

University of Fort Hare
Together in Excellence

**ANALYSES OF RETAIL AND TRANSPORT GEOGRAPHY OF LIQUIFIED
PETROLEUM PRODUCTS IN IBADAN METROPOLIS, NIGERIA**

BY

AJAYI, ADEYINKA PETER



DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL SCIENCE
Together in Excellence
FACULTY OF SCIENCE AND AGRICULTURE

UNIVERSITY OF FORT HARE

ALICE, SOUTH AFRICA



**The Analyses of Retail and Transport Geography of Liquefied Petroleum
Products in Ibadan metropolis, Nigeria**

By

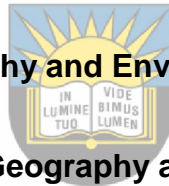
AJAYI, Adeyinka Peter

A thesis submitted in fulfilment of the requirement for the award of the degree

of

DOCTOR OF PHILOSOPHY

(Geography and Environmental Science)



Department of Geography and Environmental Science

University of Fort Hare

Faculty of Science and Agriculture

University of Fort Hare

Alice 5700

South Africa

Supervisor: Dr Sonwabo Perez Mazinyo

February 2019

DECLARATION

I, the undersigned, declare that this thesis entitled “**The Analyses of Retail and Transport Geography of Liquefied Petroleum Products in Ibadan metropolis, Nigeria**” submitted to the University of Fort Hare for the award of the degree of Doctor of Philosophy in Geography and Environmental Science in the Faculty of Science and Agriculture is my original work. I also affirmed that all cited works in the thesis are duly referenced. This work has not also been submitted to any other University in partial or entirely for the award of any degree.

Name: **Adeyinka Peter, AJAYI**

Signature:

Date:



University of Fort Hare
Together in Excellence

DECLARATION OF PLAGIARISM

I **Adeyinka Peter AJAYI**, Student Number: 201700738 hereby declare that I am fully aware of the University of Fort Hare's policy on plagiarism and I have taken every precaution to comply with the regulations.

Signature:

Date:



University of Fort Hare
Together in Excellence

CERTIFICATION

This thesis entitled “**Analyses of Retail and Transport Geography of Liquefied Petroleum Products in Ibadan metropolis, Nigeria**” meets the regulation governing the award of degree of Doctor of Philosophy of the University of Fort Hare and is approved for its contribution to scientific knowledge and literary presentation.

.....
Dr. Sonwabo Perez Mazinyo
Supervisor

.....
Date



University of Fort Hare
Together in Excellence

DEDICATION

“God is not a man that he should lie; neither the son of man that he should repent; hath he said, and shall he not do it? Or hath he spoken, and shall he not make it good” (Numbers 23 v 19).

“The Lord, the Lord, a God merciful and gracious, slow to anger, and abounding in steadfast love and faithfulness, keeping steadfast love for thousands.” (Exodus 34 v 6 - 7).



University of Fort Hare
Together in Excellence

Acknowledgements

To the Eternal Rock of Ages, The Father, the Son and the Holy Spirit be all glory forever!

I'm hugely indebted to my hardworking, humane and brilliant supervisor. Sir, you typify the best our continent has to offer both in scholarship and character. I learned so much from you. I can't achieve this important milestone without your invaluable contributions, concise suggestions and timely reviews of submitted works. You provided painstaking guidance every inch of the way. Your attention to details is second to none. So also are your humane and frank dispositions to issues which made an indelible impression on me. Thank you so much sir!

I will forever be grateful to the Govan Mbeki Research and Development Centre for granting me fee waivers during the course of my study. I also express my heartfelt gratitude to all the members of staff of the department of Geography and Environmental Sciences Fort Hare University led by the Head of the Department, Dr. Kalumba, others are Prof Nel, Dr. Bheki Magagula, and Ms Z Mzitshi. Thank you for the frank suggestions that has made the completion of this research endeavor a reality.

I want to specially thank God for the management of the Redeemer's University led by the visitor of the university, Pastor E. A. Adeboye (Daddy G.O.) for a providing a great citadel of learning where it is possible to dream and "run with vision". I also appreciate Prof. O. Tomori (the first Vice Chancellor of the university) and Prof. Z. Adeyewa (the incumbent V.C.) for providing an environment that drives scholarship. I'm particularly indebted to every member of staff of the department of Transport and Tourism starting from the "father" of the department; Retired Prof. O.O. Odugbemi,

Associate Prof. Mrs. 'Bola Adeleke, Dr. Mrs, P. Adeniji, Dr. A. Oluwakoya, Mrs. A. Omitola, Dr. K. Ogunsusi, Mr, B. Irinyemi, Mrs. E. Abiola-Oke, Mr. D. Ogundipe and Mrs. D. Olorunfemi. I can't thank you enough for the sacrifices you made on my behalf in the course of this research exercise. I want to thank the non-teaching members of the department; Mrs. A. Awe, Mr. O. Idowu. I will be eternally grateful to my "younger brother", Mr. Ademuyiwa O. (Oluu) for helping out with the GIS analysis and the map productions for this thesis.

I'm eternally grateful to the management and staff of the various corporations where data utilized for this work was sourced.

The New Covenant Church (NCC) family led by Dr. Paul Jinadu, Rev. Femi Oyelade (Deputy General Overseer) and my leaders in the Ososami Family of NCC; Rev. and Mrs. Adebola Abioye (Granpa and Granma Abioye-you are the best!). Pastor and Mrs. P. Nwosu, Pastor and Mrs. Faith Raheem. Elders S. Siwoku, D. Solaja (for helping in obtaining municipal authorization), J. Isreal, P. Ogunleye, T. Olatuyi, J. Jagun, W. Ogunjobi and Bro. Biodun. I thank you all for your prayers and for providing an environment where God can be served in simplicity.

Members of the Redeemed Christian Church of God (Alice Parish) able led by a devoted "Deborah" in person of Pst. Prof. Mrs. Bola Okoh (thank you so much ma), Pst S. Ikusika (my loving landlord), Pst. Dr. Goke, Pst. Dr. Okoh, Pst. Tim. Pst. Olaniyan and every member of the Alice family....I say "nkhosi kululu!" I also thank the Pastorate and the members of All Within Praise Ministry for their prayers, I specially thank the Bankoles.

I'm grateful to God for giving me a father who believed in my scholarly ability from the onset...my late dad- Stephen Babatunde Ajayi. The irrepressible, the

indefatigable, the urbane and intelligent SB! Omo Owa! I will forever be grateful to my mom-My prayerful, dutiful, caring and down-to-earth mother- Iya Edunabon....better days ahead in Jesus name (Amen). My siblings (from the Ajayi's) Sis Toyin and Bro Yemi, Henry (my senior Bro who always got his baby brother's back) and Kemi, Nike and Ade, Funso, Tope, Taiwo, Kehinde, Idowu, Dammy, Itunu. My cousins. Martins, Kola, Lanre and Bola.

The other half of my family (the Olasinde) starting with the late Mama Mary Olasinde (who lovingly took to me from the first time she set her sight on me), the frank and enigmatic J.P.Olasinde (our father and the patriarch of the Olasinde dynasty). Bro. Kayode, Bro. Lanre, Bro. Yemi and Aunty Ayo, late Sis Jumoke and Bro. Gbenga, thank you all for making me realize that marriage can truly birth a bigger family. I want to specially thank my senior brother, mentor and leader-Bro Kunle (Baba-ni-Baba-nje!). Sir, your resourcefulness, vision and faith are practical demonstration of the biblical standards we are expected to live by. Thank you for your gifts in cash and kind. You will always be appreciated.

I want to thank my very good friend Dr. I. Oyeleke (who persistently implored me to explore the option of running my PhD program in the University of Fort Hare after being frustrated by 'men who turned themselves to God in Nigeria', thank you Isaac. I want to specially commend my bosom friend, companion and reliable chum-Dr. (Ogbeni). O. Olajire (Acting Head Department of BES, RUN), Mr. Adedeji, Pastor Alakija, Mr. Oluwalogbon, Dr. Obasa, Dr. Mrs. Babalola, Mr. Esiri, Mr. Olabode (Aluta), Mr. Adio, Associate Prof. Ekande, Dr. J. Iwuh, Prof. S. Omotola, Dr. Ogini, Dr. Robaro, Dr. Ajewole and Mr.Owolanke, i thank you all. Prof E. Akinnawo (the previous Dean CMSS), Prof. I. Oloyede (the present Dean CMSS) all the staff of the College of Management and Social Sciences, I'm grateful.

My very helpful companions in the Department of Geography and Environmental Sciences, University of Fort Hare, Dr. I. Orimoloye (you are more than a friend..leadership!), Dr. E. Iortyom(I'm blessed knowing you), Ms Xoxo, Mr. Pindura Tineyi, Mr. Ntaka, Mr. Emmanuel Busayo, Mr. Tolu, Mr. Patrick, Mr. Solomon Owolabi, Mr. Bongoza, Ms Zurkanyi space would not allow me to pen down all your names. Thanks for being there for me during this period. I also thank my childhood friends-Femi (Yoyo), Ade (Bundle Alaska), Olu (Abandon), Biodun (SP), Auntie Sola Adetujoye. Our loving mentors-Prof. and Mrs. Oyesola, Dr. and "Auntie" Salami. Uncle and Auntie Adegbolagun. Sis Sola and Bro Yemi, Suzan and Abiodun-Akinola. My good friend in Joburg –Andy, his wife, kids-Lita, Bobo and Junior.

Saving the best for the last; my deepest appreciation (human) goes to my incomparable bundle of unquantifiable blessings. We both know that after God, you are next. Mobolaji thank you for being all that I longed and prayed for in a wife! My lovely nations –Fikunmi (Capt. FAPI), Fikayomi (Bambini d' Garcia) and Funmi. My nieces-Peace, Doalpo, Isoji, Nifemi (Orombo), Tide, Wumi; My nephews-Debo, Dayo, Emman, Remi, Ayomide, Goodness, God's love, Feranmi (Boros), Tomiwa and Seyifunmi.

My students over the years; Bayo, May, Emike, Ebube, Sile, Deji, Tolu (Tiny) Ivie, Deborah, Odejayi, Tope, Ifex and many too numerous to mention. Thank you all and God bless!

LIST OF ACRONYMS

AHP- Analytical Hierarchy Process

ANOVA - Analysis of Variance

ATA - American Transport Association

B2C - Business to Customer

CBD - Central Business District

CDT- Cognitive Dissonance Theory

CFS - Chronic Fatigue Syndrome

CMV - Commercial Motor Vehicle

CNS - Central Nervous System



CPT - Central Place Theory

University of Fort Hare
Together in Excellence

CRT- Current Reality Tree

CRD - Conflict Resolution Diagram

DBR - Drum Buffer Rope

DPR - Department of Petroleum Resources

DRP - Distribution Resource Planning

EC - Evaporating Cloud

EDM - Expectation Disconfirmation Model

EDT- Expectation Disconfirmation Theory

ERI - Expected Returns on Investment

FGN - Federal Government of Nigeria

FMCA - Federal Motor Carrier Safety Administration

FMCG - Fast Moving Consumable Goods

FRSC - Federal Road Safety Corps

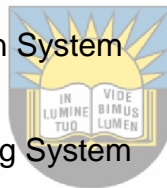
FRO - Fuel Retail Outlets

FRT - Future Reality Tree

GDP - Gross Domestic Product

GIS - Geographical Information System

GPS - Geographical Positioning System



HGV - Heavy Goods Vehicles

University of Fort Hare
Together in Excellence

HOT- High Occupancy Toll

HSE - Health, Safety and Environmental

ITS - Intelligent transport systems

IPMAN - Independent Petroleum Market Association of Nigeria

JIT - Just-In-Time

LPI - Logistics Performance Index

LRM - Logistic Regression Model

MCA - Multi Criteria Analysis

NBS - Nigeria Bureau of Statistics

NNPC - Nigeria National Petroleum Corporation

OECD - Organization for Economic Cooperation and Development

PMS - Petrol Motor Spirit

POOGI - Process of on Going Improvement

PT- Prerequisite Tree

PTD - Petroleum Tanker Drivers



PWC - Price Water Cooper

RTC - Road Traffic Crashes

University of Fort Hare
Together in Excellence

SAP - Structural Adjustment Programme

SBPM - Scenario-Based Planning Model

SC - Supply Chain

SCC - Supply Chain Collaboration

SCM - Supply Chain Management

SEI - Stockholm Environmental Institute

THC - Tetra Hydro Cannabinol

TOC - Theory of Constraints

TUI - Theories of Urban Impact

TT - Transition Tree

UDE - Undesirable Effects

UNDP - United Nations Development Program

UNODC - United Nation Office on Drugs and Crime

USEIA - United States Energy Information Administration

USDT - United States Department of Transport

VIM - Vertical Integration Model

3PLs - Third Party Logistics Service Providers



University of Fort Hare
Together in Excellence

TABLE OF CONTENT

DECLARATION OF PLAGIARISM.....	III
CERTIFICATION	IV
CHAPTER I.....	1
1.0 Background.....	1
1.1 Statement of Research Problem	4
1.2. Research Questions	7
1.3. Aim and objectives of the study	8
1.3.1 Objectives of the Study	8
1.4. Research Hypotheses.....	9
1.5. Justification and the Significance of the study.....	9
1.6 Scope and Limitations of the Study.....	13
1.7. Chapter Demarcation	14
CHAPTER II.....	17
LITERATURE REVIEW.....	17
2.1 Introduction	17
2.2 Urban Freight	18
2.3 Relational Issues between Spatial Pattern of Urban Retail, Retail Agglomeration, and Transport System.....	26
2.4 The Influence of Ethnodomination on Urban Retail Structure in the Developing World	34



University of Fort Hare

of the Study Excellence

2.5 Location Attractiveness, Land Valuation, Accessibility, Distributive Justice and Retail Structure	39
2.6. Distributive Justice and Location of Retail Centers in Urban Areas	46
2.7. Theoretical Framework	48
2.7.1. Expectation Disconfirmation Theory	48
2.7.1.2. The EDT Framework.....	50
2.7.2. Distributive Justice Theory	53
2.7.2.1. Definition of some Sub-Components of Distributive Justice Theory constructs.....	57
2.7.3. Central Place Theory (CPT).....	59
2.7. 4 Theories of Urban Impact.....	65
2.7.5 Theory of Constraints in Supply Chain Management (SCM).....	69
CHAPTER III: THE STUDY AREA.....	76
3.1. Study Area	76
13.2 Research Design	90
3.3 Research Method.....	90
3.4 Study Population.....	91
3.5 Sample Frame and Sample Size	92
3.6. Data Sources	94
3.6.1 Data needed;	94
3.6.2. Required Data.....	95
3.6.3. Required Data.....	98



University of Fort Hare
Together in Excellence

3.6.4. Required Data.....	100
3.6.5. The reliability and the validity of the research instruments employed in the study.	103
3.7. The Conceptual Framework.....	106
 CHAPTER IV: FINDINGS	 109
4.1. Spatial Distribution of Fuel Retail Outlets between Core and Peripheral Zones of Ibadan Metropolis	111
4.2. Determination of Compliance Rate to Urban Planning Standard among Fuel Retail Outlets in the Core and Peripheral Zones of Ibadan Metropolis	111
4.3. Analysis of the Compliance Rate among Fuel Retail Outlets in both the Core and Peripheral Zones of Ibadan Metropolis	112
4.4. Mean and Standard Deviation summation for the Observed.....	115
4.5. The interplay of the Forces of Ethn domination in the Ownership Structure and Spatial Pattern of Fuel Retail Outlets in Ibadan Metropolis	118
4.6. Geographical Information System (GIS) Pivotal Role in the Determination of Optimal Location for Contemporary Urban Retail Outlets	121
 CHAPTER V: FINDINGS	 123
5.1.1. Population of Participants	124
5.1.2. Analysis of the Gender Distribution	124
5.1.3. Analysis of the Age Distribution	124
5.1.4. Analysis of the Marital Status of the Respondents	124
5.1.5. Educational Status of the Respondents	125
5.1.6. Years of Experience as a Worker in the Present Place of Employment.....	125



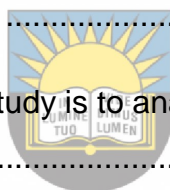
5.1.7. Analysis on the Status of Employment of the Respondents.....	125
5.2.1. Analysis of the Ownership Status of the Fuel Retail Outlets	126
5.3.1. Analysis of the Ownership Structure of the Fuel Retail Outlets.....	127
5.4.1. Analysis of the Operational Years of the Fuel Retail Outlets.....	128
5.5. Analysis of the Relationship between the different Explanatory Variables and the Location of Fuel Retail Outlets in both the Core and Peripheral Zones of Ibadan Metropolis	128
5.5.1. Ho;	129
5.5.2. Test of Hypothesis	129
5.5.3. Result.....	129
5.6. Analysis of the Interview sessions	133
6.1. The Influence of the Vertical Integration Model (VIM) and Third-Party Logistics Service (3PLS) providers on Optimal Delivery of Products.....	138
6.2. Examination of the Variables employed in the Measurement of Performances among Service Providers in Supply Chain Management	141
6.3. Hypothesis Testing	143
6.4 Analysis of the Interview sessions	145
7.1 Analysis of the Socio-Economic Characteristics of the Respondents	150
7.1.2 Gender Distribution	150
7.1.3 Age Distribution.....	150
7.1.4 Marital Status	151
7.1.5 Educational Background	151
7.1.6 Analysis of the Working Years of Haulers	152



University of Fort Hare

Together in Excellence

7.1.7 Years Spent in the Employment of the Place of Present Employer	153
7.2 Analysis of the Knowledge of Stimulant Usage among Truckers	154
7.3 Self-Confession on the Usage of Stimulants.....	155
7.4. Types of Stimulants Used	156
7.5. Analysis of the Relationship between the different Socio-economic Explanatory Variables.....	158
7.5.2. Test of Hypothesis	159
7.6. Result.....	160
7.7. Analysis of the Interview Session.....	161
CHAPTER VIII - DISCUSSION.....	164
8.1. The first objective of this study is to analyze the spatial distribution of fuel retail outlets in Ibadan metropolis.	164
8.1.2. Discussion.....	164
8.2. The second objective of this study is to analyze the factors which determine the location of fuel retail outlets both in the core and peripheral zones of Ibadan metropolis.	170
8.2.1. Discussion.....	170
8.3. The third objective of this study is to analyze the effects that the supply chain technique employed by different categories of retailers has on the achievement of efficient distribution of the products.....	171
8.3.1. Discussion.....	172
8.4. The fourth and the final objective	176
8.4.1. Discussion.....	177



University of Fort Hare
Together in Excellence

8.5. Synopsis of the Discussion section.....	180
CHAPTER IX	182
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS	182
9.0 INTRODUCTION	182
9.1 Summary.....	182
9.2. Suggestions	191
9.3. Recommendations for further studies	194
REFERENCES	197
APPENDICES.....	220
APPENDIX 1 QUESTIONNAIRE 1	220
APPENDIX 2 QUESTIONNAIRE 2	224
APPENDIX 3 ETHICAL CLEARANCE.....	229
APPENDIX 4 PLAGIARISM SIMILARITY INDEX	231



University of Fort Hare
Together in Excellence

TABLE OF FIGURES

Figure 2.1. A Basic Edt Model (Oliver, 1980).....	50
Figure 2.2: Edt Model.....	51
Figure 3.1 : Map Of Ibadan (Oyo State) As A Subset Of Nigeria	77
Figure 3.2: Political And Administrative Map Of Ibadan Metropolis Showing The 11 Local Government Areas.....	80
Figure 3.3: Map Showing The Spatial Pattern Of Population Distribution Of The 11 Lgas In Ibadan Metropolis	84
Figure 3. 4: Map Showing The Core And Peripheral Zones Of Ibadan Metropolis.....	86
Figure 3.5; The Conceptual Framework.....	106
Figure. 4.1 Map Showing 400m Buffering Analysis For Fuel Retail Outlets In The Core Zone Of Ibadan Metropolis	114
Figure. 4.2 Map Showing 800m Buffering Analysis Of Fuel Retail Outlets In Ibadan Metropolis.....	117
Figure 8.1: Showing The Influence Of Ownership Structure Of Petroleum Products Retailing Firms On Scm Performances	176



University of Fort Hare
Together in Excellence

LIST OF TABLES

Table 3.1. The Breakdown Of Ibadan Metropolis Population Between The Core And Peripheral Zones	87
Table 3.2. Distribution Of Fuel Service Outlets Owned By Multinationals And Government Owned Oil Corporation	88
Table 3.3: Pattern Of The Spatial Distribution On Roads/Zonal Delineation Of Privately Owned (Ipman) Outlets.....	89
Table 3.4: Analysis Of Objectives	108
Table 4.1. Spatial Distribution Of Fuel Retail Outlets Between Core And Peripheral Zones Of Ibadan Metropolis	110
Table 4.2. Analysis Of The Compliance Rate Among Fuel Retail Outlets In Both The Core And Peripheral Zones Of Ibadan Metropolis.....	112
Table 4.3. Mean And Standard Deviation Summation For The Observed	115
Table 4.4 Independent Samples Test	118
Table 4.5 Analysis Of The Influence Of Ethn domination On The Ownership Pattern Of Fuel Retail Outlets And In Ibadan Metropolis	118
Table 5.1: The Socio-Economic Characteristics Of The Respondents	123
Table 5.2 Status Of The Ownership Of The Fuel Retail Outlets.....	126
Table 5.3 Type Of The Ownership Structure Of The Retail Outlet	127
Table 5.4: Years Of Operation Of The Fuel Retail Outlets	128
Table 5.5. Model Summary	129
Table 5.6: Summary Of Logistics Regression Analysis Showing The Influences Of The Explanatory Variables On Locational Choices For Petroleum Retail Outlets	131
Table 6.1. Result Table: Summary Of One-Way Anova Showing The Influence Of Ownership Type On Management Performance	143
Table 6.2 : Descriptive Statistics Showing The Mean Difference In Management Performance Based On Ownership.....	144
Table 7.1: The Socio-Economic Characteristics Of The Respondents	149
Table 7.2 Analysis Of The Knowledge Of Stimulant Usage Among Truckers	154
Table 7.3 Self-Confession On The Usage Of Stimulants	155
Table 7.4. Types Of Stimulants Used	156

Table 7.5. Summary Of Multiple Regression Analysis Showing The Influence Of Use
Of Stimulant, Work Condition, Marital Status And Educational Qualification On
Compliance 160

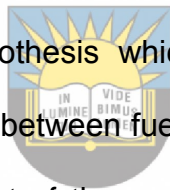


University of Fort Hare
Together in Excellence

ABSTRACT

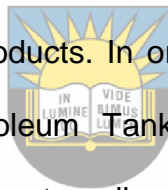
This study analyzed the effects that spatial arrangement of petroleum products retail outlets and the supply chain management techniques employed for products distribution (for both intra city and intercity shipments) have on the retailing dynamism of petroleum products within built environment and peripherals of Ibadan metropolis over the years. Specifically, the study investigated the differentials in the spatial configurations of petroleum products retail outlets between the core and peri-urban zones of the metropolis. An attempt was made to determine the explanatory variables that influence the spatial distributional decisions of petroleum products retail outlets in the metropolis. The study equally examined how the supply chain management (SCM) techniques by the different categories of the retail outlet owners influence the efficient and cost effective distribution of petroleum products. Lastly an attempt was made to analyze the relationship between the socio-economic attributes of the haulers and the achievement of compliance to the HSE stipulations guiding the conveyance of petroleum products. The theoretical underpinnings for the research were a derivative of the amalgamation of normative and psychological theories from geography, psychology, SCM and retailing science. Specifically, Expectation Disconfirmation Theory (EDT), Distributive Justice, Central Place Theory (CPT) Theories of Urban Impact (TUI) and Theory of Constraint (ToC) were the theories utilized in the study. For the achievement of the first objective which was to investigate the possible differential in the compliance rate between spatial pattern of fuel retail outlets in the core and peripheral zones of Ibadan metropolis, the first hypothesis of the study (which examined if there was no significant difference in the rate of compliance to the planning authority stipulations guiding the location pattern of petroleum product retail outlets between those located in the built up and

peripheral zones of the city), was tested through the use of buffering and proximity analyses in the ArcMap environment of ArcGIS 10.1, while inferential statistical tool of an independent-samples t-test was conducted to compare the rate of compliance to the stipulations guiding the locations of these outlets in both the core and the peripheral zones. The result from the GIS analysis indicated that 33 (15.56%) out of the 220 outlets in the core zone of the metropolis complied with the planning stipulations guiding the location of fuel retail outlets. For the peripheral zone, out of the 220 fuel retail outlets 24 (10.90%) complied with the stipulations. The result from the t- test which was employed to test the hypothesis indicated that no significant difference existed in the rate of compliance $t(263) = -2.66, p = 0.08$ between fuel retail outlets in the core zone ($M=3.9, SD=1.4$) and peripheral zone ($M=4.5, SD=1.79$). The alternate hypothesis which stated that “no significant difference existed in the compliance rate between fuel retail outlets located in the two zones” is accepted. For the achievement of the second objective of the study which was to analyze the factors which determine the location of fuel retail outlets both in the core and peripheral zones of Ibadan metropolis. All the managers/owners of the 432 fuel retail outlets in the metropolis were sampled out of which 256 questionnaires were retrieved for the purpose of this analysis. The breakdown of the socio-economic characteristics of the sampled respondents showed that the gender distribution showed that 194 (75.78%) of the respondents were males, while 64 (24.22 %) were females. The average age of the sampled population was 33.70 years. The mixed method was employed for the achievement of the second objective of this study. Logistic Regression Model (LRM) was employed to test the hypothesis and the result revealed that the inclusion of the independent variables in the model increased the overall level of it accuracy. The overall significance revealed that the *Model Chi-*



University of Fort Hare
Together in Excellence

Square, derived from the likelihood fitted is also accurate ($X^2 = 43.47$, $df=5$, $p>.05$). The model chi-square value of 43.47 (approximately 44%) was significant. Thus, the indication is that the model has a good fit in predicting the possibility of a fuel retail outlet being located in the core or peripheral zone of the metropolis as determined by the explanatory variables (the independent variables accounted for about 44% of possible factors which determined whether a fuel retail outlets is located either within the core or peripheral zones of the metropolis. The remaining 56% are factors not considered in the study). The result gotten from the in depth interview sessions corroborated the findings from the tested hypothesis. The third objective was to examine the effects which the supply chain technique employed (either vertically integrated model or third-party arrangement) has on the achievement of efficient and effective distribution of the products. In order to achieve this objective, all the 389 registered members of Petroleum Tanker Drivers (PTD) association who are members of the PTD in the metropolis were sampled, 265 (around 70%) of the distributed questionnaires were retrieved and used for the analysis. In depth interview sessions were also conducted with three different managers of the three major conglomerates in the downstream sector of the Nigerian petroleum sector. The result of one-way between subjects (ANOVA) which was conducted to compare differences in the management and performances of haulage services outsourced to the 3PLS and those run under VIM showed that there was a significant effect of ownership type on management performance ($F(2,262) = 60.26$, $p<.05$). The null hypothesis was therefore rejected while the alternate hypothesis was accepted. The findings from the interview sessions posted similar results. The fourth and final objective was to analyze the effect that the socio-economic attributes of the participants (haulers and managers of retail outlets) involved in the distribution of



University of Fort Hare

Together in Excellence

petroleum products has on the safe, efficient and cost-effective distribution of product and this was done through the use of descriptive statistics, inferential statistics and incisive analysis of the interview sessions. A total number of 265 (70%) out of the 389 registered members of Petroleum Tanker Driver Association (PTDA) participated in the study. Multiple regression analysis (MRA) was used to test this hypothesis. The result from the statistical analysis show that the use of stimulant, work condition, marital status and educational attainment/literacy level have joint influence on compliance ($R^2 = 0.31$, $F(4,260) = 29.72$, $p < .05$). On the basis of the foregoing, the hypothesis is thus accepted. The result from the interview sessions confirmed the existence of strong relationship between the explanatory variables and the hypothetical dependant variable.



The study recommended a review of the planning processes guiding the establishment of fuel retail outlets. The study also advocated that retailers should endeavour to have stronger control over the supply chain of their products this could be done by investing more in VIM rather than outsourcing such functions to 3PLs. This will help in better business performances. Government agencies in charge of monitoring drug abuse among haulers are advised to be more proactive by the duo of prevention and punishment strategies. This should include advocacy campaign against drug abuse. Different ranges of punishments should also be meted out for individual haulers found culpable.

Key words; Location Determinants, Fuel Retail Outlets, SCM performances, VIM, 3PLs, Haulers, Socio-economic attributes

CHAPTER I

1.0 Background

Meeting the national transportation fuels and energy demand is a complex and engaging process (Sekoai and Yoro, 2016; Storeygard, 2016). The availability of the products in the crude form and having a systemic capacity for refining the crude products are no guarantee for consistent availability of the products for the end users (domestic, industrial and transportation). The supply chain of petroleum products distribution can only be completed when the products are available to all categories of users, at the right time, in the right place and at a competitively market driven prices. Statistics from United State Energy Information Administration (USEIA 2013) showed that at the global scale, despite the vigorous on-going campaign against the use of fossil fuels as a means of energy, the crude oil still remained the major source of energy. The total global figure for Petrol Motor Spirit (PMS) consumed per day for 2009 stood at 4 billion barrels. Nigeria in the same year consumed 280,000 barrel per day (bbl/day). The latter mentioned figure showed that Nigeria was at both the 38th, and 4th positions in the world and Africa respectively (USEIA 2013). Maintenance of functional national supply chain infrastructure that can guarantee continuous efficient and effective availability of these products into all the regions of many countries in sub-Saharan Africa has proven over time to be a demanding task (Arosanyin, 2006; Kojima *et al*, 2010; Sokona, 2012; Obasanjo *et al*, 2014). Findings from studies carried out at different times on the demand pattern and structure of supply chain employed by countries in sub-Saharan Africa region revealed that nearly all the countries in the region are dependent on fossil fuels as the major means for meeting both domestic and industrial energy demands (UNDP 2003; Arosanyin, 2006; Jaja, 2007; Kojima *et al*, 2010; Sokona, 2012: Obasanjo *et*

al, 2014). It was further revealed from some of these studies (Arosanyin, 2006; Jaja, 2009; Kojima *et al*, 2010; Sokona, 2012; Obasanjo *et al*, 2014), that nearly all the countries in the region lack a well-designed supply chain network. Sokona *et al* (2012) observed that “though pipeline transportation presents the most economical means of petroleum products distribution, its huge upfront capital investment is acting as a deterrent from its being considered as a viable option by the majority of governments in the region (Sokona *et al* 2012, pp1)”. Rather than using pipelines for bulk transport of petroleum products, the cheaper alternative for countries in the region is the disproportionate use of road haulage tankers. This has often resulted in an inefficient delivery schedule, uncertainty in inventory management (volatility in inventory) and high rates of road accidents involving Heavy Goods Vehicles (HGV) used in hauling of petroleum products in these countries. All these, analysts argued contributed in no small measure to price volatility in most of these countries (Aronsanya, 2006; Kojima *et al*, 2010; Sokona, 2012; Brauner *et al*, 2013, Ejoh and Okafor, 2015; Storeygard, 2016).

Over time, the Nigerian government has invested in an extensive, nationally designed petroleum products supply chain infrastructure. The infrastructure was built around petroleum product pipelines conveying the crude oil first from the oil fields to the three refineries located in three different cities (Warri, Port Harcourt, and Kaduna) and then the refined products to the main demand centers (depots located in major cities). As at 2003, the estimated length of the total pipeline infrastructure was about 4,000 km (roughly, 3,400 km of product pipelines and 600 km of crude oil pipelines, UNDP, 2003). This afforded the country the opportunity to rely on the pipeline system for the conveyance of all the crude oil demand and 60% of the total refined product demand. (UNDP 2003). However, from 2004, an increment in

activities of militants and oil thieves has created multifarious issues relating to meeting national petroleum products demand through the pipeline system (UNDP 2003).

Literature review established that retail outlets, along with suburbanization and new developments at city fringes, have altered urban form and development worldwide (Ozoduru et al, 2014; Erkip *et al*, 2014; Kearney, 2015). Pioneering researches in the field of retail geography are Proudfoot (1937), Vance (1962), Simmons (1964) and Berry (1967). These earlier works established the nexus between the retailing of Fast Moving Consumable Goods (FMCG), urban functions and spatial structures in most American and European cities of the twentieth century. In contemporary times analysts are of the opinion that salient factors associated with globalization, its impact on the burgeoning growth of consumerism among the present generation, free trade agreements and neoliberal ideologies (Wrigley and Lowe, 2002; Baker and Wood, 2010; Rotem-Mindali, 2012) has redefined the concept of retail geography in the urban space both in developed and developing worlds. This redefinition is characterized by relocation/opening up of new retail outlets in inexpensive out-of-town locations or on the fringes of the urban areas, growth in store size and a shift toward electronic modes of retail. This has taken a severe toll on the survival of main street retailing (Birkin *et al*, 2002; Thomas *et al*, 2003; Baker and Wood, 2010; Rotem-Mindali, 2012, Waxell, 2015; Sansone and Colamatteo, 2017; Deloitte, 2018).



University of Fort Hare
Teaching with Excellence

1.1 Statement of Research Problem

The difficulty experienced in transshipment of petroleum products to the various fuel service stations particularly in cities can lead to traffic congestion and its attendant consequence. While it is an incontrovertible fact that the location and equitable distribution of fuel retail outlets on major highways are germane for road users and the functionality of the entire highway system, findings showed that uncontrolled horizontal expansion in most traditional African cities growth has 'relocated' many of such outlets from their hitherto peripheral/suburb locations into the built-up zones of cities (Mabogunje, 2002; Arosanyin, 2006; Aluko, 2011; Federal Government of Nigeria, 2012; Obasanjo *et al*, 2014). Also, there has been upsurge in the reported cases of Road Traffic Crashes (RTC) involving Heavy Good Vehicles (HGV) conveying petroleum products on Nigerian roads (FGN, 2012). Available statistics (Arosanyin, 2006; Aluko, 2011; Federal Government of Nigeria, 2012; Obasanjo *et al*, 2014; Dogara, 2017), showed that intra-city and intercity transportation of petroleum products by HGV has been responsible for some of the most highly destructive RTC experienced within the urban space in Nigeria in contemporary times (Arosanyin, 2006; Ajayi, 2017). Expectedly, the conflict in interest between a city's governing authorities and private-sector decision makers meant that spatial distribution of these fuel retail outlets may not of necessity follow the principle of distributive justice naturally in place for the distribution of public oriented goods/services. A critical determinant of the location of retail activities such as fuel service station is the expectation of guaranteed flow of patronage and profit (Ozoduru *et al*, 2014). Research activities on urban service delivery for public-oriented goods/services in both geographical and political sciences' literature have established the critical role of territorial justice in the achievement of societal

sustainable development (Davies, 1968; Hay, 1995; Smith, 1994; Javadi and Shahrabi, 2014). The roles that distributive politics play in the noticeable patterns of accessibility to certain services and the geographic relationship between service/neighborhood deprivation in urban locations in different regions of the world have been of keen interest to the academic community over time (Knox, 1978; Pacione, 1989; Okafor, 1981; SEI, 2012; Sansone and Colamatteo, 2017; Deloitte, 2018). Similar attention has however been lacking when the focus is on how conformable the existing pattern of urban retail activities are, particularly as it relates to the achievement of territorial justice and distributive parity between different neighborhoods within a city (Lee and McCracken 1982; Aguda, 1998, SEI, 2012; Waxell, 2014; Benai and Antipova, 2016).

Over time the petroleum industry in Nigeria has benefitted a lot from intense interests from the academic community. This has resulted in diverse incisive studies on different aspects of both the upstream (exploration and drilling) and downstream (refining, distribution, and marketing) sectors of the industry. Some studies included the works of Obadan (1978), Anifowose (2008) and Ehinomen and Adeleke (2012) which all analyzed pertinent issues in the upstream sector of the petroleum industry. The afore-mentioned studies focused on oil prospecting processes and impact of oil prospecting on the environment. Academic papers on the downstream sector included the various empirical analyses of the demand configuration of the refined petroleum products at national, regional and local scales (Ikporukpo ,1978; 1982; Onyemelukwe ,1978; Jaja 2009) Another aspect that has received commensurate attention in literature in the downstream sector is the transportation and distribution of petroleum products(Arosanyin,2006; Olagunju, 2011; Abdulkadir, 2012; Obasanjo *et al*, 2014;Dogara, 2017; Adenigbo *et al*, 2017). Review of some of

the works showed that Ikporukpo (1978) researched the national structure of gasoline supply, its consumption, stepwise movement of the product. Based on his findings, he suggested a heuristic model that if employed could help in efficient distribution and storage of the product. Similarly, Onyemelukwe (1978), provided an empirical analysis on the spatial structure of petroleum products demand in a city. In contemporary times, the works of Jaja (2009), Arosanyin, (2006), Olagunju, (2011), Abdulkadir, (2012), Obasanjo *et al*, (2014), Adenigbo *et al* (2017) and Dogara, (2017) gave insights into the difficulties associated with the cost effective and environmental friendly distribution and transportation of petroleum products in Nigeria, particularly the inter regional shipment of the products. Some of the aforementioned published works utilized a similar approach in their discourses on the analyses of the demand pattern of petroleum products at the regional and national scales in the country. The use of secondary or aggregate data is prevalent in most of these scholarly works except that of Jaja (2009). While making a case for an alternative approach in data collection method, Jaja (2009), opined “that past studies which made use of aggregate data while being ideal for analyses done at national and regional scales provided little concrete evidence for local areas” (Jaja, 2009, pp, 5).

Many of the aforementioned studies emphasized the demand/supply structures of petroleum products at either the national or regional scale generally with little consideration given to how the supply chain management techniques employed by retailers affect the retailing pattern of retail outlets at the local scale (city level). Possible relationships between the existing (spatial and temporal) patterns of fuel retail outlets and the supply chain management techniques employed for products distribution has on the retailing dynamism within built environment and peripherals of

Ibadan metropolis (local scale) have therefore drawn the interest of the researcher. Such relationship cannot be determined without due consideration given to the roles that the supply chain management techniques favoured by the different categories of retailers have on effective transportation structure. Also of interest, are the roles that different locational explanatory variables, such as the marketing concept of ethnodomination have on locational decision of retail outlets. It is against this background that this study was conceived.

1.2. Research Questions

The research questions are meant to provide guidance for the achievement of the study's stated objectives. As a derivative of the statement of problem, it is pertinent to examine first, the explanatory variables which influence the distributional patterns (across space and time) of fuel retail outlets and the transportation techniques employed by retailers in ensuring effective products supply in Ibadan, Nigeria. Some of the questions which provide needed guidance in the achievement of the study's stated aim and objectives are the followings;

1. What are the spatial and temporal patterns of fuel retail outlets in the study area?
2. Is there any statistically significant difference in the spatiotemporal trend of fuel retail outlets between the core and peripherals of Ibadan metropolis?
3. What are the relationships between the factors that necessitated the choice of fuel retail outlets and other explanatory variables?
4. What are the influences that the supply chain management techniques favoured by retailers have on the effective transportation and distribution of petroleum products?

5. What are the roles that the socio-economic variables of key participants in the supply chain of petroleum products play on the safety of products distribution?

1.3. Aim and objectives of the study

The aim of the study is to provide analyses of the effects that the spatial arrangement of both the petroleum products retail outlets and the supply chain management techniques employed for products distribution (for both intra city and intercity shipments) have on the retailing dynamism of petroleum products within built environment and peripherals of Ibadan metropolis over the years.

1.3.1 Objectives of the Study

To help in the achievement of this aim, the following objectives are to be examined:

1. Investigate the spatial arrangement of petroleum products retail outlets between the core and peripheral zones of Ibadan metropolis;
2. Identify and analyze the criteria which are used by retail outlet owners to determine the present site of petroleum products retail outlets;
3. Examine the effects which the supply chain integration and ownership structure (either vertically integrated model or third party arrangement) has on the achievement of efficient and effective distribution of the products;
4. Analyse the socio-economic attributes of the participants (haulers and managers of fuel retail outlets) involved in the distribution of products as well as of those involved in the safe, efficient and cost-effective distribution of products.

1.4. Research Hypotheses

1. There is no significant difference in the rate of compliance to the planning authority stipulations guiding the location pattern of petroleum product retail outlets between those located in the built up and peripheral zones of the city.
2. Determinants of the present locations of retail outlets are significantly influenced by prevailing price of landed property, closeness of such location to highway/busy route, proximity to zones with high population density, distance from to the Central Business District (CBD), proximity to competitors and availability of functional road networks for haulage trucks engaged in products shipment.
3. There are no significant differences in the quality of organization and activities of Supply Chain (SC) services (transportation, distribution, and storage of products), being run by third service logistics (3PLs) and those which operates under vertical integration model.
4. Safety consciousness against road traffic crashes, ability to understand and obey the Health, Safety and Environmental (HSE) standards guiding the operations of the petroleum products supply chain are influenced by socio-economic attributes of key participants (retailers, managers, and haulers).

1.5. Justification and the Significance of the study

Review of relevant literature on the interaction of urban form with retail viability established a strong nexus between urban form, retail viability and accessibility (Berry and Parr, 1988; Birkin et al, 2002; Baker and Wood, 2010; Li and Liu 2012; Banai and Antipova. 2016). This is particularly truthful of haulage vehicles designed with bigger axle sizes to carry heavy goods. For petroleum products retailers,

however, accessibility for the haulage trucks engaged in the supply of petroleum products is just one of the key factors to be considered when answering the question on optimal locational choice. Equally germane are the questions of other explanatory variables (population density or catchment zone of prospective clients, cost of landed property and nearness to competitors. Apparently, it is nearly impossible to controvert the advantage the opportunity an optimal location offers the quintessential petroleum products retailer. It is also observable that the supply chain integration and ownership structure employed for the transportation of petroleum products could consistently guarantee environmentally friendly and cost effective products transportation (Berry and Parr, 1988; Oni, 2008; Benai and Antipova, 2016; Dogara, 2017; Adenigbo *et al*, 2017). The choice of supply chain technique is key to the overall success of petroleum products retailing that a disruption in the supply chain activities of products can conversely lead to the loss of any benefits an optimal location initially offered the retailer (Deblanc 2007; Brehends *et al*, 2008; Ajayi, 2016; Dogara, 2017; Adenigbo *et al*, 2017).



University of Fort Hare
Higher in Excellence

Studies carried out in different third world cities, on urban retailing and the spatial structures of cities at different periods showed results that are consistent with the development strides being taken in Western nations. For example studies in Latin America by Griffin and Ford, (1980) Crowley, (1995) Ford, (1996) KPMG, 2013- Africa (Aguda 1998; Omole, 2000; Price-Water-Cooper, 2013), Asia (Kosambi and Brush, 1988; Sun, 2000; Zaheer, 2014), generally painted a picture that shows development in urban retailing as a reflection of globalization, albeit with a tinge of local derivatives. In a number of third world cities some of the studies conducted on the subject underscored the importance of nearness of retail centre to Central Business District (CBD), as well as the peculiarities of the various ethnic groups

resident in the locations studied and their social classes (Ford, 1996; Aguda, 1998; Omole, 2000; Sun, 2000; Kearney, 2015) .

