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Investigating the Market Infiltration of Adulterated Engine Oil in North-Eastern Nigeria

Stephen Ishaya; & Soguna Macdonald Daniel
Social Science Unit, General Studies Department, School of Business and Management Technology, Federal Polytechnic Bali, P. M. B 05 Bali, Taraba State.
kusstephen@gmail.com

Abstract

This study seeks to investigate fake and adulterated engine oil dominance in North-Eastern Nigeria with a focus on how adulterated engine oil is made and, how it gets into the market. The study adopted a survey research design with automobile users in northeast Nigeria as its target population. A simple random sampling technique was employed to sample four hundred fifty (150) respondents from three local government areas across Adamawa, Taraba, and Bauchi States. A self-designed questionnaire modeled after the Likert scale was used for data collection and data were presented in tables and analyzed using statistical tools of measures of central tendency and dispersion. The result of the study reveals a concerning prevalence of various methods of adulterating engine oil in the North-East Nigerian market. Among the identified practices, the abrupt termination of refining processes and the mixing of genuine oil with cheap solvents emerge as prominent means of producing fake and adulterated lubricants. Equally, it was also found out that because adulterated engine oil is smuggled into the market unchecked, the implication is that the consumers may unknowingly choose fake or adulterated products due to misinformation or a lack of awareness. The study recommended that government agencies upon which rest oversight roles of ensuring good quality engine oil should enhance effort to check this menace. Therefore, there is a need for intensified government oversight to ensure quality

engine oil and widespread consumer education campaigns to identify and avoid adulterated products in Northeast Nigeria.

Keywords: Adulterated, Engine Oil, Infiltration, Market, Northeast Nigeria

Introduction

The criminal act of faking, counter-faking, and adulteration of products in Nigeria is pervasive, despite existing statutory provisions designed to regulate the manufacture and sales of products (Dogarawa, 2013). This issue extends to petroleum products, notably kerosene, premium motor spirit (referred to as petrol in Nigeria), and motor lubricating oil (commonly known as engine oil), which are targeted by audacious criminal elements seeking to either earn a living or make supernormal profits (Brand Impact, 2023; Dogarawa, 2013). The rise of technological advancements has led to the proliferation of factories and companies producing similar goods with varying qualities. Unfortunately, consumers lack the tools or knowledge to determine the quality of these products, creating a situation ripe for exploitation by unscrupulous operators seeking illegal profits. The illegal practice of product adulteration is not confined to Nigeria; it is a global phenomenon, with petroleum product adulteration being a notable abuse (Gawande and Kaware, 2013).

Adulteration, defined as the unauthorized introduction of a foreign substance into another, altering its original production, composition, and specification, is a significant concern. In the case of motor lubricating oil, the extent of adulteration of oil product in Nigeria is underscored by court actions, where two individuals have been executed for criminal offenses related to adulteration (Dunia, 2012). Motor lubricating oil is an essential component for automotive owners across Nigeria, especially in the North-East region, as internal moving engines heavily rely on it. The implications of lubricating oil adulteration are substantial, with reports indicating a staggering economic cost to Nigeria. Adulterated lubricating oil alone has reportedly cost the Nigerian economy the substantial sum of two hundred billion naira (Brand Impact, 2023). This underscores the urgency of addressing this criminal activity to safeguard both consumers and the economic well-being of the nation.

Indeed, the implications of adulterated motor lubricating oil extend beyond individual consumers to impact the broader economy, especially in the northeast part of the country, which is an integral component of the Nigerian economy. The economic significance of this region makes it crucial to address the challenges posed by the widespread use

of substandard lubricating oil. The substantial economic cost of up to two hundred billion naira (₦200 billion) as of 2023, resulting from the use of adulterated motor lubricating oil is indicative of the large patronage of these products. Such a significant financial impact underscores the scale of the problem and the urgent need for intervention to mitigate further economic losses. It is essential to recognize that the standards and specifications set for engine oil are designed to ensure the effective and efficient performance of automotive engines. Adulterating motor lubricating oil compromises the quality of the oil, raising concerns about its impact on consumers. The potential consequences include reduced engine efficiency, increased wear and tear, and possibly more severe mechanical issues, ultimately affecting the reliability and lifespan of vehicles. Therefore, addressing the issue of adulterated motor lubricating oil is not only crucial for protecting consumers but also for safeguarding the overall economic health of the North-East and, by extension, the entire Nigerian economy. Effective measures to curb this illegal practice are imperative to ensure adherence to quality standards, the well-being of consumers, and the sustainability of the automotive industry in the region. It is against this background that this study seeks to investigate the implication of adulterated engine oil for consumers in north-east Nigeria with a focus on how adulterated engine oil is made and gets into the market in north-eastern Nigeria

