profit, like with cooking gas. Section C was organized into five clusters of five items each. Each cluster was organized according to the variables of this study which is: cooking method (independent variable) and competitiveness/profitability (dependent variable). Each response was given a degree of score which ranges from one to five as shown below.

Strongly Agree (SA) - 5points

Agree (A) - 4points

Undecided (U) - 3points

Disagree (D) - 2points

Strongly Disagree (SD) - 1points

Validation of instrument

The items in the questionnaire were drawn in reflection of the variables under study. Before using the instruments the items developed were given to experts in research and statistics for screening and finally to the supervisor who carefully go through them for approval. Those that were deemed to be relevant were kept, while those that were not discarded.

Data analysis and techniques:

For the processing and analyzing the collected data, simple frequency tables shall be employed in the presentation of the personal data of respondents and some relevant questions on the questionnaire which were used in testing the hypothesis formulated. To test the hypotheses generated above, the statistical techniques employed were shown below.

Descriptive statistics in SPSS were used in creating variables, entering data, and analyzing. Chi-square statistical tools were used in testing the hypotheses formulated. The chi-square formula goes thus (next page):

$$X^2 = \frac{\sum(O-E)^2}{E}$$

X = chi-square coefficient

$\sum$ = summation sign

O = observed frequencies

E = Expected frequencies

$$E = \frac{Row\ Total\ x\ Column\ Total}{Grand\ Total}$$

Findings, analysis, and Interpretation

The obtained data on the sampled respondents on the competition among retail food sellers in Nigeria utilizing cooking gas and firewood is presented in this chapter. The findings of this study, as well as the following examination of answers, reflect the main cooking method that offers retail food vendors

a competitive advantage. The results of this study show how the business technique of cooking affects overall performance in terms of sales, output, cost reduction, and profitability.

The presentations of the personal data of respondents were done with the aid of simple frequency tables. This was also used to analyze and present some relevant questions on the questionnaire that are used in testing the hypotheses and the descriptive data formulated in chapter one, two and three in this project,

Presentation and analysis of the Personal Data of Respondents

Table 1: Distribution According to Sex

S/N	Sex	Frequency	Percentage (%)
1	Female	56.09	55.54
2	Male	44.97	44.53
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The above table shows the distribution of respondents according to their gender. 55.54% of the respondents were females while 44.53% were males.

Table 2: Distribution According to Marital Status

S/N	Marital Status	Frequency	Percentage (%)
1	Single	44.88	44.44
2	Married	56.11	55.56
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022

The table drawn above reveals that 44.44% of those administered with questionnaires are single while 55.56% are married.

Table 3: Distribution According to Educational Background

S/N	Educational Background	Frequency	Percentage (%)
1	Educated	26.89	29.63
2	Uneducated	71.07	70.37
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The table shows that 29.63% are educated while 70.37 are uneducated.

Table 4: Distribution According to Position at Work

S/N	Position at Work	Frequency	Percentage (%)
1	Unprofessional Kitchen Staff	44.43	44.43
2	Professional Kitchen Staff	22.44	22.22
3	Sole Proprietor	18.70	18.52
4	Stakeholders	14.95	14.81
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The positions held by respondents in their respective workplace are presented above. 44.43% are Unprofessional Kitchen Staff, 22.22% Professional Kitchen Staff, 18.52% are Sole Proprietor while 14.81% are Stakeholders.

Table 5: Distribution According to Age Group

S/N	Age Group	Frequency	Percentage (%)
1	20-29	37.40	37.03
2	30-39	41.13	40.73
3	40-49	18.69	18.51
4	50 above	3.73	3.70
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The distribution above is the age group of respondents. 37.03% are between the ages of 20-29, 40.73% between 30-39, 18.51% between 40-49, while 3.70% are 50 above.

Table 6: Distribution According to Experience

S/N	Experience	Frequency	Percentage (%)
1	1-3yrs	29.92	29.63
2	3-5yrs	33.66	33.33
3	5-7yrs	18.69	18.51
4	7yrs-above	18.70	18.52
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The distribution above is the years of experience of respondents in the food business. 37.03% are between the ages of 20-29, 40.73% between 30-39, 18.51% between 40-49, while 3.70% are 50 above.