Evidences gleaned from some studies carried out in the United States and Western Europe, which examined the effect of supply chain technique employed in the distribution of petroleum products established the following;

- i. that oil corporations who operate vertically integrated downstream system (ownership of distribution/transportation, storage and sales of products under singular business registered name) achieved better scale economies than independent owners who engaged third party service providers for part of these functions (Kleit 2003; Nakamishi and Koyiyama, 2006; Aspentech 2009; Kishore and Patel, 2012).
- ii. that third party or out sourcing arrangement often reduce supply chain agility (Kishore and Patel, 2012).

It is however observed that whilst there are plethora of studies which examined the relationship between the viability of retail outlets dedicated to the sales of FMCG viability and the influences of other explanatory locational variables (Oni, 2008; KPMG, 2013; PWC, 2013 and Antipova, 2016; Deloitte, 2018), there are little evidences of studies which empirically examined such relationship on the spatial and temporal patterns of petroleum products retail outlets (as an example of a homogeneous group of retailing activities) within the urban space in Nigeria. It is also noticeable studies that provide empirical evidences detailing the influences that the supply chain management techniques employed by retailers have on environmentally friendly and cost effective petroleum products transportation in the country are relatively scarce.

Therefore my study will provide the opportunity to empirically investigate the urban retailing and transportation of petroleum products in the Sub-Saharan Africa environment. It will also provide analysis on roles played by retailing activities on the existing growth pattern of urbanization in Ibadan metropolis as well as the effects of market dynamism as it concerns the perceived ethnodomination in ownership holdings of fuel retail outlets on urban revitalization schemes within the inner city. Retail activities through adaptive capacity such as a change in ownership structure of some of the retail outlets within the inner city are identified in the body of existing literature as one of the key drivers of urban revitalization schemes (Leeuwen, 2010; Ozoduru *et al*, 2014; Waxxel, 2015; Sansone and Colamatteo, 2017).

This study utilized techniques and concepts found useful in other fields like Geographical Information System (GIS), operational research, supply chain management, transport planning, urban studies, economics, retailing science, environmental sciences and behavioral studies to explain and analyze the critical determinants of locational choices of retailing outlets within the urban space of contemporary sub Sahara African city. The study also examined the merits and demerits of business decisions influencing the choice of supply chain techniques employed by business owners for the transportation of petroleum products to their retail outlets. It is believed that the techniques and concepts borrowed from the aforementioned fields provided a platform for synthesizing of relevant ideas for comprehensive analyses of the research problem. Arising from this, it is therefore safe to posit that this research has contributed to knowledge and that it fills a gap in the existing body of knowledge in the field of transport geography and supply chain management. Findings from this study will not only be useful for urban planners in Ibadan (and by extension other traditional Sub-Sahara African cities), the study is

also relevant to supply chain managers, retail managers and business owners in the downstream sector of petroleum products distribution in Nigeria.

1.6 Scope and Limitations of the Study

The major focus of this study was first, on the analysis of the spatial and temporal patterns of fuel retail outlets in Ibadan, second, on the factors that determine the distribution pattern of the fuel retail outlets in Ibadan. The study equally analyzed the efficiency of transportation techniques favored by the different categories of retailers for the supply chain management of petroleum products. It did not attempt to provide a predictive model for the determinations of both the present and future spatial and temporal patterns of fuel retail outlets in the study area. The study did not also investigate the methods employed by the retailers in the selection of haulage trucks or personnel who drive these trucks by the retailers. Geographical Information System (GIS) techniques were employed in analyzing the spatial and temporal patterns of petroleum products retail outlets in Ibadan metropolis. Respondents were drawn from two main groups, the first, are retail outlets owners/managers of such outlets and the haulers who drives the trucks used in haulage of these products. The opinions of the respondents were relied upon in carrying out other analyses in the study. The authenticity or accuracy of such opinions while not in doubt cannot be presented as being totally free of personal biases of the respondents.

As should be expected, there are some challenges encountered during the study. First, it was expensive, cost-wise, running the program in Republic of South Africa and having the study site in Nigeria. The data collection process was also cumbersome, by virtue of the job schedules of haulers (on transit most times during the day), it was a herculean task pinning the haulers down. The fact that most of them are direct employees of the retailers helped in this regard because the

employers facilitated meeting with them. It must also be stated here that most of the retailers (including managers) were wary of the “intent” behind the research. It took a lot of time to explain to such category of respondents that, the research is not meant to force “relocation” of their outlets from their present locations or capriciously increase the land taxes they pay.

The use of hand held Geographical Positioning System (GPS) to pick the coordinates of each fuel retail station within the metropolis, while, it provided answer to the question of exactness or the locational specificity of the sampled fuel retail population was a cumbersome exercise. Regardless of these limitations, the findings from this study and the inferences that could be drawn from it are not in any manner negatively affected. Different interview sessions were also held with other key participants in the determination of sites of fuel retail outlets (major stakeholders in the retailing, transportation and management of the supply chain of petroleum products including officials from Department of Petroleum Resources and official of the State Ministry of Town Planning).

1.7. Chapter Demarcation

Chapter I presented the introduction and background to the study. The chapter also located a lacuna in the current discourse on the subject and thereby situates the present research problem on such gap..

Chapter II, Extant and contemporary literature on the discourse was presented in this chapter; through the rigorous literature search, contextual and theoretical gaps were identified which the research aimed to fill. Arising from this a theoretical framework for the research was presented.

Chapter III was dedicated to the unraveling of the research methodology. The study engaged the mixed method or research triangulation to analyze the various objectives. However, the opening section is dedicated to discourse on Ibadan metropolis, the study area.

Chapter IV discussed findings from the first objective-which was the analysis of rate of compliance to the planning stipulations guiding the location of fuel retail outlets either in the core or suburb (peripherals) of Ibadan metropolis. Also, literature highlighting the importance of GIS in the urban transportation, distribution of retailing activities and general planning was discussed..

In chapter V, findings arising from the second objective of the study was discussed. Empirical analyses and reports on the criteria responsible for present locations of petroleum products retail outlets were presented.

Chapter VI, this chapter was dedicated to the presentation of the findings from the third objective of the study which was basically a comparative analysis between Vertical Integrated Model (VIM) and Third Party Logistics (3PLs) influences on the achievement of efficient distribution network. Current discourse on third party logistics/outsourcing in urban transportation and distribution planning was also presented.

In chapter VII, findings relating to the fourth (and final objective of the study) which examined the influence that socio-economic attributes of key participants in the Supply Chain Management (SCM) of petroleum products distribution (haulers, retailers, and managers) has on the achievement of efficient and cost effective management of petroleum products in an urban environment was discussed.

In chapter VIII, summary of the discussions from each of the four objectives of the study were presented in sequential order. This gave a robust insight into how the researcher is able to relate the findings from the study to on-going discourses on the subject in a thematic manner.

In the concluding chapter (chapter IX), the summary of the observed urban transportation and retailing challenges in Ibadan was discussed. Recommendations on how to effectively manage the nexus between transport planning, urban and retail management in sub-Saharan Africa, Nigeria and Ibadan was presented. Research gaps were also identified which future researches could most likely fill.



University of Fort Hare
Together in Excellence

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

The second chapter is devoted to the review of extant discourse on the different premises of the research exercise. In order to achieve this purpose, available literature was reviewed on the different sub-themes, which are; urban freight transport and distribution of retail activities within the urban space. The central themes which are the causal relationships between the determinants of the location of retail outlets, the nature of techniques employed for the shipment of petroleum products and their influence on the environment are equally addressed. In doing this, attention is given to the review of relevant literature on different subcomponents and the central theme of the discourse. The review provided a strong basis for developing the researcher's ideas on the general concepts of the study. Additionally, the review of the extant literature provided a detailed account of some earlier studies in order to identify the gap that exists in the literature, which the thesis attempted to fill. An attempt was also made to examine relevant concepts and theories which provided conceptual and theoretical frameworks for this research exercise.

Extant discourses from cognate disciplines to transport geographical research such as economics, transport planning, supply chain management, Geographical Information System (GIS) and retailing science are the main basis for the establishment of concise lacuna which the study attempted to fill. Specific emphasis was on previous scholarly works on urban freight transportation, the spatial pattern of retail activities, supply chain management employed for urban freight shipment and critical determinants of eco-friendly transportation of petroleum products.

2.2 Urban Freight

Classical theorists in the field of transport geography are of the opinion that freight transportation interactions with the built environment (urban environment) are best conceptualized under six different constructs ((Starkie, 1967; Freight Transport Association, 1974; Freight Management, 1975; Pitfield, 1978; Hay, 1979). The first two constructs are related to the freight origin and destination processes (these are freight generating and distributive activities within the urban or regional space). While the next two constructs are directly related to the interdependence of freighting on existing modal spilled and the interaction between cargo distributions with the urban environmental space (Starkie, 1967; Hay, 1979; Pifield, 1978). The last two constructs are related to pertinent issues revolving around the nature of the vehicle used for the haulage and their degree of utilization.



Review of relevant literature (Behrends et al, 2008; Brauner et al. 2013), gave credence to the knowledge of the spatiotemporal pattern movements of goods in the urban space (production, storage, distribution, and transportation to retail outlets/point of sales) is critical in the establishment of the causal link between urban freighting and each of the six constructs. Apparently, urban freight is given a different description in the literature apart from the larger body of transportation. This can be confirmed by the description given to urban freight by the Organization for Economic Cooperation and Development (OECD 2003), "Freight transport is the delivery of consumer goods (not only by retail but also by other sectors such as manufacturing) in city and suburban areas, including the reverse flow of used goods in terms of clean waste" (OECD 2003, p. 19). Urban centers are naturally much dependent on the quality of the efficiency of freight transportation that services them. As observed by different researchers (OECD, 2003, Behrends et al, 2008; Ajayi,

2017), urban freight transport is a key driver of sustainable urban life in cities across the world. Although urban areas are mostly thriving industrial hubs for production of goods and services, they still depend upon goods and services produced from other places within national/continental borders and sometimes the larger global community. Freight transport is germane to the achievement of a relative form of livability by urbanites. While it is a fact that intermodalism (the use of different modes-road, rail, air, water, and pipeline) for delivery of different categories of urban freights is quite possible for most cosmopolitan cities of the twenty-first century. It is without any gainsaying that the bulk of urban freights is done mainly on road transport. The fulfillment of the last leg of door-to-door delivery is mostly undertaken through road transport and this on its own creates problems for urban centers world all over (OECD, 2003, Behrends *et al*, 2008; Ajayi, 2016, Ajayi, 2017).



Concerted efforts have been made by various researchers to provide insights on the influences of these identified six constructs on freight transportation within the urban space in the Nigerian environment. For example, Udo (1978), Ogunsanya (1982, 1983, 1984) Alokun's (1988, 1995) and Olagunju (2011) worked extensively on the identification of economic regulations, structure and spatial patterns of freight movements within the different regions of Nigeria. These studies highlighted the fact that the patterns in the freighting of all manner of goods (one of the legacies of the country's colonial past), were not undone by the different national development plans from the independence in 1960 (Udo, 1978; Ubogu, 2011). Further, the review of literature also revealed that the global slump in oil prices (the mainstay of Nigeria's economy is crude oil) and the resultant Structural Adjustment Programme (SAP) of the 1980s clearly redefined the characterization of freight transportation in the country.

The sharp decline in the volume of economic activities (manufacturing, agricultural output, importation, and exportation) and the extortive cost of importation of new haulage trucks meant that the transportation sector during the period (1980s-1990s) was adversely affected (Alokan, 1988, 1995; Ojekunle, 2004; Ogunbodede, 2008). Other studies further provided empirical shreds of evidence on the interregional pattern of freight movement within Nigeria (Oni, 1998; Odugbemi and Ajiboye, 1998; Ajayi, 2016). Such studies established the fact that the major industrial hubs of Lagos/S-West Nigeria/ Eastern regional blocks of the country are originating points for both industrial and imported goods (the major seaports are located in the region). While major agricultural produce (grains, groceries, and cattle) are freighted southward from the grassland of the north (Ogunsanya, 1984; Oni, 1998; Odugbemi and Ajiboye, 1998; Ojekunle, 2004; Ubogu, 2011; Ajayi, 2016). Some of these studies also identified urban areas within the countries as "growth pole" or major hubs for the generation of bulk cargoes in the country (Ogunsanya, 1984, 1985; Ojekunle, 2004; Ajayi, 2016), which expectedly made them bear the brunt of socio-economic and environmental problems posed by improperly organized urban freight system. Among identified constraints and difficulties associated with urban freighting by scholars in Nigeria revolve around some of the six constructs earlier mentioned. For example, Ogunsanya (1984), in an exploratory study on the identification of nodes of freight generation and the spatial pattern of its movement in the Lagos metropolis discovered that commercial zones (retail/market center) are the major hub of freight generation in the metropolis. The study also provided empirical evidence to the effect that vehicles engaged in urban freight contributed more than 50% to the traffic logjams experienced on the metropolitan road networks. This

finding is analogous to results obtained from a similar study conducted in the U.S. between 1990 and 2006 (U.S. Department of Transport, 2010).

The U.S. DoT (2010), empirically examined the degree of utility of different types of trucks and their contributions to the traffic densities on all categories of routes between 1990 and 2006, trucks used in both intra and intercity line haul in the U.S. increased by over 70% for the period under review. It was further highlighted that some categories of trucks used in intercity haul accounted for nearly 11% of total vehicle travel on both intercity and inner-city routes. Findings from the study concluded that excessive utility of freight trucks on inner-city routes increases concerns on Road Traffic Crashes (RTC). Based on factors associated with cost-effectiveness, freight consolidation and reduction of carbon emission, vehicles used for urban freight transport are usually light or heavy goods vehicles. (Hesse and Rodriguez, 2004; Schoemaker *et al*, 2006; Anand *et al*, 2015). As a result of their sheer sizes, light and heavy goods vehicles used for urban freight transport have an important role in urban transport issues. Such issues include urban freight being the source of noise and air pollution in urban centers. It has also been observed by different scholars (U S. Department of Transport, 2010; Barco *et al*, 2010; Hongqi *et al*, 2016), that the problem associated with the fulfillment of the "last mile" in urban freight transport arises because most of the destination points are located on inner cities roads' with inadequate width, pavement thickness, turning and parking capacities. Hongqi *et al* (2016) posited that on this type of road, freight trucks reported a much higher accident rate than on the US interstates. It is a fact that making the last leg of the distribution exercise done in built up zones or commercial zones like Central Business Districts (CBDs) sometimes have a disruptive effect on the entire road network of adjoining zones within cities. Due to the axle sizes of

these vehicles negotiating turns and securing parking spaces in densely populated (high number of vehicles, human and buildings) downtown are nery issues in most cities, particularly third world cities (Behrends *et al*, 2008; Barcos *et al*, 2010; Anand *et al*, 2010; Ajayi, 2016). Bearing this in mind, transport analysts are generally of the opinion that while efficiently planned urban freight transport system is a harbinger of development, it is not without its negative effects or externalities (Ogden, 1992; Muñuzuri *et al.*, 2010; Anand *et al*, 2012; Ajayi, 2016).

In order to ameliorate some of these observed shortcomings, different scholars have attempted to provide concise models (Ogden, 1992; Crainic *et al*, 2004; Anderson, 2005; Yannis, *et al*, 2006; Deblanc, 2007; Anand *et al*, 2012).. Many of such models focuses on different means of improving the efficiency of urban freight transportation, while reducing traffic congestion and lessening environmental impacts (Ogden, 1992; Crainic *et al*, 2004; Anderson, 2005; Yannis, *et al*, 2006; Deblanc, 2007; Anand *et al*, 2012)



University of Fort Hare
Together in Excellence

Ogden (1992), in a study with the overall objective of conceptualization of a model aimed at reducing the total social cost of urban goods movement, discovered that there are interrelationships between the six relative variables of economic, efficiency, road safety, environment, infrastructure management and urban structure. He also posited that there is a correlation between the objective of reducing the total social cost of urban freight and the degree of differentials in the interrelationships between all the six variables (Ogden, 1992). The study provided one of the earliest set of constructs for comprehensive modeling of the reduction in the total social cost of urban freight transport. Findings from different studies on the discourse (Ogden, 1992; Debalanc, 2007; Berhends *et al*, 2009; Anand *et al*, 2012) strongly inferred that a higher level of cooperation among stakeholders in the pursuit of maximal

positive interactions of the six identified variables, will generally guarantee a higher the level of through traffic for freight vehicles and lower the overall societal social cost (Ogden, 1992; Debalanc, 2007; Berhends *et al*, 2009; Anand *et al*, 2012). In addressing the salient theme of reduction in social cost through the provision of a sustainable urban freight environment Zunder *et al*, (2016) opined that such objective could only be achieved by reducing the number of freight movements and the distances travelled; using low emission urban trucks to carry out deliveries; making maximum use of Intelligent Transport Systems (ITS) to increase the efficiency of deliveries; and reducing noise pollution from freight movements, so that road infrastructure can be used more efficiently at different times of the day.

The use of simulation models has been quite popular in various studies to analyze the contributory roles of urban freight to traffic congestion and increasing atmospheric conditions (Zinder and Ibanez, 2004; Yannis et al, 2006; Dablang, 2007; Hongqi et al, 2016). Through the use of such simulation models, Dablang (2007) realized that while urban freight represents between 20 and 30% of vehicle kilometers travelled within contemporary urban spaces which translates to between 16-50% of the emissions of air pollutants.

All these cited works showed the there is no paucity of studies on urban freight distribution alongside its influences on the achievement of suitable environmental concern, better quality of life and overall improvement of economic competitiveness of modern cities of the developed world (E.U. and U.S). As observed in different studies (Mabogunje, 2002; Arosanyin, 2006; Aluko, 2011; Obasanjo *et al*, 2014; Dogara, 2017; Adenigbo *et al*, 2017), Sub Saharan African cities generally lack well-defined neighborhood delineation, serviced by a system of a good road network which both jointly are critical determinants of smooth urban freight delivery.

Apart from this salient fact, scant attention has been paid to the problems of trucks engaged in the distribution of homogeneous goods in the region major urban areas without clear physical delineation of cities on a zonal basis. As should be expected physical delineation of different zones within cities on the basis of commercial, industrial, residential and institutional functions do have a resultant positive effect on road network system that serviced them (Zinder and Ibanez, 2004). Evidences showed that Heavy Good Vehicles (HGVs) engaged in freighting of heterogeneous goods of similar product line (like groceries, knock-down-components of homemade appliances, fast-moving commercial goods etc) do generally employ the use of good consolidation points and distribution centers, a situation which is not easy to replicate when freighting petroleum products within urban space (Yannis et al, 2006; Dablanc, 2007; Hongqi et al, 2016; Adenigbo *et al*, 2017). Although urban freight transport of petroleum products constitutes only a very small proportion in the total urban freight transport length, it is safe to infer that it invokes a high proportion of the social transport costs (Obasanjo and Nwankwo, 2014; Adenigbo et al, 2017). It can be argued that for most traditional African cities, the "last mile" in the transport chain of petroleum products to unevenly distributed sales outlets in cities contributes to the long hours of travel time experienced by other road users, increases emission of carbon into the air, increases rates of RTC on the routes and the noise levels in these cities (Arosanyin, 2006).

In Nigeria, Arosanyin (2006), Obasanjo and Nwankwo (2014) and Adenigbo, et al (2017) provided some pieces of evidence to support this assertion, for example Adenigbo *et al*, (2017) used the combination of Geographical Information System (GIS) and descriptive statistics to examine problems associated with spatial location of petroleum product retailing points and transportation on a busy stretch of a 15.6

kilometers road in Akure (a state capital in the southern part of Nigeria). Adenigbo *et al* (2017) discovered that the studied arterial road had a width of 15 meters (which is 9 meters short of the standard road width for an arterial road that is considered 24 meters), amongst other findings, it was discovered that the average distance between the 42 fuel retail points which are situated on the road stretch is 372 meters. Also in Nigeria, Obasanjo *et al.* (2014) examined the same problem but on a larger scale by providing trend analysis in the volume of petroleum products distributed by HGVs, the constraints experienced during the freighting of the products and the spatial pattern of retail outlets in Kaduna state. While the work of Arosanyin (2006) employed content analytical techniques to analyze the trends in the rates of RTC involving HGVs engaged in petroleum products freighting within the country and the environmental/safety concerns arising from such decisions.



The research efforts of Arosanyin (2006), Obasanjo *et al.* (2014) and Adenigbo *et al.* (2017) , which were carried out on three different scales (street level in a city, regional and national basis), succeeded in the identification of road transportation challenges associated with petroleum products haulage and the spatial pattern of retail outlets that sells the products but they failed to empirically investigate the influences that the socio-economic characteristics' of haulers and their working conditions (including the mechanical nature/characteristics of HGVs used in freighting have on efficient distribution).

One of the central concern of my study therefore, is to determine how such socio-economic attributes (age, gender, years of experience, knowledge of health status, educational attainment and marital status), working conditions (including the mechanical attributes of haulage trucks; manufacturer, age of truck, axle size, size, volume, mode of truck constitution and insurance policy on trucks/ goods-in-transit)

determine safety outcomes on urban freighting of a homogeneous single-product in Ibadan metropolis (an example of a traditional African city). Apart from this, existing literature in Nigeria has not considered the nexus between these two key constructs (socio-economic attributes of haulers and working conditions) in relation to the achievement of safe and environmentally friendly Just-In-Time (JIT) distribution of petroleum products in the country. This study, therefore, intends to fill this gap through the use of mixed method parametric statistical techniques of multiple regression analysis and in depth interview sessions) to analyze the relationship between the explanatory components of socioeconomic attributes of haulers, mechanical nature of trucks engaged and the achievement of safe and efficient logistics throughput associated with petroleum products in Ibadan metropolis.

2.3 Relational Issues between Spatial Pattern of Urban Retail, Retail Agglomeration, and Transport System



Different studies done in the U.S. have demonstrated that the spatial organization of urban activities and associated travel requirements are never in static equilibrium (Yim, 1990; Yim, 1993; Ward et al, 2002; Jetter et al, 2006; Kantola, 2016). Pioneering researches in the field of retail geography includes that of Proudfoot, (1937), Vance, (1962), Simmons (1964), and Berry (1967). These earlier works established the nexus between retail activities, urban functions, retail agglomeration and spatial structures in most American and European cities of the twentieth century. It has been suggested that retail outlets due to the constant flux between them and transport systems, have "self-organization" capabilities in relation to the transport costs (Yim, 1993; Jetter et al, 2006). Yim (1993) asserted that earlier theoretical models built to examine the interrelationships between the distribution of retail stores and transport systems in urban location failed to provide what could be described as

"optimal location" that bore a resemblance to real-life situations. Yim (1993) further opined that embedded in such theoretical models are elements of disparity in respect to the locations of retail outlets, the market area served by such outlet, the prevailing market size, the commuting distance for suppliers and clients of such stores. In a study (Yim 1993) that spanned five decades which investigated self-organization processes of food retail outlets with respect to transportation costs to and from stores in Seattle, Washington it was confirmed that spatial pattern of food retail stores and transportation systems which served it has equilibrating character. The result from the study (Yim, 1993) which employed dynamic models further indicated that it took five decades for self-propelling adjustment between the two variables to achieve optimal locational patterns in relation to travel distance measures (Yim, 1993).



Arising from some of these earlier works (Yim, 1990; Yim, 1993), it has been suggested that retail outlets due to the constant flux between them and transport systems, have relational capabilities on prevailing transport costs (Yim, 1993; Jetter et al, 2006). In pointing out some of the observed flaws in some of the earlier useful models on the discourse, Yim (1993) asserted that earlier theoretical models built to examine the interrelationships between the distribution of retail stores and transport systems in urban location failed to provide what could be described as "optimal location" that bore resemblance to real-life situations. Yim (1993) further opined that in such theoretical models are elements of disparity in respect to the locations of retail outlets, the market area served by such outlet, the prevailing market size and the commuting distance for suppliers and clients of such stores.

In a similar vein, other researchers; Thomas and Bromley (2003) and Jetter, *et al.* (2006) argued that key constructs like the market spatial structure, consumer

information, and competitiveness of the market are salient dynamic variables (which are not transport related). The infusion of these variables, they argued helped in building models which explained the observed differences in retail pricing of groceries located in similar zones within urban centers in the US (Thomas and Bromley, 2003; Jetter *et al*, 2006). Another valuable derivative of some of these studies (Thomas and Bromley, 2003; Jetter *et al*, 2006; Kantola, 2016) is the discovery that the spatial pattern of market structure for single-product type (like food retail outlets or gas stations) respond differently to competition unlike what is obtainable in multiple-products market (like departmental stores). Connor (1997), for example, discovered that operators in the food retailing industry (an example of single-product market) are often limited by the lack of depth in quantities of products available for sales and this informed decisions on differentials in the nature of services rendered, costs of products, location occupied in space and resultant costs of haulage services. The disparity in the reaction to competition between retailers who operate in a single-product market like petroleum products retail outlets to multiple-products market is one of the key determinants of their locational distribution. The location of retail outlets is often one of the critical reasons behind the costs of freight transport which services them (Kantola, 2016; Benai and Antipova, 2016).



University of Fort Hare
Teaching in Excellence

Contemporary researches on the discourse relating to transportation impact on retailing showed that another critical manner through which transport infrastructure is known to influence the spatial pattern of retail activities is the agglomeration of retailing centers or hubs in a particular location (Hicks 2006; Fox *et al*, 2007; Teller and Elms, 2011; Delfino, 2013; Kantola, 2016). Hicks (2006) employed empirical

analysis to examine the role that highway infrastructure and local property tax rate variability played in retail agglomeration in Indiana from 1988 through 2003. This Hicks (2006) did by the application of a time-series cross-sectional model of Indiana's 92 counties from 1988 through 2003; he estimated the impact that highway infrastructure, property taxes, and big-box competition have in creating regional agglomerations. The result from the research indicated that while highways do not significantly determine retail agglomeration within cities, their presence is quite a significant determinant within the suburbs, where incidentally most supercenters are sited (accounting for as much as 10 percent of total agglomeration variability). Similar studies conducted in a third world environment through the use of qualitative techniques showed results that are alike, despite the differences in the spatial and socio-cultural pattern of urban retail functions of the two locations (Delfino, 2013). The paucity of secondary data on sales record from retail stores, property taxes, influence of highway infrastructures on property prices and delineation of neighborhood population alongside income classes in most third world countries make the application of a more descriptive approach inevitable (Delfino, 2013),. It can be argued that despite the robustness that inferential statistics provided as a tool for the establishment of causality between key variables of accessibility, spatial pattern of urban retail and development of agglomeration, the use of more qualitative technique can deepen understanding of the interplay of these variables. For example, findings from Delfino's (2013) exploratory analysis of the agglomeration of retail activities in Manila in the Philippines, showed that none transportation variables like pricing strategies, price adjustments and level of market competitiveness also affects agglomeration. Incidentally, the same study (Delfino, 2013) confirmed that transport considerations like accessibility of streets where retailers are sited and



University of Fort Hare
Together in Excellence

retail agglomeration are also premium factors. In an earlier study, Fox *et al* (2005) provided estimated models of consumer spending at the leading packaged goods retailers in a metropolitan market using two key dimensions of retail location (proximity to consumers, i.e., travel times), and proximity to other stores (agglomeration). The study established that agglomeration of retail activities in space have significant effects on their performances. Large supercenters which naturally offer greater depths/varieties in products segmentation naturally benefit more from agglomeration than smaller discount stores who concentrate on just a product (grocery stores or petrol dispensing station). Analysis carried out by Miller *et al* (1999) focused on the trajectory in the development of retail agglomeration within the urban space. Findings from the study posited that agglomeration of retailing activities will always have a symbiotic relationship with how attractive a location is perceived by retailers. The presence of factors like population with purchasing power, good road network, ethnodomination, and affordable cost of land are known to influence choice of location. Based on Miller *et al* (1999) summation, agglomeration of retailing activities occurs over time. Despite the presence of these aforementioned positive add-ons, agglomerations of businesses naturally evolve over time. Ultimately the net gains/losses from agglomeration will be dependent on the balance of two countervailing transport induced forces. The first force, refer to as being "symbiotic" captures the incremental attractiveness of stores located close together compared to the attractiveness of those same stores individually. This incremental attractiveness reflects a reduction in consumers' costs of transmuting among stores or retail outlets. In effect, the development of retail hub in such location becomes a shopping destination (Miller *et al*. 1999; Fox *et al*, 2005; Delfino, 2013; Deloitte, 2018). The second force, aptly termed "Darwinism" reflects the intense competition for



University of Fort Hare

Tumkhen in Tumkhen

consumer purchases among stores that sell similar products, which will ultimately lead to overcrowding thereby compromising the accessibility components of such location (Miller et al, 1999). It is observable that there are points of convergence between the findings from Europe (as it concerns retail agglomeration and its impact on retail structure) with that from the USA. For example, a recent study by Kantola (2016) which focused on the determinants of regional trade performance in Sweden reflects the significant impacts of retail agglomeration and product diversifications by retail centers. The study (Kantola, 2016) employed quantitative techniques which unravelled several factors that influenced the retail trade development in different regions of the country over a period of 7 years. Empirical findings from the study (Kantola, 2016) clearly proved that agglomeration and diversity in terms of products on sale are critical determinants of the performance of each region. Empirical analysis clearly showed that regions with bigger market size (with ability for greater retail agglomeration) and retail stores which offered different ranges of products (diversification) have greater propensity of success than those which does not.

In Nigeria, much of earlier works on the relationships between retail activities, urban functions, retail agglomeration and spatial structures include the exploratory works of Porter (2005) which employed a qualitative technique of historical/archival search. Porter (2005) discovered that the extension of the rail line from the southern port city of Lagos to Kano in 1911 was a singular factor which opened up the ancient city for unprecedented international and local retail activities. As a matter of fact, the nodal junctions on the rail link into the city evolved into the key retail hub (Porter, 2005). The bulk of the interregional trade in pre and post independent Nigeria depended on the functionality of the available transport infrastructure; first developed by the colonialist and later by successive Nigerian government (Udo, 1982, Filani, 2000,

Ogunbodede, 2008). This same trend continued in the new millennium, a 2015 Nigeria Retail Sector Report indicated that the transport system has been one of the key drivers of the recent growth being experienced in the sector (Business Day Intelligence, 2015). Apparently, the boom the Nigerian economy experienced at the turn of the century (which coincided with the return to civilian government) made the strengthening of public infrastructure such as roads possible. A 2013 Pricewaterhouse Coopers report on the influence that transport and logistics exert on trading in ten leading African countries, lent credence to this credence. The country posted enviable records on the yearly Logistics Performance Index (LPI) before 2012 (when the Nigerian economy showed the signs of contracting for the first time in nearly two-decades). Not surprising, the underperformance of the transport and logistics sector for 2012 (which put Nigeria at 121 out of 155 ranked countries; with a score of 2.45 out of a possible 5) impugned negatively on the projected national retail expansion (PriceWaterhouse Coopers, 2013). By and large, these studies (PriceWaterhouse Coopers, 2013; Business Day Intelligence, 2015) have clearly established the correlation between the pattern of urban retail activities, availability of functional transport system and retail agglomeration in the contemporary urban space. While the reviewed literature established that there are various congruent transport induced factors and those which are not transport induced factors affecting retail pattern/ development of agglomeration in cities, it is obvious that accessibility to a mode of transport more directly affects the suitability of location.

It is observable that most studies on the discourse employed the quantitative methodological approach in the provision of assessments on the contributory roles of some of these variables. Availability of secondary data from sales record, traffic density and socio-economic attributes of studied population (income, age, gender)

made the use of quantitative techniques like time series and trend analysis of the influence that the variables exert on one another more possible in developed economies. Apart from this, the earlier studies have focused on the interrelationships between the pattern of urban retail activities, availability of functional transport system and retail agglomeration on mostly large departmental stores engaged in the retail of diverse product lines. There are fewer pieces of evidence of studies that focused on the nature of interactions that are generated if the focus is on a single-product retail market like petroleum product retail outlets. It must also be mentioned that most studies where these variables are examined were carried out in developed countries (Benai and Antipova, 2016; Sansone and Colamatteo, 2017; Deloitte, 2018). Studies which investigated the influence that the pattern of urban retail activities, availability of the functional transport system and retail agglomeration have on retailing structure of a single product like petroleum product retail outlets are few in Nigeria (for example, Porter et, 1995; PWC 2013; Adenigbo et al, 2017; Obasanjo et al, 2014 and Business Day Intelligence, 2015). These studies also failed to provide in-depth analysis on the influence that key variables like the availability of functional transport system and retail agglomeration have on urban retail pattern of a single product market like petroleum products retail outlets in the contemporary Nigerian urban space. This study will, therefore, fill this gap by relating the impact that the availability of functional transport system and retail agglomeration have on urban retail pattern of a single product market like petroleum products retail outlets in Ibadan, Nigeria.



University of Fort Hare

To others in Excellence

2.4 The Influence of Ethnodomination on Urban Retail Structure in the Developing World

Literature review established the fact that retail outlets, along with suburbanization and new developments at city fringes, have altered urban form and development on a worldwide scale (Ozoduru and Guldman, 2014; Erkip et al, 2014; Kearney, 2015). In contemporary times analysts argue that salient factors associated with globalization, its impact on the burgeoning growth of consumerism among the present generation, free trade agreements and neoliberal ideologies (Wrigley and Lowe, 2002; Baker and Wood, 2010; Rotem- Mindali, 2012) has redefined the concept of retail geography in the urban space both in developed and developing worlds. This redefinition is characterized by relocation/opening up of new retail outlets in inexpensive out-of-town locations or on the fringes of the urban areas, growth in store size and a shift toward electronic modes of retail. This has taken a severe toll on the survival of main street retailing (Birkin et al, 2002; Thomas and Bromley, 2003; Baker and Wood, 2010; Rotem-Mindali, 2012, Waxell, 2015). It is also observable that some of these analyses relied heavily on earlier theoretical approaches developed from the normative modeling works of Christaller (1966), Losch (1954) and focused on the four interrelated themes of consumer's behavior, retail location, retail organization, and public policies in retailing (Dawson, 1980; Sun, 2000; Erkip et al, 2014; Ozoduru et al, 2014, Kearney, 2015).

Studies carried out in third world cities at different periods showed results that are consistent with the development strides being taken in Western nations. For example studies in Latin America by Griffin and Ford, (1980) Crowley, (1995) Ford, (1996) - Africa (Aguda, 1998, Omole, 2000; Porter, 2005), Asia (Kosambi and Brush, 1988;

Sun, 2000; Zaheer, 2014), generally painted a picture that shows development in urban retailing as a reflection of globalization, albeit with a tinge of local coloration. In third world cities, several studies (Vance, 1970; Smith, 1974; Ford, 1996; Aguda, 1998; Omole, 2000; Sun, 2000; Zaheer, 2014) underscored the importance of nearness of retail centre to Central Business District (CBD), the peculiarities of the various ethnic groups being dominant in the retailing chain in the locations studied and the effects of such on the economic stratification of the societies. In modeling the emerging spatial pattern of retail structure across spaces in many developing economies at the latter part of the twentieth century, Vance (1970) opined that such spatial structure is best conceptualized as the "mercantile model". According to Vance (1970) the spatial structures of thriving retailing hubs in most countries which have a history of colonial past are influenced by two major factors. First is what he described as "... the operation of forces external to the local system..." (Vance 1970, p. 153) or simply put the orientation of trading primarily toward the international trade network which is situated in coastal areas. The second factor is the one which affects the hinterland retail spatial structure and Vance (1970) opined that the structure of the subordinate or hinterland markets centers is generally influenced by the pattern of subsisting transport routes located (Vance, 1970; Speece, 1990; Speece, 2005).

Smith (1974, 1975 &1976) conceptualized the "dendritic model" as an improvement on Vance's mercantile model. Smith's (1974, 1975 &1976) argument was predicated on the assumption that while Vance's model "was a forerunner of his own explanatory dendritic system" (Smith 1974; 178), it could be made better by the inclusion of key explanatory variables which measure the influences of the prevailing local business environment in the studied colonies. Smith (1976) posited

that the local business culture or environment generally have a way of contributing to the definition of the eventual spatial structure of retailing. By way of definition, Smith (1974) conceptualized the dendritic model of retail structure in a developing economy as providing an alternative theoretical lens to mercantile model by providing a deeper insight into the spatial structure of retailing/marketing activities. Smith (1974, 1975, 1976) opined that one critical factor which affects the eventual spatial structure of retailing channel in these countries is the "ethnic domination" or "ethnodomination" of the emerging marketing spatial structure. According to Smith (1974, 1975 and 1976), ethnic domination of marketing channels is a pattern where a dendritic spatial structure is apparent. The structural pattern of a dendritic system is best described as the organization of all lower retail centers in a vertical link which are in subjection to a higher level center without the benefit of horizontal links (Smith, 1974; Speece, 2005). The dendritic spatial structure is a tree-like configuration, where retailers or marketers interact only with other markets which are placed above or below in the spatial hierarchy (Speece, 2005).

According to Speece (2005), the two models provide a suitable explanation for the emerging national and regional spatial structures of retailing activities in colonial or post-colonial societies. The present day spatial structure of retailing/marketing in nearly all these countries is a direct legacy from their colonial past (Speece, 2005). There is also the very important factor of control which is also imposed by an outside group involved in the international market and import-export trade (Porter, 2005). The dominance of marketing or retailing structure by a particular ethnic nationality at the detriment of other ethnic nationalities within most developing world economies are maintained through a form of economic organization called "rent capitalism" (Speece, 1990; Porter, 2005; Speece, 2005). Rent capitalism is the missing link

between feudal economic organization and industrial capitalism. It is usually defined as a system in which commercial pursuits (and not industrial concerns) hold the pole position in the national economic structure, and this scenario indirectly hands control of the economy to the merchants (Speece, 2005). Profits garnered from successful trading activities are overtime invested in cottage industry, agriculture and other sectors of the economy. Ultimately these merchants often progressed to become important creditors or major financier of the informal sector of the national economy (Speece, 2005; Porter *et al*, 2005) While various attempts have been made to examine the effect of ethnodomination and some other explanatory variables (transport, communication, cost of land etc) on spatial structures of retailing activities at the regional or national levels in many developing economies (Speece,1990, 2005; Porter et al, 2005) similar studies dedicated to the understanding of their roles on the spatial structures of retailing activities at city level are scarce. For example Speece (1990, 2005) analyzed the influence of ethnodomination alone on the spatial structure of retailing/marketing pattern in two developing countries (which were also former colonies of foreign powers), the findings in the exploratory studies which employed qualitative techniques revealed the situation in Oman and Sudan are very similar. Different researchers on the discourse (Speece, 1990, 2005; Porter, 2005; Zhou, 2009), approached the study by focusing on the national outlook of ethnodomination's influence on trading/retailing structure. In Nigeria, much earlier works (Porter, 2005; PriceWaterhouse Cooper, 2013; Business Day Intelligence, 2015) which examined the impacts of ethnodomination on retail structure focused more on its influence on the interregional pattern of retailing activities. It is also discernible that most of these works paid little attention to the interrelationships between ethnodomination, cost of land, nature of transport network available, retail



University of Fort Hare
Together in Excellence

agglomeration and their subsequent effects on urban retail structure. A review of some of the studies which examined the influence that ethnodomination exerts on retail activities showed that some were carried out in regions which have dissimilar social, cultural, economic and political situations from Nigeria. Adoption of findings from such studies while being a useful guide may not provide a concrete explanation of the Nigerian situation.

My study therefore intends to fill this gap in the body of existing knowledge by critically examining if ethnodomination has any major influence on existing structure of urban retail structure in a contemporary Nigerian city (Ibadan). A study of this nature is germane for two critical reasons; first, in multi-ethnic African society like is found in Ibadan metropolis, jostle for economic domination is rife among the various ethnic groups. This competition, on its own is healthy once it does not lead to the wholesome deliberate displacement of any of the different ethnic groups. Second, findings from researches carried out in other developing societies substantiated the belief that some ethnic groups deliberately established controlling influence over a particular marketing channel or product (Speece, 1990, 2005; Porter, 2005; Zhou, 2009). The major objective behind such an act often revolves around welding socio-economic and political power over other ethnic groups. Such control, if not checked often, has degenerated into ethnic strife and civil insurrections (Speece, 1990, 2005). Unfortunately, Nigeria being a multi-ethnic nation (over 200 different ethnic nationalities) has a sad history of ethnic strifes occasioned by struggle for economics controls (grazing land, property and marketing channel ownerships) and is always living on the edge. The most recent is the ethnic cleansing that occurred over the ownership battle over the marketing channel for Kolanut (a popular fruit in the country) between the Yoruba and Hausa ethnic nationalities in Ile Ife southwestern



University of Port Harcourt
Together in Excellence

Nigeria, 46 souls perished while the strike which spanned three days lasted (Okogba, 2017). Findings from this study will therefore help in providing exploratory guidance on the understanding of retail structure with the influence exerted by the forces of ethnodomination in the spatial distribution of fuel retail outlets in Nigerian cities generally and Ibadan metropolis particularly. Such analysis will contribute knowledge in this regard.

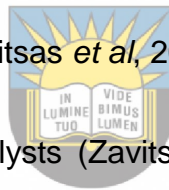
2.5 Location Attractiveness, Land Valuation, Accessibility, Distributive Justice and Retail Structure

Available facts indicated that there is no consensus among scholars on the influence that retail activities exert on urban land valuation (Mathews, 2007; Oner, 2015). It is noticeable that a school of thought (macroeconomic theory) strongly aligns with the tenets of microeconomic theory which opines that the prevailing transportation costs for both retailers and shoppers are strong determinants in location suitability or attractiveness as a retail center. Based on such assumption, this school of thought affirmed that the cost of landed property which houses retail centers situated closer to the targeted customers will be more expensive (Mathews, 2007). An opposing strain of theory, however, predicts that prices of landed properties for retail outlets will decrease once the distance between it and places of abodes of the targeted customers decreases because of negative externalities associated with commercial development. An "externality" in this regard was defined by Miller (1999) as "consequence of an economic activity that spills over to affect the third party" (Miller, 1999, p. 95). Commercial activities generally are harbingers of certain negative externalities if sited within residential neighborhoods- traffic congestions, the increment in noise levels and increment in the level of waste generated are some of the common negative externalities. My research seeks to address the importance of

the availabilities of salient situational externalities and their influences on the locational attractiveness of a retailing site in the urban area. There is a strong argument by the proponents of the theory of static spatial equilibrium that availabilities of certain amenities could be drivers of the valuation of a landed property in a location (Glaser, 2001; Oner, 2015). Some researches (Oduwaye, 2004; Oner, 2015) that applied these theoretical viewpoints in their studies of the influence of urban amenities on location attractiveness as it relates to the choice of residential quarters, include, the works Oduwaye, (2004) and Oner, (2015). Oner (2015) in a series of findings from his study opined that retail activities could be classified as one of the numerous urban amenities, he further argued that the presence of retail outlets within residential districts increases the location attractiveness and cost of land valuation in the district. He further posited that land values and transportation costs have a bidirectional association. Based on this premise Oner (2015) made the following conclusions; first, the distance between a residential location and other important economic activities (workplace, shopping mall, hospital etc) within the urban space will determine the monetary value of such residential location. Second, the rule of thumb behind the choice of retail outlets locations' by retailers is always to be sited as close as possible to targeted customers. Retailers being the archetypal business investors generally choose prime locations which may not necessarily obey zoning ordinances. Lastly, he warned that disobedience of zoning laws in urban land use; will generally increase the rate of negative externalities and diseconomies (Oner, 2015).