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Conceptual Review

Engine oil is defined as a viscous substance that is added to internal combustion engines which lubricates moving parts. It is obtained from crude oil or raw petroleum. It is one of the many fractions or components of petroleum. Engine oil cleans another engine, prevents corrosion, and cools the engine by conveying heat between the moving parts (Alacoque, 2018). The effectiveness of lubricating oil is determined by its capacity to contribute to the life span of an engine. The kind of engine oil used for automotive is largely determined by the kind of vehicle. As a result, engine oils differ in their chemical composition leading to differences in combustion levels (Alacoque, 2018).

Engine oil is sourced from different places around the world. The engine oil is obtained from oily yellow-to-black like flammable liquid which is a mixture of several hydrocarbons. Hydrocarbons are organic compounds of carbon and hydrogen atoms. Hydrocarbon is formed from the decomposition of organic matter (plant and animal remains) over several years. Engine oil has two components. The base oil is derived from petroleum and other synthetic additive. These use blended to meet performance requirements. The blend of the base oil and additive also determines the quality of any

engine oil. Engine oils that have higher base numbers are most likely to have a higher quality capacity to neutralize acids which can evolve from oil combustion (Nonia Corporesin, 2015).

Generally speaking, there are two broad sources of automotive engine oil. The first is the base engine oil which is obtained as one of many fraction or components that are collected during crude oil refining. The base mineral-derived engine oil is usually an oily well yellow-to-black, flammable liquid mixture of several hydrocarbons. There are synthetic engine oil types extracted directly from vegetables and certain animals. These synthetic engine oil types are prepared through laboratory reactions. (Alacoque, 2018).

Theoretical Framework

To thoroughly investigate the dominance of fake and contaminated lubricants in North-East Nigeria, this study employs a multifaceted theoretical framework that combines Nancy Fraser's Neo-Marxian Theory with the Consumer Choice Theory. Combining these theories offers an in-depth knowledge of the lubricant market's socioeconomic dynamics, power relationships, and consumer decision-making procedures.

Nancy Fraser's Neo-Marxian Theory: Capitalism, Injustice, and Exploitation

The theoretical framework adopted for this study is Nancy Fraser’s strand of neo-Marxian theory of capitalism and consumer choice theory. Fraser, in her book, ‘’ Heterosexist misrecognition and capitalism ‘’posited that capitalism as an economic system and ideology promotes injustice under the guise of freedom of choice and consumer in the market sphere. The theory addresses the moral inquiry into the unequal distribution of privately owned productive assets and its interpretation as requiring an egalitarian distribution of resources in the external world (Ferguson & Veneziani, 2018). It emphasizes the need for a reasonable allocation of resources to effectively exploit opportunities and create value (Ge et al., 2016). Furthermore, the theory delves into the facets of exploitation, particularly focusing on unfair advantage in prevailing circumstances (Fleurbaey, 2014). It also considers the relationship between exploitation and injustice, highlighting the importance of understanding the affective dimension of epistemic injustice and its impact on individuals' lives (Zembylas, 2022). Additionally, Fraser's theory encompasses the exploitation of labor and commodities, providing a comprehensive analysis of the productiveness of the economy (Yoshihara & Veneziani, 2013). The theory also acknowledges the challenges posed by structural injustice to reconciliation, emphasizing the need to address injustices of the distant past (Eisenberg, 2018).

Impliedly, truth and peace are no longer virtues to pursue in the era of capitalism; rather, profit should be regarded as the ultimate goal to pursue at all costs even at the cost of human life. Capitalism, therefore, encourages opportunism, and exploitation. This theory has been chosen because it explains the loss of conscience by dealers or marketers of engine oil in North-East Nigeria. The drive for super-profit relegates to the background the more important need to pursue truth, justice, and fairness in business transactions. The relentless pursuit of super-profits, as advocated by capitalism, may contribute to the subversion of ethical standards, ultimately leading to the proliferation of fake and adulterated lubricants. This theoretical lens unveils the socio-economic forces that may drive opportunism, where profit maximization takes precedence over the well-being and rights of consumers.