Descriptive Statistic and Analysis of the of Respondents Data

Table 7: Distribution of respondents by food products

S/N	Food Products	Frequency	Percentage (%)
1	Rice	21	20.79
2	Native swallows and soups	1	0.99
3	Finger foods	33	32.67
4	Swallows and native soups	17	16.83
5	Poultry food	23	22.77
6	Wraps and Sandwiches	6	5.94
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 8: How is your business Stationed.

S/N	How is your business stationed?	Frequency	Percentage (%)
1	Online Stores	70	69.31
2	Side Stand	18	17.82
3	Enclosed shop or restaurant	13	12.87
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 9: Distribution by number of kitchen staff

S/N	Number of kitchen staff?	Frequency	Percentage (%)
1	2	15	14.85
2	3 to 5	67	66.34
3	7 to 10	16	15.84
4	10 and above	3	2.97
	Total	**101**	**100**

Source: Researcher's Field Survey, 2022.

Table 10: Distribution of means of cooking used.

S/N	Equipments used for cooking?	Frequency	Percentage
1	Cooking gas	54	53.47
2	Both	36	35.64
3	Firewood	11	10.89
	Total	**101**	**100**

Source: Researcher's Field Survey, 2022.

Table 11: Distribution of Customer Reaction

S/N	Customer reaction to your business environment	Frequency	Percentage
1	Normal (no reaction)	78	78.00
2	Always satisfied with the environment	9	9.00
3	Sometimes sneeze or cough due to smells in the atmosphere	7	7.00
4	Often easily irritated or frustrated	6	6.00
	Total	**100**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 12: Distribution of Staff Reaction

S/N	Staff reaction to operations environment?	Frequency	Percentage
1	Normal (no reactions)	75	74.26
2	Work at optimum productivity	9	8.91
3	Feel the need to take constant breaks	17	16.83
	Total	**101**	**100**

Source: Researcher's Field Survey, 2022.

Table 13: Distribution illustrating chances of switching from firewood to cooking gas

S/N	Can you make a switch from Firewood to cooking gas?	Frequency	Percentage (%)
1	No	97	97.98
2	Yes	2	2.02
	Total	**99**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 14: Distribution illustrating chances of switch from cooking gas to firewood

S/N	Can you make a switch from cooking gas to Firewood?	Frequency	Percentage (%)
1	No	56	59.57
2	Yes	38	40.43
	Total	**94**	**100**

Source: Researcher's Field Survey, 2022.

Table 15: Distribution illustrating the cheaper means of cooking.

S/N	What is cheaper to acquire for food production?	Frequency	Percentage (%)
1	Cooking gas	77	76.24
2	Firewood	24	23.76
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 16: Distribution method of cooking giving more sales

S/N	What means of cooking increases sales?	Frequency	Percentage (%)
1	Firewood	7	6.93
2	Cooking gas	94	93.07
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 17: Distribution of method of cooking that takes less time.

S/N	Which takes less time for production?	Frequency	Percentage (%)
1	Cooking gas	96	95.05
2	Firewood	5	4.95
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 18: Distribution of method of cooking giving higher quality

S/N	Which makes for higher quality of food production?	Frequency	Percentage (%)
1	Cooking gas	96	95.05
2	Firewood	5	4.95
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Table 19: Profits like with cooking gas

S/N	With the use of cooking gas what are your profits like?	Frequency	Percentage (%)
1	Rises constantly every month	96	95.05
2	Stationary monthly	5	4.95
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022