Urban land use and transportation have a bidirectional relationship and this relationship ultimately provides answers to how accessible a location will be (Zavitsas *et al*, 2010; Inturri *et al*, 2016). On the one hand, the provisions of

functional transport facilities influence the pattern of urban land use and locational accessibility. Pieces of evidence from researches have shown that the use to which a particular location is subjected to, the quality of the structures, the densities of the buildings developed overtime in the location and the intensity of activities that occur among inhabitants of such locality are key determinants of how accessible the location will be (Barnes, 2005; Zavitsas *et al*, 2010; Inturri *et al*, 2016). On the other hand, the availability of standard transport systems (particularly road network) can be a harbinger of the paradoxical concept of "induced transport demand". This is best exemplified as when the constructions of newer and wider routes, with the noble intention of increasing accessibility in certain zones of the city, may attract increment in vehicle densities, a development which negates the purpose behind the project original conceptualization (Zavitsas *et al*, 2010; Inturri *et al*, 2016; Ajayi, 2017).



It has been observed by analysts (Zavitsas *et al*, 2010; Inturri *et al*, 2016; Ajayi, 2017)

University of Fort Hare
Together in Excellence

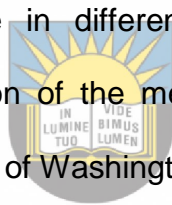
that challenges bedeviling contemporary cities with respect to land use, provision of sustainable transportation and accessibility are best conceptualized as either "macroscopic" (high-level) or "microscopic" (low-level) in nature. Macroscopic challenges revolve around the development of new city extensions (suburbs), zoning or land delineations of the new areas and the provision of transport in order to maximize accessibility. Microscopic challenges, on the other hand, are more complex, they are often concerned with the redistribution/redesigning of existing road networks with the aim of addressing the needs of established land uses and increasing accessibility of the disadvantaged to transport facilities (Zavistas *et al*, 2010; Inturri *et al*, 2016; Ajayi, 2017). Irrespective of the nature of the challenge, experience has taught contemporary city administrators that the stronger the

relationship which exists between land use planning and transport planning, the more accessible will key locations within the present-day city be.

Empirical evidence from sets of simulation studies conducted by a team of researchers (Levinson *et al*, 2012) clearly exemplified how accessibility could be used as a performance measure to evaluate various combinations of land use and transportation plans for Minnesota's Twin Cities metropolitan area (Levinson *et al*, 2012). The study evaluated how accessibility in the Twin Cities region would be affected by various changes in land use (including population, employment trends and spatial configuration of commercial activities) and the transportation network (due to proposed highway infrastructure improvements and public transit investments). The researchers analyzed 60 different model runs, through the use of digital maps by combining six land use scenarios with 10 transportation network scenarios involving both highway and transit. Land use scenarios were simulated under different assumptions. The main variables used in the assessment of accessibility for the study area were both the present population/employment distribution patterns and expected growth spatial distribution of population and employment growths. The specific influence these variables exerted on the present spatial pattern of the city structure within the Interstate 494/694 Beltway region was analyzed. The study also utilized the extant 2010 land use pattern as a baseline scenario, and with the infusion of different innovative models like high occupancy toll (HOT) lane, congestion pricing uses of streetcars and rapid transit. As a result, the simulated desired 2030 scenario reflecting decentralized growth predicted by the Twin Cities Metropolitan Council was obtained. Further analysis of the results showed that locations within centralized growth in population and employment produced the highest accessibility, followed by locations with population occupying

centralized zones but had their employment locations decentralized. The resultant forecasted simulation for 2030 showed that fully centralized positions for population and employment locations within the studied urban area produced about 20 percent to 25 percent more accessibility (Levinson *et al*, 2012).

Results from other empirical studies dedicated to the understanding of the perceptions of urban populations on the association between accessibility and valuations of properties depicted strong similarity to those obtained through simulated processes. (Downs, 1992; Dunse *et al*, 2002; Oduwoye, 2004; Oni, 2008; Inturri, 2016). These results simply re-emphasized the significant role, accessibility and transportation play in the determination of property value based on the perceptions of the populace in different cities. For example, Downs (1992), discovered that the completion of the metro rail system which converged at the central business district (CBD) of Washington D.C. from different links across the city have a resultant positive effect on how accessible the CBD is for the residents and the cost of commercial properties in the CBD. In the same vein, Dunse *et al* (2002) carried out an empirical analysis on determinants of commercial and industrial property values in the highly urbanized sections of Fort Worth/Dallas in the US. The study examined the effects of selected multivariate attributes on property values. The identified variables are; distance to places of interests (the CBD, the airport, the nearest major road and access to rail network), national market conditions, local market conditions and interest rates. Findings from the study (Dunse *et al*, 2002) indicated that local market conditions and physical characteristics of the location (accessibility attributes) of the property are significant determinants of their values. In Nigeria, an empirical study on land value determinants in medium density residential neighborhoods of metropolitan Lagos by Oduwaye (2004), obtained



University of Fort Hare
Together in Excellence

similar results as earlier studies from the US (Downs 1992; Dunse *et al*, 2004). Multivariate characteristics like access roads and other physical locational attributes (good drainage, availability of electricity supply, public water supply, and fixed telephone lines significantly influenced the value of residential properties. He concluded that the availabilities of these characteristics actually determined the valuation of property in the study area. Oduwaye's (2004) exploratory study particularly provided an insight into the bidirectional relationship between accessibility of residential facilities and their valuations in a contemporary Nigerian city. Through the use of an inferential statistical technique of Spearman's correlation analysis, he discovered that there was a relatively strong correlation coefficient of 0.177 on transport improvement (accessibility) at 0.01 level of statistical significance. This discovery clearly provided empirical evidence that accessibility was one of the key determinants of residential property values in the studied area. Oni (2008) attempted to provide a deeper insight in a similar exercise, by examining the influence exerted by the availabilities of the good road network (accessibility) and other explanatory variables on commercial properties valuation in Ikeja CBD of Lagos metropolis. Oni's (2008) work was an attempt to fill an important gap in the body of existing knowledge on the interrelationships between accessibility and commercial property valuations within the CBD of a contemporary Nigerian city. Oni's research, therefore, differed in scale, components, and nature from that of Oduwaye (2004) which was focused on the interrelationships between residential property values and availability of functional road networks (accessibility) amongst other explanatory variables in Lagos metropolis as a whole. Results obtained from regression analysis between rental values and accessibility/connectivity indexes of commercial properties in the study area indicated a relatively strong relationship



University of Fort Hare
Teaching in Excellence

between high mean rental values and high accessibility/connectivity indexes (average accessibility index is 0.74 and connectivity index is 0.30, both representing the highest and costliest properties in the study area).

These aforementioned works only showed the relationship between growth in transport development and improvements in accessibility. However, the studies did not empirically determine degrees of association between accessibility and the spatial structure of retail outlets on a city-wide scale. In addition, it also did not consider the effects that accessibility (transport linkages available at a location) and commercial property values have on the spatial structure of retail outlets in the study area.

The following conclusions can be derived from the holistic reviews of all these aforementioned studies, first, it is evident that most of the studies were conducted in western societies (the USA), although there are few studies on the theme from the Nigerian environment. Second, all the cited works established that there is a likely causal relationship between augmentation of existing transport network and improvements in accessibility rates of any location all things being equal. Lastly, it is deductible from the review of all these aforementioned studies, that there are series of factors that determine commercial property values, these include infrastructural funding, the impact of high-speed mode of transportation, nearness to rail stations, metro lines, good road network, political will, planning regulation and socio-cultural factors. Despite the seemingly innumerable factors which can affect the rental value of a commercial property within the contemporary city, it has been proven that there is a bidirectional relationship between the availability of functional transportation network and commercial property values in most cities.

As exhaustive as the discourse on the theme of location attractiveness, land valuation and accessibility appeared to be (from the review of available literature), noticeable gap exists on how the interaction between all these variables influences the spatiotemporal structure of retail outlets of a homogeneous product (petroleum products) under a partially deregulated but competitive environment in a contemporary urban centre. This study intends to fill this gap by examining how the identified multivariate attributes of location attractiveness, land valuation, and accessibility (functional transport linkages) influence the spatiotemporal distribution of fuel retail outlets in the different zones (core and peripherals) of Ibadan metropolis.

2.6. Distributive Justice and Location of Retail Centers in Urban Areas

Perhaps another identified variable that critically influences the spatiotemporal structure of commercial activities within the contemporary city is the non-economic, but important challenge of equitable distribution of service points within the different zones of a city. The roles that distributive politics play in the noticeable patterns of access to certain services and the geographic relationship between service/neighborhood deprivation in urban locations in different regions of the world have been of keen interest to the academic community over time (Knox, 1978; Pacione, 1989; Okafor, 1981; SEI, 2012). Similar attention has however been lacking when the focus is on how conformable are the existing pattern of urban retail activities, particularly as it relates to the achievement of territorial justice and distributive parity between different neighborhoods within a city (Lee and McCracken 1982; Aguda, 1998,). It is a reality that the goals of private sector retailers and government agencies in charge of the provision of public goods/services (schools, health care centers, waste disposal units etc) greatly differs. While one is mainly

motivated by business survival/gain, the other considers factors that are mainly non-economic (distributive justice, geographic proximity/accessibility etc). Such distinctive differences in goals is largely responsible for the disparity in the pattern of distribution of retail activities and that of public services provided by government agencies within the urban landscape (SEI, 2012; Waxell, 2014; Banai and Antipova, 2016). The review of some works on how the achievement of the principle of distributive justice is influencing the spatial pattern of retail structure in the urban environment gives credence to the age-long belief that, business owners do not always respect zoning laws (SEI, 2012; Waxell, 2014; Banai and Antipova, 2016). The focus of the research community hitherto has always been on how conformable are the existing pattern of public goods/services are to the principle of distributive justice. The reasons why there are scanty pieces of evidence of how conformable the existing pattern of most privately owned enterprises is to the principle of distributive justice are not detailed in the available literature. It could, however, be inferred that it is easy to assume that private enterprise pays strict adherence to zoning regulations as outlined by city's planning authorities. However, the reality on the ground in most sub-Saharan Africa cities questioned this assumption. This research exercise will, therefore, study the existing pattern of distribution of fuel retail outlets among the different zones in Ibadan metropolis. The aim is to fill the gap on how conformable are the spatial structure of the fuel retail outlets to the principle of distributive justice between the affluent and the poor sections of Ibadan metropolis, through the use of socio-economic delineations of the different neighborhoods in the city.

The next section is dedicated to the understanding of the theoretical and conceptual underpinnings that guided the design of the study.

2.7. Theoretical Framework

In this section, attention is given to the discussion of relevant theories and concepts which provides the desired guidance for proper understanding of the various sub-themes relevant to this study. These include Expectation Disconfirmation Theory (EDT), Central Place Theory in the distribution of urban resources, concepts of distributive justice in the spatial configuration of vital urban services, Theories of urban impact and the Theory of Constraints (TOC) in Supply Chain Management (SCM).

2.7.1. Expectation Disconfirmation Theory

Expectation Disconfirmation Theory as we know it today is originally an off-shot of the psychological theory of Cognitive Dissonance [CDT] as propounded by Festinger (1957). In the original conceptualization of CDT, Festinger (1957) defines dissonance as being the variation between the initial cognition of anything and its truest state. Festinger (1957) emphasized the unpleasant feeling that accompany the discovery of the truest state of an object of perception after an initial lofty subjective opinion as “dissonance” (Harmon-Jones, 2007; Elkhani and Bakri, 2013; Huang, 2015). The basic constructs of CDT revolves around the summation of consonant cognitions and subtraction of dissonant cognitions in the perception of an individual about an object of perception. This variation is the dissonance, and once it in the negative, the observer will most likely experience a disappointment which invariably will affect futuristic decisions on the subject (Harmon-Jones, 2007; Elkhani and Bakri, 2013). The EDT on the other hand was conceived through the scholarly writings of Oliver (1980, 1997). Anderson and Sullivan (1993) also made spirited efforts in the development of the theory which focuses more on expectations paradigm, rather than dissonances (perceptions). The basic constructs of EDT can

be deconstructed into 5 successive stages for the ease of use and application. The stages can be broken down as thus; first, customer's initial or pre-purchase experience. This perception is usually based on the level of information available to the customer and the ability to reasonably process such information. The second stage involves the after purchase experience, the customer's "consumption rate" of the purchased product will most certainly 'test' the performance perception of the procured product. The performances of the product will either meet the pre-purchase expectations or not. The confirmation or disconfirmation these "expectations" is the third stage of the construct. The fourth and final stage is the off-shot of the third stage; this involve the positive or negative personally informed decision that the customer will now make on further investment or purchase of the product (Oliver, 1977; Anderson and Sullivan, 1993; Santos and Boote, 2003; Elkhani and Bakri, 2013; Huang and Liu, 2014).



Diagrammatic representation (Figure 2.1) of a basic EDT model depicts the interactions between the various sub constructs (expectations, perceived performance, disconfirmation and satisfaction) of the model. It must be noted that this model shares much similarity with the CDT. The model therefore, emphasized the measurement of customer's satisfaction through the summation of the difference between pre-purchase expectation and after purchase experience (Spreng et al, 1996; Spreng and Chase, 2003; Elbakhini and Bakri, 2013; Huang and Liu, 2014).

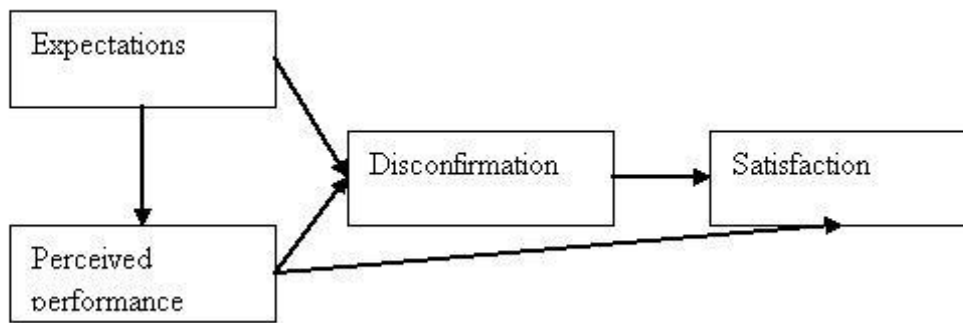


Figure 2.1. A basic EDT model (Oliver, 1980).

2.7.1.2. The EDT Framework

Santos and Boote (2003) proposed an EDT conceptual framework (Figure 2. 2), which was later applied by Elkanaini and Bakri (2013) in the summation of customer's perception in business to customer (B2C) e-commerce retailing. The framework is divisible into three parts: part 1 (expectations), part 2 (customer's satisfaction or dissatisfaction) and part3 (customer's post purchase behaviors). Breakdown of the framework shows the expectation (cognitions) construct being broken further into nine different tolerance levels (ideal, should, desired, perceived, deserved, adequate, minimum tolerance, intolerable and worst imaginable). The second construct in the framework depicts the post purchase affective state of the consumer (confirmation /disconfirmation of consumer's perception). This is also broken down into four different levels (delight, satisfaction, acceptance and dissatisfaction). The third and final construct recognized the compliment or complaint affective action (reaction) which follows the post purchase affective stage. The stage is also broken down into three levels (compliment, no action and complaint). An insightful perusal of the framework will reveal the following; that the 'rational' man have a 'logical' pre purchase perception guiding his decision making process. The perception, however could swing from the ideal (being the best) to the worst

imaginable. Irrespective of the perception of the “rational man” at this stage, suffice that a decision to purchase the product will be made. Furthermore, the pre purchase decision will now be confirmed or disconfirmed at the second stage. It should be noted that the “seller” of purchased products are usually most comfortable if the “rational” man has the worst imaginable pre purchase perception of the product and to have such disconfirmed by the realistic perception of the purchased product than vice versa (Oliver, 1980; Spreng et al, 1996; Spreng and Chase, 2003; Elbakhini and Bakri, 2013; Huang and Liu, 2014).

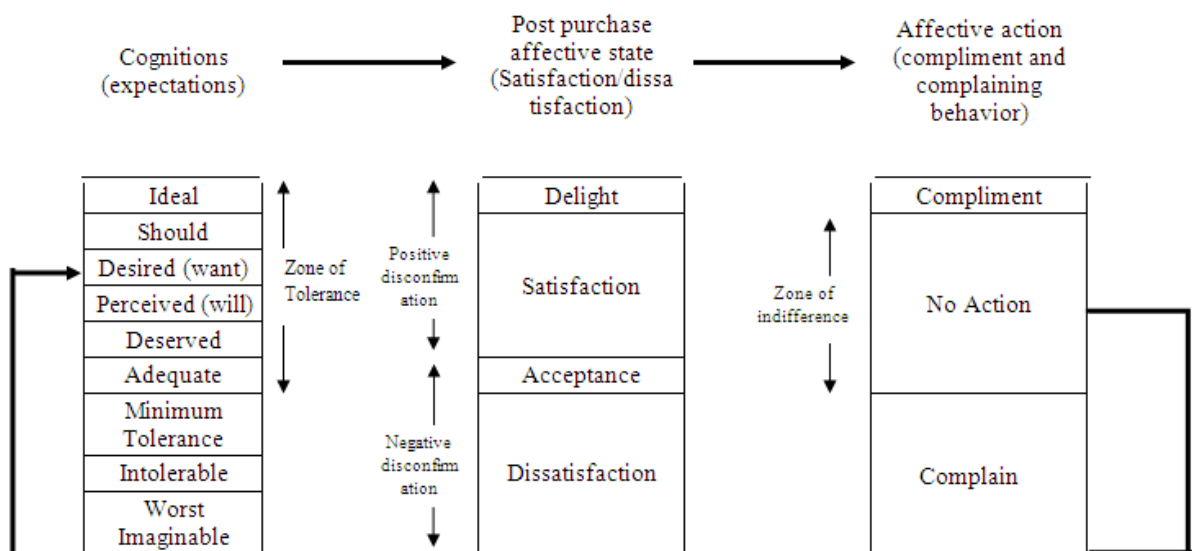
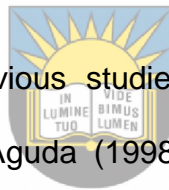


Figure 2.2: EDT model (Oliver, 1980; Spreng et al, 1996; Spreng and Chase, 2003; Elbakhini and Bakri, 2013; Huang and Liu, 2014).

The third and final stage is the post purchase decision process. The customer can now make informed futuristic decisions based on the perception of overall satisfaction resulting from a comparison between expectation and outcome performances (Oliver, 1977; Anderson and Sullivan, 1993, Spreng and Chase, 2003, Santos and Boote, 2003; Elkhani and Bakri, 2013; Huang and Liu, 2014).

The use of Expectancy Disconfirmation Theory (EDT) as being applied in my research provides an alternative theoretical lens through which the performance-specific expectations of the owners/operators of the fuel stations on how commercially viable their present locations can be adjudged. The retailer being the quintessential 'logical' investor will make the decision on the most suitable site for a new fuel retail station based on a pre purchase expectation. The expectation will usually be one of the listed nine tolerance levels (from ideal to worst imaginable). My research intends to analyze the post purchase perceptions of the owners of the fuel retail outlets, so as to find out if there is any distinctive pattern in the disconfirmation perceptions of owners of retail outlets located within inner city and those in the suburbs.



While on the one hand previous studies on the spatial pattern of fuel outlets distribution included that of Aguda (1998) which tried to provide answers to the question of optimal location of retailing outlets through spatial modeling, the works of Kishore and Patel (2012) on the other hand empirically analyzed the roles that Non-Fuel-Retailing activities (ancillary services) played in the achievement of higher levels of patronage. Aspentech (2009) holistically examined the effects of the triangulation of competition intensity, consumer search and firms' pricing decisions have on retailing of petroleum products in a deregulated market. EDT has been extensively used in previous studies analyzing influence of expectation/performance of goods and services on consumerism (Bhattacharjee & Premkumar 2004; Elkhani and Bakri, 2013; Huang and Liu, 2014). However, it was noticed that much attention has not been given to the nexus between central place theory (Christaller, 1966; Losch, 1954, Berry, 1967, Ikporukpo, 1982; Dijst, 1999, 2004) and the role that EDT (on the part of retailers) play in the provision of an effective model for optimal

location of retail outlets and effective urban goods distribution. Applications of such behavioral/marketing theory to studies on spatial/retailing science provide a more robust insight into why certain locational decisions are taken by retailers when such decisions obviously negate the principle of distributive justice.

2.7.2. Distributive Justice Theory

The concept of Distributive Justice addresses the principle of justice in the allotment of societal goods (Forsyth, 2006). Poor policy formulation and implementation could easily result in non-equitable distribution of societal goods. The concept seeks to unravel the understanding of how available societal goods are best quantified, the nature of the distribution processes employed among the constituents of the society and the fairness of such distributive arrangements (Forsyth, 2006; Farlex 2013). The concept of distributive justice first appeared in urban planning literature through the work of Harvey (1973). Harvey (1973) described it as “social justice in city created by widening urban inequalities produced through neoliberal capitalism”, (Harvey, 1973 p 314). Distributive justice theory was defined contextually in the literature as the equitable distribution of the triads of societal technological, environmental and economic benefits or disproportional distribution of the risks and negative impacts that are outcomes of these benefits (Harvey, 1973; Farlex, 2013; Gilbert, 2014). Due to the limitation in the amount of wealth and resources available to societies and to city dwellers, the question of how most equitable or fairly these benefits ought to be distributed has always been a recurring one (Farlex, 2013; Gilbert, 2014).

Application of the principle of distributive justice by policy makers is often beleaguered by the provision of answers to the questions of equality, equity and need in the allocation of finite resources (Harvey, 1973; Farlex, 2013; Forsyth, 2013).

Due to the obvious variance in the level of need of individuals or neighborhoods within cities, equal distribution of resources might not necessarily solve the problem of the fairness in the distribution of resources. Equitable distribution is often advocated because it is believed that the benefits available for distribution which are at individual or neighborhood levels are best shared in proportion to the observed needs (Gilbert, 2014). In urbanism, the concept of distributive justice is often viewed in the context of understanding the basis of the widening gulf between city dwellers in terms of infrastructure deficits between the “haves and have nots”. These disparities are often apparent along income, racial and ethnic lines (Dunlop and Savulescu, 2014; Gilbert, 2014). Some of the more popular benefits that are often subjects of contentions urbanites are issues revolving around the questions of the distributions of health-care, taxation, education, affirmative action, capital punishment, and public infrastructures (roads and retail centers). Conversely, the burdens that are sometimes rife with negative environmental outcomes include air pollution, landfills, industrial congestion, transportation hiccups and over population.

Distributive justice in urban planning is essentially a core principle of environmental justice. It has been observed that the lack of uniformity in the distribution of negative social impacts of environmental degradation which negatively affects quality of lives more than any other thing gave rise to environmental justice (Dunlop and Savulescu, 2014; Gilbert, 2014). The concept of environmental justice as an offshoot of distributive justice in urban planning focuses on the achievement of a just distribution of opportunities and challenges along class, income and ethnic lines within the contemporary urban centers. Gilbert (2014) while analyzing Harvey’s (1973) treatise on distributive justice in urban planning posited that Harvey’s (1973) viewpoint was motivated by the need to examine concerns about “territorial distributive justice”

within the urban space. Harvey argued that for all categories of urbanites “ need is defined as a highly relative concept and the disparity between identified needs among urbanites and actual allocations of benefits form the basis of distributive or environmental justice in urban planning” (Harvey, 1973, p. 107). While the lopsided distribution of the available infrastructural benefits within the urban space could be the source of tension, the uneven allotment of the effluents from environmental degradation that usually acquire as a waste from the uses to which some environmental benefits are subjected to within the urban space produces greater social tension (Harvey, 1973; Gilbert, 2014).

For the clarity of the conceptualization of distributive justice, Forsyth (2006) detailed five types of distributive norms which would provide the needed guidance in the understanding of the concepts. The five “norms” are intertwined and the absence of any of them could easily trigger distributive or environmental “injustice “specifically in urban planning. The five modified specified norms as it relates to the distribution of infrastructural needs within the urban space are;

1. **Equity:** Residents outcomes should be based upon their inputs (property values, cost of tenement rates on properties). Therefore, a resident who has invested a large amount of input on the choice of location in the city (e.g. property value and tax) should receive better and higher qualities of infrastructural provisions (transport, education, health, commerce) from the urban policy planners than resident who has contributed very little. Residents who are making the largest contributions to urban centers development in terms of taxes conversely believe that allocation of infrastructural benefits should reflect the rewards of such investment (Forsyth, 2006).

2. **Equality:** The equality norm is based on the premise that irrespective of their inputs (in terms of buying properties in choice location and tenement taxes), all urbanites should be beneficiary of equal distribution of infrastructural facilities. The norm of equality strongly advocates that all residents, irrespective of class, race, gender and age differences should enjoy the best infrastructural facilities the city could offer (Forsyth, 2006).
3. **Power:** Forsyth posited that the tendency is that residents with more political authority and higher economic status, generally exercise control (power) over decision making processes of what should allocated where in urban planning (Forsyth,2006).
4. **Need:** The need norm identified that residents/location with the greatest needs should be provided with infrastructural resources needed to satisfy those desires. It is only fair that deprived neighborhoods within cities enjoying the benefits of distributive justice. This should be regardless of the taxes being paid or valuation of properties in such locations (Forsyth, 2006).
5. **Responsibility:** Forsyth opined that affluent residents must show consideration and responsibility by being ready to share their resources with other residents. This should be done by regular payment of their taxes and evolvment of policies that allows equitable distribution of infrastructural facilities (Forsyth, 2006).

Dunlop and Savulescu, (2014), also provided some further elucidation on the different sub-components that could help in deepening the understanding of the concept of distributive justice in urban planning. These are further redefined so as to reflect the purpose of this study. Part of the purpose of this study is to examine how

much of the concept of distributive justice is obeyed in the spatial distribution of fuel retail outlets (privately owned commercial but essential entities) in Ibadan metropolis.

2.7.2.1. Definition of some Sub-Components of Distributive Justice Theory constructs

Distributive: This has to do with the understanding of the laws stipulating equal protection for all urbanites irrespective of their social, racial, gender or economic differences. It is argued that pollution resulting from industrial wastes must not be unevenly distributed to the disadvantaged of the poor.

Recognition: This is the identification of all the residents within the city. Everyone in the city must be recognized as being part of the main beneficiary of justice or injustice that may arise from the distributive activities.

Capacity and capability: Unevenness in the distribution of essential infrastructures (transport, communication, educational, health and financial) could hamper the capacity development of the disadvantaged within the city.

Procedural; Dunlop and Savulescu, (2014), posits that every stage of the decision making process through which infrastructural distributive decisions are made must pass the fairness and the transparency tests.

Social equity: The tenet of social equity strongly advocates that there should be fair distribution of social benefits available to all residents within a city.

Economic equity: In reality, economic equality is not achievable in human society; however equitable management of economic benefits and burdens could be implemented for an all inclusive societal growth. This could be done often through the implementation of progressive taxation system and social welfare system. To this

end, there must a deliberate economic plan of action to make sure that disadvantaged in the society are not deliberately neglected in the sharing of the economic benefits that acquire to the society.

Environmental equity: The institutionalization of the equitable distributions of environmental risks and benefits among all groups all the residents of a city, in a manner that eschew that no resident is denied on the basis of ethnic, racial, gender and social class segregations.

Environmental inequality: This described a geographic reality which many modern cities particularly in the third world are battling with, there are evidences that the pattern of distribution of negative environmental features like hazardous waste sites, polluting industries, nuclear waste dumps, and other environmental dangers are more likely to be domiciled within or adjacent to the poorer neighborhoods.

Spatial inequity: This refers to the inequality in the quantity and quality of service points available in different neighborhoods or sections within a city, service providers like retailers and medical centers, more often than not deliberately sites their service points in locations closer to the affluent members of the society.

Ecological: Ecological focus is mainly on the assessment of the relationship between a city flora and fauna components. Ecologists expresses concern about how developmental activities impact upon both the local and global environment.

Scholars generally believed that a functional and efficient social distributive system will guarantee that every member of such society have a sense of belonging of the available social infrastructures. This on its own will encourage the belief of individual in the system. To achieve a sustainable social and just distributive system in the

allocation of societal benefits, there should be a means of consistent evaluations of the procedures engaged in the distribution of such benefits. The eventual outcomes of such decisions as it relates to the impact on the well being of members of the society must also be evaluated (Harvey, 1973; Farlex, 2013; Dunlop and Savulescu, 2014).

Fair distributive system is usually is an exercise where societal benefits are allotted according to need. This rule, when objectively applied help in ensuring that all the members of the society basic needs are met. This on its own will greatly reduce tensions generated by unfairness in allotment of benefits and lure into criminality in the society. In fostering equality in the distribution of benefits it is essential that equity is not sacrificed. Equitable distribution of benefits within the society encourages productivity, as it motivates the members of the society to aspire. Due to the fact stringent adherence to any of these two concepts (equality and equity) might result in the abandonment of the other, it is often advocated that a balance which will guarantee competition and social welfare system be struck by policy planners (Harvey, 1973; Forsyth, 2006; Farlex, 2013; Gilbert, 2014; Dunlop and Savulescu, 2014).

2.7.3. Central Place Theory (CPT)

The Central Place Theory was originally formulated by Christaller (1933/1966), and improved upon by Losch (1954). CPT is targeted at the provision of concise explanation of the interrelationships between the size and spacing of human settlements. CPT also provides explanation on the distribution of facilities in cities and its influence on people's economic activities, especially their shopping behaviors. The original conceptualization of the theory was aimed at the efficient organization of human settlements in a hierarchical order. Geographers overtime

recognized there is a seemingly natural tendency for the spatial distribution of settlements within a particular region. Three interrelated functions are usually responsible for this spatial arrangement, which include marketing, transportation and administrative functions (Knox and Marston, 2007; Walmsey and Weinand, 2008; Mulligan *et al*, 2012). In the literature, central places are defined as settlements which are at the center of a region (or sometimes a city), in which certain types of products and services are available to consumers (King and Golledge, 1978; Knox and Marston, 2007). In other words, the dominant function of a central place is to provide market and supply services for the region. Geographers recognized the fact that human beings are generally traveling some distances to fulfill a need (or needs) which can only be met in a central place. Based on this discovery, Christaller (1933/1966) in postulating CPT posited that there is hierarchical order in the arrangement of needs. There are needs that require daily fulfillments; such needs must be met within a short range in terms of distance of commuting. The framework of CPT holds that the satisfaction of a daily need should naturally requires less cost in terms of distance and time than what is expected from needs that are not necessarily daily required by men. Another important framework central to the understanding of CPT is the concept of threshold. The threshold of central place, is defined as the minimum market size required to ensure the viability of particular product or service offered in the marketplace by the seller (Knox and Marston, 2007; Mulligan, *et al*, 2012; Prospero and Oner, 2015). Due to the validity of findings from studies (Mulligan, *et al*, 2012; Prospero and Oner, 2015) in which the theory was applied, its application went beyond the narrow sphere of geography into cognate disciplines like economics, urban planning, regional science and sociology. For a particular urban location, the Central Business District (CBD) usually represents the

highest order center or the optimal urban location where the functions (either goods or services) which residents are most willing to travel the greatest distance to get are available. It must however be noted that before an acceptable hierarchical pattern could be universally acceptable, it must satisfy the condition of centrality in relation to adjoining zones. CPT includes three interwoven concepts of central place, range and threshold which can be mathematically measured alongside the population size, spatial distance (between customers and service areas), and numbers of available central places (Mulligan, et al, 2012; Prosperi and Oner, 2015). In the development of a functional framework for central place theory Christaller (1933/1966) and Losch (1954) applied series of concepts (majorly borrowed from complexity theory) such as self-similarity, scaling laws, and self-organization concepts (Chen, 2008; Mulligan, et al, 2012). The developed central place system is therefore structured as a hierarchical cascading arrangement with a network with self-similar properties. The hierarchical arrangement of settlements within studied space is germane to the understanding of spatial urban fractal or geometry and so also is the categorization of goods or service on offer (Walmsey and Weinand, 2008; Prosperi and Oner, 2015). Generally, ubiquitous goods are the least necessitating travel time, while rare goods or services often elicit the longest trips. Theoretically, the functionality of central place network models are best interpreted with fractal geometrical analysis a method similar to the one used in studying network of rivers (Chen, 2009). Empirically, findings from the works of Christaller (1966) avowed that the central places of southern Germany do follow the scaling laws indicative of fractal structure (Chen, 2009).

As explanatory as the application of CPT seems to be in the understanding of how central places are organized, it is not without some drawbacks. There is a yawning gap between the constructs used in the development of the models and what is obtainable in real life. Also, the design of the CPT is hinged on the acceptance of some basic assumptions; such as the availability of an unbounded isotropic plain with a homogeneous distribution of the purchasing power. Another important criticism is that the use of regular hexagonal formation in the explanation of the pattern of settlements system which is constituents of the CPT model which bears little or no resemblance to what is realistically available.

Some other salient consideration which must not be ignored when applying CPT is that the validity does vary with local factors. Such critical local features include the climatic condition, topography, history of development, level of technological development and other socio-cultural considerations (ethnodomination of marketing channel/ preference of consumers). The economic class of consumers in a location under study is germane. Application of the model in affluent locations (urban zones where the high and middle income occupies), shows that affluent consumers generally tend to be more mobile and therefore bypass centers providing only lower order goods. The desires of these categories of urban residents to have all their shopping done in a location often make the choice of large retail center attractive. Apparently residents' purchasing powers have effect on the density and the spacing of centers when arranged in a hierarchical pattern. Other features which have impact on the density and hierarchical arrangement of retail centers in urban location include the pattern of land use, poor accessibility, competition and the level of the societal technological deployment (Speece, 1990; Walmsey and Weinand, 2008; Prospero and Oner, 2015).

Analysts (Walmsey and Weinand, 2008; Prosperi and Oner, 2015) often counseled that the application of CPT should be guided by the awareness or the understanding of these factors when planning shopping center spatial distribution whether for a city or a region. Such understanding informed the application of CPT in the distribution and the optimal distribution of Wal-Mart stores in the United States. DeMarco and Matusitz (2011) described the process as the “Central Place Theory Wal-Martization process”(p1). The study analyzed the impact that CPT has on the effectiveness of the spatial distribution of the retail centers. DeMarco and Matusitz (2011), discovered that Wal-Mart applied CPT in the determination of optimal location for its stores given the hierarchical order of towns and cities in a region. The same rule is equally applied at arriving at the most suitable location within a city. DeMarco and Matusitz, (2011), concluded that the application of CPT has given the expansion process of the organization a meaningful geographic expansion which invariably contributed significantly to the organization successful growth. The general rule when applying CPT in the site selection processes for optimal retail location in new towns is definitely different from what is obtainable if the new retail location is being situated in an existing urban area. For new towns, hierarchical ordering of zones alongside the nature of goods and services being offered is more easily attainable. For example, the zoning of district shopping centers as mostly markets for durable goods (higher order) and local shopping centers as markets for convenience (lower order) goods could be easily achieved since there are no existing structures in place.

The shortcomings noticed in the application of CPT led to the reinvention of the frameworks of the theory particularly when applying it in urban planning generally and optimal retail location processes specifically. For example, Smith (1977, 1979) posited that, Christaller’s (1933;1966) reliance on the use of population size and

number of telephones ownership as the criteria used for the determination of a city was wrong even for the 1930s. Smith (1977; 1979) opined that the nature and number of services offered by the city should have been a more objective determinant of its status. This was found to be true by other researchers (Knox and Marston, 2007; DeMarco and Muiwitzst, 2011; Firsher, 2012; Mulligan et al, 2012; Doran and Fox, 2015) who agreed that a more rational determinant of the importance of a settlement or a zone within a city lies in the quantity of services which attract consumers to it. Smith subsequently proved this to be true by applying the principle of CPT to evaluate the delivery of medical care in California, Smith (1979) carried a census of the available number of medical doctors that are specialists that are domiciled either within a zone in a city (to determine the hierarchical ordering of the different zones in the city) or the numbers of specialists available in a city (to determine the hierarchical ordering of the different cities in the region). The use of quality and quantity of medical services available to residents within different zones in a city or different cities in the same region offered a new methodological paradigm. This also created a basis for more objective application of CPT.

Another point of departure between Christaller (1966) and later day revisionists of CPT lies in Christaller's (1966) insistence that homogeneous distributions of socio economic indices (income, population size and physical distance) is germane to the successful application of the model.

A review of Smith (1979), DeMarco and Muitsuit, (2011) and Firscher's, (2012) works revealed that it is quite possible (and as a matter of fact it is more realistic) to assume that these socio economic indices are not evenly distributed among residents either within the different zones of a city or among cities in a region, Smith

(1979) and other antagonists to Christallers' postulation also provided empirical evidences (Smith, 1979; DeMarco and Muitsuit 2011) that showed that such paradigm shift in the framework of the model rather than weakening the functionality only helped in making it more realistic. Smith provided a new understanding of the CPT by showing how possible it is to utilize services provided by locations to determine their centrality and sphere of influence in relation to adjoining zones or settlements. Smiths' (1977;1979) research successfully delineated medical care on regional (in case of cities) or zonal basis (in case of a single city) as the "range", describe the hierarchy of medical services, the population base required of each medical specialty as the "threshold", the "centrality" is then defined in the efficiency of regions, and the importance of how an area was settled to the delivery of medical care, that is, according to traffic, market or administrative principles. The adoption of the CPT model as being applied in this present study leveraged more on the paradigm shift in the model's framework as espoused by Smith and later day revisionist of the original model (Hsu, 2012). The reason behind such a decision is hinged on the fact that just like Smith's work in California, this present research is also geared to the understanding of how the application of CPT could provide insight into the effect that the spatial configuration of fuel retail outlets (marketing services) have on the attainment of centrality between the two different zones (core and peripherals) of Ibadan metropolis.

2.7. 4 Theories of Urban Impact

At least five major theoretical perspectives have been advanced to explain the impact of urban environments on residents. These theoretical perspectives are based on principles of human ecology (Wirth, 1938 as cited in Pacione 2003; Gaspar, 2013), subcultures (Fischer, 1984; Balckman, 2015; Hodkinson, 2016);

environmental load (Milgra., 1970), behavioral constraints (Lefcourt, 1976) and behavior settings (Barker, 1968; Wiecker, 2002 ; Tisot and Thurman, 2002; Popov and Chompalov, 2012). Each of the theories identifies how urbanites' reacts to the societal impulses emanating from a particular aspect of urban lire, and so contributes to and overall understanding of the influence of the urban system on the individual residents. For example, the use of the behavior setting theory framework suggests that human behaviors are studied by analyzing the interface between the patterns of behavior and the milieu (environment). Accordingly the behavior-milieu interface is called the synormorph ((Popov and Chompalov, 2012) and the 'milieu' is said to be circumjacent and 'synormophic' to the 'behavior'. A synormophic situation is achieved when there is a convergence between what the environment dictates and the corresponding reaction (behavior) it elicited in individuals in such milieu. A behavior setting exists at the interface between the standing patterns of behavior and the milieu (environment). For the objective analyses of the development, causality and purpose behind human behavior it is germane to explore the interaction between the analysis and happening in the milieu.

Environmental Stress of load theory sees human behavior as a function of the person, the environment, and the interaction between the two. Adverse environmental conditions as perceived by an individual will generally elicit an undesirable reaction in the recipient. Prolonged and unabated adverse environmental conditions will give rise to 'environmental load or stress' which the individual coping abilities may fall short of. Urban environment generally are seen as sources of 'stress generators'. Stress in this context is defined as combination of adverse environmental conditions interfacing with normal human functioning and if

unchecked is capable of disrupting cognitive function, physical health, and/or psychological well-being of the stressor (Murphy and Leach, 2013; Zhen *et al* 2017).

An important aspect of human ecological theory is the subculture theory (Popov and Chompalov, 2012; Balckman, 2015; Hodkinson, 2016). Urban environments are generally seen as 'springboards' for subcultural behaviors or traits, particularly among the disadvantaged (Balckman, 2015; Hodkinson, 2016). Investigation revealed that there is a point of convergence in the formation of subcultural traits, biological and environmental influences (Roque *et al*, 2015). This is particularly true in the spatial distribution of anomie, crime and peculiar behavioral attributes in inner cities. Roque *et al*, (2015) specifically, discovered that societal structural pressures of poverty, discrimination, unemployment, nature of employment, working conditions and high rates of emotional abuse have a significant impact on the stress level an average urbanite on the receiving end faces. These stressors according to Rocque *et al* (2015) if not decisively dealt with might lead to outbreak of violence, crime and disobedience of authorities (Murphy and Leach, 2013).

The five theoretical perspectives have been integrated into a general model built around the concept of stress defined as increased wear and tear in the body as a result of attempts to cope with environmental influences (Pacione, 2003). In the stress model, the experience or perception of the city is represented as a joint function of the objective environmental conditions (for example, population density, temperature, pollution levels) and the individual characteristics of the person (for example, adaptation level, previous experience, and time in the city). If the perceived environment is outside the individual's optimal range (for example, if it is over-stimulating, contains too many stressors, constraints behavior, or offers insufficient resources), stress is experienced which in turn, elicits coping. If the

attempted coping strategies are successful, adaptation and/or habituation occurs, though possibly followed by after such effects such as fatigue and reduced ability to cope with the next stressor (Pacione, 2003; Murphy and Leach, 2013; Roque *et al*, 2015).

Positive cumulative after effects would include a degree of learning about how to cope with the next occurrence of undesirable environmental stimulation. If the coping strategies are not successful, however, stress and/or arousal will continue, possibly heightened by the person's awareness that strategies are failing. Possible after effects include exhaustion, learned helplessness, severe performance decrements, illness and mental disorders. Finally, in the model, experiences feed back to influence perception of the environment for future events and contribute to individual differences which affect future experiences. Four general types of environmental stressors have been identified: cataclysmic events—for example, geophysical hazards. (b) ambient stressors—for example, air and water pollution (fumes from vehicle exhaust), (c) stressful life events—for example, death in the family, accident/crashes, caring for injuries daily hassles—for example, noisy neighbors, reckless and impatient driving, traffic congestion.