Consumer Choice Theory

Consumer choice theory is based on several fundamental assumptions that underpin the decision-making process of individuals when faced with various options. One of the key assumptions is rational behavior, which forms the basis of traditional consumer theory (Stockhammer et al., 2021). This assumption posits that consumers make choices that maximize their utility, given their preferences and budget constraints. The rational behavior assumption is closely associated with the concept of homo economicus, which represents individuals as rational agents who consistently make decisions to maximize their overall satisfaction (Stockhammer et al., 2021). Additionally, the assumption of rational behavior is integral to the development of models such as the multinomial logit model, which is widely used to analyze discrete choice behavior (Matějka & McKay, 2011).

Moreover, consumer choice theory assumes that individuals have well-defined preferences and make consistent choices based on these preferences (Panda, 2018). This assumption is rooted in the idea that consumers have transitive preferences, meaning that if option A is preferred to option B, and option B is preferred to option C, then option A is also preferred to option C. The transitivity of preferences is a fundamental assumption in consumer theory and is closely linked to the concept of rationality (Panda, 2018). Furthermore, consumer choice theory often assumes that consumers have complete information and are capable of processing this information to make optimal decisions.

However, recent research has challenged this assumption by introducing the concept of rational inattention, which suggests that individuals may selectively ignore certain information due to cognitive limitations or information overload (Joo, 2022). This challenges the traditional assumption of complete information and highlights the complexities involved in consumer decision-making processes.

Impliedly, the theory states that consumers make rational decisions based on available products in the market. In the context of lubricants, consumers might unknowingly choose adulterated engine oil due to wrong and lack of awareness on how to identify good oil in the market. This lack of awareness can lead to suboptimal performance of machinery, increased maintenance cost, and knocking of engines affecting the overall economic well-being of consumers.

METHODOLOGY

This study adopted a survey research design in which respondents were sampled as a representation of the population. The study utilized both primary and secondary sources of data. The primary sources of data known to this study include in-depth interviews, focus group discussion, observation, direct participation, questionnaires, and experiments. The study cannot employ all these instruments of data collection. Therefore, the study adopted a questionnaire for data collection.

The population for this study are consumers of engine oil in North-East Nigeria only. Impliedly, the population for this study includes motorcycle riders, both private & commercial Cars and Bus drivers, Heavy Trucks, Heavy Duty Machine and Company automobile Machine in the North-Eastern part of Nigeria. Accordingly, people within the North-Eastern parts of Nigeria who did not possess automobiles did not form part of the population for this study. Additionally, automobile owners in other parts of Nigeria other than North-East Nigeria do not form part of the population.

This study sampled a total number of four hundred and fifty respondents with one hundred and fifty respondents drawn from nine different local governments across three states of the six states in the North-eastern part of Nigeria. The study proceeded from there to adopt the stratified random sampling technique in which three states were randomly selected first. Then three local government areas were further selected from each state on a random routine.

The three states selected were Bauchi, Adamawa, and Taraba states. In Bauchi state Das, Alkaleri, and Bauchi South local governments were selected. In Adamawa State, Gombi, Guyuk, and Jada were selected. In Taraba state, Wukari, Takum, and Ussa were the local government areas selected.

Data collected through the questionnaire were coded manually and the result was transmitted into a system where STATA 14 (2023) software application was used to run the analysis. The raw data were presented in tables with figures in appendices.

DATA ANALYSIS AND PRESENTATION OF RESULTS

Decision Rule

To capture the objectives for which the study was poised to achieve, descriptive statistical tools were employed in analyzing the data collected during the study; this

involved the use of tools like frequency distribution tables, percentages, mean scores, and standard deviations. For the mean score ($\overline{X}$), the decision rule that served as the basis for acceptance or rejection was determined based on the decision rule of a 4-point rating scale $\left(\frac{4+3+2+1}{4}\right) = 2.5$; therefore responses with mean score ($\overline{X}$) up to the above 2.5 were regarded as good while those mean scores ($\overline{X}$) below 1.9 were regarded as not so strong or good. For the standard deviation ($*$) which measures the amount of variation of values from its mean score, the decision rule is that the deviation of actual data from their mean values should be very small (Agung 2004 in Bubari & Salisu, 2019).

Likert-Scaling

The questionnaire adopted five steps Likert-Scale options which consist of Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD). The Likert Scale is used to gauge attitudes and opinions; it is also consistent with the survey research design adopted for this study (Likert, 1932).

How Adulterated Engine Oil Are Made?

The data presented in Table 4.1 sheds light on the responses gathered from the research conducted on the production and distribution of adulterated engine oil in the North-Eastern part of Nigeria. The study, which aimed to discern the methods employed in the production of adulterated engine oil, encompasses five key inquiries.