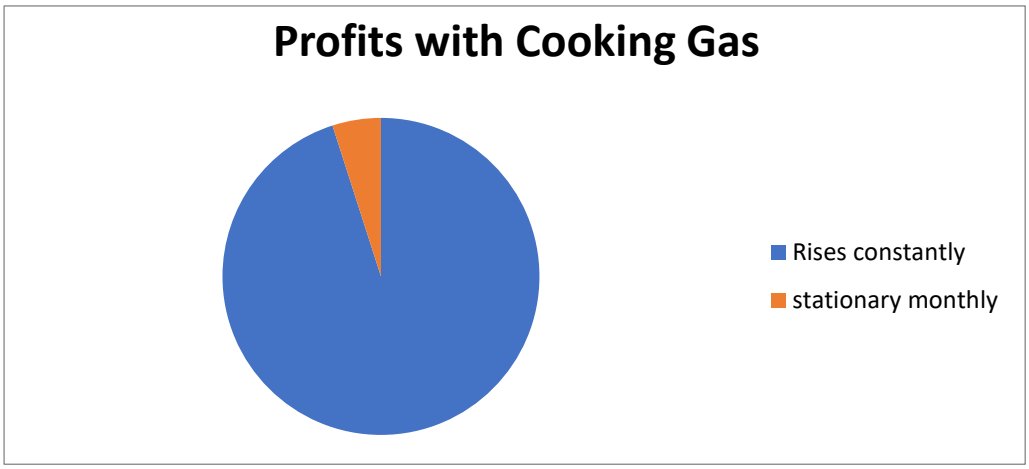
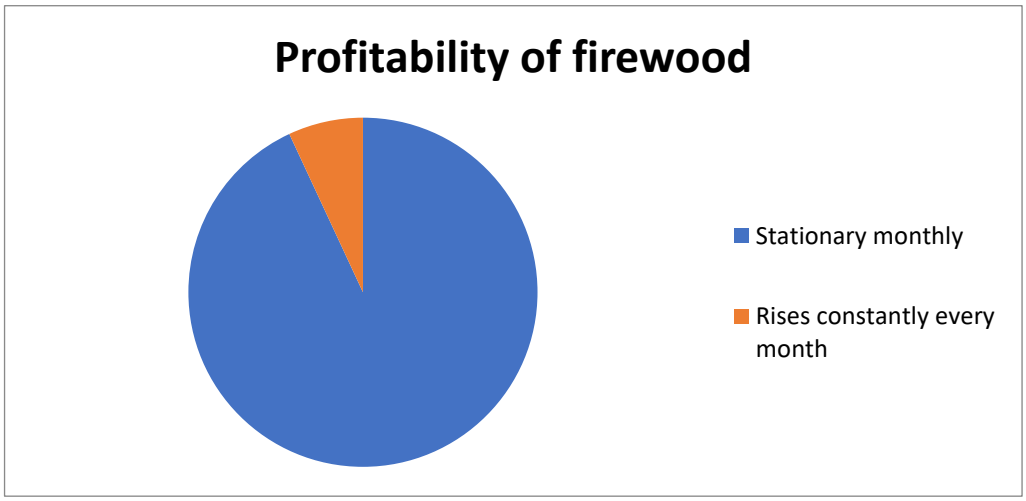


Table 20: Profits like with firewood.

S/N	What are your profits like with the use of firewood?	Frequency	Percentage (%)
1	Stationary monthly	94	93.07
3	Rises constantly every month	7	6.93
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.



Presentation and Analysis of Relevant Questions to the Research Hypotheses

This section deals with the presentation and analysis of some questions on the questionnaire that will be used in testing the research hypotheses. These questions are questions 1, 2, and 3.

Question 1

Table 21: Will method of cooking have any significant influence on the quality of food Vendors dish out?

S/N	Variables Options	Frequency	Percentage (%)
1	SA	29	28.71
2	A	25	24.75
3	U	10	9.90
4	D	14	13.87
5	SD	23	22.77
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The above table depicts the percentage distribution of responses to question 1 on the questionnaire. 28.71% strongly agree, 24.75% agree, 9.90% were undecided, 13.87% disagree while 22.77% strongly disagree. Therefore, a total of 53.46% are in support of the statement while 36.64% disagree.

Question 2:

Table 22: Is cooking gas (LPG) the more profitable method of cooking food vendors can step into?

S/N	Variables Options	Frequency	Percentage (%)
1	SA	26	25.74
2	A	37	36.63
3	U	38	37.63
4	D	-	-
5	SD	-	-
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

The table drawn above shows the degree of response of respondents to the question/assertion made above in question 2. It however reveals that 25.74% strongly agree, 36.63% agree, 37.63% were undecided. Therefore, a total of 62.37% are in support of the statement.

Question 3:

Table 23: Can food vendors sustain competitiveness with this more profitable method of cooking?

S/N	Variables Options	Frequency	Percentage (%)
1	SA	30	29.70
2	A	20	19.80
3	U	2	1.98
4	D	25	24.76
5	SD	24	23.76
	Total	**101**	**100.00**

Source: Researcher's Field Survey, 2022.