It is fairly well documented and known that haulers engaged in transshipment of products both on intra and inter-city routes account for a significant number of most stressed residents of urban centers (due to their condition of service and the nature of the job itself) and this arguably affect their attitude and compliance to safety practices (Loeb and Clark, 2007; Wilson, 2007; Potter and Lawalni 2008; Murphy and Leach, 2013). In recent years, the health of truck drivers and its influence on their job delivery has assumed a global concern (Loeb and Clark, 2007; Murphy and Leach, 2013). Accordingly truck driving is already being taken as one of the most dangerous occupations in the world (Behrends *et al*, 2008; Murphy and Leach, 2013; Benhood and Mannering, 2016). It has

also been ranked as the occupation with the greatest number of injuries and illnesses (Murphy and Leach, 2012). The use of the environmental stress model as it is applied in this study allows us to identify sources of stress, predict how certain environmental stimuli impact health and occupational lives of drivers.

2.7.5 Theory of Constraints in Supply Chain Management (SCM)

The theory of constraints (TOC) is a management science construct which views any manageable system as being limited in achieving more of its goals due to the presence of very small number of constraints (Goldratt and Cox, 1992; Goldratt, 1997; Martin and Paulova, 2010; Farouk, 2016). The application of the guiding philosophy of the Theory of Constraints (TOC) has proven useful in the identification, analysis and elimination of carefully detected constrictions restricting a firm's value adding process. The TOC construct was initially applied in resolving detected encumbrances limiting the manufacturing and production processes (Goldratt and Cox, 1992). The successes the application of its philosophy brought to the manufacturing processes coupled with the robustness of its constructs gave it a universal appeal, hence the application of its philosophy in the field of management sciences (Simatupang, 2003; Martin and Paulova, 2010; Farouk, 2016). Various scholars in recent times enthused how the TOC has evolved into a dynamic, powerful and systematic tool for problem detection. The construct of the theory has innate ability for altruistic problem identification, systematic methodology for problem solving and increasing ability for the identification of futuristic source of problem (Simatupang, 2003; Martin and Paulova, 2010; Farouk, 2016). This has made its application popular among scholars and managers in the industry as a problem-solving technique. Its ability to guarantee continuous improvement in the system wherein it is applied is also seen as another critical factor. According to Farouk (2016),

the TOC is increasingly being applied as a problem-solving tool in the field of supply chain management, planning, physical distribution and transportation.

Goldratt and Cox, (1984; 1994), designed and successfully implemented the Five Focusing Steps (5FS) framework as a unique problem solving construct. The construct of the framework consist of five interwoven process of implementing the TOC concept. The process consists of these five outlined steps (i) detection of the constraint impeding the throughput of the process, (ii) decision on how best to exploit (tackle) the earlier identified system constraints. (iii) prioritize the decision on how best to remove the identified constraints above every other decisions in the process or subordinate ever other thing in the process to the constraint, (iv) elevate the system's constraint by providing every support needed to achieve optimal throughput and (v) to prevent inertia any newly identified constraint in the process must be subjected to the process (from step 1-4). In the convectional TOC literature, these five interwoven steps are referred to as Process of on Going Improvement (POOGI). The processes was later extended to seven through the works of Ronen and Spector (1992), they added to steps which they enthused increased the robustness of the construct. The two steps are, (i) clear definition of the system's goal (what manner of throughput is desired) and (ii) determine the global performance measures (global best practices).

After a period of successfully implementing the 5 steps approach in resolving operational constraints, Goldratt (1994) subjected the TOC to a POOGI test by introducing a newer construct to guide in the improvisation of a more holistic framework in constraints prevention in organization (Goldratt and Cox, 1994; Dettmer, 2007). In the new approach which he labeled as "The Thinking Process" (Goldratt, 1994, p. 1), Goldratt proposed a new paradigm which he believed is required to boost the robustness of the TOC, he simplified the processes of solving identified constraints with asking the

“change” questions. The change questions which are required to be answered are; (i) what to change? (ii) What to change to and (iii) how to cause change? Unlike the 5steps processes, the Thinking processes of TOC focused more on the factors that are the causes of the constraints rather than the constraints themselves. Analysts believed that the Thinking Process constructs run on two types of logical perspectives; causality and conditional logics. The causality logic uses three developed frameworks to resolve constraints these are, the Current Reality Tree (CRT), Future Reality Tree (FRT) and the Transition Tree. On the other hand, the conditional logical perspective utilizes the Evaporating Cloud (EC) and the Prerequisite Tree (PT) (Watson *et al*, 2007; Tulasi and Rao, 2012).

Just like hierarchical ordering in the 5 steps processes, the TP framework also runs on processes pattern of five different stages. The first stage involved the identification of what requires a change in the entire process. The CRT, (which bear striking similarity to the current state of situation map used by some enterprises) — systemically evaluates the entire process with the sole intention of identifying the cause-effect relationship between the entire system and the undesirable effects (UDE's, also known as gap elements). Such identified gap or constraint is often the weakest link of the chain. Once the weakest link in the chain is found, the location of the root cause(s) of most of the undesirable effects could be easily effected (Rahman, 2002; Watson and Polito, 2003; Naor *et al*, 2013). The identification of the constraint limiting throughput within the system pave the way for proffering response to the second question of what to change to? To answer this question the EC and the FRT frameworks are deployed. The EC is designed as a conflict resolution diagram (CRD), it basically reveals the root causes of the conflicts and by using the conditional logic available options to replace the UDE or constraint with are

examined. The deployment of the FRT is usually the next, at this stage a future state map or futuristic state of the system which has benefitted from the two earlier stages (identification of the constraint and its replacement) is projected for critical examination. The FRT will guide against any new negative outcome that the change effected in the system could trigger (Cox *et al*, 2005; Naor *et al*, 2013; Farouk, 2016). The last two stages of the TPs focuses on how most appropriate the implementation of the change could be wisely done. The PRT framework first identified all the intervening objectives required to carry out the change and then the obstacles that must be overcome in the process of achieving the required change. (Cox *et al*, 2005). While the last stage is the TT, which is devoted to the detail description of all the processes to be followed in order to achieve the fulfillment of the plan necessary to implement the new changes (Naor *et al*, 2013; Farouk, 2016).

Review of extant literature on the application of TOC by field managers and the academia shows that it is useful in the provision of valuable benchmarks in the achievement of distributional throughput in the field of Supply Chain. It is also a useful tool for operational, tactical and strategic planning in the sustainable management of an organization. For example, in the field of physical distribution (transportation of materials) TOC is usually employed in the identification of organizational constraints which can negatively affect the achievement of consistent deliveries or throughputs. The focusing steps and thinking process techniques are used in the identification and classification of constraints either as being internal or external. Internal constraints are those that militate against the achievement of timely and consistent deliveries of goods to meet the market demand (Watson and Polito, 2003).

For a firm engaged in distributive activities such internal constraints include issues relating to equipments (vehicles, plants, spare parts), employees (skilled drivers, safety consciousness) and organizational policies on the level of deployment of scheduling techniques like Drum –Buffer-Rope (DBR) and Distribution Resource Planning (DRP), evidences have shown that these techniques when effectively deployed have the capacity to buffer the system against variability in inventory levels (Gardiner *et al.* 1993; Watson and Polito, 2003). There is a wide spread acceptability among scholars (Gardiner *et al.* 1993; Watson and Polito, 2003) in the field that these techniques (DBR and DRP) are ideal for strategic (3-5 years), tactical (3-6 months) and operational (daily) planning and control of inventory throughput. External constraints on the other hand are those that are purely market driven and are not as a result of any internal disruption in the supply chain flow, for example a glut in the supply of products to market (Goldratt, 1997; Watson and Polito, 2003; Simatupang *et al.*, 2004).



University of Fort Hare

Together in Excellence

One other area of keen interest to researchers in the field of SCM is the application of Theory of Constraints to supply chain management and physical distribution (Goldratt and Cox, 1992; Goldratt, 1997; Watson and Polito, 2003; Simatupang *et al.* 2004). The purpose of the TOC distribution solution is to establish a decisive competitive edge based on extraordinary availability by dramatically reducing the damages caused when the flow of goods is interrupted by shortages and surpluses. Scholars evinced that the application of TOC to SCM and the physical distribution environment has led to reduction in inventory investment, improve lead time, reduce transport costs while simultaneously increasing forecasting accuracy and satisfying customer's level (Ireland and Bruce, 2000; Watson and Polito, 2003; Simatupang *et al.* 2004; Goldratt, 1997). Evidences from the literature indicated that the nature of

constraints experienced by haulers engaged in physical distributive activities are internal in nature and may be similar across national geographical borders, although there is a general consensus by scholars that there are pockets of heterogeneity due mainly to prevailing socio-economic, climatic factors and legal framework guiding haulage operations in different countries (Savage, 1989; Chopra and Sodhi 2004; Loeb and Clark, 2007; Potter and Lawalni 2008). According to Potter and Lawalni (2008) some of the globally identified constraints are; fatigue due to long distance driving, sleeplessness, alcohol and substance abuse'. Other recognized constraints (Bombana *et al*, 2017) include traffic build up occasioned by construction work zones, gridlocks in and around city's centers (especially at peak hours) crashes, breakdowns, extreme weather conditions and suboptimal traffic controls.



Studies in the Nigerian milieu agreed on the presence of some of the identified constraints associated with achieving distributional throughput (Oni and Okanlanwon, 2006; Oni, 2008; Mamman, 2008; Abdumaliki and Omokhogio. 2009). Other identified constraints that militates against an efficient physical distributional system in Nigeria include poor state of road network, narrow bridges, menace of armed robbery on highways, harassment by security officials, touting, delays occasioned by traffic congestion, outright non-delivery of consignments consequent upon accidents, shortage or scarcity of fuel, incessant vehicle breakdown and traffic hold-up in urban centers (Mamman, 2005; World bank, 2007; Oni, 2008; Abdumaliki and Omokhogio 2009; Obasanjo *et al*. 2014). Obasanjo *et al*, (2014), observed how puerile it may be to holistically adopt these identified constraints associated with physical distribution of other commodities to petroleum products without due recourse to Nigerian environment. The differentials in the economic regulation of rates, costs of procurement and maintenance of Heavy Goods Vehicle (HGV) used

in long distance haul of the products, entry and standard of practice influences the operating practices of the sector given the dangerous goods designation of petroleum products, may weakened the basis for such wholesome adoption (Ubogu *et al.* 2011; Obasanjo *et al.* 2014).

The application of TOC in this research revolves around the utilization of the theoretical framework for the identification, analyses and possibly elimination of the constraints that impede against the safe distribution of petroleum products by haulage trucks in Ibadan metropolis. The TOC rigorous and robust constructs can be a veritable tool for the identification of constraints assaulting the effective SCM of petroleum products in the study area. It can also provide a guidance on the nature of change the system requires and how best to implement such changes.



University of Fort Hare
Together in Excellence

CHAPTER III: THE STUDY AREA

3.0. This chapter is dedicated to the discussions on the study area and the research methodology employed by the researcher for the achievement of the various objectives of the study. Mixed method was employed for both data acquisition and analysis. Detailed explanations of data sources, sampling techniques and data analytical processes are given in this chapter.

3.1. Study Area

The city of Ibadan is located approximately in longitude $3^{\circ}51'E$ of the Greenwich Meridian and latitude $7^{\circ}33'N$ of the equator (Figure 3.1). It lies at a distance of 145 kilometers north-east of Lagos (Nigeria commercial capital) and 530 km south-western of Abuja (Nigeria administrative capital). (Filani, 1994). Ibadan transport connections with its regions and outside world are highly related to its geographical location (the city is located in a frontier zone between the forest to the south and the grassland to the north). Its administrative function includes, being a rallying point for the entire Yoruba race since its emergence in 1829 as a war camp and also as the capital of the Western region in 1946, and from 1976 till date as the capital city of Oyo State and its commercial function. Ibadan metropolis covers a total area of 3,080 square kilometers (1,190 sq mi), the largest in Nigeria, West Africa and arguably one of the largest on the continent of Africa (Filani, 1994; Mabogunje, 2002; Ajayi, 2016).

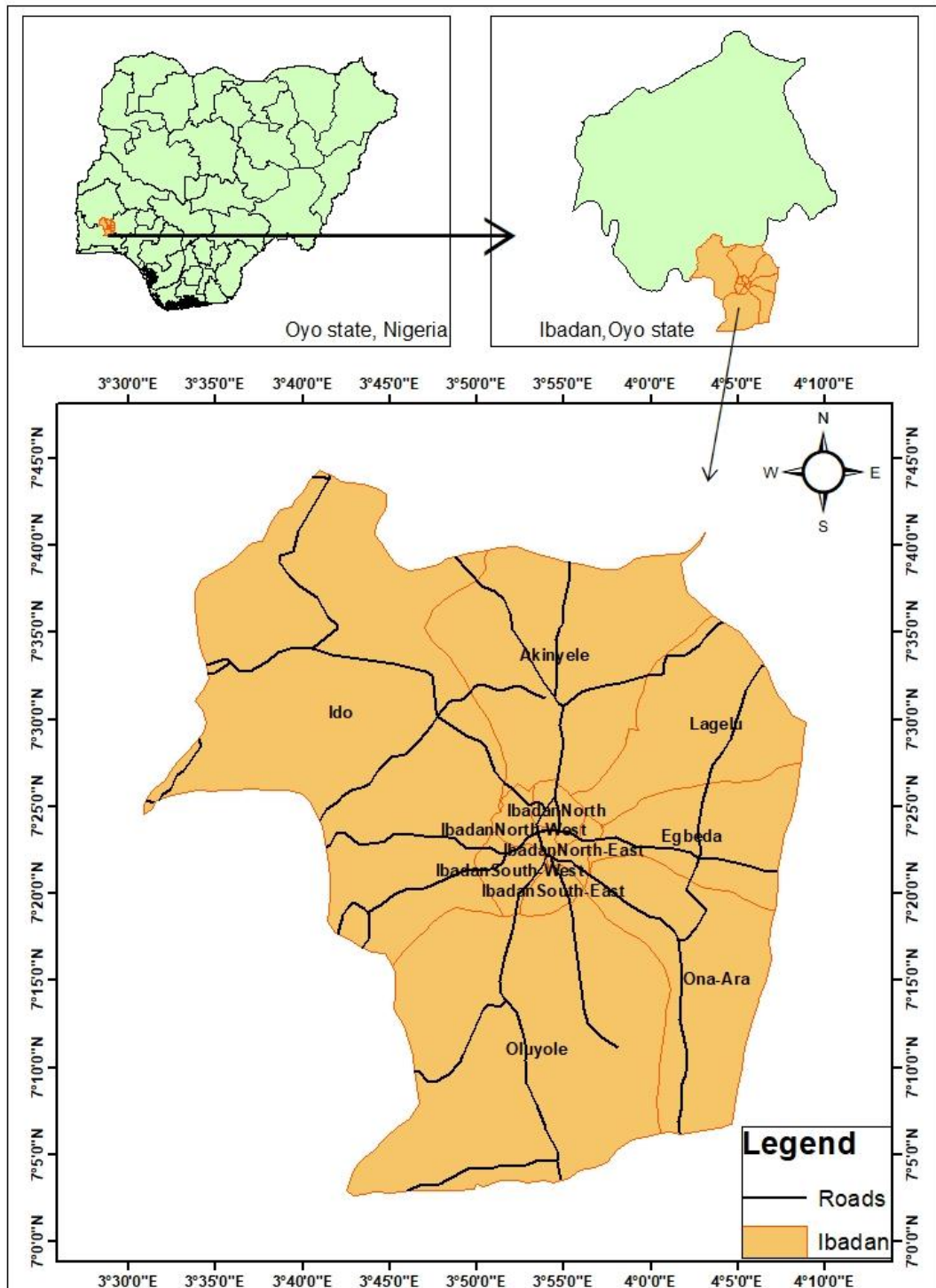


Figure 3.1: Map of Ibadan (Oyo state) as a subset of Nigeria

It is on record that from the latter part of the 19th century, the growth in the expanse of Ibadan assumed a phenomenal dimension. As of 1952, the total area of the city was put at 103.8 km² with only 34.8% (36.2 km² being the built-up zone while the

remaining 67 km² were devoted to non-urban uses). The spatial extent of the city had a symmetrical growth with the attainment of Nigeria's independence in 1960. New industrial zones were carved out in Oluyole Industrial Estate (southwestern part of the city). Various research institutes were located in different hitherto unoccupied sections of the city and new housing estate to cater for the workers of these new workplaces were built near them (Filani, 1994; Mabogunje, 2002; Ajayi, 2016). A 1973 aerial photograph of the city showed that the urban zone had completely covered about 100 km². The trend continued in the succeeding years as more industrial, educational and commercial activities lured more population into the city. The spatial extent grew from 136 km² in 1981 to 210–240 km² in 1989. The size grew to around 400km in the year 2000, as of today it is estimated that Ibadan metropolis presently covered over 600 km² -(Filani, 1994; Ajayi, 2016). Ibadan presently is spatially divisible into two, particularly when the spatial densities or clustering of structures within the city is considered. There is the core which is the older section of the city, where the ancient city originated from and the 'European planned section' of the city. This section of the city was the site of development before and immediately after the advent of colonialism. It is also the residents of the first set of elites in the city and also the hub of commercial activities.

By the 1960's this section of the city became saturated and the development extended to the surrounding peripherals of the Ibadan city. The peripherals of Ibadan metropolis has been the zone where unabated structural developmental activities has been on-going in the last five decades (save for some cases of gentrification in the older section of the inner city). It should be noted that the peripherals section of the city do not enjoyed the detailed planning seen in some zones of the older city originally planned by the European colonialists. Due to this

oversight, the newer section of the city do not enjoy an even distribution of basic amenities, commercial activities and governmental institutions when compared with the European planned section of the inner city (Filani, 1994; Mabogunje, 2002; Ajayi, 2016).

Administratively the city is divisible into eleven local government areas (Figures 3.1,3.2&3.3.5). Five of these areas are within the core (inner or older) section of the metropolis (Figure 3.4). These are Ibadan North, North West, North East South West and South East. Incidentally these five local government areas are the zones where we have higher rate of clustering of residential quarters, commercial hubs (major markets) and of many of the first generation governmental institutions (Figure 3.3.3.4). The main Central Business District (Dugbe-Agbeni) and the emerging Central Business District of Iwo Road are also both located in this section of the city. The remaining six local government areas; Ido, Akinyele, Egbeda, Ona-ora, Lagelu and Oluyole are domiciled in the peripheral zone of Ibadan metropolis. The peripheral zone geographically 'surrounded' the old section of the city, sprawling in all directions. It has been the zone with higher rate of structural development between the two in the last three and half decades (from the 1980s till date). Though, presently with lesser clustering of structures, there are stronger evidences of disobedience to urban planning standards guiding land use. There are more indications of mixed land uses (for example the unethical location of commercial activities in residential zones) in this section of the city (Filani, 1994; Mabogunje, 2002).



University of Fort Hare
Together in Excellence

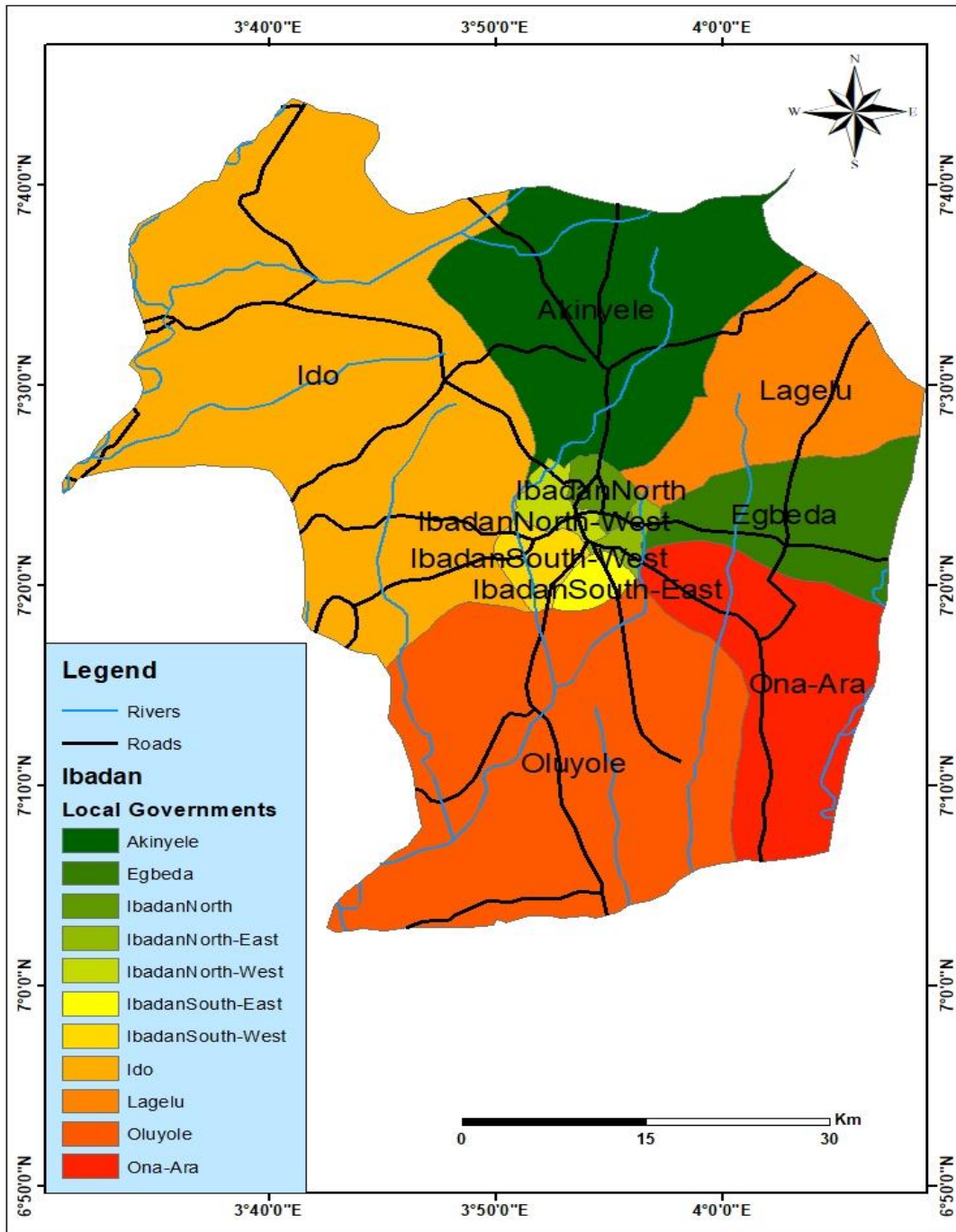



Figure 3.2: Political and Administrative Map of Ibadan Metropolis showing the 11 Local Government Areas

Historically, one key determinant of urban spread in the peripheral section of Ibadan metropolis is the opening up of expressways and the attendant commercial activities on such routes. In the 1980s, the Ibadan-Lagos expressway generated the greatest urban sprawl (east and north of the city), followed by the Eleyele expressway (west of the city). Presently, the newly reconstructed Akala expressway in Podo axis of the city (the southern tip of the city), the Akobo-Bashorun and the Arulogun-Ojoo expressways (the northern axis) are some of the new zones generating greatest urban sprawl. Overtime Ibadan has evolved into a cosmopolitan city offering homes and business opportunities to residents from all works of life. It is particularly a major Nigerian road transport hub with freeways linking it with Lagos (Nigerian commercial capital) to the South. It also provides linkages' to Abeokuta to the West, Oyo, Ogbomosho, Offa,  and Ilorin to the North. While Ife, Ado Ekiti, Osogbo, Ilesha, Akure, Benin City, Okene, Auchi and other cities are linked by these freeways to the Eastern part of the country. The city has a functional airport and a railway terminus which provides linkages to other cities in the country. The main modal choice for intra-city transportation is road transport. Walking, taxi cabs, taxi-vans commonly called *Danfós*, mass transit buses, commercial motorcycles (Okada) and the use of private/personal/family cars are the means of intra-city transport in Ibadan metropolis. Intercity transport services are provided by commercial buses/taxi vans and Coach (bus) services (Filani, 1994; Mabogunje, 2002; Ajayi, 2016).

Ibadan is Nigeria's third largest city in terms of population size (Figure 3.3), although it is the largest when physical size is considered is an important economic growth pole in the southwestern region of the country. Economically it is the capital of the state with the fourth largest Gross Domestic Product (GDP) in Nigeria and the second

largest non-oil state economy in after Lagos state. With its strategic location as a frontier zone between the forest zone of South Western Nigeria and the grassland of Northern Nigeria, it has evolved over time to an important break-of-bulk-of trade point. A location where various agricultural produces (like cassava, cocoa, cotton, rubber, and palm oil) from the southern part and grassland farm produce (like cattle, groceries, dairy products, and some seasonal fruits) from the northern part of the country are routinely traded. The city is also home to different industries in the Agro allied sector, while global and local manufacturing concerns in Textile, Food processing, Breweries, Bottling, Health Care, Cosmetic, Tobacco processing, and Cigarette abounds within the city. The thriving business and employment opportunities the city offers naturally engender the flow of migrants to it yearly. Catering for the transportation need amongst other competing needs of the inhabitants has remained a nagging headache for the city administrators (Filani, 1994; Mabogunje, 2002; Ajayi, 2016; NBS, 2016; NPC, 2016).



University of Fort Hare
Together in Excellence

The recent unwieldy growth witnessed in the city spatial extent could be attributed to the influx of migrants from neighboring settlements and the non-adherence to the master plan guiding the planned expansion of the city. One of the resulting effects of the increment in both the city population (Table 1) and spatial extent has been the increment in automobile acquisitions, as the distances between important nodes of activities (workplaces, CBD, markets, schools, hospitals) increases so do the increment in numbers of vehicles. Fuel retailers being the quintessential businessmen exploited this situation by the unethical proliferation in the arbitrary openings of retail outlets in unauthorized locations, both within the city (core) and the peripherals. The challenges occasioned by this development are hydra-headed, fuel retail outlets are sandwiched in zones ideally meant for other uses within the city, and

haulage vehicles shipping the products to these retail outlets periodically have difficult discharging the products safely because the width of the roads leading to the outlets are not in conformity to the axle size of the haulage trucks. At the peripherals or peri-urban zones of the city (Figure 3.5), inter-state freeways are cluttered with fuel retail outlets at the detriment of other categories of the road. The situation simply negated the principle of distributive justice as residents in the peri-urban zones are not adequately serviced while those in the core zones are “over saturated’ with fuel retail outlets. It was also discovered that there is slack compliance to the Town Planning stipulation guiding the location, and distribution of fuel retail outlets either within the city (core zone) and the



University of Fort Hare
Together in Excellence

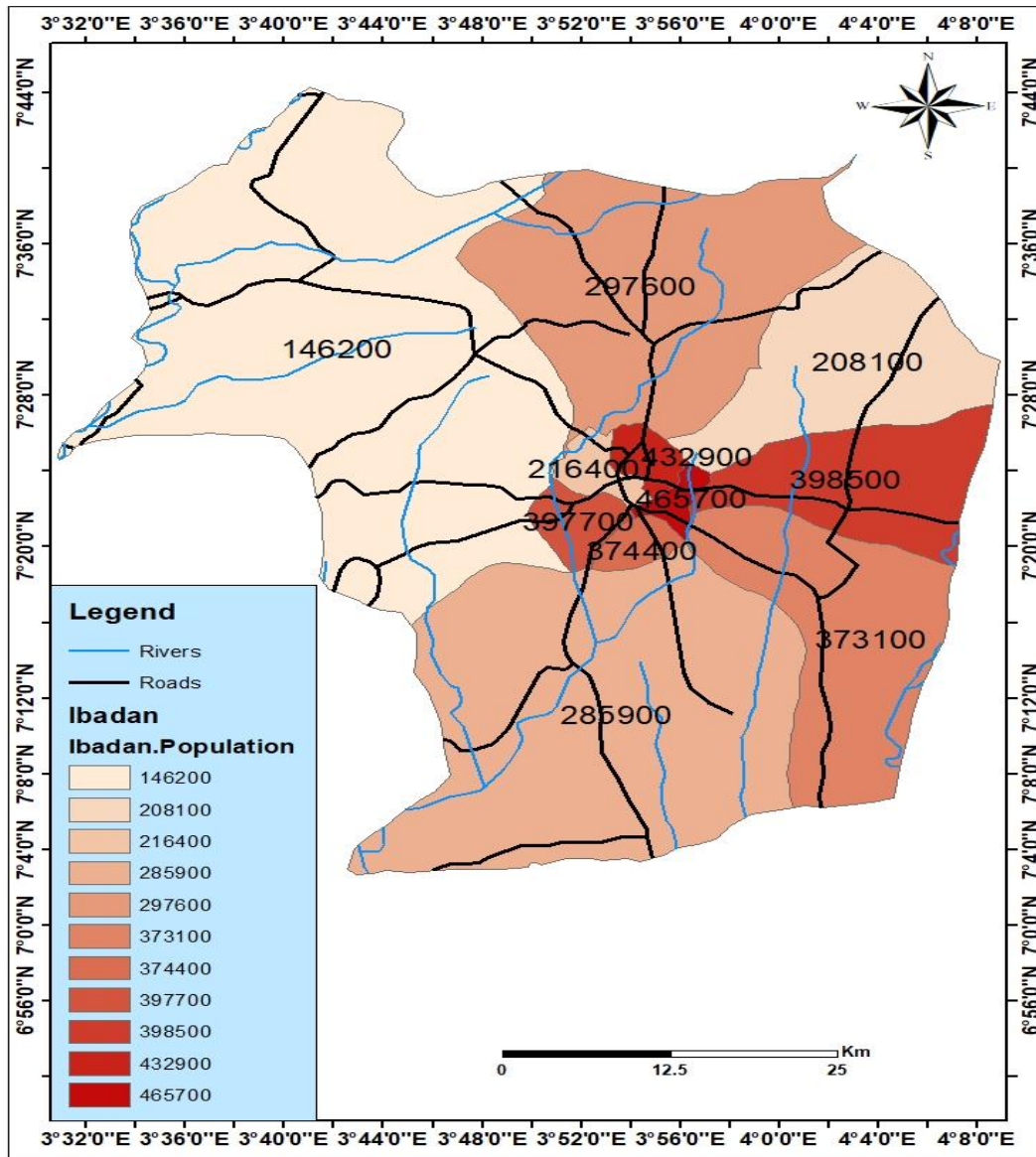


Figure 3.3: Map Showing the Spatial Pattern of Population Distribution of the 11 LGAs in Ibadan Metropolis

peri-urban (peripheral zone). For example, the law guiding the establishment of fuel retail outlets within the built-up zone stipulates that the distance between two retail outlets on the same route (road) should not be less than 400 meters while for those in the peri-urban zones should not be less than 800 meters, there is a general disregard of this law. Retailers either within the city built up zone (core) or the peri-urban (peripherals) had difficulty complying with the dictates of this regulation (Filani, 1994; Mabogunje, 2002; Ajayi, 2016; NBS, 2016).

Ibadan metropolis is being considered as a study area because of the following reasons; first, the city represents a typical African pre-colonial traditional city with the attendant urban land use/ transportation planning problems. With significant increment over time in both population size (Figure 3.3 & Table 1) and spatial extent (with a population size in the region of 4 million), there are needs for empirical analysis on the spatial pattern of fuel service stations and the roles such distribution play in the achievement of adherence to the principle of distributive justice in the allocation of public services and the gaining of insightful exposition on the supply chain management of petroleum products in a traditional Africa metropolis. It is also needful that a study that examines the relationship between urban freight transshipment and the use of intelligent transport system navigational aids in developing countries is carried out. It is hoped that a study such as this will facilitate seamless urban good transshipment, help in militating against artificial shortages of petroleum products and aid in urban land use/ transportation planning (Abdumaliki and Omokhogio 2009; Obasanjo *et al.* 2014; Benai and Antipova, 2016; Ajayi, 2016).



University of Port Harcourt
Together in Excellence

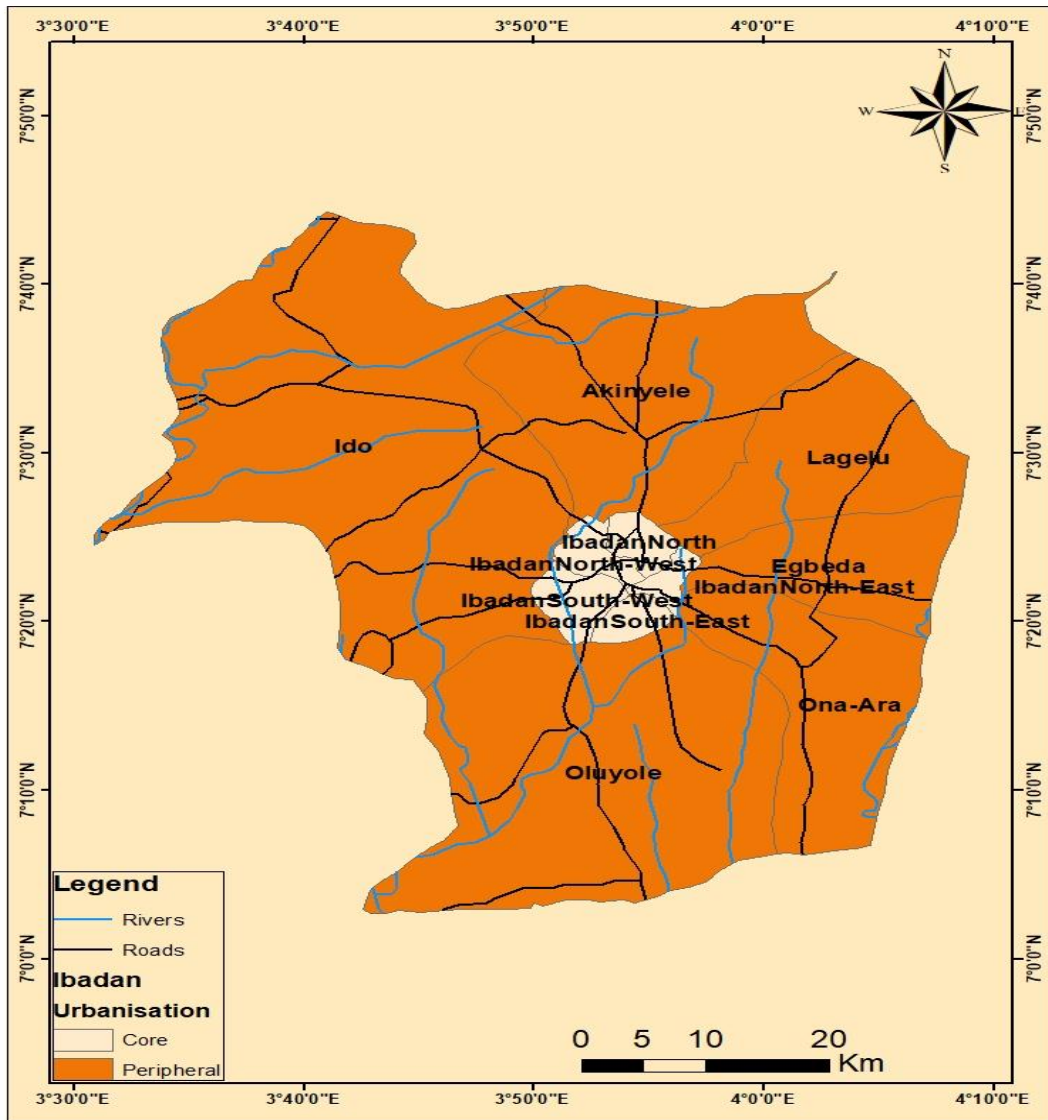


Figure 3. 4: Map Showing the Core and Peripheral Zones of Ibadan Metropolis

Table 3.1. THE BREAKDOWN OF IBADAN METROPOLIS POPULATION BETWEEN THE CORE AND PERIPHERAL ZONES

Name	Status	Population Census 1991-11-26	Population Census 2006-03-21	Population Projection 2016-03-21
Name of LGA	Status			
Akinyele	Peripheral	140,118	211,811	297,600
Egbeda	Peripheral	129,461	283,643	398,500
Ibadan North	Core	302,271	308,119	432,900
Ibadan North East	Core	275,627	331,444	465,700
Ibadan North West	Core	147,918	154,029	216,400
Ibadan South East	Core	225,800	266,457	374,400
Ibadan South West	Core	277,047	283,098	397,700
Ido	Peripheral	53,582	104,087	146,200
Lagelu	Peripheral	68,901	148,133	208,100
Oluyole	Peripheral	91,527	203,461	285,900
Ona-Ara	Peripheral	123,048	265,571	373,100
Total		1,835,300	2,559,853	3,596,500

Source: Adapted from figures of National Population Commission of Nigeria (web) and National Bureau of Statistics (web) (2016).

Analysis from the Table1 based on the 2016 projected population figures supplied by the National Population Commission above shows thus;

Population of Residents in Core zone of the metropolis= **1,887,100**

Population of Residents in Peripheral zone of the metropolis= **1,709,400**

This means that **52.47%** of residents in the city are living within **the core zone**, while **47.53%** are living in the **peripheral zone** of the city.

Table 3.2. DISTRIBUTION OF FUEL SERVICE OUTLETS OWNED BY MULTINATIONALS AND GOVERNMENT OWNED OIL CORPORATION

S/N	Roads	Con Oil	Mobil	Forte	Total Fina	MRS	Oando	NNPC	Tot	Urban locati Classification
1	Ibadan-Lagos Express	1	2	1	-	1	2	5	12	Peripheral
2	Sango-Bodija-U.I.-Ojoo	6	4	-	1	3	5	-	19	Core
3	Mokola-Dugbe-Gbagi-Oke Padre-Merin	2	1	3	8	1	1	1	17	Core
4	Oke-Ado-Molete-OdoOna-Challer	1	-	2	2	2	2	-	9	Core
5	New Garage-Podo-Idi Ayunre	1	1	2	3	2	-	-	9	Peripheral
6	Apata-Owode-OmioAdio	3	2	1	2	1	2	1	12	Core-Periphera
7	Sango-Ijokodo-Apete-Eleyele	2	-	2	2	-	3	-	11	Core
8	Ring Road-One Ten Road-Oluyole	-	1	1	3	-	1	-	4	Core
9	Gate-Ojee-Beere-Ojo Oba-Aremo-Agugu	3	-	3	6	1	3	-	16	Core
10	Adeoyo-Yemetu-Total Garden-Old Ife Road	1	2	2	4	-	4	-	13	Core
11	IdiApe-Iwo Rd-Interchange-New Ife Road	2	1	1	3	1	2	3	13	Core Periphera
12	Olodo-Iyana Church-Iwo Rd	3	-	-	2	-	-	-	5	Peripheral
13	Ojoo-Moniya-Akinyele	1	-	1	2	1	1	-	6	Peripheral
	Total Number of Stations	26	14	19	38	13	26	10	146	

Source: Extracted from the records of NNPC 2017

Table 3.3: PATTERN OF THE SPATIAL DISTRIBUTION ON ROADS/ZONAL DELINENATION OF PRIVATELY OWNED (IPMAN) OUTLETS

S/N	ROADS	Actual Numbers of Fuel Retail Outlets	Percentage of the Total	Urban locational Classification
1	Idi-Ape-Bashorun--Akobo-Olorunda	12	4.19	Peripheral
2	Mokola-Samonda-U.I.-Ojoo	9	3.14	Core
3	Yidi-Gate-Old Ife Road	16	5.59	Core
4	Sango-Junction-Ijokodo-Apete	6	2.09	Core
5	Mokola-Dugbe-Sango-OkePadre	12	4.19	Core
6	Gate-Oje-Mapo-Molete	6	2.09	Core
7	J-Allen-Molete-Challenge-New Garage	18	6.29	Core
8	New Garage-Akala E-way Idi Ayunre, Apata- Abeokuta E-way	28	4.54	Peripheral
9	Odo-Ona-Apata-Abeokuta E-way	10	3.5	Core
10	Lagos-IB-Tollgate-Iwo road-Ojoo	27	9.44	Peripheral
11	Iwo road Interchange -New Ife Road-Toll Gate/Monatan-Leyland-Egbeda	39	13.63	Peripheral
12	Ojoo-Moniya-Sasa/ Gofamint Rd-Arulogun-Akinyele	25	8.74	Peripheral
13	Challenge-Ring Road/Akala Expressway- Elebu	8	2.79	Core
14	Olorunsogo-Ogbere-Akanran	15	5.24	Peripheral
15	Moniya-Iseyin Road	11	3.84	Peripheral
16	Elekuro-Muslim-Oremeji-Gbaremu	12	4.19	Core
17	Jericho-Eleyele-Ologuneru-Elere-Ido-Eruwa Road	19	6.64	Peripheral
18	Total Garden-Yemetu/Agugu-Orita Aperin-Eleta-Olomi Academy	13	4.54	Core
	Total	286	99.88	

Source; Extracted from the records of IPMAN 2017

3.2 Research Design

Research Design is the careful and concise outline of the plan, structure, and strategy employed for the investigation of the central aim of the study, which is the Analysis of Retail and Transport Geography of Petroleum Products Distribution in Ibadan metropolis, Nigeria. The design is broken down into the planning, structuring, and the strategic phases. The planning phase took care of the research scheme through which the exercise was done. The structure phase carefully specified the research outline, while the strategic phase depicted how the research objectives were achieved, including the methods used in data collection and their analyses. For the purpose of this study cross-sectional survey and experimental types of designs were employed. The elements of which included descriptive, exploratory, explanatory and actual fieldwork designs. All these are used in the achievement of the purpose of the study (Creswell, 2003; Kothari, 2004; Creswell and Clark, 2011; Rucks-Ahidiana and Bierbaum, 2015).



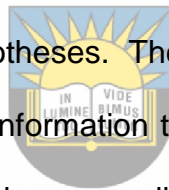
University of Fort Hare
Together in Excellence

3.3 Research Method

Mixed methods which are the combinations of both quantitative and qualitative research techniques are employed in this study. It has been observed that the employment of mixed methods in the collection, analysis and presentation of a research exercise offers a deeper insight and truer reflection of the subject of the study (Creswell, 2003; Kothari, 2004; Creswell and Clark, 2011; Rucks-Ahidiana and Bierbaum, 2015).

Due to the central aim of this study which is to examine a rather complex research problem bothering on the Analysis of Retail and Transport Geography of Petroleum Products Distribution in Ibadan Metropolis, it was decided that the mixed methods

will give room for the most comprehensive analysis. Existentialists in the field of land use studies are increasingly leveraging the unique opportunities which mixed methods or research triangulation offers as the essential tools for unbiased and balanced analyses on the discourse (Creswell and Clark, 2011; Zawadi and Ariel, 2015). On the basis of this fact I decided that the employment of mixed methods - which combined the two popular techniques (qualitative and quantitative) are most appropriate to unearth some of the nuances that dictated the dynamics of the retailing/transportation of petroleum products over time and space in Ibadan metropolis. While the use of a quantitative technique of hypotheses testing at a given confidence level (in this case at 95% level) brought scientific rigor into the analytical processes, which provided guidance in the formulation and rejection (or acceptance) of the null hypotheses. The qualitative research technique of oral interviews provided insightful information that did not only compliment findings from the quantitative analysis but also unravelled vital information that statistical figures cannot reveal.