The findings indicate that a significant proportion of respondents (52.4%) acknowledged that the process of refining genuine engine oil is frequently interrupted by modular refiners. This conclusion is supported by the mean score of 2.367 and a standard deviation of 1.025, signifying a consensus among respondents. Moreover, the data reveals that 48.0% of participants reported that authentic engine oil is often mixed with inexpensive solvents and subsequently sold under the original brand name after repackaging. This observation is substantiated by a notable mean score of 2.036 and an expected standard deviation of 0.949, emphasizing the prevalence of this practice.

A noteworthy aspect of the study is the acknowledgment by 5.05% of respondents that blending original engine oil with a more affordable brand and marketing it under a different name is a common occurrence. This insight is supported by a significant mean score of 2.189 and an expected standard deviation of 0.908. Furthermore, the majority of respondents (with a mean score of 2.418 and a standard deviation of 0.999) concurred that the adulteration of engine oil often involves the addition of solvents. This underscores a concerning trend in the production process.

Lastly, the study found that 48.2% of participants revealed the direct importation of adulterated engine oil, substantiated by a significant mean score of 2.408 and a standard deviation of 0.958.

These findings collectively highlight the multifaceted nature of adulterated engine oil production in the North-Eastern region of Nigeria. The insights gained from this research could be instrumental in formulating policies and strategies to address this issue and ensure the quality and safety of engine oil in the market.

Table 4.1 How Adulterated Engine Oil Are Made?

S/N	Item Statement	SA	A	D	SD	UD	$\bar{X}$	*
1	The engine oil which process of refining was abruptly terminated by modular refiners	64 (14.7)	227 (52.4)	92 (21.2)	21 (4.8)	29 (6.6)	2.367*	1.025
2	Original engine oil that is mixed with cheap solvent and sold under the same brand name after repackaging	126 (29.1)	208 (48.0)	74 (17.1)	7 (1.6)	18 (4.5)	2.036*	0.949
3	Original engine oil brand that is mixed with cheaper engine oil brand and sold under different brand name	87 (20.1)	219 (50.5)	101 (23.3)	10 (2.3)	16 (3.6)	2.189*	0.908
4	Used engine oil that is mixed with solvent	62 (14.3)	204 (47.1)	116 (26.7)	26 (6.0)	25 (5.7)	2.418*	0.999
5	Direct importation of adulterated engine oil	56 (12.9)	209 (48.2)	128 (29.5)	15 (3.4)	25 (5.7)	2.408*	0.958

Source: Computed and Compiled by the Researchers using STATA 14 (2023)

Note: *, denotes means score acceptance

Figures in ( ) are percentages

How Adulterated Engine Oil Gets into the Market

The insights provided by the data in Table 4.2 offer a comprehensive understanding of the mechanisms through which fake and adulterated engine oil permeates the market in the North-Eastern region of Nigeria. The second research objective, comprising six inquiries, sought to unravel the dynamics involved in the distribution of such compromised products.

A substantial majority of respondents (60.5%) expressed agreement that diluting high-quality oil procured from licensed producers with inexpensive solvents creates a challenge for consumers to discern adulteration. This sentiment is underscored by a significant mean score of 2.263 and an accepted standard deviation of 0.943, highlighting the deceptive nature of the adulteration process.

In a parallel vein, 40.1% of participants acknowledged that sellers of adulterated engine oil collaborate with government officials responsible for inspecting the quality of petroleum products. This observation is substantiated by a significant mean score of 2.192 and a standard deviation of 1.116, pointing to a concerning nexus between unscrupulous sellers and regulatory authorities.

Additionally, a majority of respondents (64.2%) conceded that there is direct smuggling of adulterated engine oil, supported by mean scores of 2.071 and a standard deviation of 0.786. This finding suggests the existence of illicit channels through which compromised products find their way into the market.

The study also brought to light that 41.8% of participants acknowledged compromises by genuinely licensed producers as a factor contributing to the presence of adulterated engine oil. This is substantiated by significant mean scores of 2.464 and a standard deviation of 1.008, indicating a concerning breach of quality assurance by legitimate producers.

Furthermore, a majority of respondents (49.6%) indicated that unlicensed modular refiners are a source of the adulterated oil supply chain, as evidenced by mean scores of 2.351 and a standard deviation of 0.990.

Lastly, a noteworthy finding is that 53.8% of respondents strongly agreed that there is inadequate awareness among consumers about how to identify adulterated oil. This underscores a critical need for educational initiatives to empower consumers with the knowledge to make informed choices.