Considering the table above, the degree of response of respondents were presented and analyzed. It therefore shows that 29.70% strongly agree, 19.80% agree, 1.98% were indifferent, 24.76% disagree, and 23.76% strongly disagree.

Hypotheses Testing

In this section, the focus is to test the hypotheses formulated in chapter one of the research study using the chi-square analysis as the chosen statistical tool. The questions and their corresponding responses, which were previously analyzed and presented, will be used to conduct this hypothesis testing. The primary objective of the chi-square analysis is to investigate the association between categorical variables present in the data. Specifically, the researchers seek to determine whether a significant relationship exists between the variables explored in the research questions. By applying the chi-square test to the collected data, the researchers aim to draw conclusions regarding the hypotheses and evaluate whether there is a meaningful connection between the adoption of cooking gas (LPG) in Nigerian food vendor businesses, the recognition of its importance by stakeholders, and its potential effects on factors like profitability and food quality. Through this statistical analysis, the researchers hope to gain valuable insights into the relationships between the variables under investigation and contribute to a better understanding of the implications of using cooking gas in the food vendor industry in Nigeria.

$$X^2 = \frac{(O-E)^2}{E}$$

Where X^2 = Chi-square coefficient

O = Observed frequencies

E = Expected frequencies

$$E = \frac{Row\ Total\ x\ Column\ Total}{Grand\ Total}$$

The level of significance is 5% in testing the hypothesis.

Hypothesis 1

Ho: There is no method of cooking that influence the quality of food Vendors dish out.

Hi: There is the method of cooking that influences the quality of food Vendors dish out.

Table 24: Responses from participants.

Varies	**Responses**			
Options	**Online Stores**	**Side Stand**	**Enclosed shop or restaurant**	**Total**
SA	19	6	4	29
A	12	5	8	25
U	10	-	-	10
D	-	13	1	14
SD	2	17	4	23
Total	**43**	**41**	**17**	**101**

Source: Researcher's Field Survey, 2022.

The appropriate question to test 'hypothesis 1' is question 2. The responses are however presented in the chi-square table below thus:

Table 24.1: Chi – Square Analysis

O	**E**	**O – E**	**$(O - E)^2$**	**$\frac{(O - E)^2}{E}$**
19	12.35	6.65	44.2225	3.5808
6	11.77	-5.77	33.2929	2.8286
4	4.88	-0.88	0.7744	0.1587
12	10.64	1.36	1.8496	0.1738
5	10.15	-5.15	26.5225	2.6131
8	4.21	3.79	14.3641	3.4119
10	4.26	5.74	32.9476	7.7342
13	5.68	7.32	53.5824	9.4335
1	2.36	-1.36	1.8496	0.7837
2	9.89	-7.89	62.2521	6.2944
17	9.34	7.66	58.6756	6.2822
4	3.87	0.13	0.0169	0.0044
Total				**43.2993**

Source: Researcher's Field Survey, 2022.

Decision Rule

Accept Ho (Null hypothesis) if the calculated value is less than the table value at 5% level of significance.

f_{cal} = 43.2993

f_{tab} = d-f = (r-1)(c-1) (5-1)(3-1) = 4 x 2 = 8

f_{tab} = 15.51

$f_{cal} > f_{tab}$ i.e. calculated value is greater than the table value therefore the alternative hypothesis is accepted.

Hypothesis 2

Ho: There will be no profitable method of cooking food vendors can step into.

Hi: There is a profitable method of cooking food vendors can step into.

The appropriate question to test "Hypothesis 2" is question 1

Table 25: Responses from participants.

Varies	**Responses**			
Options	**Online Stores**	**Side Stand**	**Enclosed shop or restaurant**	**Total**
SA	5	14	7	26
A	30	3	4	37
U	-	28	10	38
D	-	-	-	-
SD	-	-	-	-
Total	**35**	**45**	**21**	**101**

Source: Researcher's Field Survey, 2022.

Table 25.1: Chi – Square Analysis

O	**E**	**O – E**	**$(O - E)^2$**	**$\frac{(O - E)^2}{E}$**
5	9.01	-4.01	16.0801	1.7847
14	11.58	2.42	5.8564	0.5057
7	5.41	1.59	2.5281	0.4673
30	12.82	17.18	295.1524	23.0228
3	16.49	-13.49	181.9801	11.0358
4	7.69	-3.69	13.6161	107706
28	16.93	11.07	122.5449	7.2383
10	7.90	2.1	4.41	0.5582
Total				**46.3835**

Source: Researcher's Field Survey, 2022.