University of Fort Hare
Together in Excellence

3.4 Study Population

For the purpose of this study, three different, but slightly interrelated groups are chosen for investigative purposes. These are the fuel retail outlets (which coordinates were collected as part of the study) in Ibadan metropolis, the managers/owners of these retail outlets and the truck drivers (haulers) who drive the articulated trucks used for the conveyance of petroleum products to these outlets. The pre-field exercise was carried out to determine the actual numbers fuel of retail outlets available in the eleven local councils of Ibadan metropolis. The official statistics on the numbers of fuel retail outlets in Ibadan were obtained from two sources, these are; the zonal headquarter of Independent Petroleum Market

Association of Nigeria (IPMAN) and the Department of Petroleum Resources (the Federal Government Agency in charge of licensing and regulating the activities of fuel retail outlets). The official records and pre-field exercise showed that there are 432 fuel retail outlets in Ibadan metropolis. These are made up of 146 outlets owned by 6 multinational oil companies and the Federal Government owned oil firm (NNPC) participating in the downstream sector of the Nigerian petroleum industry, these are Oando, Forte, Mobil, MRS (Texaco), Total and Conoil. The remaining 286 fuel retail outlets are owned by individual investors who registered their fuel retail outlets as privately owned business entities. These retailers operate under the aegis of Independent Petroleum Marketers of Nigeria (IPMAN).

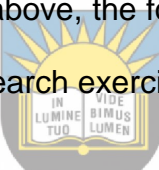
Further distribution of the fuel retail outlets on the basis of their spatial pattern showed that 168 (38.88%) are located solely in the core zones of the metropolis, 128 (28.2%) are located on routes that transverses between the core and peripheral routes. While the differentials of 142 (32.87%) of these retail outlets are located in the peripheral zones.

3.5 Sample Frame and Sample Size

Sampling frame broadly defines the total number of all the units in a given population under study. It is also a strong determinant of the structure or form through which an unbiased investigation can be made (Sapsford and Jupp, 1996; Zawadi and Ariel, 2015). A good sampling frame should satisfy the quality of being a fair representation of each identifiable element in a sampled population. This simply translates to the fact that all the members of the population under study in this research exercise (the total numbers of fuel retail outlets in the study area, the total numbers of their managers and the total numbers of the haulers servicing the sales' outlets) were fairly considered in the sampling frame. While it is obvious that different types of

models have been developed for scientific estimation of sample size in research endeavors, it is generally agreed upon by scholars (Gunther, 1973; Sapsford and Jupp, 1996; Zawadi and Ariel, 2015) that the population size being studied and the nature of the data generated (whether continuous or categorical) are germane in the determination of the best choice amongst various options. For the purpose of this study, the total sampling technique (Gunther, 1973) was chosen. The premise behind the choice of the technique is a derivative of the fact that it is most ideal when the population being sampled is not too large (<500) and also when the data being considered are either continuous or categorical in nature (Gunther, 1973).

On the strength of the application of both the sampling frame and sampling size techniques as conceptualized above, the following data are collected for the purpose of achieving the aim of this research exercise;

- 
- The logo of the University of Fort Hare, featuring a shield with a sunburst at the top, an open book in the center, and the Latin motto 'IN LUMINE TUO VIDE BIVOS LUMEN' on a banner below the book. The shield is flanked by two figures, possibly representing the university's founding figures.
- University of Fort Hare
Together in Excellence
- (a) The coordinates of all the 432 fuel retail outlets in the metropolis.
 - (b) All the 432 owners/managers of fuel retail outlets were sampled with questionnaires from which 256 (approximately 60%) were retrieved and subsequently used to analyze objectives one and two.
 - (c) All the 389 registered members of Petroleum Tanker Drivers (PTD) association which are affiliated to each of the retail outlets either as a direct employee or an outsourced staff. 265 (around 70%) of the respondents returned the questionnaires given to them which were then utilized for analyzing some of the study set objectives.

3.6. Data Sources

3.6.1 Data needed

Records of the distribution of fuel retail outlets, Point Data of Fuel Retail Outlets, Street/Road Map of Ibadan Metropolis, Quick bird Imagery of Ibadan, Geographical Information System (GIS), Geographical Positioning System (GPS)

1. Objective One

To investigate the spatial arrangement of petroleum products retail outlets between the core and peripheral zones of Ibadan metropolis

For the achievement of this objective the data required included a 2017 Quick bird imagery of 2.5 meters resolution, a recent street/road map of Ibadan (sourced from the map depot of Oyo State Ministry of Lands and Surveying) and locational records of all the 432 fuel retail outlets in the Eleven Local Government Area of the metropolis (which was obtained from the Department of Petroleum Resources an agency in the Federal Ministry of Petroleum Resources). Furthermore, a handheld Geographical Positioning System (Garmen 76X Model) was used to pick the coordinates of all the 432 fuel outlets in order to obtain their coordinates and to further synchronize the records of the DPR with the actual fieldwork records. Part of the data obtained from the DPR contained information on the exact date each fuel retail outlet obtained final approval on their completed building/structure. Such information is vital in the actual investigation on the compliance rate among the FRO. The date of final approval of each is vital in the determination of which FRO disobeyed planning stipulations if two or more FRO are clustered in same location/zone. The FRO with the oldest record of approval is recognized as being the one with the 'authentic approval'. MS Excel was to analyse the data, presented as tables and simple percentage summations of the inventoried data. To test the first

hypothesis of the study (which is to examine if there are significant differences in the level of compliance with stipulated planning guidelines on the establishment of petroleum product retail outlets located within the built up areas from those in the peripheral zones of the metropolis) buffering and proximity analyses in the ArcMap environment of ArcGIS 10.1 were used to find out the actual numbers of these outlets that complied with these standards and inferential statistical technique of paired t-test. The resultant maps and the results from the descriptive statistics were used in the discussion of this objective.

3.6.2. Required Data

Questionnaires sampled from all the respondents (owners/managers of fuel retail outlets in the study area), where the views of the sampled respondents on the possible determinants of location of fuel retail outlets (cost of land, nearness to highways, population density, proximity to competitors and the distance from Central Business District (CBD)/ accessibility for haulage trucks) were obtained. The information received provided insight into what influenced the decisions to site the fuel retail outlets either in the peripherals or core zone of Ibadan metropolis.

Objective Two

To identify and analyze the criteria which are used by retail outlet owners to determine the present site of petroleum products retail outlets (i.e., whether it is located within the core or peripherals of Ibadan metropolis)

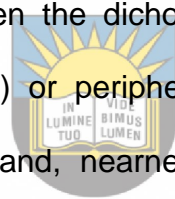
Four hundred and thirty-two (432) representing the total numbers of the managers/owners of all the retail outlets in the entire metropolis were sampled as respondents. From which 256 (approximately 60%) were eventually retrieved and deployed for the achievement of the second objective of this study. The derived hypothesis which helped in the realization of this objective is thus - The determinants

of the present locations of retail outlets (either in the core or peripherals of the metropolis) are significantly influenced by prevailing price of landed property, closeness of such location to highway/busy route, proximity to zones with high population density, distance from to the Central Business District (CBD)/accessible road network for haulage trucks and proximity to competitors. For the purpose of testing the formulated hypothesis, logistic regression was used. Logistical regression is most ideal when dealing with a dependent variable that is dichotomous and categorical. Once it is established that the dependent variable is dichotomous it becomes impossible to predict a numerical value for it using logistic regression (as it is usually done when using regression least squares deviations criteria for best-fit approach or minimizing error around the line of best -fit). Rather, logistic regression utilizes binomial probability theory which usually provides for only two values to predict: that probability (p) is 1 rather than 0. For example, as it is employed in the hypothesis above; the dependent variables are dichotomous – the fuel retail outlets could only be located either in the core (0) and peripherals (1). Logistic regression gives the best fitting equation or function through the use of the maximum likelihood method, which maximizes the probability of classifying the observed data into the fitting category given the regression coefficient (Akinci *et al*, 2007; Peng and Chao-Ying, 2016; Aglaia, 2018).

Just as it is with cases involving ordinary regression, logistic regression also have a coefficient 'b', which gives the measurements of each independent variable's partial contribution to the observed variations in the dependent variable. The ultimate goal when employing logistic regression is to achieve the correct prediction for each category of outcome for individual cases using the most parsimonious model. To accomplish this goal, a model or an equation is built that contains all the predictor

(independent) variables that can successfully predict the response (dependent) variable. Once these variables are quantified properly, they are, fitting to be entered into the model in the order deemed most fitting by the researcher in a stepwise fashion like regression (Akinci *et al*, 2007; Peng and Chao-Ying, 2016; Aglaia, 2018).

In a summary, for the purpose of this research logistic regression helped in the accomplishment of these two key points, first, it gave the accurate prediction of each of the group membership (core or peripheral). Logistic regression as a rule of thumb determines the probability of fuel retail outlets being sited either in the core (0) or the peripherals (1) in the form of this odd ratio (failure or success). The second point is that logistic regression gave an illuminating insight to the nature of the relationships/strengths between the dichotomous dependent variable (fuel outlets being located at the core (0) or peripheral (1) and the 5 different independent predictor variables (cost of land, nearness to highway, population density, and proximity to other retailers and accessibility/distance from CBD).



University of East Hornu
Together in Excellence

The standard formula for logistic regression analysis is thus;

$$\text{logit}(Y) = \text{natural log}(\text{odds}) = \ln(P / 1-P) = \alpha + \beta X \dots \dots (I)$$

Where the logit Y is the natural logarithm (\ln) of odds of Y and these odds are the ratios of probabilities (P) of Y occurring (the fuel retail outlets being located in the peripheral zones of the metropolis), and the probabilities ($1-P$) of Y not occurring (the fuel outlets being located in the core zones of the metropolis).

β is the logit regression of the odds. On taking the antilog of Equation I on the two sides, a new equation which can accurately predict how the independent variables influenced the decisions behind the location of the fuel retail outlets either in the peripheral or core zones of the metropolis was derived;

$P = \text{Probability}(Y = \text{outcome of interest} \mid X = x,$

a specific value of X =

$$P = \frac{e^{\alpha + \beta X}}{1 + e^{\alpha + \beta X}} \quad \text{.....(II)}$$

The variables of the new Equation are given thus;

P = the probability that a case is in a particular category, in this case the probability that the independent variables determined the odds of locating the fuel retail outlets either in the peripherals or the core zones of the metropolis

e = the base of natural logarithms (approx 2.72),

a = the constant of the equation

b = the coefficient of the predictor variables

Y = the categorical dependent variable in the logistic regression

X = the independent variables which can either categorical or continuous

Note; A categorical dependent variable (Y) is a must as this is the probability odds ratio, as for the independent variables they can be categorical or continuous. This implies that the response given to questions asked could either be odds (yes or no) or continuous (strongly agree; agree; disagree; strongly disagree) as it pertains to the independent variables.

X_1 = Cost of land

X_2 = Nearness to highway

X_3 = Population density

X_4 = Proximity to other retailers

X_5 = Accessibility of the outlets/Distance from Central Business District (CBD).

3.6.3. Required Data

Questionnaires were used to collect on information Supply Chain Management (SCM) performances from haulers and managers who are in the employment of the

two categories of organizations considered for the study (those who outsourced their distributive activities to 3rd parties and those who run them internally).

Objective Three

To examine the effects which the supply chain technique employed by the two categories of organizations studied (either vertically integrated model or third-party arrangement) has on the achievement of efficient and effective distribution of the products.

In order to achieve this objective, it is necessary to have the understanding of the indices agreed upon in Supply Chain Management (SCM) literature as being the standard performance measurement for the analyses of efficient SCM. Scholars generally believed that SCM performances can be assessed at the strategic, tactical and operational levels in organizations, by measuring to what extent the four key variables - environmental uncertainties, penetration of information technology, supply chain relationship (the level of information sharing), and the quality/ quantity of value-added services (provided by partners or sub-component being assessed) are affecting the entire supply chain management (Patterson *et al.*2003; Lee *et al.* 2009; Quesada *et al.* 2012). The third hypothesis which states that “there are no significant differences in the quality of organization and activities of Supply Chain (SC) services (transportation, distribution, and storage of products), being run by third service logistics (3PLs) and those which operate under the vertical integration model” was tested through the use of Analysis of Variance (ANOVA) to determine whether there are significant differences in the assessment of employees (haulers) who were employees of the two types of organizations studied (third party logistic service providers and internally vertically integrated logistics operations). The

haulers assessed the responses of their organizations to the four key parameters which are established in literature (Patterson *et al.*, 2003; Lee *et al.* 2009; Quesada *et al.* 2012) as the scientific measurement for supply chain performances by SCM firms. The four parameters are environmental uncertainties, penetration of information technology, supply chain relationship (the level of information sharing), and the quality/ quantity of value-added services through the use of Likert scale.

Likert or rating scale is one of the most popularly used approaches for the determination of responses in survey research. For each of these four established SCM performances parameters, scaling responses that range from strongly agree, agree, disagree and strongly disagree were used to calibrate the views of the respondents on the level compliance or noncompliance of their organizations to each of the carefully presented questions. The one-way analysis of variance (ANOVA) was then used to determine whether there are any statistically significant differences in the means of the four identified SCM assessment parameters (environmental uncertainties, penetration of information technology, supply chain relationship -the level of information sharing, and the quality/ quantity of value-added services) used for the evaluation of the two independent groups studied (organizations which outsourced their supply chain functions and those who operate them internally under a vertically integrated system).

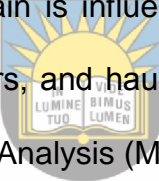
3.6.4. Required Data

Questionnaires were utilised to collect information from haulers and managers (key participants) in the distribution of the petroleum products on the influence that the socio-economic characteristics exerted on the safe, efficient and cost-effective shipment of products.

Objective Four

To analyze the effects that the socio-economic attributes of the participants (haulers and managers of retail outlets) involved in the distribution of products has on the safe, efficient and cost-effective distribution of products.

This objective is meant to unravel the influence which socio-economic characteristics (marital status, educational qualification, working condition and attitude to the use of stimulants) have on the safe, efficient and cost-effective distribution of petroleum products. To accomplish this objective a hypothesis was thus derived; “safety consciousness against road traffic crashes, ability to understand and obey the Health, Safety and Environmental (HSE) standards guiding the operations of the petroleum products supply chain is influenced by socio-economic attributes of key participants (retailers, managers, and haulers)”. The hypothesis was tested through the use of Multiple Regression Analysis (MRA).



University of Fort Hare
Together in Excellence

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_n X_n + e$$

Where safety consciousness is the dependent variable Y and the independent variables X are; attitude towards the use of stimulants for driving purpose (X₁), work conditions (X₂), marital status (X₃), and educational qualification (X₄).

Multiple Regression Analysis is ideal for examining relationship between several independent variables and a dependent variable. Although multiple regression models gives room for analyzing the relative influences of these independent or predictor variables on the dependent variable, there are some basic assumptions which must be met before results gotten from such exercise will be deemed valid. Below are some of such assumptions;

(a) There must be a linear relationship between the outcome variable and the independent variables.

(b) Multivariate normality must be achieved (the residuals must be normally distributed or have constant variance).

(c) No Multicollinearity or to simply put, the assurance that the independent variables are not highly correlated (related) with each other.

(d) Homoscedasticity—This assumption states that the variances of error terms are similar across the values of the independent variables.

All these assumptions are met before applying MRA to test the stated hypotheses. For example scatterplots was used to show whether there was a linear or curvilinear relationship between the independent and dependent variables, and the plot showed a linear relationship. Multivariate normality was measured through a residual predicted graph. This is a graph of each residual value plotted against the corresponding predicted value. The residuals were randomly scattered around the center line of zero, with no obvious pattern, which is an indication that the multivariate normality assumption is met. The assumption no presence of multicollinearity among the independent variable was assured through the use of the Variance Inflation Factor (VIF) values of the independent variables. Lastly, the assumption on homoscedasticity was assured through the plotting of standardized residuals versus predicted values. This showed that points are equally distributed across all values of the independent variables.

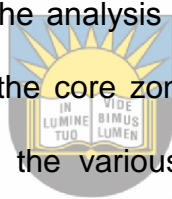
3.6.5. The reliability and the validity of the research instruments employed in the study.

The goal behind the subjections of the different research instruments to reliability and validity tests is to ensure the consistency of the results obtained in the study. The tests also helped in producing a more balanced representation of the views of the population studied. When the research instruments used in a study passes the reliability and validity tests, results obtained from such research can be replicated once the methodology employed are the same, even if the contextual environment differs (Joppe, 2000; Golafshani, 2003). Validity testing is solely conducted to ascertain if a research instrument truly measures what it originally set out to measure. While it might be practically impossible to have an instrument which can be 100% valid, it is necessary to achieve a relatively high degree of validity of the research instrument being used. A pilot test is a popular technique in establishing the validity of a research instrument (Joppe, 2000; Golafshani, 2003). Responses garnered from such pilot study could provide the needed guidance of how valid the survey instrument is. In the context of this research, the instruments employed (questionnaire and in-depth interview) were subjected to both the external and content validity tests. The external validity test ascertained that the population used for the study is the true representation of the different groups studied (the fuel retail outlets, the managers and the haulers engaged in the products shipment. The content validity test was realized by determining if the questionnaire and in-depth interviewing sessions employed accurately assessed the information needed from the respondents.

Reliability test on the other hand, measures the consistency of the research instrument, through the use of four general estimators. These are; the inter-

rater/observer reliability estimator (the degree of the consistency in the responses of different raters/observers). The second one is the test-retest reliability which estimates the consistency of a measure evaluated over time. The parallel-forms reliability ascertains that two tests constructed same way provide the same level of reliable estimates. The last is the internal consistency reliability which is measured with the Cronbach's Alpha test. In a nutshell, the reliability test as applied in this study established that the two different questionnaires distributed to the two categories of respondents sampled (owners/managers of fuel retail outlets and haulers) provided consistent results or similar results given the same assumptions and context (Joppe, 2000; Golafshani, 2003).

This study's main focus was the analysis of the spatial pattern of fuel retail outlets between the peripherals and the core zones of Ibadan metropolis. The study also examined the influences that the various supply chain techniques employed by organizations have on the achievement of cost-effective distribution. This required the adoptions of established parameters which measured supply chain performances by an organization engaged in distributive activities as evinced in supply chain literature (Patterson *et al*, 2003; Lee *et al*, 2009; Quesada *et al*, 2012). For the other sets of objectives, various efforts were made to design instruments which generated data on each dimension (variable) and such were tested for reliability/validity. Specifically, the reliability test was conducted by providing two similar questionnaires measuring the same variables which were then administered within the interval of a short time. The rule of thumb is usually that; the use of different research instruments (questionnaires) to measures the same construct should be given a result which is fairly highly correlated (similar) - a high degree of association or similarity between



University of Port Harcourt
Together in Excellence

the two instruments (questionnaires) indicates the high reliability of the instrument and vice versa.

The pilot survey or pre-field exercise which was done earlier before the actual field work also helped in the establishment of content validity of the research instruments. Different stakeholders from both the town and gown were consulted to provide necessary critique on how truthfully could the instrument pass the content validity test if the set of objectives of the study must be achieved. To this end, practitioners in the oil and gas industry, transport and supply chain industry and senior members of the academic communities all made valuable inputs on the suitability of the research instruments.



University of Fort Hare
Together in Excellence

3.7. The Conceptual Framework

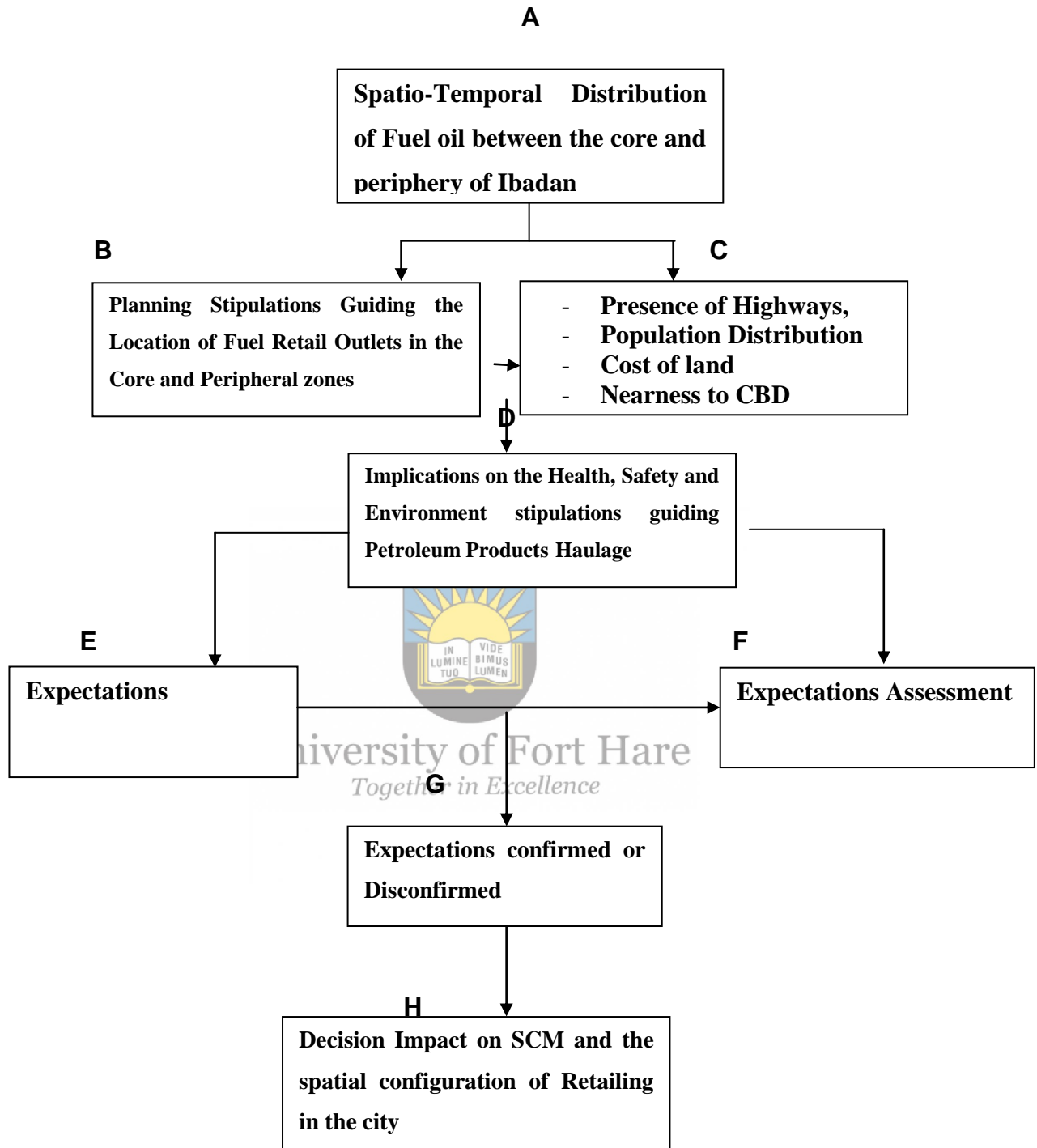
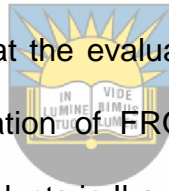


Figure 3.5: The Conceptual Framework

The Expectation Disconfirmation Theory (EDT) was adopted to generate a conceptual framework for this study (Fig.3.8). The conceptual framework of the study is represented with eight (8) points **A**, **B**, **C**, **D**, **E**, **F**, **G** and **H**. A is for the

examination of the principal aim of the study. B is dedicated to the critique of the planning stipulations which guide the location of Fuel Retail Outlets (FRO) in the metropolis (either in the core or suburb). Block C is for identified factors which usually guides the decisions of retailers when locating a FRO. D examined the effect which retailer's locational decisions have on safe, efficient and effective haulage of petroleum products to the various FRO in the metropolis. Block E is for the examinations of the investment expectations of the retailers before the opening of the FRO. While Block F is for the evaluation of the retailers expected Return-On-Investment (ROI) some periods after opening the FRO. Block G is for the evaluation of the investment expectations on the site of their FRO in the different part of the metropolis by the retailers (either it is confirmed or disconfirmed). The last block H is dedicated for the influence that the evaluation done in G will have on the futuristic decisions of retailers on location of FRO and the effects on the Supply Chain Management of petroleum products in Ibadan metropolis.



University of Fort Hare
Together in Excellence

Table 3.4: Analysis of Objectives

SN	Objective	Data Required	Analytical Tool
1.	Investigate the spatial arrangement of petroleum products retail outlets between the core and peripheral zones of Ibadan metropolis	Map of Ibadan Metropolis, GPS coordinates of all Fuel Retail Outlets (FRO) in Ibadan Metropolis	Descriptive statistics, GIS analysis, Inferential statistical technique of t-test which tested for possible differentials in the compliance rate between Fuel Retail Outlets (FRO) in the Core and Peripheral Zones of Ibadan Metropolis
2.	To identify and analyze the criteria which are used by retail outlet owners to determine the present site of petroleum products retail outlets	Responses gotten through sampled questionnaires and interview sessions from key stakeholders (retailers, managers and owners of FRO)	Descriptive statistics, Logistics Regression Model (LRM) to ascertained critical determinants of the location of FRO in the two zones. Transcribing of the various interview sessions held with key stakeholders
3.	To examine the effects which the supply chain technique employed (either vertically integrated model or third party arrangement) has on the achievement of efficient and effective distribution of the products	Responses garnered through the distributed questionnaires and interview sessions from key stakeholders (haulers, members of Petroleum Tanker Driver Association and SCM managers)	Descriptive statistics, Analysis of Variance (ANOVA) to test for the evidences of differentials in the Supply Chain (SC) performances among the three participants (Multinationals, NNPC and IPMAN) in the downstream sector of petroleum products sales and distribution in Nigeria
4.	To analyze the socio-economic attributes of the participants (haulers and managers of fuel retail outlets) involved in the distribution of products has on the safe, efficient and cost-effective distribution of products	Socio-economic attributes of haulers, information on their attitude towards the consumption of stimulants or performance enhancing substance sourced through questionnaires and interview sessions.	Descriptive statistics, Multiple Regression Analysis (MRA) to examine if socio-economic attributes are determinants of haulers attitude towards Health Safety Environment (HSE) guiding the carriage of petroleum products

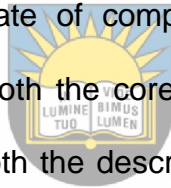
CHAPTER IV: FINDINGS

4.0. This chapter is dedicated to the provision of the different analyses and the explanations which are needed to achieve the first objective of this study. The objective is to analyse the spatial distribution of fuel retail outlets in Ibadan metropolis. The specific objective is to investigate if there are significant differences in the compliance rate to the planning standards stipulated by the government on the siting of fuel retail outlets between fuel retail outlets located in the core zone from those sited in the peripheral zone of the metropolis.

For the achievement of this objective the data required included a 2017 Quick bird imagery of 2.5 meters resolution, a recent street/road map of Ibadan (sourced from the map depot of Oyo State Ministry of Lands and Surveying) and locational records of all the 432 fuel retail outlets in the Eleven Local Government Areas of the metropolis (which was obtained from the Department of Petroleum Resources an agency in the Federal Ministry of Petroleum Resources). Furthermore, a handheld Geographical Positioning System (Garmen 76X Model) was used to pick the coordinates of all the 432 fuel in order to obtain the coordinates of all the outlets and to further synchronize the records of the Department of Petroleum Resources with the actual fieldwork records. The Oyo State Ministry of Urban Planning set dichotomous standards for the siting of fuel retail outlets in the core (inner) zone and the peripheral (outer) zones of Ibadan metropolis. The standard stipulated that retail outlets within the inner zone of the city should be sited at a distance not less than 400 meters on the same stretch of the road. This means that a new fuel retail outlet could only be located on the same stretch if the distance between the former and the new one exceed the mandatory 400 meters. For those sited in the peripherals, the

standard set by the government is 800 meters. The conditions set by the government are the same also for fuel retail outlets in the peripherals just like those in the core zone (NPC, 2016; Adenigbo *et al*, 2017; Dogara, 2017). The only difference is the distance.

In order to achieve the first objective of this study, the derived hypothesis (which is to examine if there are significant differences in the distribution pattern of petroleum product retail outlets located within the built up from those in the peripheral zones of the metropolis) was tested. Buffering and proximity analyses in the ArcMap environment of ArcGIS 10.1 were used in providing analytical maps which depicted the differences, while inferential statistical tool of an independent-samples t-test was conducted to compare the rate of compliance with the stipulations guiding the locations of these outlets in both the core and the peripheral zones. The resultant maps, and the results from both the descriptive and inferential statistics are hereby presented;



University of Fort Hare
Together in Excellence

Table 4.1. Spatial Distribution of Fuel Retail Outlets between Core and Peripheral Zones of Ibadan Metropolis

Location	Frequency	Percent
Core	212	49.08
Suburb	220	50.92
Total	432	100.0

Source: Author's Fieldwork 2018

4.1. Spatial Distribution of Fuel Retail Outlets between Core and Peripheral Zones of Ibadan Metropolis

The breakdown of the spatial distribution of the fuel retail outlets in the metropolis shows that they are four hundred and thirty-two (432) outlets in the metropolis, of these 212 (49.08%) are sited within the core of the city. The differentials of 220 (50.92%) are located within the peripherals of the metropolis (Table 4.1). The entire population of the inhabitants of the eleven local government areas of the city is nearly four million (Table 3). The distribution of the city population between the core and peripheral zones of the city shows that of the nearly 4 million residents of the metropolis, 1,887,100 (52.47 %) reside in the core zone while 1,709,400 (52.47%) resides in the peripherals (NPC, 2016). Further analysis shows that are 8902 inhabitants of the core zone to one fuel retail outlet. While there are 7770 inhabitants of the peripheral zones to one fuel retail outlet.



4.2. Determination of Compliance Rate to Urban Planning Standard among Fuel Retail Outlets in the Core and Peripheral Zones of Ibadan Metropolis

Two major government agencies are saddled with the optimal determination of fuel retail outlets across urban and rural settlements in Nigeria. The agencies are, the Department of Petroleum Resources (DPR) which is an agency under the Federal Ministry of Petroleum Resources, while the other agency is the Urban Planning Ministry domiciled in each of the thirty-six (36) which made up the Nigerian Federation. Due to the Health, Safety and Environment (HSE) stipulations guiding the conveyance, sales and management of petroleum products, the Nigerian government through these agencies set a minimum standard of distance between these outlets both within cities and suburbs. Table 4.1 shows the analysis of the compliance rate among fuel retail outlets in both the core and the peripheral zones of

the metropolis. Furthermore, results from the proximity analysis carried out in ArcGIS 10.3 also provide graphical detail of the compliance rate is presented in Figure 4.1.

Table 4.2. Analysis of the Compliance Rate among Fuel Retail Outlets in both the Core and Peripheral Zones of Ibadan Metropolis

Spatial Distribution	Total Number of Retail Outlets	Frequency of Non Compliance rate	Frequency of Compliance Rate	Percent of Compliance Rate
Core	212	179	33	15.56
Peripheral Zone	220	196	24	10.90
Total	432	375	57	13.19

Source: Author's Fieldwork 2018

4.3. Analysis of the Compliance Rate among Fuel Retail Outlets in both the Core and Peripheral Zones of Ibadan Metropolis

From the analysis in Table 4.1, Figures 4.2 and 4.3 a worrisome picture of the compliance rate to the stipulations guiding the locations of fuel retail outlets in both the core and the peripheral zones of the metropolis is painted. A paltry figure of 33 (15.56%) out of the total figure of 212 fuel retail outlets within the core or built up zone of the metropolis presently complied with the standard set by the two government agencies in charge of Health, Safety and Environment (HSE) guiding the location of these outlets. The situation is not better in the peripheral zone where 24 (10.9%) of these outlets complied with the standard. It is obvious that retailers in the two zones has a very slack attitude to the compliance of the stipulation, out of the total sum of 432 retail outlets in the metropolis only 57 (13.19%) complied. The

implications of this neglect to urban planning standards are already being felt in the city Health, Safety and Environment (HSE) indices (Filani, 1994; Mabogunje, 2002; Ajayi, 2016). Distortion of the urban master plan of Ibadan has significantly increased the Road Traffic Crashes (RTC).

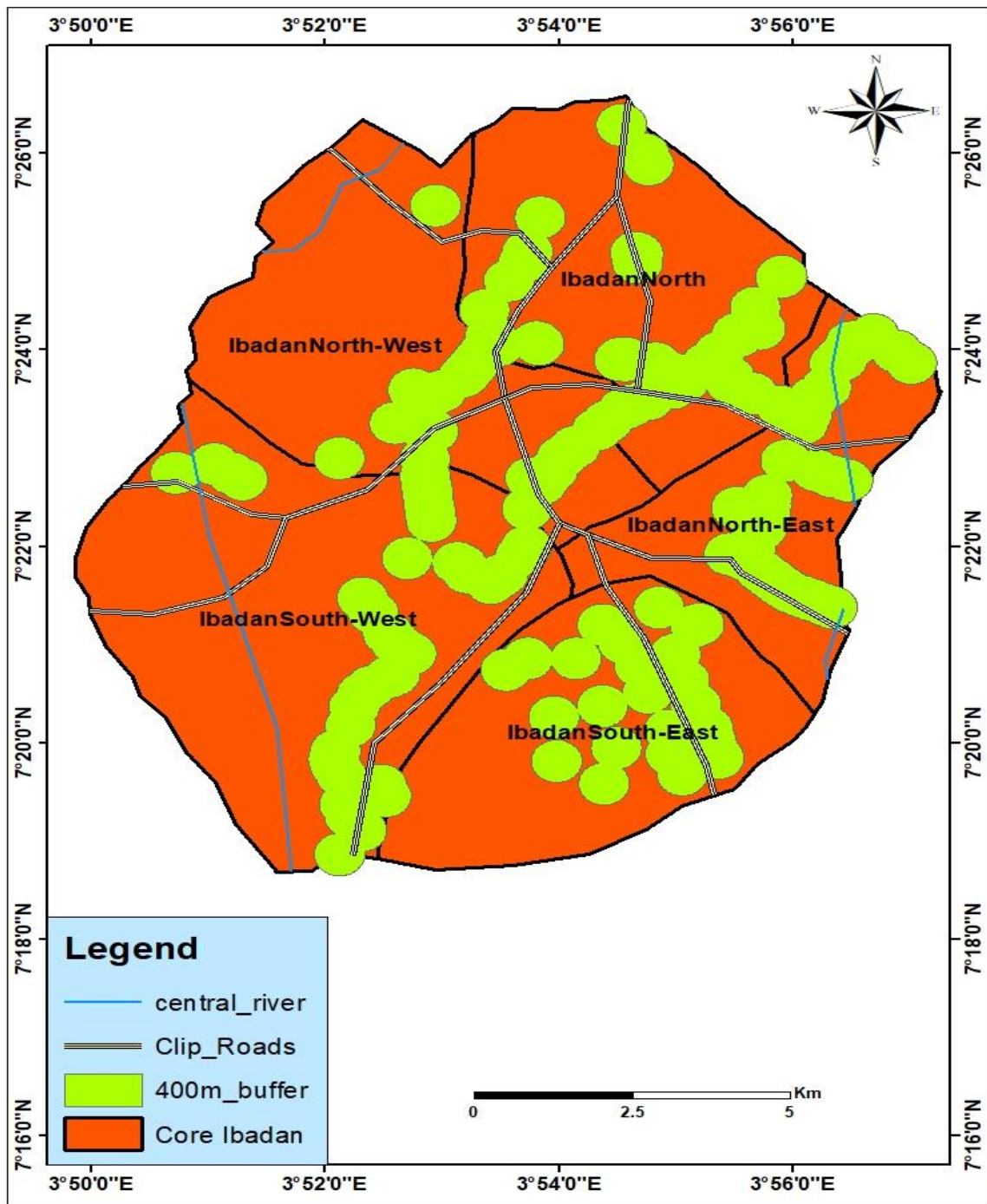


Figure. 4.1 Map Showing 400m Buffering Analysis for Fuel Retail Outlets in the Core Zone of Ibadan Metropolis



Table 4.3. Mean and Standard Deviation summation for the Observed

	Location	N	Mean	Std Deviation
Compliance	Core	126	3.9841	1.47504
	Suburb	139	4.5252	1.79100

4.4. Mean and Standard Deviation summation for the Observed

Table 4.3 showed the Mean score (M) and the Standard Deviation for the compliance rate of the two investigated zones. The mean scores represented the average values for the observed compliance rates of the investigated FRO while the Standard Deviation (SD) showed the amount of variability or dispersion of the values from the mean scores. Higher SD usually indicates the presence of more outliers (dispersion) in the observed data and vice versa (Adenigbo *et al*, 2017; Dogara, 2017). On the basis of this fact, the dataset of FRO located in the core zone (with the lower mean score of 3.9841) are more clustered than those in the peripheral/suburb zone with the mean score of 4.5252 (which are more dispersed). Similarly, from Table 4.3 it is observable that observed dataset of FRO sited in the core zone has lower SD (1.47504) than those in suburb zone (1.79100) this suggested that the set of data from the core zone are also more clustered (or consistent) than those from the suburb zone.

An independent samples t-test was conducted to compare the rate of compliance with the stipulations guiding the locations of fuel retail outlets for core and peripheral zones in Ibadan metropolis (Table 4.3 and 4.4). The result from the statistical analysis indicated that there was no significant difference in the scores for core zone (M=3.9, SD=1.4) and peripheral zone (M=4.5, SD=1.79) conditions; $t(263) = -2.66, p = 0.08$. These results suggest that the location of these outlets really does not have an effect

on their compliance with planning stipulations. Specifically, these results suggest that irrespective of where these fuel retail outlets are sited between the core or the peripheral zones of Ibadan metropolis compliance to planning stipulations guiding the establishment are not guaranteed.



University of Fort Hare
Together in Excellence

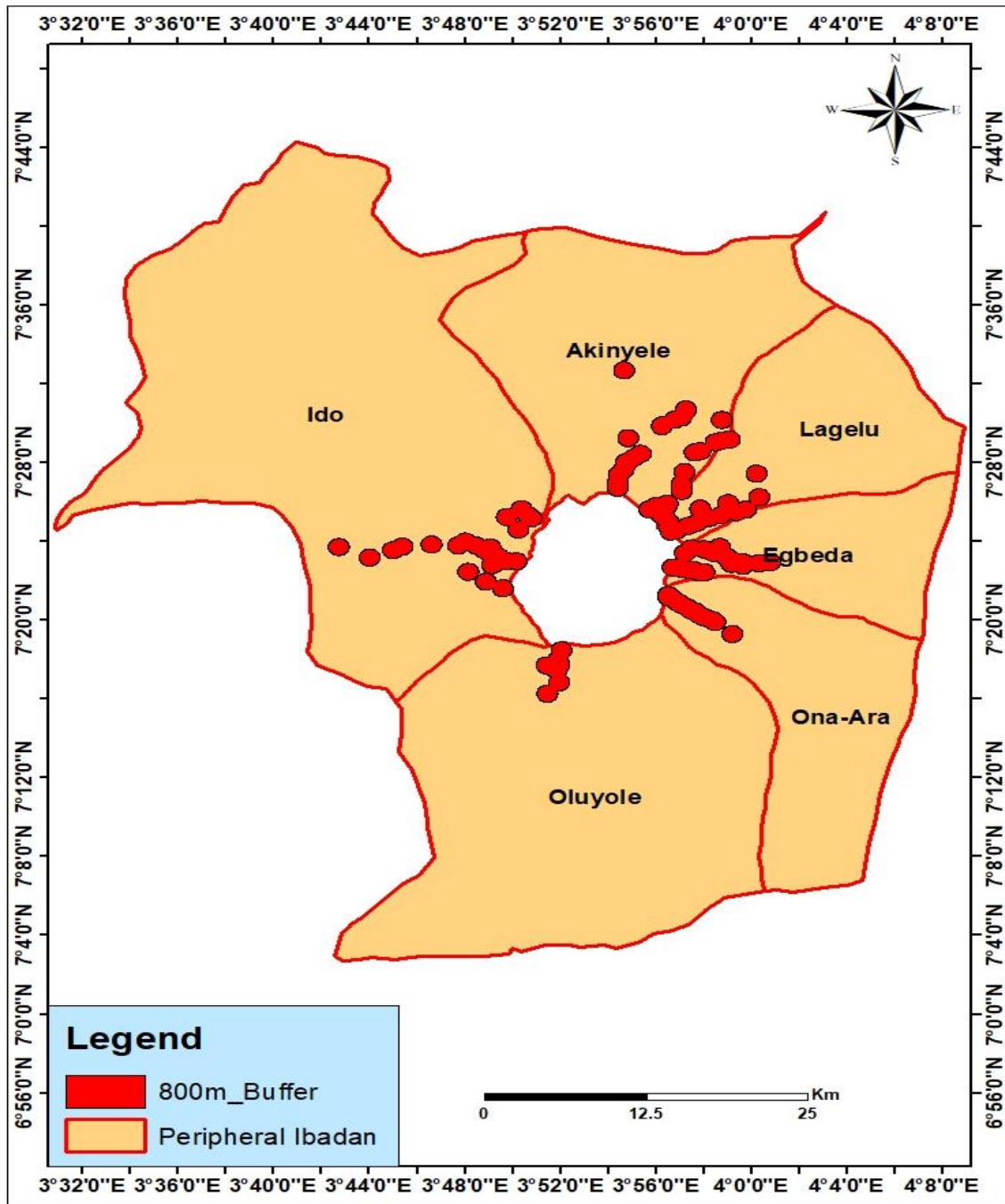


Figure. 4.2 Map Showing 800m Buffering Analysis of Fuel Retail Outlets in Ibadan Metropolis

Table 4.4 Independent Samples Test

		Leven's Test for Equality Variances		T-Test for Equality of Means						
		F	Sig	T	Df	Sig (2-tailed)	MD	Std Error Diff	95% Confidence Interval of the Difference	
									Lower	Upper
Compliance	Equal variances assumed	17.429	.000	-2.668	263	.008	-.54105	.20277	-.94030	-.14180
	Equal Variances not assumed			-2.69	260.6	.008	-.54105	.20086	-.93657	-.14554

4.5. The interplay of the Forces of Ethnodomination in the Ownership Structure and Spatial Pattern of Fuel Retail Outlets in Ibadan Metropolis

Another set of analyses carried out during the course of the research is to examine the influence of the forces of ethnodomination in ownership and spatial pattern of these retail outlets in Ibadan metropolis. Table 9 provides information on the possible pattern of ethnic domination or ethnodomination of a retail channel plays in the ownership structure of fuel retail outlets in Ibadan metropolis.