These revelations provide a nuanced understanding of the complex network through which adulterated engine oil enters the market in the North-Eastern region. Addressing these issues requires a multi-faceted approach, involving regulatory interventions, industry collaboration, and consumer education.

Table 4.2 How Adulterated Engine Oil Gets into the Market

S/N	Item Statement	SA	A	D	SD	UD	$\bar{X}$	*
1	Diluting good quality oil purchased from licensed producers with cheap solvent makes it difficult for consumers to identify.	60 (13.8)	262 (60.5)	72 (16.6)	12 (2.7)	27 (6.2)	2.263*	0.943
2	Sellers of adulterated engine oil connive with government officials responsible for checking the quality of petroleum product	126 (29.1)	174 (40.1)	87 (20.0)	13 (3.0)	32 (7.3)	2.192*	1.116
3	Direct smuggling of adulterated engine oil	77 (17.7)	278 (64.2)	57 (13.1)	9 (2.0)	11 (2.5)	2.071*	0.786
4	Compromise by a genuinely licensed producer	62 (14.3)	181 (41.8)	143 (33.0)	16 (3.6)	29 (6.6)	2.464*	1.008
5	Supply made by unlicensed modular refiners	67 (15.4)	215 (49.6)	107 (24.7)	17 (3.9)	26 (6.0)	2.351*	0.990
6	Inadequate awareness on the part of consumers about how to identify adulterated oil	162 (37.4)	233 (53.8)	19 (4.3)	3 (0.6)	14 (3.2)	1.979	0.832

Source: Computed and Compiled by the Researchers using STATA 14 (2023)
Note: *, denotes means score acceptance

RESULTS

The research reveals a concerning prevalence of various methods of adulterating engine oil in the North-East Nigerian market. Among the identified practices, the

abrupt termination of refining processes and the mixing of original oil with cheap solvents emerge as prominent means of producing fake and adulterated lubricants. Additionally, the blending of different brand oils and the use of used oil with solvents are significant contributors to the adulteration problem. The direct importation of adulterated oil is also noteworthy, indicating a complex landscape of unethical practices within the lubricant industry. The entry points of these adulterated oils into the market further expose systemic issues. Dilution with cheap solvents and collusion with government officials stand out as significant pathways. Direct smuggling of adulterated oil and compromise by genuinely licensed producers are also notable, along with the supply of adulterated oil by unlicensed refiners.

CONCLUSION AND RECOMMENDATIONS

In the final analysis, this research underscores the widespread nature of adulteration in the North-East Nigerian lubricant market. Unethical practices such as abrupt refining process termination and mixing with cheap solvents are pervasive, indicating a need for immediate attention. The findings highlight systemic issues within the industry, with collusion, compromise, and inadequate market surveillance allowing adulterated oil to enter the market. The research also emphasizes the vulnerability of consumers due to insufficient awareness, exposing them to the detrimental effects of using fake and adulterated lubricants.

Based on the findings outlined and discussed in the foregoing, this research recommends the following;

(i) **Enhance Regulatory Oversight:**

The government official that is responsible for checking the quality of crude oil by-products should be strengthened and enforcement mechanisms to limit the direct importation and blending of adulterated engine oil into north-eastern Nigeria. This may involve stricter monitoring of importation processes on the high sea and increased punishment for those unscrupulous operators who violate such rules as a lesson to others.

(ii) **Collaboration between Industry and Government:**

There should be synergy between stakeholders and government officials in the oil and gas sector to address the identified connivance between sellers of adulterated oil and government inspectors to discourage the production and distribution of adulterated oil in the market. Besides that, there should be severe punishment be imposed to ensure ethical conduct and discourage the use of official positions for personal gain by any officials to serve as a distance to others.

(iii) **Consumer Education Campaigns:**

There should be massive campaigns to educate consumers on how to identify adulterated engine oil in circulation in northeastern Nigeria. This can be reached

through workshops, public advocacy, and media advertising such as television, radio, and the distribution of informational materials to empower consumers to make informed choices when buying engine oil in the market.

(iv) **Increased Industry Awareness:**

Factories and companies that produce similar oil but with varying qualities in the oil and gas sector should know and understand the negative consequences of producing and delivering adulterated engine oil into the market should be stopped. The manipulation of the original product to alter the qualities is a criminal act. Encourage responsible business practices and ethical considerations in the production and marketing of lubricants.

(v) **Regular Quality Inspections:**

Government must as a matter of urgency implement regular and thorough inspections of petroleum products in the market. This includes routine checks on the quality of engine oil by relevant regulatory bodies to ensure compliance with established standards. Any deviation should be met with swift and appropriate sanctions.

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