Decision Rule

Accept Ho (Null hypothesis) if the calculated value is less than the table value at 5% level of significance.

f_{cal} = 46.3835

f_{tab} = d-f = (r-1) (c-1) (5-1) (3-1) = 4 x 2 = 8

f_{tab} = 15.51

$f_{cal} > f_{tab}$ i.e., calculated value is greater than the table value, therefore the Alternative hypothesis is accepted.

Hypothesis 3

Ho: There will be no significant influence of competitiveness with more profitable methods of cooking.

Hi: There will be a significant influence of competitiveness with more profitable methods of cooking.

The appropriate question to test this "Hypothesis 3" is question 2.

The responses are however presented in the chi-square table below:

Table 26: Responses from participants.

	Responses			
Options	**Online Stores**	**Side Stand**	**Enclosed shop or restaurant**	**Total**
SA	10	14	6	30
A	12	-	8	20
U	2	-	-	2
D	11	10	4	25
SD	10	13	1	24
Total	**45**	**37**	**19**	**101**

Source: Researcher's Field Survey, 2022.

Table 26.1: Chi – Square Analysis

O	**E**	**O – E**	**$(O - E)^2$**	**$\frac{(O - E)^2}{E}$**
10	13.37	-3.37	11.3569	0.8494
14	10.99	3.01	9.0601	0.8244
6	5.64	0.36	0.1296	0.0230
12	8.91	3.09	9.5481	1.0716
8	3.76	4.24	17.9776	4.7813
2	0.89	1.11	1.2321	1.3844
11	11.14	-0.14	0.0196	0.0018

10	9.16	0.84	0.7056	0.0770
4	4.70	-0.7	0.49	0.1043
10	10.69	-0.69	0.4761	0.0445
13	8.79	4.21	17.7241	2.0164
1	4.51	-3.51	12.3201	2.7317
Total				**13.9098**

Source: Researcher's Field Survey, 2022.

Decision Rule

Accept Ho (null hypothesis) if the calculated value is greater than the table value at 5% level of significance.

f_{cal} = **13.9098**

f_{tab} = d-f = (r-1) (c-1) (5-1) (3-1) = 4 x 2 = 8

f_{tab} = 15.51

$f_{cal} < f_{tab}$ i.e., calculated value is less than the table value, therefore the null hypothesis (Ho) is accepted.

Summary, Conclusion and Recommendation

Summary

After analyzing the collected data, the following observations were made: The efficiency and significance of cooking gas (LPG) as a cooking method are not yet fully appreciated within the food vendor businesses in Nigeria. The stakeholders in the Nigerian food vendor industry have not recognized cooking gas (LPG) as a necessity for gaining a competitive advantage and increasing their profit margins. However, it has been found that cooking gas significantly improves the quality of food. One of the advantages of adopting cooking gas is its controllable cooking temperature, which allows for the preparation of various dishes at their ideal temperatures, reducing the risk of burning food and minimizing wastage. While firewood may be more expensive over time, the use of cooking gas has been shown to increase sales and reduce costs, positively influencing profitability for food vendors.

Conclusions

The significance of using cooking gas (LPG) cannot be overstated, especially when considering the survival and growth of food businesses in Nigeria. Adopting the best cooking method, specifically cooking gas (LPG), is crucial for achieving numerous factors that contribute to the success of these businesses. By embracing cooking gas (LPG) as their primary method of cooking, stakeholders in the food industry can gain a key competitive advantage and enhance their profit margins.

Recommendation

Cooking gas (LPG) holds utmost significance and should be integrated into food businesses' operations. Despite entailing safety precautions that incur expenses from stakeholders, provisions for these costs should be included in the business's annual overhead. Food businesses, particularly those emphasizing food quality over quantity, should seriously consider adopting cooking gas. To maintain high standards, regular efficiency checks must be conducted.

Conflict of Interest: None

Funding: Self

Author's competing interest statement/Ethical Review: The author(s) have declared ethics committee/IRB approval is not relevant to this content.

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