Table 4.5 Analysis of the Influence of Ethnodomination on the Ownership Pattern of Fuel Retail Outlets and in Ibadan Metropolis

Spatial Distribution	Total Number of Retail Outlets	Frequency of The Numbers Owned by Yoruba	Percent
Core	212	203	95.75
Peripheral Zone	220	207	94.0
Total	432	410	94.90

Source: Author's Fieldwork 2018

Ibadan historically evolved as a core Yoruba city-state in the early part of the eighteenth century. It has however grown in the last one hundred years into a cosmopolitan city, which provides a home for the different ethnic nationalities that made up the Nigerian state and other foreign nationalities. According to population statistics obtained from Ibadan metropolitan authorities, nearly 25 % (899125) of the inhabitants of the metropolis are from other ethnic nationalities in the country and nationals of other countries (Oyo State Government, 2017). This study, however, reveals how strong the forces of ethnic domination are at work in the ownership structure of the fuel retail outlets situated in the metropolis. Four hundred and ten 410 (94.90%) of the fuel retail outlets operating in the metropolis are owned mainly by the Yoruba ethnic nationality (Table 4.5). The implication of this finding throws up serious questions on the achievement of an egalitarian multi-ethnic cosmopolitan metropolis by the authorities of Ibadan city. Ownership of fuel retail outlets by their very nature transfers land property rights in most cases to the owner (who must have bought the property in the first place) except if it is a franchise arrangement. While it might be far-fetched to conclude that there is a deliberate plan by the Yoruba ethnic nationality to dominate the trade in the downstream sector of the petroleum industry in the metropolis, the apparent vice grip presently being exercised by the nationality on the trading channel is worth investigating.

Such study is germane for the following reasons; first, it has been observed that wherever there is a strong influence of ethnodomination in the management of a trading channel for a key product in the developing world, ethnic cleansing, xenophobic attacks, and civil unrests often rear their ugly heads (Speece, 2006). Speece (1990, 2006) in a series of studies, underscores how strong the forces of

ethnodomination could be in the determination of the socio-economic and political privileges that could be available for an individual if he or she “belongs” to the “right” ethnic nationality. Once an ethnic nationality established a firm control over the trading channel (importation, production, distribution, and sales) of any essential commodity or a product that is vital for the well-being of the entire population, experiences showed that such control often translated into the political dominance of other ethnic nationalities domiciled within such a federation ((Speece, 1990, 2006; Cooke, 2015).

Examples of such experiences are found in Oman and Sudan in the latter part of the twentieth century (Speece, 1990; 2006). Cooke (2015) reported that the various ethnic nationalities that made up the southern part of the defunct Sudan nation (The Abyei, Dinka, Nuer, Kurdufan, the non-Arabic and Chadian-related Sudanese in the western region of Darfur) had a long history of resisting the economic and trading channel dominance of the Arabic dominated northern Sudan. The control of the economic channel by the Arab dominated north in Sudan also culminated in total political dominance. After a long period of civil insurrection, a full fledged civil war broke out which eventually led to the carving out of a new country- South Sudan from Sudan in 2011. Till date, major areas of dispute still exist between the different ethnic nationalities over the control of the oil business (the production, importation, distribution, and sales). The different ethnic nationalities in the two countries believed that the Bedouin-Arabs have the control of all the vital trading channels and economic structures and so conflicts still exist in Darfur region (where an estimated 400,000 people have been killed in the last 10 years) (Fadlalla, 2007; Cooke, 2015).



University of Fort Hare
Together in Excellence

The situation observed in the seemingly ethnodomination of the petroleum distribution in Ibadan metropolis might have little or no resemblance to the scenario in Sudan because while what transpired in Sudan was on a national scale the situation in Ibadan is within just a cosmopolitan city in a nation with many of such cities. However, further and deeper investigation is advocated to ascertain if a similar scenario prevails in the cities of the different regions of Nigeria. This will definitely help in the achievement of the prevention of the forces of ethnodomination from snowballing into social and civil unrest among the various ethnic nationalities in the country.

4.6. Geographical Information System (GIS) Pivotal Role in the Determination of Optimal Location for Contemporary Urban Retail Outlets

The relevancy of Geographic Information System (GIS) as a tool for making business decision on the optimal location for a new retail outlet has assumed a critical level of importance in the last three decades (Roig-Tierno et al, 2013; García-Sierra et al, 2015; Ford et al, 2015). The myriads of factors to be considered before arriving at the generally acceptable decision often require the fusion of data from diverse fields. GIS provides a solid platform that can integrate both the geodemand and the geocompetition data after which such spatial information could be presented in real-time digital maps. Such digital maps are also easily amendable or editable as newer information is discovered (Suarez-Vegaz et al, 2012; García-Sierra et al, 2015). Major changes experienced in the global economic trend in the last three decades fuelled by the unprecedented increment in the deployment of Information and Communication Technology (ICT) and globalization has reinvented the planning decisions behind the siting of retail outlets within the urban space. The resultant shifting focus in trade liberalization is now more centred on the satisfaction of the

consuming public. GIS is helping the business manager in providing the scientific means of making an informed decision on the most suitable location for retail outlets by considering the cost of available properties, accessibility of such site, demographics, the nearness of competitors and distance from suppliers (Suarez-Vegaz et al, 2012; Roig-Tierno et al, 2013).

The application of GIS in this study is, however, a bit different-unlike most retailing studies in western societies, where GIS is employed either as a tool in the achievement of the most suitable location for a new retail outlet or in the urban redesigning of existing outlets. GIS is being used in this study to present a real-time analysis of the distribution problem associated with the pattern of locating of fuel retail outlets within a metropolis with two distinctive zones. The findings from this study clearly revealed nearly all the fuel retail outlets located in the metropolis flagrantly disobeyed the urban planning standards guiding their establishment. The implication of this malaise on both the physical planning, Health, Safety and Environment (HSE) indices of the metropolis is already being felt. Some of the HSE indices include the increasing cases of trucks engaged in the distribution of petroleum products becoming sources of traffic congestion within the built-up zone of the city. These trucks are also regularly involved in fatal crashes. The trucks are also sources of noise and air pollution, particularly when they are in large numbers delivering within the same location. Non-compliance to the existing urban planning laws by owners of old and new fuel retail outlets also means that the aesthetic outlook of the metropolis is compromised.

CHAPTER V: FINDINGS

5.0. This chapter is dedicated to the detailed examination of the second objective of this study. This is to analyze the factors which determine the location of fuel retail outlets both in the core and peripheral zones of Ibadan metropolis. In order to accomplish this objective, all the 432 fuel retail outlets in the metropolis were sampled out of which 256 questionnaires were subsequently retrieved for the purpose of this analysis. Below is the table (Table 5.1) analyzing the socio-economic characteristics of the sampled respondents.

Table 5.1: The Socio-Economic Characteristics of the Respondents

Attributes	Total Number of Respondents	Male (%)	Female (%)
Gender	256	194 (75.78)	62 (24.22)
Age			
21-25	57 (22.26)	30 (56.63)	27 (47.37)
26-30	63 (24.60)	49 (77.77)	14 (22.23)
31-35	18(7.03)	16(88.88)	2(11.12)
36-40	30 (11.71)	21 (70)	9 (30)
41-45	37 (14.53)	34 (91.89)	3 (8.11)
46 and Above	51(19.92)	48 (94.11)	3 (5.89)
Marital Status			
Single	101 (39.45)	53 (52.48)	48 (47.52)
Married	136 (53.12)	124 (91.17)	12 (8.82)
Widowed/Separated	19 (7.43)	17 (89.48)	2 (10.52)
Educational Status			
Primary School Leaving Certificate	15 (5.85)	10(66.66)	5 (33.34)
Secondary School Leaving Certificate	157(61.32)	110 (70.06)	47 (29.94)
Ordinary National Diploma	60 (23.43)	52 (86.66)	8 (13.34)
HND/BSc	24 (9.40)	22 (91.66)	2(8.34)
Years of Experience in the Present Place of Work			
1-4 Years	154(60.15)	94 (61.84)	58 (38.16)
5-9 Years	83 (32.42)	81 (97.59)	2 (2.41)
10 Years and Above	19 (7.43)	17 (89.47)	2 (10.4)
Status of Employment of Respondents			
Owner of Business	19 (7.42)	16 (84.21)	3 (15.79)
Employed by Outsourcing Enterprise for the Oil Company	74 (28.90)	43 (38.10)	31 (41.90)
Employed directly by the Oil Company	163 (63.68)	135 (82.82)	28 (17.18)

Source: Author's Field work, 2018

5.1.1. Population of Participants

In all 256 respondents who are either sales' attendants in the sampled fuel retail outlets, managers of the outlets or some owners of these outlets participated in this study (Table 5.1). They were chosen as respondents because they are in the position to provide an unbiased assessment of the different factors that could have necessitated the decision behind the present site of their respective fuel retail outlets. Interview sessions were also held with three (3) willing participants who provided deeper insights into the achievement of the objective.

5.1.2. Analysis of the Gender Distribution

One hundred and ninety seven 197 (75.78%) of the respondents are male while 62 (24.22) are females. It is noticeable that the few females that are captured as part of the study were gas attendants who manned sales points. The top echelons of vacancies (which are the managerial positions) are mostly occupied by the males.

5.1.3. Analysis of the Age Distribution

The analysis of the age distribution of the respondents revealed that slightly higher percentages are over 30 years (53.19 %). While this information on its own may have little significance on the outcome of the study, it is an indication that most of the respondents are matured and could, therefore, be relied upon to give responses that reflect their ages.

5.1.4. Analysis of the Marital Status of the Respondents

The bulk of the respondents are married. 135 (53.12 %) which are more than half of the respondents are married, 101 (39.45 %) are singles while a paltry 19 (7.43 %) of the respondents are either divorced or widowed.

5.1.5. Educational Status of the Respondents

All the participants in the study are educated (Table 5.1). Although a tiny proportion 15 (5.85 %) had only primary school education. Literacy (defined here as ability to read, understand and write in English language) is key to how well the respondents could provide answers to issues raised in the questionnaire. The fact that all the participants had formal education helped greatly in the administration of the questionnaires.

5.1.6. Years of Experience as a Worker in the Present Place of Employment

One hundred and fifty four (60.15 %) of the respondents claimed that they have been in their present place work for a period ranging between 1 to 4 years, 83 (32.42 %) indicated that they have spent between 5 to 9 years in the organization. 19 (7.43 %) responded that they have spent more than 10 years as a member of the organization. It is discovered that the bulk of those in the last category are either part of the management team of these outlets and sometimes the outright owners. This group of respondents provided necessary historical information on what are the contributory factors which led to the siting of their fuel retail outlets. Information such as this helped in providing clearer perceptions of how the average fuel retail owner in Ibadan metropolis visualizes the location problem.

5.1.7. Analysis on the Status of Employment of the Respondents

Nearly a tenth of the respondents are business owners, 19 (7.42%). These categories of the respondents are deep repositories of knowledge on the dynamics of retail and transport geography of petroleum products distribution both in the metropolis and the country at large. 163 (63.68 %) of the respondents are direct employees while 74 (28.90) are outsource staff. As a rule of thumb the direct

employees are generally better informed about the goings in the organizations than outsource staff.

Table 5.2 Status of the Ownership of the Fuel Retail Outlets

Status of ownership structure	Frequency	Percentage
Privately owned	135	52.73
Dealership	81	31.64
Franchise	40	15.63
Total	256	100.0

Source: Author's Fieldwork 2018

5.2.1. Analysis of the Ownership Status of the Fuel Retail Outlets

One hundred and thirty five (52.73%) of the sample respondents stated that the fuel retail outlets are privately owned (Table 5.2). This is a higher percentage of the total number of fuel retail outlets sampled; this definitely corroborated the records supplied by the Independent Petroleum Marketers Association of Nigeria (IPMAN) which showed that 286 out of the 432 fuel retail outlets in the two zones of the metropolis are owned by its members. This figure represents 66.20 % of the total number of fuel retail outlets available in the city at the time of the study. 81 (31.64 %) of the fuel retail outlets operate under a dealership arrangement, while 40 (15.63 %) is being run as a franchise of a bigger corporation. The difference between those run under dealership and franchise system is mainly that while a franchise system often operate under a detailed, very comprehensive, well-designed arrangement between the owner of the franchise and the one operating the franchise, a dealer does not

have such detailed arrangement that makes it share the complete identity of the business owner. A dealer generally has his own business entity-they only provide point-of-sales for the principal products. It is observable that most of the multinationals oil companies operate either a franchise arrangement or as a principal to dealers.

Table 5.3 Type of the Ownership Structure of the Retail Outlet

Types of ownership structure	Frequency	Percentage
IPMAN	136	53.13
NNPC	23	8.98
Multinational	97	37.89
Total	256	100.0

Source: Author's Fieldwork 2018



5.3.1. Analysis of the Ownership Structure of the Fuel Retail Outlets

Table 5.3 depicts the analysis of the ownership structure of the fuel retail outlets studied. The Independent Marketers Association of Nigeria (IPMAN) a Nigerian oil behemoth which draws its members from private investors in the downstream sector of the Nigerian petroleum industry owns 136 (53.13%) of the sampled outlets. The federal government oil corporation owns 23 (8.98 %) of the sampled outlets while the six multinationals oil companies (Table 5.3) who participated both in the up and downstream sectors of the Nigeria petroleum industry owns 97 (37.89%) of the fuel retail outlets studied.

Table 5.4: Years of Operation of the Fuel Retail Outlets

Years	Frequency	Percent
1 – 4	34	13.28
5 – 9	67	26.20
10 – 14	40	15.62
15 – 19	34	13.28
20 – 24	23	8.98
25 – 29	28	10.93
30 years and above	30	11.71
Total	256	100.0

Source: Author's Fieldwork 2018

5.4.1. Analysis of the Operational Years of the Fuel Retail Outlets

Table 5.4 gives the narrative of the years the sampled fuel retail outlets has been in operation. Nearly 70 % of the sampled outlets were opened for business in the last twenty years. To be specific 175 (66.02 %) of these outlets were established during the last twenty years.

5.5. Analysis of the Relationship between the different Explanatory Variables and the Location of Fuel Retail Outlets in both the Core and Peripheral Zones of Ibadan Metropolis

This section is devoted to the determination of the relationship that exists between the several explanatory variables (cost of land, nearness to highways, population

density, and proximity to competitors and the distance from Central Business District (CBD) / accessibility for haulage trucks) and the decision to site a fuel retail outlet either in the core or peripheral zones of Ibadan metropolis. This was done in order to provide a scientific and objective analysis of the factors which contributed to the prevailing distribution pattern of fuel retail outlets in the study area. This is in tandem with the achievement of the second objective of this study. In this respect, the hypothesis earlier formulated is hereby re-stated in the alternate form;

5.5.1. Ho;

Determinants of the present locations of retail outlets are significantly influenced by prevailing price of landed property, closeness of such location to highway/busy route, proximity to zones with high population density, distance from the Central Business District (CBD), proximity to competitors and availability of functional road networks for haulage trucks engaged in products shipment.



University of Fort Hare

Together in Excellence

5.5.2. Test of Hypothesis

As earlier stated in Chapter 3 (Research Methodology), Logistic Regression Model (LRM) was used to test this hypothesis because of the identified advantages it holds over other regression analytical models. The Logistics Regression Model is best fit to examine the relationship between dichotomous dependent variable (in this case core and peripheral zones) and the different independent explanatory variables.

5.5.3. Result

Table 5.5. Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	121.253 ^a	.304	.407

- a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Table 5.5 represents the Model Summary. The Cox and Snell's R-Square which is like Multiple Regression R-Square attempt to measure the 'likelihood' relationship. This means that it seeks to explain the level of variation observed in the dependent variable (location of fuel retail outlets in either core or peripheral zones) as explained by the logistic model. The value obtained here is 30.4 %. It is observed that minimal attention is paid to Cox and Snell R square value because of the smallness of its value (usually less than 1.0, making it difficult to interpret). The Nagelkerke R² modification that ranges from 0 to 1 provides a more reliable measure of the relationship. Nagelkerke's R² will normally be higher than the Cox and Snell measure. The table reading of Nagelkerke's R² is 0.407, which indicated a moderately strong relationship of 40.7% between the predictors and the prediction. A value between forty and sixty percent are generally assumed to be moderate in some fields in social and management sciences (Akinci *et al*, 2007; Quesada *et al*, 2012; Peng and Chao-Ying, 2016; Ajayi, 2016; Aglaia, 2018).

Table 5.6: Summary of Logistics Regression Analysis showing the influences of the explanatory variables on locational choices for petroleum retail outlets

	B	S.E.	Wald	Df	Sig.	Exp(B)
Cost of land	-.277	.193	2.060	1	.151	.758
Nearness to highway	-.178	.230	.600	1	.439	.837
Population density	-.474	.229	4.280	1	.039	.622
Proximity to other fuel retail outlets	-.051	.196	.067	1	.796	.950
Accessibility/Distance from CBD	.123	.191	.412	1	.521	1.131
Constant	4.818	1.363	12.485	1	.000	123.700

2 Log likelihood= 121.253, Cox & Snell R Square= .304, Nagelkerke R Square= .407, ($X^2 = 43.47$, $df = 5$, $p>.05$)

The result from Table 5.6 revealed that the inclusion of the explanatory (independent) variables (cost of land, nearness to the highway, population density, and proximity to other fuel retail outlets /distance accessibility to the Central Business District (CBD)) in the model increased the overall level of its accuracy. The overall significance revealed that the *Model Chi-Square*, derived from the likelihood is significant ($X^2 = 43.47$, $df=5$, $p>.05$). The model chi-square value of 43.47 was significant (the independent variables accounted for about 44% of possible factors which determined whether a fuel retail outlet is located either within the core or

peripheral zones of the metropolis. The remaining 56% are factors not considered in the study). Thus, the indication is that the model has a good fit in predicting the chances of either a fuel retail outlet is sited in the core or peripheral zone of the metropolis as determined by the explanatory variables.

It is observed from the result that not all the explanatory variables significantly predicted the location of fuel retail outlets in the metropolis. For example, cost of land ($B = -.277$, wald statistics = 2.06; $P > .05$), nearness to highways ($B = -.18$, wald statistics = .60; $P > .05$), distance from competitors ($B = -.05$, wald statistics = .067; $P > 0.05$), distance from CBD/ accessibility for haulage trucks ($B = .12$, wald statistics = .41; $P > .05$) do not significantly predicted location of fuel retail outlets in both the core and the peripheral zones of the metropolis. It was only population ($B = -.47$, wald statistics = 4.28; $P < .05$) that significantly predicted the location of fuel retail outlets in the metropolis. Further analysis from the result indicated that the respondents strongly believed that population density of the locality where a retail outlet is sited is the major determinant behind its location (population ($B = -.47$, wald statistics = 4.28; $P < .05$)). The wald statistics showed that respondents opined that they considered population density of a locality within the metropolis four times more important above any other factor. Fast on the heels of the population density as a major determinant in the locational factor is the variable associated with the prevailing cost of land on which the retail outlet is sited ($B = -.277$, wald statistics = 2.06; $P > .05$), This simply means that the cost of the land upon which the retail outlets are sited is considered twice as important over other factors. There are little to choose from among the three other factors; proximity to competitors is next with statistical result of ($B = -.05$, wald statistics = .067; $P > 0.05$) nearness to major highways follow with ($B = -.18$, wald statistics = .60; $P > .05$) while accessibility for

haulage trucks/ distance of fuel retail outlets from CBD brings up the rear with a statistical score of ($B = .12$, wald statistics $=.41$; $P>.05$). Although, all the explanatory variables do not significantly predicted the locations of the FRO, it is obvious that (when the model- $X^2 = 43.47$, $df=5$, $p>.05$ is considered) that the respondents agreed that they are the critical factors which determined the location of the fuel retail outlets in both the core and peripheral zones of Ibadan metropolis. Another salient fact observable from this analysis is that there are other critical factors (56%) which could be key determinants of locational decisions of FRO in the study area that are not considered in this study. This will definitely provide a veritable gap for further studies on the subject. It is also reasonable to conclude from the findings that nearness to the highway, proximity to other fuel retail outlets alongside the distance from CBD / accessibility for haulage trucks carrying products do not significantly increased the chance of better locational choices for petroleum retail outlet. The result duly infers that the costs of land and population density are the major determinants of locational choice for petroleum retail outlets in the two zones studied within the metropolis.

5.6. Analysis of the Interview sessions

The interview sessions with three owners/managers and one official of the regulatory body (DPR) in charge of the approval of operating license for the fuel retail outlets in the metropolis further highlighted the contributory roles of the above factors whilst illuminating further the social, economic and cultural issues that underpinned locational decisions by these entrepreneurs. A retailer P1 (65 years old, male), opined that his decision when choosing the present site of his fuel retail outlet was informed largely by “the population size of this section of the city, it is from a large populated neighborhood abinito that you can draw a sizeable market.....when we got the approval to build this outlet....the market over there (a major grocery and meat

market) was one of the major ones in the city...taxi cabs and shoppers always patronized us because they were coming to the market". The second participant in the interview P2 (45 years old, male) a facility manager with one of the multinational oil companies posited that the " company set a hierarchical order of factors which is often used in the final selection of a site to build their retail outlets on, they are- population, off purely residential neighborhood, not on petroleum pipeline, close to major roads and where the Urban Planning Authority designate as suitable" However when asked if a location satisfying all these other conditions could be abandon simply because the Urban Planning Authority disapproved the building plan, he said" we rarely have such cases...we do our homework very well ...we make sure it is not a location that contravenes any regulation, however we also sometimes settle (bribe) the Urban Planning officials...especially if the intended location is a hot cake or else the process will be long and other competitors might beat you to the property". The third participant P3 (36 years old male) who runs an Independently or privately owned outlet in the peripheral zone of the city said "the cost of land within the core zones of the city was a major contributor to the proliferation of fuel retail outlets in the peripheral zone...."the costs of lands within the city are exorbitant! The multinational are often the ones with the financial muscle to buy them...as a matter of fact, they are very few vacant plots in the built-up zone of the city now....most new outlets that are springing up there are as a result of urban gentrification...some hitherto residential zone are being converted to commercial use". He however insisted that "the retail outlets in the peripherals are performing better in terms of sales despite the fact that the population density is lower to those in the core zone ... we are on major transport routes ...we have bigger space and so we are more accessible to the haulage trucks bearing petroleum products and customers...we are also not as

clustered as those within the built-up zone of the city...where outlets are stone throw from each other". For P1..."nearness to Dugbe (the main CBD of the metropolis) was a critical factor which affected sales around 30 years ago...He is of the opinion that "having an outlet in the CBD zone today has become more disadvantageous"..... "Haulage trucks carrying products often find it difficult accessing the busy CBD during commercial activities peak hours and the zone becomes a ghost town from evening when workers goes home".

Excerpts from the interview session with the official of Department of Petroleum Resources- O1 as transcribed below affirmed most of the thesis of the owners of the retail outlets. When asked if he is aware that overwhelming percentage of the fuel retail outlets within the metropolis defied planning stipulations in terms of compliance to specified distance- the official replied in the affirmative "of course we are aware....some of these problems were not created today, but they are now becoming exacerbated by the further disobedience that is more recent". He submitted that there are three stages involved before the agency grants approval –“ We are the field agent, my own duty is to go out with my team and verify the correct location of an intending fuel retail outlet, we also conduct all the other background checks, our recommendation is thereafter submitted to the regional director”. He continued “the regional director on the strength of our observation will make a further recommendation to the national director of the agency whose office has the final say”. “There have been many instances when we will deny an applicant the licenses based on the background check we had –only for us to discover that such application was eventually approved by the national office”. He clarified further

some of my colleagues at the office are also susceptible to inducements or bribes and ethno-religious considerations-there

have been instances when some of them gave approval to an applicant that didn't merit such approval simply because they considered other factors that are totally alien from established standards.

Finally, he criticized greedy and unscrupulous retailers who "often offer bribes to officials in order to circumvent the rules". However, he concluded that "all hope is not lost-urban renewal activities going on in some of the built-up zones are affording the agency the second chance to re-appraise some licenses and this will help in bringing sanity to the situation".

The interview sessions supported the findings of the hypothesis testing that the five explanatory variables are critical determinants of locational choice of fuel retail outlets in both the core and peripheral zones of the city. All the participants expressed their opinions on the culpabilities of the officials from the Urban Planning agency and Department of Petroleum Resources-the two bodies in charge of operating license issuance. P3 said, "the springing up of fuel retail outlets in areas that they shouldn't be is with the connivance of these officials....no retailers will go on to invest money into a project that he/she knows will not be allowed to operate".

P1 clarified that

the distortion of the urban master plan that ordinarily guides the location and zoning of different urban functions was a sad legacy from the military era....when the military were at the helms of government in the country....there was a suspension of the constitution....they introduced fiat/military decree and did many things that were illegal, this includes the granting of approval for the siting of fuel retail outlets in locations that are not permitted by the law, sometimes because such location is a prime one for the customer patronage

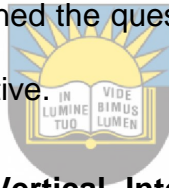
The similarity in responses from all the interviewees strongly suggests that the determination of fuel retail outlets in the two zones of the metropolis was largely informed by the expectation of guaranteed patronage rather than the altruistic desire of satisfying distributive justice. The attitude of the officials who should ordinarily regulate the spatial distribution of these outlets further exacerbated the problem rather than exorcise it. Ultimately the anomalies must be corrected or else the quality of lives in the metropolis will be seriously negatively affected.



University of Fort Hare
Together in Excellence

CHAPTER VI - FINDINGS

6.0. The sixth chapter is where the third objective of the study is examined and the hypothesis derived from the objective tested, the chapter ended with the provision of the detailed explanation of the findings. The third objective of this study is to examine the effects which the supply chain integration model employed (either vertically integrated model or third-party arrangement) has on the achievement of the efficient and effective (two supply chain metrics) distribution of the products. In order to achieve this objective, all the 389 registered members of Petroleum Tanker Drivers (PTD) association which are affiliated to each of the retail outlets either as a direct employee or an outsourced staff were sampled. Two hundred and sixty five (around 70%) of the respondents returned the questionnaires given to them which were then utilized for analyzing the objective.



6.1. The Influence of the Vertical Integration Model (VIM) and Third-Party Logistics Service (3PLS) providers on Optimal Delivery of Products

Vertical Integration Model (VIM) in Supply Chain Management (SCM) is a bit different from Third Party Logistics Service providers (3PLS). They are both popular operational and management models that organizations often employed for the achievement of business objectives. Vertical Integration Model, when applied in Supply Chain by an enterprise, is often to achieve a near seamless alignment and coordination within a supply chain. Vertical integration occurs when a business entity attempted to control all the activities that are peculiar to a specific organisation's entire supply chain. They are broadly categorized into three, these are backward, forwards, and equal (both forward and backward) integrations (Ajayi, 2016; O'Byrne, 2017). It is backward when an organization decides to be involved in the raw

material sourcing (upstream operations). Forward integration when the company gets directly involved in the supply and sales of the products to the customers (downstream) and equal integration-when the organization do both (O'Byrne, 2017). Vertical integration is seen as being advantageous by organizations because of two major factors; it hands over the control of the entire production and marketing processes to the company. The second factor is that it often results in cost reduction over time.

Third-Party Logistics service providers in Supply Chain (SC) relationship are distinctive business entities who perform some ancillary functions on behalf of the principal organization. 3PLS often have some functions that are not tied to direct production (though not of lesser value) outsource to them. These ancillary elements are often related to the company's distribution and fulfillment services (Ajayi, 2016; O'Byrne, 2017; Malkanthie and Kelum, 2017). In reality, 3PLS act as agents that undertake integrated operations, particularly warehousing and transportation services for their principals. They are required to have in-depth knowledge of the market conditions, demands and delivery schedules which are often scaled or customized to customers' needs based on the information they provide. Many times, 3PLS go beyond operational and tactical outsourcing agent and grow into becoming strategic partners of the principal outfit. This occurs as a result of long-standing relationships where the 3PLS provide value-added services that go beyond transportation and warehousing (O'Byrne, 2017; Malkanthie and Kelum, 2017).

In the downstream sector of the Nigeria petroleum industry, the three key participants (IPMAN, NNPC, and Multinationals) employed different supply chain management techniques for the transportation, distribution, warehousing, and sales

of their products. The multinationals which comprised of six international oil conglomerates (MRS, Forte, Oando, Mobil, Total and Con Oil) vertically integrate the supply chain activities as it related to the earlier mentioned activities. NNPC which is the Federal Government owned oil enterprise also vertical integrate their downstream activities. The third participants in the industry are the privately owned or independently owned retail outlets; most of the members of this group generally outsourced their supply chain activities to the third-party logistics service providers. It is against this background that the third objective of this study becomes necessary. The objective is meant to assess the performances of these three main participants in the downstream sector of the Nigerian petroleum through the use of the attributes agreed upon in Supply Chain Management (SCM) literature as being the standard performance measurement for the analyses of efficient SCM. Scholars (Patterson *et al.* 2003; Lee *et al.* 2009; Quesada *et al.* 2012) generally believed that SCM performances can be assessed at the strategic, tactical and operational levels in organizations, by measuring to what extent the four key variables of environmental uncertainties, penetration of information technology, supply chain relationship (the level of information sharing), and the quality/ quantity of value-added services (provided by partners or sub-component being assessed) are affecting the entire supply chain management. These four attributes are identified in the body of extant literature on the discourse as being capable of measuring the efficiency and effectiveness of SC integration in organizations (Patterson *et al.* 2003; Lee *et al.* 2009; Quesada *et al.* 2012; Ajayi, 2016; O'Byrne, 2017; Malkanthie and Kelum, 2017).

6.2. Examination of the Variables employed in the Measurement of Performances among Service Providers in Supply Chain Management

As earlier stated the measurement of throughput among service providers in the contemporary supply chain management outfits are the four independent variables of environmental uncertainties, penetration of information technology, supply chain relationship (the level of information sharing), and the quality/ quantity of value-added services (Patterson *et al.* 2003; Lee *et al.* 2009; Quesada *et al.* 2012; Ajayi, 2016; and Malkanthie and Kelum, 2017). All of these four variables are good calibrating instruments that reveal how efficiently the model employed (either VIM or 3PLS) by the owners (IPMAN, NNPC, and Multinational oil companies) influences the effective transportation of the products.



Environmental uncertainty is described in the literature as a condition where the management of a business entity has little information about the situations of events that influence its external or operating environment that is constantly undergoing changes and, hence, largely unpredictable. The management of the firm can do little or nothing to immune their organizations to the influences of their operating environment which will ultimately have a say in the choices, risks and opportunities that are available to the firm (West and Drnevich, 2010; Quesada *et al.* 2012 ; O'Byrne, 2017; Malkanthie and Kelum, 2017). In SCM business activities associated with throughputs or achievement of seamless delivery are always affected by the operating or external environment (West and Drnevich, 2010; Quesada *et al.* 2012). The effect of the external environment could be in form of a political interference, infrastructural gaps (like poor state of road network) or constitutional change; this is more peculiar to the world countries where policy somersaults from governmental agencies often disrupt tactical and strategic plans among business associates (Ajayi,

2016). However what has been responsible for the greater percentage of the environmental uncertainties being experienced in the last three decades by SCM firms is the influence of Information and Communication Technology (ICT) on the operating environment (West and Drnevich, 2010; Quesada *et al.* 2012; O'Byrne, 2017).

Bearing this in mind SCM analysts identified it as a key variable for the measurement of the performance of an SCM firm. For example West and Drnevich (2010), who conceived a model for the evaluation of SCM performances, identify environmental uncertainty as the “independent variable” describing it as “the degree to which technology is changing the industry” and provided measurement for the variable by positing that respondents should choose from 1 to 4 to depict how well they believed that technology has changed the industry (West and Drnevich, 2010 p 24). This is also true of the three other variables; penetration of information technology, supply chain relationship and quality/quantity of value-added services that exists among constituents of the supply chain in the two ownership structures examined in this study. To this end the hypothesis to test this objective was formed and stated thus;

“There are no significant differences in the quality of organization and activities of Supply Chain (SC) services (transportation, distribution, and storage of products), being run by third service logistics (3PLs) and those which operate under the vertical integration model”.

6.3. Hypothesis Testing

A one-way between subjects ANOVA was conducted to compare if there are differences in the management and performances of haulage services outsourced to the 3PLS and those run in-house under a Vertical Integration Model (VIM) by assessing them based on the four key variables of environmental uncertainties, penetration of information technology, supply chain relationship and quality/quantity of value-added services.

Table 6.1. Result Table: Summary of one-way ANOVA showing the influence of ownership type on management performance

Source	SS	Df	MS	F	Sig.
Between Groups	51164.861	2	25582.430		
Within Groups	111221.501	262	424.510	60.26	<.05
Total	162386.362	264			

The result in Table 6.1 shows that there was a significant effect of ownership type on management performance ($F(2,262) = 60.26, p < .05$).

Due to the fact, the ANOVA result is statistically significant; there was a need to compute a post hoc test. The post hoc test provided an opportunity to compare each of the obtained performances of the ownership structures with one another. This test compared the performances of those who employed Vertical Integrated Model (Multinationals) to those who operated Third-Party Logistics services (IPMAN) and those who operated the combination of the two (NNPC).

Table 6.2: Descriptive statistics showing the mean difference in management performance based on ownership.

Ownership	N	Mean	S.D	LSD POST HOC ANALYSIS		
				1	2	3
IPMAN	135	87.56	12.10	-		
NNPC	29	105.07	8.78	-17.51*	-	
MULTINATIONAL	100	117.17	29.52	-29.61*	-12.10*	-
Total	264	100.65	24.80			

*. The mean difference is significant at the 0.05 level.

The result in Table 6.2 shows that there was a significant effect of ownership type on management performance ($F(2,262) = 60.26, p < .05$). The null hypothesis is therefore rejected while the alternative hypothesis is accepted.

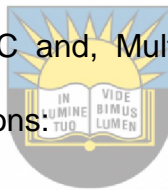
Descriptive analysis and pot hoc analysis (table 6.2) revealed that multinational oil company (M= 117.17) significantly reported better management performance, followed by NNPC (M= 105.07) compared to IPMAN (M= 87.56) with poor management performance. Taken together, these results suggest that the ownership structures/models employed by an organization engaged in the distribution and retailing of petroleum products do have an effect on the effective haulage/transportation services they offer. Specifically, the results suggest that SCM firms who operate under a Vertical Integrated Model (Multinational oil companies), reported better management performances when the four variables were examined.

The NNPC who operated under the combination of both VIM and 3PLS reported a lower level of performances, while IPMAN who operated under a 3PLS arrangement reported the lowest level of performance.

Table 6.1 is the graphical representation of the descriptive analysis and it succinctly confirmed what was reported in Table 6.2.

6.4 Analysis of the Interview sessions

Three different interview sessions were held with three managers of the participating conglomerates in the downstream sector of the petroleum industry. Each interview session was dedicated to the representative of each of the participating conglomerates (IPMAN, NNPC and, Multinational oil companies). Below are the excerpts of the interview sessions:



When asked what are the factors which influenced their choice of SCM model employed for the transportation of their merchandise, B1 (male, 45) a manager with a multinational oil company submitted that “the business philosophy behind the operations of multinational oil firms is the foremost reason behind the choice-don’t forget that these companies are global brands who operating in the Nigeria environment, the business philosophy we operate under is not incidental to any particular country. They are usually designed and determined by the global headquarters. We only implement such policy at the country level here. The business philosophy of these entities is to have total control over the all integrated levels of supply chain, such as research and development, production, pricing policy, packaging, marketing and, transportation, in essence, overall the processes from the factory through to retail outlets”. B2 (male, 57) station manager with the NNPC

clarified that NNPC employed the two models: “we have two types of NNPC retail outlets, the first is the 36 outlets that are present in the capital cities of all the 36 state capitals, these are completely owned by NNPC and their transportation operations are run in-house under the vertical integration model. The second type of retail outlets are the franchises of the conglomerate, they operated the third-party logistics services for the freighting of their merchandise”. B2 continued

Most of the franchise does not have the financial capability to vertically integrate their operations and so enter into a third-party agreement with available haulage firms under on-demand model (where haulage tanker are provided for the conveyance of the products from point-of-procurement to their retail outlets).



B3 (male, 36) logistics manager to a privately owned retailer (member of IPMAN) corroborated the submission of the other two as it related to finances being a criterion in the choice of the model employed by participants “

we cannot match the financial muscle of the multinational oil companies, ownership of all the different levels of the supply chain is practically impossible for nearly all the members of IPMAN....don't forget that these are private holdings....so we simply out-source the transportation aspect of the business and focus on sales.

He continued

some of us tried the vertically integrated model (howbeit at a moderate level) at one time or the other and discovered that we were running at loss, we had the headache of maintenance of the trucks to contend with, apart from this –it can be difficult dealing

with some drivers and we lost money when the trucks are not operating.

He further posited that

paying the all the wages of those in the transport section (drivers, mechanics and managers) was a big drain on the resources of most of the fledging outlets, the overhead cost became too much and we couldn't compete well with the bigger participants in the market.

B1, however, believed that his organization is reaping the reward of vertically integrating their operations

our haulers are well trained, educated and focused individuals...we have a training school in the city...which was patterned after a similar one in our global head office in France. Our haulers received the same globalized training designed by our global headquarters. That is why you can hardly find our trucks involved in accidents or oil spills.

He enthused further that

The logo of the University of Fort Hare, featuring a shield with a sunburst at the top, an open book in the center, and the motto 'IN VIDE' on either side of the book. Below the shield is a banner with the motto 'Together in Excellence'.
University of Fort Hare
Together in Excellence

We take an active interest in the calibre of our employees and that include our haulers, we see them as part of our brand projection to the outside world and so we organize periodic training for them and they have better self-esteem than the average hauler. Whatever it appears we are losing because of the payment of salaries, we can gain more by having a very low rate of accident cases.

CHAPTER VII - FINDINGS

7.0. The seventh chapter is dedicated to the analysis of the fourth and the final objective of this research work. This objective which was to analyze the effect of the socio-economic attributes of the participants (haulers and managers of retail outlets) involved in the distribution of petroleum products has on the safe, efficient and cost-effective distribution of products is examined here through the use of descriptive statistics, inferential statistics, interview sessions and a comprehensive discourse of the results.



University of Fort Hare
Together in Excellence

Table 7.1: The Socio-Economic Characteristics of the Respondents

Attributes	Total Number of Respondents	Male (%)	Female (%)
Gender	265	262 (98.86)	3 (1.14)
Age			
21-25	13 (4.90)	11 (84.61)	2 (15.39)
26-30	19 (7.17)	18 (84.74)	1 (5.26)
30-34	45 (16.98)	45(100)	0(0)
35-39	75 (28.30)	75(100)	0 (0)
40-44	63 (23.78)	63 (100)	0 (0)
45 and Above	50 (18.84)	50 (100)	0 (0)
Marital Status			
Single	25 (9.40)	23 (92.)	3 (8)
Married	231 (87.20)	231(100)	0 (0)
Widowed/Separated	9 (3.40)	9 (100)	0 (0)
Educational Status			
Non-formal Education	2 (0.8)	2 (100)	(0)
Primary School Leaving Certificate	48 (18.11)	48 (100)	0 (0)
Secondary School Leaving Certificate	190(71.70)	190 (71.70)	0 (0)
Ordinary National Diploma	25 (9.4)	22 (88.0)	3 (8.0)
Years of Experience as Haulers			
1-4 Years	45(17)	42 (97,30)	3 (6.70)
5-9 Years	84 (31.70)	84 (100)	0 (0)
10-14	61 (23.0)	61 (100)	0(0)
15-19	36 (13.6)	36 (100)	0(0)
20 and above	39 (14.70)	39 (100)	0 (0)
Years Spent in the Employment of Present Employer			
1-4 Years	25 (9.40)	22 (88.0)	3 (12.0)
5-9	50 (18.90)	100 (100)	0 (0)
10-14	135 (50.90)	135 (100)	0 (0)
15-19	49 (18.50)	49 (100)	0 (0)

Source: Author's Field work, 2018

7.1 Analysis of the Socio-Economic Characteristics of the Respondents

Table 7.1 represents the socio-economic attributes of the respondents who participated in the study, out of the 389 registered members of the Petroleum Tanker Drivers (PTD) association that are servicing the fuel retail outlets in Ibadan metropolis, 265 (nearly 70%) of them participated in the study. Also three drivers affiliated with three different retail outlets in the metropolis (each representing a main participant in the petroleum product retailing industry in the country) were interviewed. A retired driver (also a unionist) was also interviewed.

7.1.2 Gender Distribution

The overwhelming majority of the respondents were male, 262, which represented (98.86%), while an insignificant proportion 3 (1.14%) were female (Table 7.1). This distribution figure on its own is not different from figures obtained from other regions of the world (Bunn *et al*, 2009; Black *et al*, 2017). It is a proven statistics that the bulk of truck drivers worldwide are males. Bunn *et al* (2009) in a study conducted in the US which assessed gender and age variability of truck drivers effects on road accident prevention found that a paltry 554 of the 18678 (2.9%) of the truck drivers sampled in the study were females. The lengthy time spend on wheels; including driving at odd hours and possibly the rigors associated with the job schedule of a hauler must have been responsible for the lukewarm interest the female gender have in the occupation.

7.1.3 Age Distribution

Truck driving and maturity in age seems to have a causal relationship, it can be safely inferred that most haulers are above the 30 years old region. Statistics from this study showed that less than 13% of the sampled respondents were below 30

years of age. The figure is slightly lower to the 25.30% obtained by Bunn *et al* (2009) when age distribution of truckers were also analysed in a US study. As it has been pointed out in many studies where the ages of drivers were considered as the explanatory variable in road traffic accidents, younger drivers generally have the propensity to be more carefree about safety issues when driving (Deblanc, 2007; Berehends *et al*, 2008; Ajayi, 2016; Ajayi, 2017). This factor definitely must be a major consideration at the point of recruitment for most fleet managers who must often than not are in charge of recruitment exercise for haulers.

7.1.4 Marital Status

How marital status is sometimes defined culturally differs. In the Nigerian society marital status of an employee is sometimes synonymous to how responsible such a staff will likely be. From the above analysis, a dominant percentage of the truckers were married. Two hundred and thirty one, which represented 87.20%, were married, while the differentials of 12.80% were either single or widowed. Some other salient facts that are revealed through this analysis are; that the 3 female gender captured in the study were all below 30 years of age, they were all single and are all literate (had 2 years of post-high school education). This could mean either of these two things; a possible shift in paradigm in gender/job definition equation and the reduction in job opportunities is establishing a new frontier in the gender/job definition equation.

7.1.5 Educational Background

Nearly all the respondents had a form of formal training. An insignificant number - 2 - which represented (0.8%) of the respondents were not educated. The greater majority of the respondents had high school education (12 years of formal education)

while 25 (9.4%) had post-secondary school education. The essence of formal education for all categories of drivers cannot be over-stressed. Literacy as a factor comes into play when drivers have to make decisions and interpret road safety signs. The U.S. government through its Federal Motor Carrier Safety Administration (ATA 2014) stipulated that the ability to read and write in the English Language is a non-negotiable condition for Commercial Motor Vehicle (CMV) operators (or truck drivers). The Federal Road Safety Corps (FRSC) which is the body saddled with the issuance of driving licenses to drivers in Nigeria also insisted that truckers must be able to read and understand road signs (FGN, 2012).

7.1.6 Analysis of the Working Years of Haulers

More than half of the total number (51.30%) of the respondents captured in the survey has spent more than ten years on the job. Nearly 15 % of the total population had over twenty years' experience as haulers (table 7.1). Recent findings are showing that there are evidences of casual relationships between the age of drivers and the propensity to be involved in accidents. While Murphy and Leach, (2012) discovered that over 20% of road crashes that occur among teen drivers are directly attributable to youthful exuberance while drivers who are below 40 years old generally drive faster than those who are above that age group (Ramos et al, 2018). Older truckers are also known to have problems associated with reduced visibility and impaired visions associated with night driving (Murphy and Leach, 2012). Doubtlessly the entry age into truck driving is an important criterion which eventually influenced the demographics of the industry. In most countries younger truckers are only qualified to drive at twenty-one (Short, 2014). Studies among truck drivers have shown that age has a direct effect on their driving skills such as vision, reflex movement and the processing of information. Reporting the findings from a

2010 safety study on all categories of drivers, Short (2014) revealed that drivers who are 25 years of age and younger showed an alarming 188% more chance of being the direct cause of a road traffic crash while the same study showed that drivers who are 65 years and above showed a paltry figure of 16%. The global trend generally seems to be that truckers are older men, in the US a 2014 study put the average age of truckers at 52 (Short, 2014), from the analysis in this study over 70% (70.92% to be specific) were 35 years and older. While there might be different salient factors that could be responsible for this observation, it might not be far-fetched to assumed that trucking companies are generally wary of committing truckloads of client's goods to inexperienced and exuberant young drivers.

7.1.7 Years Spent in the Employment of the Place of Present Employer

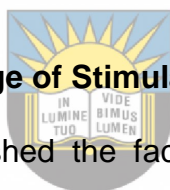
The majority of the respondents have spent between ten to nineteen years as employees in the same organization, close to 70% (69.40% to be specific) reported that they have been in the employment of the same organization for over 10 years (Table 7.1). This figure sharply contrasted with the US statistics which showed that there could be as much as 100% rate of annual job turnover among truckers (Short, 2014). There could be many factors responsible for this disparity among which could be the availability of job opportunities and security among truckers in Nigeria compared to the scenario in the US. There is a definite interplay between the working conditions available in a workplace and the desire to stay on the job. Research findings ascertained that truck driving is one of the most stressed jobs, with a causal relationship between "workplace" stressed induced fatigue and accident rate (Murphy and Leach, 2013, p.1). Truck drivers generally place higher premiums on good working conditions. After this comes the satisfaction that the job brings (Short, 2014). Due to the stressful nature of the job most drivers pay scant

attention to issues relating to their personal health and periodic on-the-job training programs, workplaces that emphasized the importance of her truckers' wellbeing will generally be able to retain a higher percentage of the workforce.

Table 7.2 Analysis of the Knowledge of Stimulant Usage among Truckers

Level of awareness	Frequency	Percentage
Fully aware	163	61.50
Partially aware	90	33.96
Not aware	12	4.54

Source; Author's Field work, 2018



7.2 Analysis of the Knowledge of Stimulant Usage among Truckers

Several studies have established the fact that usage of stimulants among truck drivers is arguably one of the highest when compared to verifiable statistics from similar outdoor professions (Murphy and Leach, 2013; Reguly *et al*, 2014; Benhood and Mannering, 2016). Academic literature establishes that truck driving is generally one of the most stressful jobs in the contemporary world, work-induced exposures, such as vehicular vibration, manual handling of driving components of the truck and poor ergonomics significantly increase the risks for chronic conditions among truckers (Reguly *et al*, 2014). In a bid to effectively cope with the work-induced stress and the resultant chronic conditions associated with trucking most truckers engaged in the use of psychoactive substances to keep them “awake” when driving (Bombana *et al*, 2017). It can therefore be assumed that the view expressed by the respondents above on their knowledge of the usage of illicit drugs.

Table 7.3 Self-Confession on the Usage of Stimulants

Attributes	Frequency	Percentage
Does it regularly	70	26.41
Does it occasionally	90	33.96
Abstain from it	88	33.22
Refused to provide answer	17	6.41
Total	265	100

Source; Author's Field work 2018

7.3 Self-Confession on the Usage of Stimulants


Table 7.3 showed that slightly over 60% of the respondents confirmed that they utilize stimulants in order to enhance their performances or to reduce the stress associated with their work schedules. Different studies (Reguly *et al*, 2014; UNODC, 2015 and Bombana *et al*, 2017) reported the practice as being very popular among truckers world over. In 2017 study carried out on truck drivers in Sao Paulo in Brazil, Bombana *et al* (2017) confirmed that nearly 10% of the total number of the truck drivers sampled tested positive to the use of illegal psychoactive substances (amphetamine, cocaine, and tetrahydrocannabinol).

Table 7.4. Types of Stimulants Used

Types	Frequency	Percentage
Kolanut Alone	35	21.9
Cigarette Alone	44	27.5
Cannabinoids Alone	19	11.9
Opioid Analgesics Alone	13	8.0
Combination of Any of these Stimulants	49	30.7
Total	160	100

Source; Authors' Fieldwork, 2018

7.4. Types of Stimulants Used



According to UN Office on Drugs and Crime (UNODC, 2015), a stimulant is psychoactive substance with the ability to influence the human cognitive and psychomotor functions. These substances which can be both licit and illicit drugs do have effect on the taker central nervous system and stimulate reactions that ordinarily may be impossible for the taker. Sampled respondents (Table 7.4) identified four major types of stimulants that are commonly used these are kolanut, cigarette, cannabinoids and opioid analgesic. Kola is a caffeine-containing nut of evergreen trees of the genus Cola. It has two very popular species; Cola nitida and Cola acuminata. Cola nut contains caffeine (between 2-3.5%). Caffeine works by stimulating the central nervous system (CNS), heart, and muscles. Cola nut is used for short-term relief of fatigue, depression, chronic fatigue syndrome (CFS), melancholy, and lack of normal muscle tone (atony), exhaustion. As obtainable in any other caffeine-based stimulant, excessive consumption or abuse of kola nuts do

have some physical side effects. Some of which are insomnia, most often than not headache and jitteriness are also frequently reported among users (WebMD, 2018).

Cigarette is classified in the literature as an example of a biphasic chemical or drug (Miller, 2012). It is biphasic because of the dual ability of the nicotine content to work both as a stimulant and a depressant in the taker. Opioids are in the class of prescription medications ideal for the treatment of moderate or severe pain, however once abused they become one of the most highly addictive and hazardous chemical substances in circulation (Bombana et al, 2017). Opioids work on the taker central nervous system (CNS) by binding and interacting with the opioid receptors on the nerve cells in their bodies. They usually produced dual effects; first, the reduction of pain messages to the brain and significant loss of pain in the taker. The second feeling these drugs produces in takers are false feeling of euphoria and relaxation.

Researchers and safety analysts, generally believed that truck driving is one of the most dangerous occupations in the world (Murphy and Leach, 2012; Greenfield *et al*, 2016). It is an open secret that most haulers are stressed and fatigued by the very nature of their job schedule, some of the health complaints that frequently emanates from them include fatigue, sleeping disorder, sitting/low back pain, musculoskeletal disorders and whole body vibration (Greenfield *et al*, 2016; Bombana *et al*, 2017). Shreds of evidences exist that some truck drivers in a bid to cope with the resultant pain and stress associated with the job often take opioids (Bombana et al, 2017). Most often than not, such a drug taken initially as a pain reliever soon become an addictive psychoactive substance. The prolonged effect of these drugs on the truck drivers are the exhibition of poor judgment in personal and professional situations (Bombana *et al*, 2017).

7.5. Analysis of the Relationship between the different Socio-economic Explanatory Variables

Analysis of the Relationship between the different Socio-economic Explanatory Variables and their influences on the level of Safety Consciousness / the ability to obey Health Safety and Environment (HSE) stipulations guiding the Conveyance of Petroleum Products among Haulers

In this section effort was made to analyze the relationship which exists between the identified socio-economic attributes of haulers (working condition, educational attainment, marital status and attitudes towards usage of stimulants) and their influences on the level of safety consciousness/ability to obey health, safety and environment stipulations guiding the carriage of petroleum products by haulers. Shreds of evidences existed that truck driving is one of the most demanding outdoor jobs. In order to cope with the demands of the job schedule some haulers often indulge in the consumption of psychoactive substances (Miller, 2012). The analysis of the interaction between the socio-economic characteristics of haulers and their disposition towards safety practices associated with the carriage of petroleum products is an attempt to investigate if a casual relationship exists between these variables. This is being done in order to achieve the fourth objective of this study. To this end, the hypothesis earlier formulated is hereby re-stated in the alternate form;

7.5.1. Ho

Compliance to safety consciousness against road traffic crashes (ability to understand and obey the Health, Safety and Environmental (HSE) standards guiding the operations of the petroleum products supply chain) is influenced by socio-economic attributes of key participants (haulers).

7.5.2. Test of Hypothesis

As earlier stated in Chapter 3 (Research Methodology), Multiple Regression Analysis (MRA) was used to test this hypothesis because of the identified advantages it holds over other regression analytical models. The MRA was chosen for test the hypothesis because it is a good analytical tool for the examination of a possible casual relationship between a dependent variable and the different independent explanatory variables.



University of Fort Hare
Together in Excellence

7.6. Result

Table 7.5. Summary of Multiple Regression Analysis Showing the Influence of use of stimulant, work condition, marital status and educational qualification on Compliance

Predictors	β	T	P	R	R^2	F	P
Use of stimulant	.53	10.13	<.05				
Work condition	-.22	-4.18	<.05				
Marital status	-.10	-1.80	>.05	.56	.31	29.72	<.05
Educational qualification	.16	3.00	<.05				

The result revealed that the use of stimulant, work condition, marital status and educational attainment/literacy level have a joint influence on compliance ($R^2 = 0.31$, $F(4,260) = 29.72$, $p < .05$). What this translates to is the fact that when all these explanatory variables are combined (usage of stimulant, work condition, marital status and educational qualification), they accounted for 31% of the observed factors which influence compliance to safety practices guiding the haulage of petroleum products among the respondents (haulers). This simply means that other factors that are not captured in this study are responsible for the 69% differentials as factors which influence compliance to safety practices among haulers. The result however revealed that the collective presence of the use of stimulants, work condition, marital status and educational qualification had significant influence on compliance ($R^2 = 0.31$, $F(4,260) = 29.72$, $p < .05$). Further analysis of the result further revealed the contributions of each of the independent explanatory variables to the model. For example the usage of stimulant ($\beta = .53$, $t=10.13$; $p < .05$), work condition ($\beta = -.22$,

$t=-4.18$; $p<.05$), educational qualification ($\beta = .16$, $t=3.00$; $p<.05$) have significant independent influence on compliance, while marital status ($\beta = -.10$, $t=-1.80$; $p>.05$) have no significant independent influence on compliance. It can be inferred that respondents believed that usage of stimulants, poor working condition and level of educational attainment will influence the level of their compliance to safety practices guiding the conveyance of petroleum products. The other independent explanatory variable employed in this- marital status does not have any significant influence on the level of compliance among respondents. On the basis of the foregoing, the hypothesis is thus accepted.

7.7. Analysis of the Interview Session

Three haulers and one of the union leaders of Petroleum Tanker Driver Association (PTDA) were selected for the interview sessions. The participants were interviewed at different times, in all four different interview sessions were conducted. Excerpts of the interview sessions are presented below;

When D1 (male, 53) was questioned on his knowledge of health, safety and environment stipulations guiding the carriage of petroleum products respondents D1 (male, 53) replied thus;

I know about HSE.....we are mandated by our union (Petroleum Tanker Driver Association) to attend HSE training at least twice in a year or else your operating license as a hauler won't be renewed.....the multinational oil companies and Department of Petroleum Resources (DPR) are usually the organizers and if you fail to attend them as a hauler, you are running the risk of losing your job.

D2 (male, 37) when asked about the seemingly prevalence of psychoactive substances among haulers answered thus; “

It is not as widespread as believed by the general public....of course the stressful nature of the job coupled with the desire to maintain a high level of alertness when driving leave many of us without any option....but they are still exceptions to the general rule”. He further enthused “fuel retail outlet owners and government are to be blamed for the incidence of substance abuse among haulers....the roads are very bad....sometime it can take up to a week to load fuel into our trucks at the loading jetty because of the long queue and no sooner than you are done with the loading...you must start driving because the retailer (who owns the product) is already on your neck. D3 (male, 29) confessed “I smoke cannabis sometime to get strengthened....nobody really cares about you.....the retailers want the fuel delivered in time, the vehicle owner (in case of 3pls) want the truck in perfect condition and the government are solely concerned about the collection of taxes...no one really care about the haulers”. D1 lamented about their working condition “I don’t earn enough....i don’t get to see my family often....I have two girlfriends apart from my wife...sometimes I don’t see my wife and kids for a month”. D3 posited that substance abuse is “passed down” to “new apprentice or aspiring haulers” by their “masters”. “Most of our bosses take these substances...and we know they do so to manage the tension associated with the job, I started taking cannabis as an apprentice...but I only take it once daily...at night when I want to sleep, during the day I take cigarette to stay awake”.

U4 (male, 62) presented a contrary view as he argued that there is prevalence of psychoactive substance abuse common among younger drivers. He replied

I retired from driving when I was 55 years old, fortunately for me I got elected as one of the union executive...many young haulers (even though they are more literate than the older haulers) lacked the finesse and sound character observable in the older haulers.... In my years as a hauler taking of cannabis was not common...many of us were satisfied with the taking of kolanut and cigarette....but many of these new generation haulers take pills (opioid analgesic) and cannabis.

D1 argued that he had extra-marital affairs which did not impinge on his functionality “having lovers is normal, it does not affect my concentration on the job at all, rather it help in keeping me safe from visiting brothels and the girlfriends also perform wifely duties like preparing my meals whenever I’m with them”. D3 confessed that “incessant road traffic crashes involving trucks hauling petroleum products are caused mainly by bad roads and desperation to quickly deliver the products by some drivers”. U4 enthused that “prices of new trucks are expensive, the same goes for the spare parts...many of the trucks are old and are not in good condition...many cases of RTC involving trucks are caused by this”.



University of Fort Hare
Together in Excellence

CHAPTER VIII - DISCUSSION

This chapter is dedicated to the presentation of the summaries of the discourse of all the objectives of this study. The presentation is provided under a thematic arrangement, where an attempt is made to separately discuss each of the stated objectives as a theme. There are four research objectives, each of these four objectives is stated and the discourses of the findings are presented sequentially.

8.1. The first objective of this study is to analyze the spatial distribution of fuel retail outlets in Ibadan metropolis.

The specific objective is mainly to investigate if there are significant differences in the compliance rate to the planning standards stipulated by the government on the location of fuel retail outlets between fuel retail outlets located in the core zone from those sited in the peripheral zone of the metropolis.

8.1.2. Discussion

Analysis of the finding from this objective is an eye-opener to the malaise associated with retail and transport planning in Ibadan metropolis. The overall level of compliance with the planning stipulation regulating the maximum distances of fuel retail outlets from one another was abysmally low. The fact that the compliance level was lower in the peripheral zone which is the 'newer section' of the metropolis is unsatisfactory because this simply means flagrant disobedience of this law has become more of the norm than the exception. Another discouraging truth unearthed by this finding is that all the three main participants (IPMAN, Multinationals, and NNPC) in the distribution of petroleum products at the downstream section of the Nigerian economy are guilty of this shortcoming. Findings from the study established that the fuel retail outlets owned by the three groups are all sited in locations that

flouted the rules guiding the stipulated distances of fuel retail outlets from one another. The reason for this anomaly is not far-fetched; the second objective of this study revealed that population density and the anticipated patronage from consuming public are the leading explanatory factors behind the location of fuel retail outlets by owners.

This result (objective 2) seems to suggest that there is causality between the availability of the population of anticipated buyers and the decisions by retail owners to locate their outlets in such a locality. A deeper look at the map (figure 3) of the distribution of the retail outlets over the metropolis validates such an argument. Most of the locations where they are noticeable clusters of these fuel retail outlets are the major highways and zones closer to commercial areas (markets and CBDs). These locations are incidentally zones of relatively high population densities and the beehives of commercial activities. The results from this study reflect that the flagrant disobedience of urban planning stipulations that appears to have become the norm in most cities in Nigeria when the discourse is centered on the spatial pattern of fuel retail outlets (Adenigbo *et al.* 2017; Dogara, 2017). A 2017 study on the analysis of the spatial pattern of fuel retail outlets on a major highway in Akure (another state capital in the southern part of Nigeria) revealed that the average distance between all of the forty-two (42) fuel retail outlets on the road corridor was 372 meters (Adenigbo *et al.* 2017). This is a total violation of the urban planning stipulations guiding the establishment of these outlets. The study also revealed that all the three participants involved in the retailing of petroleum products flouted the rule guiding the location of fuel retail outlets (Adenigbo *et al.*, 2017).

Dogara's (2017) research into a nearly similar problem in Kaduna (a state capital city in the northern part of the country) also provided similar findings. He discovered that the average distance between the fuel retail outlets in the city was about 230 meters. The study further established that 86 % of these outlets were clustered on the major highways in the city, a Pearson product-moment correlation coefficient was computed to assess the relationship between the ranking of the highways in the city and the clustering of fuel retail outlets on these roads. There was a positive correlation between the two variables, $r = 0.01$, $p = 0.00110$. Overall, increases in the ranking of the roads were correlated with increases in the rate of clusters of fuel retail outlets.

What could be inferred from all these studies is that there is a cause to be worried about the spatial planning and pattern of the distribution of fuel retail outlets in Nigerian cities. While it might be far-fetched to conclude that this scenario is true of all the urban centers in the country, it cannot be totally wrong to infer that the governmental agencies mandated with the regulation of physical planning and granting of operating licenses for the retail outlets in the country are totally flummoxed by the planning mess that has been created.

Findings from my research clearly showed that the business expectations of a would-be investor play a critical role in the determination of the eventual location of a retailing facility within an urban center. This strongly aligned with the basic constructs of Expectation Disconfirmation Model (EDM). The level of satisfaction that a retailer will derive from the site in which he is located is not only the result of the implicit prior expectation but much more importantly the confirmation of such expectation (Morgeson 2012; Grimmelikhuijsen & Porumbescu, 2017). Furthermore, results from

my research strongly suggested the possibility of an inverse relationship between the applications of the constructs of EDM and Distributive Justice Theory (DJT) in the decision making processes among private investors as it concern the location of urban retail facilities. The Expected Return on Investments (ERI) which is one of the premises of EDM often exhibited by retailers habitually negates the principle of fairness as enshrined in the DJT. Results from my study affirmed that fairness in the allocation of essential services (such as fuel retail outlets) often becomes a forgone alternative, once the ERI of the retail outlet is considered by the retailers. In other to guide against such development, the urban planning team must employ multi-dimensional approaches. Such approaches must not only be the utilization of punitive measures in correcting urban planning problems (as advocated by Hicks 2006; Fox et al, 2007; Teller and Elms, 2011; Delfino, 2013; Kantola, 2016). Already, it has been proven by some scholars (Hicks, 2006; Delfino, 2013; Kantola, 2016) that retailers are sometimes willing to pay punitive taxes rather than taking locational decisions that will affect their expected return on investment (Hicks, 2006; Delfino, 2013; Kantola, 2016; Grimmelikhuijsen & Porumbescu, 2017).

Another candid observation I made from this study is that in Ibadan metropolis (and perhaps some other African traditional cities), the holistic adoption of Central Place Theory (CPT) (Christaller, 1966) and other western developed models as the premise for urban planning are largely counterproductive. Ibadan existence as a city predated the arrival of the colonialists (Filani, 1994; Mabogunje, 2002). The idea of having a CBD as the central place is alien to the cultural belief of the residents of the city. The central place in the pre-colonial Ibadan was the King's palace, adjoining the palace are different traditional religious sites and the King's market (Ojo Oba). This section represents the 'traditional CBD' of the metropolis till date and it housed many

fuel retail outlets and other commercial activities (Filani, 1994; Ajayi, 2016). The creation of a modern CBD some few kilometers away from the traditional CBD has produced two traffic generating zones which adjoined one another. Till date the two zones which are in the core of Ibadan metropolis have the densest population of both human and commercial activities (Filani, 1994; Mabogunje, 2002; Ajayi, 2016).

To correct some of these lapses, there is the need for systemic review of some the adopted urban planning models by incorporating best global practices with homegrown ideas. Such principles are already applied for modern urban planning in Iran (Habib and Shokoohi, 2009) and Australia (Perveen *et al*, 2017), incidentally the two countries shared similar history of being former colonies of the United Kingdom with Nigeria. The governments of Iran and Australia are allowing the infusion of critical homegrown ideas that are reflective of the residents cultural belief to help in redesigning of their principal cities (Tehran and Canberra) (Habib and Shokoohi, 2009; Perveen *et al*, 2017). It is the belief of some members of the academic community (Habib and Shokoohi, 2009; Perveen *et al*, 2017) that each city has unique socio-cultural, economic and physical components, it is therefore necessary to develop a fuzzy driven approach which employed the combination of different models (foreign and locals) in the management of urban planning problems.

Perhaps an urban planning tool that is presently gaining wide acceptability among policy makers and the academic community is the Scenario-Based Planning Model (Dischinger and Jackson, 2006; Liu, 2012; Perveen, *et al*, 2017; Perveen *et al*, 2018) The major advantages which SBPM has over other planning tools are the inbuilt mechanism to observe, control, project and resolve complex urban problems (Dischinger and Jackson, 2006; Liu, 2012; Perveen, *et al*, 2017; Perveen *et al*,

2018). The SBPM constructs provide scientific guidance for urban policy makers to accurately predict and prevent the growth conflicts among the different urban subsystems – environmental, economic and social by giving room for community based participation (Liu, 2012; Perveen, *et al*, 2017). Additionally, the SBPM if painstakingly implemented allow policy makers and metropolitan authorities to adequately prepare for uncertain future (Habib and Shokoohi, 2009; Perveen *et al*, 2017). The turnaround time for evaluation of SBPM is shorter than many of the traditional urban planning tools- usually between 5 to 10 years. This timeframe is considerably shorter when comparison is made with some of the traditional urban planning tools like the Analytical Hierarchy Process (AHP) and Multi-Criteria Analysis (MCA)) which are often undertaken for longer time spans—e.g., 10, 20, 50 years (Perveen *et al*, 2017). SBPM also take into account challenges of integrating socio-environmental issues and tenets of community based (participatory) planning into the final model. These attributes inherent in SBPM has given it wide acceptability as a planning tool for urban development in different cities in the developing world (Habib and Shokoohi, 2009; Perveen *et al*, 2017). It is my belief that the adoption of SBPM with the necessary inputs of homegrown ideas (from stake holders) will be of immense benefits in futuristic planning of Ibadan metropolis. The SBPM could also be modified by different traditional cities in sub Saharan Africa as urban planning tool.



University of Port Harcourt
Together in Excellence

8.2. The second objective of this study is to analyze the factors which determine the location of fuel retail outlets both in the core and peripheral zones of Ibadan metropolis.

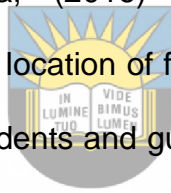
The main thrust of this objective is to examine the possibility of a relationship (either causality or correlation) between the dependent variable and the different explanatory independent variables.

8.2.1. Discussion

Analysis of the socio-economic characteristics of the respondents shows that the respondents are well informed about the objectives of the study. The demographics also indicated that all the respondents are literate (100%) - this on its own was a good development for the study. The ability to read and write helped in the filling of the questionnaires by the respondents. The demographics also revealed that over 80% of the respondents were below 46 years at the time the study was carried out. This figure is in tandem with the statistics from the Nigeria Bureau of Statistics which stated that the average age for the workforce in the country lies between 40 and 46 (Nigeria Bureau of Statistics, 2016). Over 40% of the sampled respondents posited that they have spent more than five years in the employment of their present organization. This category of respondents provided valuable information on their understanding of the dynamics of petroleum product distribution in the metropolis. The analysis of the demographics also indicated that 7.42% of the respondents are owners of the retail outlets.

The research has brought to the fore new perspectives on the determinants of the location of retail outlets generally and fuel retail outlets, particularly in the metropolitan areas. The findings from my study are similar to those from other researches on the discourse which suggests that population density or expected

consuming population to be served as a key factor associated with the decision to locate a new retail outlet that investors pay premium attention to (Teller and Elms, 2011; Delfino, 2013; Kantola, 2016). This most often negates the principle of distributive justice as there are tendencies for agglomeration of service points at uptown locations at the detriment of less posh neighborhoods in the same city (Hicks 2006; Fox et al, 2007; Teller and Elms, 2011; Delfino, 2013; Kantola, 2016). These researchers also suggest a number of factors to address the situation. High among these is the suggestion from Hicks (2006) that the expected property tax that investors are expected to pay when they site retail outlets in prime locations could be used to control retail agglomeration and associated economic de-scales. While Delfino (2013) and Kantola, (2016) advocated a community participatory developmental activities in the location of facilities in communities. This could give a sense of ownership to the residents and guide them into taking more responsibilities on the insistence that master plans should be sacrosanct in the location of facilities.



University of Port Harcourt
Together in Excellence

8.3. The third objective of this study is to analyze the effects that the supply chain technique employed by different categories of retailers has on the achievement of efficient distribution of the products

In specific terms, the third objective of this study is to examine the effects which the supply chain technique employed (either vertically integrated model or third-party arrangement) has on the achievement of efficient and effective distribution of the products.

8.3.1. Discussion

The three main participants in the downstream sector (retailing, distribution and transportation) of the petroleum industry in Nigeria employed different Supply Chain Management (SCM) models for the transportation of the products from the refineries (for the locally refined product) and loading jetties (for the imported products). The six multinationals oil companies vertically integrated their transportation activities within their corporate umbrella. For the Federal Government (FG) owned Nigeria National Petroleum Corporation (NNPC) it employs a business model that incorporates the mixture of vertical integration and the outsourcing of the transportation functions to third-party logistics service providers (3pls). The reason for this is because the NNPC operates two different retailing models; the conglomerate owns and runs retail outlets directly in each of the 36 state capitals in the country. It also has a franchise arrangement in place with different retailers. What the organization does when it comes to the freighting of petroleum products to all the retail outlets under its business name is to employ the vertically integrated model to the retail outlets that it runs directly, while 3pls model is used for the conveyance of the products to their different franchises. The third main participants are the members of the Independent Petroleum Marketers Association of Nigeria (IPMAN), the amalgamated body of different private holdings participating in the downstream sector of the oil and gas industry. This study discovered that the overwhelming majority among the members of IPMAN employs the 3PLS model for the transportation of petroleum products to their different outlets.

The major factors which determined the choice of the SCM model favoured by each of these three participants are financial consideration, business philosophy, and the operating environment. From the analysis of the interview session and the result of

the hypothesis tested, it is deductible that the multinational oil companies are operating largely under the business philosophy template designed by their global head offices. It has been observed that most of the Fortune 500 companies (global brands in different sectors of businesses) as rules of thumb adopts and implement the vertical integration model in the supply chain of their business activities (O'Byrne, 2017). This does not, however, mean that some aspects of their business operations are not outsourced to the 3pls (O'Byrne, 2017). The adherence to the corporate business philosophies often predetermined by the headquarters of these oil companies gives little or no room for local variation or adaptation by their national offices.

As for the second category of the participants in the petroleum products retailing in the Nigerian market (NNPC). The situation surrounding its emergence is more as a response to the yawning gap observed in petroleum products retailing in the country (NNPC, 2016). NNPC retail section commenced operation in the downstream sector of the Nigerian oil industry in August 2002. According to the organization website, the creation of the retail section was a strategic move to give it opportunities; for intervention in the market to tackle avoidable supply disruptions, setting a benchmark for other operators in the industry and a vehicle to ensure the integration of the upstream with the downstream arms of the organization (NNPC, 2016). The organization, therefore, operates a hybrid of the vertical integration and third-party logistics models in the transportation of petroleum products to the different retail outlets under its brand name. The results from the analyses (both qualitative and quantitative) conducted showed that the employment of the hybrid model by the organization gave it an average position ($M= 105.07$). It safe to infer that operation of

3pls model in some of the organization must have been a contributor to the reduction of the mean value among the sampled respondent.

The last participants in the downstream sector of the oil industry in Nigeria are the members of the IPMAN. These are indigenous investors who have licenses to operate under their own business name as petroleum products retailers'. IPMAN members by far outnumbered both the multinationals oil companies and NNPC in terms of sheer numbers of outlets owned. However, unlike the first two, the major unifying factor for them is the "association". There are no structured operational relationships between the members of the association as enshrined in the article of the registration of the group. Individuals can, however, work out any business relationship with other members at their own discretions. The body is a more of a loose conglomerate with very weak bonds. Most of these retailers owned a single retail outlet (over 70%), and so have little or no reason to integrate their operations. It is therefore not surprising that nearly all the retailers who are members of the association operated under a third-party logistics for the transportation of petroleum products to their outlets. The post-hoc descriptive analysis showed that this category of retailers posted the lowest mean score ($M= 87.56$). The reason for this is definitely related to the level of uncertainty in their operating environment. Shreds of evidence have shown that 3pls arrangements among most private holdings in Nigeria are not cast in iron, most of such contractual agreements can be broken without due recourse to the effect of such decision of the other party (s) as this case may be (Ajayi, 2016).

Ajayi (2016) in a study which examined the nature of Supply Chain Collaboration (SCC) among the constituents of wood products in Nigeria discovered that while

information sharing was identified as a key consideration in a 3pls arrangement, most of the respondents opined that they do not necessarily believe that they are under strict obligations “to share key business information with each other” (Ajayi, 2016 p 289). Inferences that could be made from this finding is that key considerations that measure SCM performances like information sharing and quality of value-added services among participants in 3pls arrangement in Nigeria are still very low when compared to what is obtainable in developed economies (West and Drnevich, 2010; Quesada *et al.* 2012;; O’Byrne, 2017). In a nutshell, it is safe to posit that retailers that operated under a 3pls arrangement for the conveyance of their products posted the weakest mean score is a true reflection of their SCM performances.



University of Fort Hare
Together in Excellence

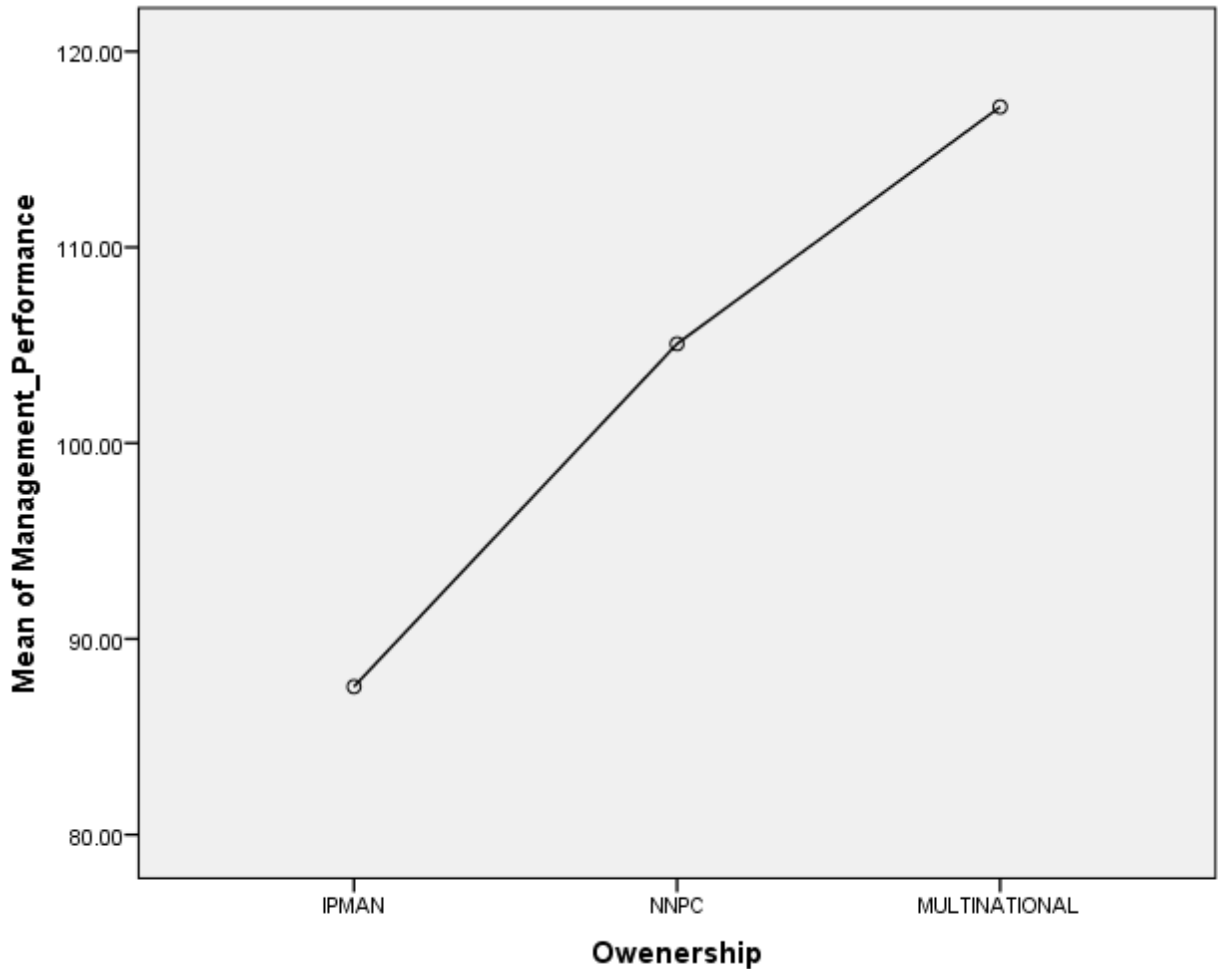


Figure 8.1: Showing the Influence of Ownership Structure of Petroleum Products Retailing Firms on SCM Performances

8.4. The fourth and the final objective

The fourth and the final objective of this research work is to examine the effects that the socio-economic attributes of those participants who are directly involved with the distribution of petroleum products has on the safe and cost- effective shipment of the products.

In specific terms, the objective revolves around the provision of a scientific explanation on the effect that the socio-economic attributes of the participants

(haulers and managers of retail outlets) involved in the distribution of petroleum products has on the safe, efficient and cost-effective distribution of product

8.4.1. Discussion

The bulk of the participants in the study were male (98.86%). This finding is in sync with observations from similar studies (Greenfield *et al*, 2009; Bombatta *et al*, 2017). Less than 1% of the total population (0.8%) of the population were uneducated at the time of the study. The implication of the literacy level of the participants on the achievement of the study objective is unquantifiable. First, the literacy level of the participants helped during the administration of the research instruments and more importantly literacy level is a key consideration in the eventual analysis of the compliance intensity of each driver. The average age of the respondents is 37.52. Recent findings are showing that there are evidences of casual relationships between the age of drivers and the propensity to be involved in accident. For example, Murphy and Leach (2012) discovered that over 20% of road crashes that occur among teen drivers are directly attributable to youthful exuberance. Short (2014) corroborated this finding through another study which discovered that drivers who are below 40 years old generally drive faster than those who are above that age group and do also take more risk as drivers. It is debatable, but proven statistics seems to support the fact that the best age range for truckers world-wide is in the region of 40-55 years (Murphy and Leach, 2012; Short, 2014; Ajayi, 2016; Bombana *et al*, 2017; Greenfield *et al*, 2016). As should be expected, the entry age into truck driving is an important criterion which eventually influenced the demographics of the industry. Many of the respondents from this study confessed that they chose truck driving as a profession in their early twenties and spent between five to ten years before fully licensed as a professional trucker. In most countries younger truckers

are only qualified to drive at twenty-one (Short, 2014). Studies among truck drivers have shown that age has a direct casual effect on their driving skills such as vision, reflex movement and the processing of information (Short, 2010). In a 2010 safety study on all categories of drivers Short (2014), revealed that drivers who are 25 years of age and younger showed an alarming 188% more chance of being the direct cause of a road traffic crash. The global trend appears to be that trucking companies show preferences for having older truckers in their stables, for example the findings from a 2014 study in the US put the average of truckers in the country at 52 (Short, 2014). Regiuly *et al* (2014), in a study which examined the interrelationship between opioid consumption and crash rates among truckers in Canada found out the mean age of the truckers who participated in the study which involved 10,190 drivers was 45.5. While there are scanty evidences to support the fact there is a direct causality between age of truckers and the willingness of compliance to HSE, findings from Smith's work showed that drivers who are above 65 years have a paltry 16% chances of been involved in accident (Short, 2014). One inference that could be arrived is that trucking companies globally seem to believe that a nexus exist between the compliance to HSE stipulations and the ages of truck drivers.

Another critical factor which influences obedience to the health, safety and environmental stipulations guiding the carriage of petroleum products globally is the attitude of truckers to stimulant consumption (Short, 2014; Ajayi, 2016; Bombana *et al*, 2017; Greenfield *et al*, 2017). Due to the stressful nature of their job schedule many truckers indulge in the consumption of stimulants or abuse psychoactive substances (Murphy and Leach, 2012; Regiuly *et al*, 2014; Short, 2014; Ajayi, 2016; Bombana *et al*, 2017; Greenfield *et al*, 2017). The consumption and the subsequent

addiction to these substances by these truckers have damning effects on their psychomotor skills and cognitive senses thereby imparting negatively on their judgmental abilities (Reguly *et al*, 2014; Short, 2014; Ajayi, 2016; Bombana *et al*, 2017; Greenfield *et al*, 2016). Nearly all the respondents (95.5%) reported that they were aware of the usage of psychoactive substances while 60.37% of the respondents confessed that they take any type of psychoactive substance. This figure is quite high, however further breakdown showed that a little less than 20% (19.8%) admitted that they take banned psychoactive substances alone (cannabis and opioids). In absolute term 32 (12.1%) of the entire sampled respondents (265 drivers) admitted that they take banned psychoactive substances. This figure is worrisome particularly when it is considered alongside the figure of those who admitted that they combine different psychoactive substances (both banned and unbanned). 49 (18.4%) of the entire sampled population (265) confessed that they take mixture of all the psychoactive substances. This simply translate to the fact that 81 (30.5%) of the entire sampled respondents admitted that they take banned psychoactive substances (either partially or fully). When analysed and presented in this clear manner the burden of drug abuse among the respondents with the possible attendant effects on their cognitive abilities become apparent. The result from the multiple regression models further confirmed this. Of the three explanatory variables in the model (that positively attested to the presence of association between the dependent and independent variables), the usage of stimulant ($\beta = .53$, $t=10.13$; $p<.05$) ranked the highest. It was followed by the work condition ($\beta = -.22$, $t=-4.18$; $p<.05$) and educational qualification ($\beta = .16$, $t=3.00$; $p<.05$).

When the interpretation of the statistical analysis is taken into consideration with the findings from the interview session, it can be succinctly surmised that three out of the

four independent explanatory variables (usage of stimulants, working conditions and educational attainment) have direct effect on the level of compliance to the HSE stipulations in each driver. Marital status which is the fourth independent explanatory variable ($\beta = -.10$, $t=-1.80$; $p>.05$) have no significant independent influence on compliance. This result was supported by one of the participants in the interview session who posited that “marital status does not affect performance on the job”. Conclusively, it is critical that a study which employs a more scientific model like the blood drug test analysis is utilized for more objective result.

8.5. Synopsis of the Discussion section

This section reflects the main thrust of my research activities on the dynamics of the retailing and transportation processes guiding petroleum products in Ibadan metropolis. The five major theories utilized in my research (Expectation Disconfirmation Theory, Distributive Justice Theory, Central Place Theory, Theory of Urban Impact and Theory of Constraints) provided the theoretical lens through which in-depth understandings of the purposes, processes and pattern of urban retailing of petroleum products in a traditional African metropolis (Ibadan). The conceptual framework (Fig. 3.5) also provided step-by-step details of the conceptualization of the entire research. My findings which are gotten through the use of structured questionnaires and semi-structured interviews further affirmed the strong interdependency between transportation, retailing and urban planning. My study also revealed that sustainable urban planning in traditional African cities will only be achieved if the culture and historical past (as represented by the urban foot prints) of such cities are considered (Magnusson, 2013; Perveen *et al*, 2017). The involvement of all stakeholders must also be given due consideration. It should be understood by government agencies that ‘global best practices’ in urban planning

might need some local inputs for effective results. Another major insight from my research is the problem associated with the safe and efficient haulage of petroleum products. The research provided an opportunity to x-rayed the influence of the supply chain technique which the different categories of retailers employed have on the efficient products distribution. Two particular theories (Theory of constraint and Theory of Urban impact) gave an insight into the critical roles that the socio-economic attributes of haulers who drives these trucks which convey petroleum products to various FRO plays in the efficient transportation of the products. The fact that my findings showed the existence of causality between haulers socio-economic attributes and their attitudes to the obedience of Health, Safety and Environment (HSE) guiding the carriage of these products is a critical discovery. Such a finding should be a strategic tool for supply chain managers, safety managers, public transport planners and vehicle licensing offices. It is my belief that all these findings could form part of contemporary retail and urban transport planning for petroleum products in Ibadan metropolis and other traditional African cities.



University of Port Harcourt
Together in Excellence

CHAPTER IX

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

9.0 INTRODUCTION

This is the last chapter of this research work. It is divisible into four sections. The first section summarizes the major findings of the research as it relates to the study's aim and objectives. The second section is dedicated to the various suggestions that are derived from the results and findings of this study. The study is concluded in the third section. In the fourth and final section, effort is made to presents research gaps or areas that require further research and investigations.

9.1 Summary

This study analyzed the effects that spatial arrangement of petroleum products retail outlets and the supply chain management techniques employed for products distribution (for both intra city and intercity shipments) has on the retailing dynamism of petroleum products within built environment and peripherals of Ibadan metropolis over the years. Specifically, the study investigated the differentials in the spatial configuration of petroleum products retail outlets between the core and peri-urban zones of the metropolis. An attempt was made to determine the explanatory variables that influence the spatial distributional decisions of petroleum products retail outlets in the metropolis. The study equally examined how the supply chain management (SCM) techniques by the different categories of the retail outlet owners influence the efficient and cost effective distribution of petroleum products. Lastly an attempt was made to analyze the relationship between the socio-economic attributes of the haulers and the achievement of compliance to the HSE stipulations guiding the conveyance of petroleum products. The theoretical underpinnings for the

research were a derivative of the amalgamation of normative and psychological theories from geography, psychology, SCM and retailing science. Specifically, Expectation Disconfirmation Theory (EDT), Distributive Justice, Central Place Theory (CPT) Theories of Urban Impact (TUI) and Theory of Constraint (ToC) were the theories utilized in the study.

To achieve the objectives of the study three set of populations were sampled. For the achievement of the first objective which was to investigate the possible differential in the compliance rate between spatial pattern of fuel retail outlets in the core and peripheral zones of Ibadan metropolis, total sampling technique was employed. Furthermore, a handheld Geographical Positioning System (Garmen 76X Model) was used to pick the coordinates of all the 432 fuel retail outlets. A hypothesis was derived which incorporated the planning standards guiding the location of fuel retail outlets in both the core and peripheral zones of the metropolis. The standard stipulated that retail outlets within the inner zone of the city should be sited at a distance not less than 400 meters on the same stretch of the road. For those sited in the peripherals, the standard set by the government is 800 meters. To analyze the collected data, tables and simple percentages summation of the inventoried data were done in Microsoft Excel. To test the first hypothesis of the study (which is to examine if there is no significant difference in the rate of compliance to the planning authority stipulations guiding the location pattern of petroleum product retail outlets between those located in the built up and peripheral zones of the city), buffering and proximity analyses in the ArcMap environment of ArcGIS 10.1 were used, while inferential statistical tool of an independent-samples t-test was conducted to compare the rate of compliance to the stipulations guiding the locations of these outlets in both the core and the peripheral zones. The results from



University of Fort Hare
Together in Excellence

the analysis indicated that of the 432 fuel retail outlets sited in the city 212 (49.08%) were in the core zone of the metropolis while the remaining 220 (50.92 %) were in the peripheral zone. The result from the GIS analysis indicated that 33 (15.56%) out of the 220 outlets in the core zone of the metropolis complied with the planning stipulations guiding the location of fuel retail outlets. For the peripheral zone, out of the 220 fuel retail outlets 24 (10.90%) complied with the stipulations. The result from the T- test which was employed to test the hypothesis indicated that no significant difference existed in the rate of compliance $t(263) = -2.66, p = 0.08$ between fuel retail outlets in the core zone ($M=3.9, SD=1.4$) and peripheral zone ($M=4.5, SD=1.79$). The alternate hypothesis which stated that “no significant difference existed in the compliance rate between fuel retail outlets located in the two zones” is accepted.



For the achievement of the second objective of the study which is to analyze the factors which determine the location of fuel retail outlets both in the core and peripheral zones of Ibadan metropolis. All the managers/owners of the 432 fuel retail outlets in the metropolis were sampled out of which 256 questionnaires were retrieved for the purpose of this analysis. The breakdown of the socio-economic characteristics of the sampled respondents revealed that the gender distribution showed that 194 (75.78%) of the respondents were males, while 64 (24.22 %) were females. The average age of the sampled population was 33.70 years, the significance of this was that all the respondents were working class and actively engaged when the study was done. 136 (53.12 %) of the population were married, 101 (39.45 %) were single while 19 (7.43 %) were widowed at the time the study was carried out. All the sampled respondents had basic education-the literacy level is 100%. 15 (5.8%) had primary school leaving certificate, the largest bulk of the

respondents completed secondary school (157; 61.32 %), while the rest 84 (32.83%) had tertiary education. The fact that all the respondents were literate is quite advantageous to the achievement of the study's objective. The purpose behind the study was understood by the respondents easily and the questionnaires were easy to fill. On the number of years the respondents has spent in the present place of employment 154 (60.15%) have spent between one and four years, while 83 (32.42 %) of the respondents have been in employment for between five to nine years. The remaining 19 (7.43 %) of the respondents have spent ten years above in their present employment. The implication of the information gotten on the number of years the respondents have spent in their present employment is germane; it is noticeable from the statistics that all the sampled respondents have valuable years of experience in the industry.



The mixed method was employed for the achievement of the second objective of this study, in line with that a hypothesis was formulated and tested, while in depth interview sessions were conducted with key participants in the industry. The derived hypothesis stated thus “Determinants of the present locations of retail outlets are significantly influenced by prevailing price of landed property, closeness of such location to highway/busy route, proximity to zones with high population density, distance from to the Central Business District (CBD), proximity to competitors and availability of functional road networks for haulage trucks engaged in products shipment”. Logistic Regression Model (LRM) was employed to test the hypothesis and the result revealed that the inclusion of the explanatory (independent) variables (cost of land, nearness to the highway, population density, and proximity to other fuel retail outlets /distance accessibility to the Central Business District (CBD)) in the model increased the overall level of it accuracy. The overall significance revealed

that the *Model Chi-Square*, derived from the likelihood fitted significantly and predicted the relationship between the dependent and independent variables ($X^2 = 43.47$, $df=5$, $p>.05$). The model chi-square value of 43.47 (showed that the explanatory variables provided 44% explanation of factors which determined the location of FRO in the metropolis) was significant. Thus, the indication is that the model has a good fit in predicting the chances of either a fuel retail outlet is sited in the core or peripheral zone of the metropolis as determined by the explanatory variables.

It is observed from the result that not all the explanatory variables significantly predicted the location of fuel retail outlets in the metropolis. For example, cost of land ($B = -.277$, wald statistics = 2.06; $P>.05$), nearness to highways ($B = -.18$, wald statistics = .60; $P>.05$), distance from competitors ($B = -.05$, wald statistics = .067; $P>0.05$), distance from CBD/ accessibility for haulage trucks ($B = .12$, wald statistics = .41; $P>.05$) do not significantly predicted location of fuel retail outlets in both the core and the peripheral zones of the metropolis. It was only population ($B = -.47$, wald statistics = 4.28; $P<.05$) that significantly predicted the location of fuel retail outlets in the metropolis. Further analysis from the result indicated that the respondents strongly believed that population density of the locality where a retail outlet is sited is the major determinant behind its location (population ($B = -.47$, wald statistics = 4.28; $P<.05$)). The wald statistics showed that respondents opined that they considered population density of a locality within the metropolis four times more important above any other factor. Fast on the heels of the population density as a major determinant in the locational factor is the variable associated with the prevailing cost of land on which the retail outlet is sited ($B = -.277$, wald statistics = 2.06; $P>.05$), This simply means that the cost of the land upon which the retail

outlets are sited is considered twice as important over other factors. There are little to choose from among the three other factors; proximity to competitors is next with statistical result of ($B = -.05$, wald statistics = $.067$; $P > 0.05$) nearness to major highways follow with ($B = -.18$, wald statistics = $.60$; $P > 0.05$) while accessibility for haulage trucks/ distance of fuel retail outlets from CBD brings up the rear with a statistical score of ($B = .12$, wald statistics = $.41$; $P > 0.05$). Although, all the explanatory variables do not significantly predicted the locations of the FRO, it is obvious that (when the model- $X^2 = 43.47$, $df=5$, $p > .05$ is considered) that the respondents agreed that they are the critical factors which determined the location of the fuel retail outlets in both the core and peripheral zones of Ibadan metropolis. Amongst other findings this study showed that there are other critical factors (56%) which could be key determinants of locational decisions of FRO in the study area that are not considered in this study.



The result gotten from the in depth interview sessions corroborated the findings from the tested hypothesis. In all four respondents were interviewed. Three of them were managers/owners of the fuel retail outlets in the metropolis. One governmental official from the Department of Petroleum Resources (DPR) was also interviewed. All the interviewees agreed that there has been systemic default in the location of the fuel retail outlets in both the core and peripheral zones of the metropolis over the years. They all agreed that the five explanatory independent variables identified in the hypothesis are the major contributory factors behind the flagrant disobedience of the physical planning stipulations guiding the positioning of the fuel retail outlets within the metropolis. While the two parties (retailers and DPR official) played the game on who was responsible for the noticeable flagrant disobedience to the physical planning stipulations guiding the location of the fuel retail outlets in the

metropolis, there is a consensus between them that correction of the anomaly will involve active participation of all the stakeholders.

The third objective is to examine the effects which the supply chain technique employed (either vertically integrated model or third-party arrangement) has on the achievement of efficient and effective distribution of the products. In order to achieve this objective, all the 389 registered members of Petroleum Tanker Drivers (PTD) association which are affiliated to each of the retail outlets either as a direct employee or an outsourced staff were sampled. 265 (around 70%) of the respondents returned the questionnaires given to them which were then utilized for analyzing the objective. In depth interview sessions were also conducted with three different managers of the three major conglomerates participating in the downstream sector of the Nigerian petroleum sector.



The breakdown of the socio-economic demographics of the respondents showed that there is a preponderance of male respondents 262 (98.86%). The average age of the respondents is 44.1. 281 (87.20%) were married at the time the study was carried out. Overwhelming majority of the respondents 262 (99.2%) admitted that they could read and write. 220 (83 %) of the respondents have more than five years working experience as haulers.

The formulated hypothesis is thus; “there are no significant differences in the quality of organization and activities of Supply Chain (SC) services (transportation, distribution, and storage of products), being run by third service logistics (3PLs) and those which operates under vertical integration model”. The result of one-way between subjects (ANOVA) which was conducted to compare if there are differences in the management and performances of haulage services outsourced to the 3PLS

and those run in-house under a Vertical Integration Model (VIM) showed that there was a significant effect of ownership type on management performance ($F(2,262) = 60.26, p < .05$). The null hypothesis is therefore rejected while the alternate hypothesis is accepted. Descriptive analysis and post hoc analysis revealed that multinational oil company ($M = 117.17$) significantly reported better management performance, followed by NNPC ($M = 105.07$) compared to IPMAN ($M = 87.56$) with poor management performance. Taken together, these results suggest that the ownership structures/models employed by an organization engaged in the distribution and retailing of petroleum products do have an effect on the effective haulage/transportation services they offer. Specifically, the results suggest that SCM firms who operate under a Vertical Integrated Model (Multinational oil companies), reports better management performances when the four variables were examined. NNPC who operated under the combination of both VIM and 3PLS reported a lower level of performances, while IPMAN who operated under a 3PLS arrangement reported the lowest level of performance. The findings from the interview sessions posted similar results. The three managers interviewed (one each from Multinational Oil Company, NNPC and IPMAN) substantiated the result from the tested hypothesis by agreeing that there are perceptible differences in the management and performances of haulage services outsourced to the 3PLS and those run in-house under a Vertical Integration Model (VIM).

The fourth and final objective was to analyze the effect that the socio-economic attributes of the participants (haulers and managers of retail outlets) involved in the distribution of petroleum products has on the safe, efficient and cost-effective distribution of product and this was done through the use of descriptive statistics, inferential statistics, an incisive analysis of an interview session and a comprehensive discourse of the results.

To achieve the objective a hypothesis was derived and tested. A total number of 265 (70%) out of the 389 registered members of Petroleum Tanker Driver Association (PTDA) participated in the study. Three haulers and one official of the Petroleum Tanker Drivers' Association (PTDA) were interviewed separately on the stated objective.

The derived hypothesis is thus stated; "Safety consciousness against road traffic crashes, ability to understand and obey the Health, Safety and Environmental (HSE) standards guiding the operations of the petroleum products supply chain is influenced by socio-economic attributes of key participants (haulers)". Multiple regression analysis (MRA) was used to test this hypothesis. The result from the statistical analysis show that the use of stimulant, work condition, marital status and educational attainment/literacy level have joint influence on compliance ($R^2 = 0.31$, $F(4,260) = 29.72$, $p < .05$). The result simply means this that when all these explanatory variables are combined (usage of stimulant, work condition, marital status and educational qualification), they accounted for 31% of the observed factors which influences compliance to safety practices guiding the haulage of petroleum products among the respondents (haulers). The result depicted that the collective factors of use the of stimulant, work condition, marital status and educational qualification has significant influence on compliance ($R^2 = 0.31$, $F(4,260) = 29.72$, $p < .05$). Further analysis of the result further revealed the contributions of each of the independent explanatory variables to the model. For example the usage of stimulant ($\beta = .53$, $t=10.13$; $p < .05$), work condition ($\beta = -.22$, $t=-4.18$; $p < .05$), educational qualification ($\beta = .16$, $t=3.00$; $p < .05$) have significant independent influence on compliance, while marital status ($\beta = -.10$, $t=-1.80$; $p > .05$) have no significant independent influence on compliance. It can be inferred that respondents believed that usage of stimulants, poor working condition and level of educational attainment significantly influences

the level of their compliance to safety practices guiding the conveyance of petroleum products. The other independent explanatory variable employed in this- marital status does not have any significant influence on the level of compliance among respondents. On the basis of the foregoing, the hypothesis is thus accepted. The result from the interview sessions confirmed the existent of strong relationship between the explanatory variables and the hypothetical dependant variable. The four respondents interviewed laid credence to the fact that there is a relatively high incidence of psychoactive substances consumption among haulers and that it has a telling effect on the compliance to HSE stipulations. The interviewees also alluded to the fact that the work conditions and how literate the haulers are do have a say on their level of compliance. The interviewees also posited that marital status is a non-consequential factor as it relates to how readily they complied with the stipulations guiding the safe and efficient shipments of petroleum products.



9.2. Suggestions *University of Fort Hare* *Together in Excellence*

Considering the various findings originating from this research exercise, the following suggestions are being made with the intent of improving the SCM practices of petroleum products shipment in the country;

- i. There is a need to holistically review the urban planning laws guiding the location of retailing activities generally but particularly petroleum products retail outlets in both the core and the peripheral zones of Ibadan metropolis. Unfortunately, the problem associated with haphazard distribution of fuel retail outlets in Nigerian metropolitan areas is not limited to Ibadan alone (Adenigbo *et al*, 2017; Dogara, 2017).

- ii. The preponderances of mixed land use in the different zones of the city is counterproductive. Distinct demarcation of the metropolitan lands into different functional zones must be strictly adhered to. The alternative is the chaotic and the intractable traffic snarl up being witnessed on the major routes in the metropolis.
- iii. Planned ethnodomination of the trading channel for any essential commodity should be prevented. In a multi-ethnic society like the one found in Ibadan metropolis (and most of other Nigerian cities), having the ownership of the entire supply chain channel of an essential product (like petroleum products) domiciled in the hand of an ethnic group at the expense of others can be dangerous. Ethno-religious conflicts are nearly everyday occurrence in the Nigerian nation. Efforts must be made to prevent situations where there maybe deliberate scheming out of other ethnic nationalities from being key participant in the trading channel of a “lucrative retailing business”.
- iv. The use of Geographical Information System (GIS) as an urban planning tool for the location of facilities and demarcation of different land use types into zones in Ibadan metropolis and other Nigerian cities is strongly canvassed. This will remove the ambiguities that often occur about what a particular portion of land is originally allotted for. It is observed from the findings of this study and similar studies that most of cities in Nigeria are battling with the problems associated with indiscriminate location of fuel retail outlets (Adenigbo *et al*, 2017; Dogara, 2017). The use of novel urban planning tools like GIS and

Scenario Based Planning Models as being advocated will ensure the sanctity of land use data, the fact that such digital data can be back-up in original format in different repository (including the cloud) make them difficult to be altered (Guerlain *et al*, 2016; Perveen *et al*, 2017).

- v. While the current forces of relocating of new retail outlets that is driving urban gentrification and renewal in the inner city (core) are commendable, it is germane that these new retail outlets are sited with sustainable urban renewal in mind. Wider road networks that will make easy access for haulage trucks engaged in the delivery and carriage of cargos into such 'new retail outlets' must be provided. Parking lots and stipulated road setbacks must also be available.
- vi. Findings from this study suggest that VIM is best suited for the logistics function, associated with the supply chain of petroleum products. Shreds of evidences show that the haulage of petroleum products done under the VIM by the six oil manufacturers posted more efficient result than those under the 3PLs. In line with this, it makes business sense for retailers who have the ability to raise the funds to invest in the ownership of their own internal transport fleet and to also have the necessary competent personnel to handle it.
- vii. Retailers who for any reason prefers the use of 3pls for the logistics function associated with the conveyance of their petroleum products, should insist that the 3pls who they outsourced such functions to must comply with the best global practices that guide the transportation of petroleum products. It is observed from the analysis done in the course

of this study that retailers who utilized 3pls, reported higher incidences of disruption in supply chain of products occasioned by road accidents and unruly acts from haulers engaged in the carriage of these products.

- viii. Relevant governmental and non governmental agencies should step up campaign against the use of psychoactive substances to enhance performance among haulers engaged in the conveyance of petroleum products. Punitive actions which might include the withdrawal of operating license of the haulage firm, heavy fine and jail terms for drivers who are found culpable could be part of the measures to guide against the dangerous habit.
- ix. Excessive use of road transport as the major mode of conveying petroleum products in Nigeria should be discouraged. The road facilities in the country are bearing the brunt of this ugly malaise. The effects are showing in the traffic bottlenecks and shortage of the lifespan of these roads. As posited by haulers sampled during the course of this study, most road traffic accidents (RTC) involving haulage trucks occurred due to the pallid state of these roads.

9.3. Recommendations for further studies

This research arguably is one of the pioneering researches which examined the intricacies involved between the retailing dynamism and the supply chain of petroleum products in Ibadan metropolis, Nigeria. To this end there are lacunae which further researches on the discourse will fill. Some of which are;

- (i) A study which focuses on the possibility of a casual relationship between the localization of fuel retail outlets on certain road corridors and the frequencies of traffic snarl ups. Such study will most likely provide a clue on the causative factor behind the intractable traffic hold ups on certain routes within the city.
- (ii) Researches on the possible existent of ethnodomination forces controlling the retailing chain of other essential economic commodities in Ibadan metropolis.
- (iii) There is a need to examine the influence that the opening of new retailing centres have on urban gentrification in the older section of Ibadan metropolis. Findings from such a study could help in the provision of a policy statement to guide urban renewal activities. This will prevent a mismatch in the land use pattern being witnessed in some of the older section of the metropolis.
- (iv) The two SCM models (VIM and 3PLS) employed by the three different oil marketing conglomerates posited different results when their performances on efficient delivery were measured, similar comparative study involving organizations who operates in similar fields but employs any of these two models is advocated. Such study could examine if similar findings could be gotten among operators in the Fast Moving Consumable Goods (FMCGs) sectors which employs either of these two models. This will guide against making a sweeping generalization based on the finding of this study alone.

- (v) Lastly, it is needful that a more scientific and robust research on the incidences of substance abuse among haulers is carried out. Such study should involve the collection of body fluid samples from respondents which would then be tested and analyzed. This will give a clearer picture of substance abuse among haulers. The significance of such study is to prevent a whimsical approach to a seemingly burgeoning societal problem.



University of Fort Hare
Together in Excellence

References

Abdulmalik, A. and Omokoghio, M. (2009). Short Delivery of Petroleum Products at Retail locations in Kaduna Region, *Journal of Logistics and Transport* 1(2):108 – 119.

Abudlkadir, A. (2012). The challenges of petroleum product distribution in Nigeria. The Health Safety and Environment (HSE) perspective. Presented at the 15th HSE Biennial Conference 5th-7th November.

Adegbelugbe, A. O. and Dayo, F. B (1986) Demand analysis of gasoline consumption in Nigeria. *OPEC Review*. 10 (2):131-14.

Adenigbo, J.A., Balogun, G.T., Olisa, T., and Arigbede, O.O. (2017). Transportation challenges of retailing petroleum products in Akure, Nigeria. *Journal of Research in National Development* 15, 1

Adenikinju, A. F. (1995). Energy pricing policy and the environment in an oil-exploring Country. *OPEC Review, Winter*, 307-329.

Aglaia K,(2018) Logistic Regression Predictive Models of Job and Degree Satisfaction among Greek Social Sciences Graduates, *International Journal of Statistics and Applications*, 8 (5) : 226-248. doi: 10.5923/j.statistics.20180805.02

Aguda, A. S. (1998). The locational efficiency of petrol filling station in Oshogbo, OsunState, Nigeria. *Ife Planning Journal*. 1(1).

Aimiwu M. (1986) *Location and distribution of filling station in Benin*. MSC Thesis, University of Benin.

Ajayi, A.P. (2016) Analytical study of supply chain collaboration guiding forestry products supply in a developing economy", *Int. J. Business Performance and Supply Chain Modeling*, 1 (4).

Ajayi A.P. (2017). Assessment of the Influence of Lagos Bus Rapid Transit Scheme (BRT-Lite) on Road Traffic Crashes (RTC) on Lagos Mainland-Island Corridor. *The Open Transportation Journal*, 11 (3): 3-8.

Akinci, S., Kaynak, E., Atilgan, E & Aksoy, S. (2007). Where does the logistic regression analysis stand in marketing literature? A comparison of the market positioning of prominent marketing journals. *European Journal of Marketing*. 41. 537-567. 10.1108/03090560710737598.

Alokan, O.O. (1995). The road freight industry in Nigeria; New challenges in an era of Structural Adjustment” *Transport Reviews*, 15 (1): 27-41.

Alokan, O.O. (1988). An analysis of the spatial distribution of freight haulage firms in Nigeria. *Journal of Economic and Social Studies*, 30: 241-260.

Alokan, O.O. (1985), *The structure of transportation costs in Nigeria’s trucking industry*’ M.Sc. Thesis, Department of Geography University of Ibadan.

Aluko, O. E. (2008). Urbanization and Effective Town Planning in Nigeria. *African Research Review, An International Multi-Disciplinary Journal*. 5 (2)19: 126-139.

Anand, N., van Duijn, R., Quak, H., Tavasszy, L. (2015). Relevance of city logistics modeling efforts: a review. *Transport Reviews*, 35(6): 701-719.

Anderson, E. W., & Sullivan, M. W. (1993). The antecedents and consequences of customer satisfaction for firms. *Marketing Science*, 12: 125–143.

Anderson, S., Allen, J., Browne, M. (2005). Urban logistics: how can it meet policy makers’ sustainability objectives? *Journal of Transport Geography*, 13.

Anifowose, B. (2008). Assessing the Impacts of Oil & Gas Transport on Nigeria’s Niger-Delta Environment U21 Postgraduate Research Conference Proceeding. University of Birmingham. Birmingham. 20th -25th July.

Arosanyin, G. T. (2006) Regulation of dangerous material transportation in Nigeria. *Geo Studies Forum*, 3 (1&2): 9-21.

Aspentech (2009). Integrating the petroleum supply chain drives value. Aspen Technology Inc.

Ayeni, B. and Rushton, G. (1985). Distributed equity and efficiency in the locational analysis of public facilities, a case study. *The Nigerian Geographical Journal* Vol 28&28 1&

Barker, R. (1968). *Ecological Psychology*. Stanford University Press, Stanford.

Baker, R. G. V., and S. Wood. (2010). "Towards Robust Development of Retail Planning Policy: Maintaining the Viability and Vitality of Main Street Shopping Precincts." *Geographical Research* 48 (1): 65–74.

Banai, R. and Antipova, A. (2016). Retail-center viability and urban form: A micro-analysis. *The International Review of Retail, Distribution and Consumer Research*, 26:5, 521-540, DOI: 10.1080/09593969.2016.1202855. Accessed 14 April, 2018.

Barcos, L., Rodríguez, V., Álvarez, M. J., Robusté, F., (2010). Routing design for less than-Truckload motor carriers using Ant Colony Optimization, *Transportation Research Part E*, 46: 367-383.

Bartlett, R. S. and Newton W. H. (1984). Goods vehicle trip generation and attraction by industrial and commercial premises. TPRL Lab Report 1059 Crowthorne.

Behnood, A., and Mannering, F.L. (2016). The effects of drug and alcohol consumption on driver-injury severities in single-vehicle crashes, *Traffic International Preview*. 28.2.

Behrends, S. Lindholm, M. and Woxenius, J. (2008). The Impact of Urban Freight Transport: A Definition of Sustainability from an Actor's Perspective, *Transportation Planning and Technology*, 31:6, 693-713, DOI: 10.1080/03081060802493247. Accessed May 3, 2016.

Berry, B.J. and Parr, J. (1988). Market Centers and Retail Location: Theory and Applications. Englewood Cliffs, NJ: Prentice Hall, (The first edition of this book was published in 1967).

BESTUFS (2005). Urban Consolidation Centres, Last Mile Solutions: *Best Urban Freight Solutions II*, Coordination Action Priority 1.6.2 Sustainable Surface Transport

Bhattacharjee, A., and Premkumar, G. (2004). Understanding changes in belief and attitude toward information technology usage: A theoretical model and longitudinal test. *MIS Quarterly*, 28(2): 229-254.

Birkin M, Clarke G and Clarke M.P. (2002) *Retail Geography and Intelligent Network Planning*. John Wiley.

Bombana HS, Gjerde H, Santos MF, Jamt REG, Yonamine M, Rohlf WJC, (2017). Prevalence of drugs in oral fluid from truck drivers in Brazilian highways. *Forensic Science International*.140–3. Doi: 10.1016/j.forsciint.2017.02.023. Accessed May 24, 2018

Blackman, S. (2014) Subculture Theory: An Historical and Contemporary Assessment of the Concept for Understanding Deviance. *Deviant Behavior*, 35(6).

Brady, M. K., & Cronin, J. J. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing*, 65(3): 34–49.

Brady, M. K., Knight, G. A., Cronin, J. J., Tomas, G., Hult, M., & Keillor, B. D. (2005). Removing the contextual lens: A multinational, multi-setting comparison of service evaluation models. *Journal of Retailing*, 81(3): 215–230.

Brauner, P., Runge S., Groten M., Schuh M., Ziefle M. (2013). Human Factors in Supply Chain Management. *Lecture Notes in Computer Science*. Volume 8018: 423-432

Brown, S. (1987) Institutional Change in Retailing. *Progress in Human Geography* 12: 181-206.

Brown, S. (1993). Retail location theory: evolution and evaluation. *The International Review of Retail Distribution and Consumer Research*, 3 (2).

Business Day Intelligence (2015). The Nigerian Retail Report 2014/2015. www.businessdayonline.com. Accessed 12 April, 2018.

Cardenas, I., Borbon-Galvez, Y., Verlinden, T., Van de Voorde, E., & Vanelslander, T. (2015). *Urban Logistics Typology and Framework: City Logistics, Urban Goods Distribution, and Last Mile Delivery and Collect*. Urban Logistics Typology and Framework. University of Antwerp. City Campus, Prinsstraat 13, B.226. 2000 Antwerp

Chopra, S.C. and Sodhi, M.S. (2004), Managing risk to avoid supply-chain breakdown, *MIT Sloan Management Review* 1, (31): 124 – 139.

Chen, C. F. (2008). Investigating structural relationships between service quality, perceived value, satisfaction, and behavioral intentions for air passengers: Evidence from Taiwan. *Transportation Research Part A* 42, 709–717.

Christaller, W. (1966). *Central Places in Southern Germany*, trans. C.W. Baskin. Englewood, NJ: Prentice Hall.

Clay, W.J. and Paul, R. (2005). Procedural Justice, Distributive Justice; How experiences with downsizing condition their impact on organizational commitment. *Social Psychology Quarterly*, 68: 89-102.

Cooke. A. (2015), *Division of Sudan – the causes and impacts of independence for South Sudan*. Oxford University Press. Series 33, Issue 2.

Cordeau, J F, F. Pasin, M.M. Solomon (2006). An integrated model for logistics network design, *Annals of Operations Research* 144: 59–82.

Cox, J.F, Mabin, V.J., Davies, J. (2005). A case of personal productivity: Illustrating methodological developments in TOC. *Journal of Human Systems Management*, 24, 39-65.

Crainic, T. G., Ricciardi, N. and Storchi, G. (2004) Advanced freight transportation systems for congested urban areas, *Transportation Research Part C: Emerging Technologies*, 12(2): 119 -137.

Creswell, J. W. (2003). *Research Design: Quantitative, Qualitative, and Mixed Methods Approaches*. SAGE. Thousand Oaks. USA.

Cresswell, J. W., & Clark, V. L. (2011). *Designing and conducting mixed method research*. 2nd Sage. Thousand Oaks, CA

Crowley, W.K. (1995). Order and Disorder - A Model of Latin American urban land Use. *Yearbook of the Association of Pacific Coast Geographers*. 57(2): 31.

Curry, L. (1967). Central places in the random spatial economy. *Journal of Regional Science*, 7(2): 131 - 147.

Dablang, L. (2007a) Goods transport in large European cities: Difficult to organize, difficult to modernize, *Transportation Research Part A: Policy and Practice*, 41(3): 280-285.

Dablang, L. (2007b). Urban goods movement and air quality-policy and regulation issues in European cities, in: The 11th World Conference on Transport Research, 24-28 June, Berkeley.

Dacey, MS. (1972). An Explanation for the Observed Dispersion of Retail Establishments in Urban Areas. *Environment and Planning A* 4 (3): 323-330.

Daskin, M. S, C. Coullard, Z.-J.M. Shen, (2002). An inventory-location model: Formulation, solution algorithm and computational results, *Annals of Operations Research*, 110: 83 –106.

Davies, R.L. (1984). *Retail and Commercial Planning*. London: Crowe Helm.

Davies, R.L. 1976. *Marketing Geography*. Retail and Planning Associates. Corbridge.

Delfino, M.N. (2013). Agglomeration in the retail sector; Insights from a survey of Metro Manila retail establishments/ Center for Business Research and Development Working paper 2013/4. De Sale University.

Deloitte (2018). Retail, wholesale and distribution outlook; An industry in transition

DeMarco M & Matusitz J (2011). The Impact of Central-Place Theory on Wal-Mart *Journal of Human Behavior in the Social Environment* Vol. 21, Iss. 2, Department for

Transport (2004) *Working with ADR; An Introduction to the carriage of dangerous goods by road*. Suffolk. DfT Publication.

Dettmer, W.H. (2007). *The logical thinking process: A systems approach to complex problem solving* (American Society for Quality). Milwaukee: Quality Press.

Dijst, M. (1999). Action space as planning concept in spatial planning, *Netherlands Journal of Housing and the Built Environment*, 14(2): 163-182.

Dijst, M. (2004). *ICTs and accessibility an action space perspective on the impact of new information and communication technologies*. In: M. Beuthe, V. Himanen, A. Reggiani and L. Zamparini (eds.) *Transport Developments and Innovations in an Evolving World*. Berlin: Springer pp. 27-46.

Dischinger, M. and Jackson, J.M. (2006). Which future urban scenarios can we construct? *Management of Environmental Quality: An International Journal*, 17: 409–420

Dogara, T.S. (2017). GIS-based locational analysis of petrol filling stations in Kaduna metropolis. *Science World Journal*, 12 (2).

Downs, A. (1992). *Stuck in Traffic: Coping with Peak-Hour Traffic Congestion*. Brookings Institution/Lincoln Institute of Land Policy.

Dunlop, M. and Savulescu, J. (2014). Distributive justice and cognitive enhancement in lower, normal intelligence. *Monash Biotech*, 32 (3-4): 189 - 204.

Dunse, N; Jones, C; Brown, J and Fraser, W. (2002). Paper presented at the Eighth Annual Meeting of the Pacific Rim Real Estate Society, Christchurch, New Zealand, 21st – 23rd January, 2002.

Ehinomen, C. and Adeleke, A. (2012). An assessment of the distribution of Petroleum products in Nigeria *Journal of Business Management and Economics*, 3(6): 232- 241.

Eke, M. N. and Enibe S. O. (2007) Optimal scheduling of petroleum products distribution in Nigeria. *Nigeria Journal of Technology*, 26(1)

Ejoh, E and Okafor P (2015) Subsidy claims; Oando will continue petrol imports. *Vanguard Newspaper*, October 13.

Elkhani. N and Bakri T (2013) Review on “Expectancy Disconfirmation Theory” (EDT) model in B2C e-commerce. *Journal of Research and Innovation in Information systems*. <http://seminar.utmspace.edu.my/myaisprint>, Accessed January 12, 2018.

Erkip, F., O. Kizilgun & G. Mugan Akinci (2014). Retailers’ resilience strategies and their impacts on urban spaces in Turkey. *Cities* 36: 112-20. DOI: [10.1016/j.cities.2012.12.003](https://doi.org/10.1016/j.cities.2012.12.003). Accessed January 3, 2017.

European Commission Directorate General Transport (1998), COST 321 Urban Goods Transport, Final Report, Brussels, and (European Commission).

Fadlalla, MH (2007). UN Intervention in Dar Fur.: *iUniverse*. New York

Farlex (2013) Norm. Farlex clipart collection <http://www.thefreedictionary.com/norm> Accessed March 13, 2018.



Farouk, A.H. (2016). The application of Theory of Constraints in a production planning process with reference to its application in ABB Company. A thesis submitted to AASTMT in partial fulfillment of the requirements for the award of the degree Master of Science in Logistics of Foreign Trade.

Federal Government of Nigeria (2010). Draft National Transport Policy.

Federal Republic of Nigeria (2012). Official gazette on Federal Road Safety Commission and National Road Traffic Regulation.

Festinger, L. (1957). *A Theory of Cognitive Dissonance*. Stanford, CA: Stanford University Press.

Figliozzi, M.A. (2007) Analysis of the efficiency of urban commercial vehicle tours: Data collection, methodology, and policy implication, *Transportation Research Part B*, 41: 1014-1032.

Filani MO (1994) *Transportation*. In: Filani MO, Akintola FO, Ikporukpo C (eds) Ibadan region. Rex Publication, Ibadan.

Fischer, C., (1984) *The Urban Experience*. Harcourt, Brace Janovich, New York.

Fischer K. (2011) Central Places: The Theories of von Thünen, Christaller, and Lösch. In: Eiselt H., Marianov V. (eds) *Foundations of Location Analysis. International Series in Operations Research & Management Science*, vol 155. Springer, Boston, MA.

Fiske, T. and Taylor, S.E. (2013) *Social Cognition; from brain to culture*. Sage. 2nd Edition. CA.

Ford, L. (1996). A new and Improved Model of Latin American City Structure. *Geographical Review*, 86 (3): 437-440.

Ford, A. Stuart, B., Dawson, R. and James, P. (2015). Transport accessibility analysis using GIS: Assessing sustainable transport in London. *International Journal of Geo-Information*. 4(1); 124-149.

Forsyth, D. R. (2006). Conflict. In Forsyth, D. R. *Group Dynamics* (5th Ed.) (P. 388 - 389) Belmont: CA, Wadsworth, Cengage Learning.

Fox E.J., Postrel S and McLaughlin A (2007). The Impact of Retail Location on Retailer Revenues: An Empirical Investigation. Working paper.

Freight Transport Association (1974). *Planning for Lorries*. Tunbridge. Wells.

Freight Management (1975). *Transport on Ration*. June.

Garcia-Sierra, M, van den Bergh, J.C. and Miralles-Guasch, C. (2015). Behavioral economics, travel behavior and environmental-transport policy. *Transport Research D; Transport and Environment*. 41: 288 - 305.

Gardiner, S C. (1993) Measure of product attractiveness and theory of constraints. *International Journal of Retail and Distribution Management*, 21: 37-40.

Gilbert, L. (2014). Social Justice and the “Green” city. *Urbana*. 6: 2.

Glaeser, E. L. (2008) *Cities, agglomeration, and spatial equilibrium*, Oxford University Press, New York.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8(4), 597-606. Retrieved from <http://nsuworks.nova.edu/tqr/vol8/iss4/6>. Accessed on 12 April 2018.

Goldratt, E. M. and Cox, J (1992) *The Goal; A process of on-going improvement*. Croton-on, Hudson NY, North River.

Goldratt, E M. (1997). *Critical Chain*. Great Barrington, MA: North River Press.

Goodchild, M.F. (1984). ILACS: A location-allocation model for retail site selection. *Journal of Retailing* 60 (1), 84- 100.

Greenfield, R. Busink, M., Wong, C., Riboli-Sasco, E., Greenfield, G. Majeed, A., Car, J., and Wark, P.A. (2016). Truck drivers' perceptions on wearable devices and health promotion; a qualitative study. *Public Health*.16: 677.

Griffin, E. and Ford, L. (1980). A Model of Latin American City Structure. *Geographical Review*. 70 (4): 397-422.

Grimmelikhuijsena, S. and Porumbescu, G.A. (2017). Reconsidering the expectancy disconfirmation model. Three experimental replications. *Public Management Review*, 19(9): 1272–1292 <https://doi.org/10.1080/14719037.2017.1282000>.

Guenther, W. C. (1973) *A Sample Size formula for the Hypogeometric*. University of Wyoming.

Habib, F and Shokoohi, A. (2009). Classification and Resolving Urban Problems by Means of Fuzzy Approach. *World Academy of Science, Engineering and Technology* 60.

Harmon-Jones, E. H. C. (2007). *Cognitive Dissonance Theory: An Update with a Focus on the Action-Based Model*. *Handbook of Motivation Science*. Gardner, The Guilford Press.

Harvey, D. (1973). *Social Justice and the City*. London.

Hawkins, E.K. (1958) *Road transport in Nigeria: A study of an African enterprise*. London, Oxford University Press.

Hay, A.M, and Smith, R.H.T. (1970). *Interregional trade and money flows in Nigeria*. Oxford, Oxford University Press.

Hay A. M. (1995). Concepts of equity, fairness and justice in geographical studies. *Transactions of the Institute of British Geographers* 20 500-508.

Hee J. Y, Song J and Choi J.C. (2016). Measuring the Externality Effects of Commercial Land Use on Residential Land Value: A Case Study of Seoul. *Sustainability*, 8: 432; doi: 10.3390/su8050432. Accessed 12 May, 2017.

Hesse, M and Rodrigue, J. (2004). The Transport Geography of Logistics and Freight Distribution. *Journal of Transport Geography*, 12, 171-184.

Hicks, M.J. (2006). Transportation Infrastructure, Retail Clustering, and Local Public Finance: Evidence from Wal-Mart's Expansion. Federal Reserve Bank of st. Louis *Regional Economic Development*. Volume 2, number 2.

Hodkinson, P. (2016). Youth cultures and the rest of life: subcultures, post-subcultures and beyond. *Journal of Youth Studies*. 19(5):1 - 17.

Hongqi L, Tan L. and Yingrong, L. (2016). The combination truck routing problem: A survey. *Procedia Engineering* 137: 639 – 648.

Hsu, W.T. (2012). Central Place Theory and city size distribution. *The Economic Journal*, 122(563): 903-932.

Huang, H.H. and Liu, C. H. (2014). The Expectation Disconfirmation Theory and Anchoring Effect on Dynamic Effect of e-WOM. *Taiwan Journal of Marketing Science*, 10(1):17-40.

Hudson, J .C. (1969). A location theory for rural settlement. *Annals Association of Americans Geographers*, 59: 365-381.

Ikporukpo, C.O. (1982) Towards a Forecasting Model of Gasoline Demand in Nigeria; Spatial Approach. *Nigeria Geographer Association*, 25(2).

Ikporukpo, C.O. (1978) *Spatial Structure and Efficiency in a Physical Distribution System; A case study of Nigerian gasoline distribution industry*. PhD thesis submitted to the Department of Geography, Ibadan.

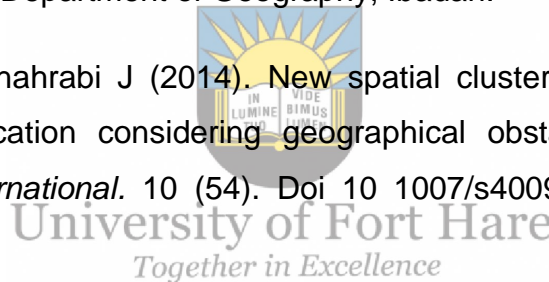
Ingram, D. R. (1971). The concept of accessibility: A search for operational definition. *Regional Studies*, 5.

Inturri, G, Ignaccolo, M, Le Pira, M, Capri, S, and Giuffrida, N. (2017). Influence of Accessibility, Land Use and Transport Policies on the Transport Energy Dependence of a City. *Transportation Research Procedia*, 25: 3273 – 3285.

Ireland, R. and Bruce, R. (2000). CPFR only the beginning of collaboration, *Supply Chain Management Review*, 4(4): 80 - 88.

Jaja, Y. C. (2009). *Spatial analysis of gasoline consumption in Nigeria*. PhD thesis submitted to The Department of Geography, Ibadan.

Javadi M and Shahrabi J (2014). New spatial clustering based model for optimal urban facility location considering geographical obstacles. *Journal of Industrial Engineering International*. 10 (54). Doi 10 1007/s40092-014-0059x. Accessed 24 October, 2016.



Jetter, K.M., Crespi, J. and Cassady, D.L. (2006). The effects of the spatial distribution of grocery Stores on food prices in low income neighborhoods. *Selected Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting*, Long Beach, California.

Joppe, M. (2000). *The Research Process*. Retrieved February 5, 2018, from <http://www.ryerson.ca/~mjoppe/rp.htm>

Kantola, H. (2016). Retail success: The impact of space and agglomeration. The Licentiate Thesis series. Jonkoping University.

Kearney, A.T. (2015). Retail in Africa; The next big thing. The 2015 Africa Retail Development Index. www.atkearney.com. Accessed 30th March 2017.

Kishore K and Patel R.P (2012). Role of non-fuel retailing services: The face of petro-retailing in India. *Journal of Business and Retail Management*, 7 (1)

Kleit, A. C. (2003). *The economics of gasoline retailing; Petroleum distribution and retailing issues in the U S*. The Pennsylvania State University ANKI@psu.edu 814-865-0711.

Klose, A and Drexl, A. (2005) Facility location models for distribution system design, *European Journal of Operational Research* 162: 4 – 29.

Knox, P. (1987). *Urban Social Geography: An Introduction* (2nd edition). Essex, UK: Longman Scientific & Technical.

Knox PL, Marston SA (2007). *Places and Regions in Global Context: Human Geography (4th Edition)*.Upper Saddle River, NJ: Prentice Hall.

Kojima M., Mathews W. and F. Sexmiths (2010). Petroleum marketing in sub-Saharan Africa; Analysis & assessment of 12 countries. Energy Sector Management Assisted Program ESMAP/World bank.

Kosambi, M and Brush, J.E. (1988). The Colonial Port Cities in India *Geographical Review*, 78(1): 32-47.

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques*. 2nd Ed. New Age International Publishers, New Delhi, India.

KPMG (2013). *2013 Retail Industry Outlook Survey*, June, United States.

Lee, Y. (1979). A Nearest-Neighbor Spatial Association Measure for the Analysis of Firm Interdependence. *Environment and Planning* 1, 1 (2): 169- 175.

Lee, Y. and McCracken, M. (1982). Spatial Adjustment of Retail Activity: A Spatial Analysis of Supermarkets in Metropolitan Denver, 1960- 1980. *Regional Science Perspectives*, 12(2):62 - 76.

Lee P, Yeung A, Cheng T (2009). Supplier alliances and environmental uncertainty: An empirical study. *International Journal of Production Economics*, 120, 190.


Leeuwen, E.S. (2010). The effects of future retail developments on the local economy: Combining micro and macro approaches. *Papers in Regional Science* 89(4): 691-710.

Lefcourt, H. (1976). *Locus of Control*. Halsted Press, New York.

LET (2000). *Diagnostic du transport de marchandises dans une agglomération*, DRAST/Ministère des Transports Publishing.

Levinson, D. Gage, B. and Rindels, A. (2012) Using twin cities destinations and their accessibility as a multimodal planning tool. www.dot.state.mn.us/research/TS/2012/2012015.pdf . Accessed September 4, 2016.

Liu, Y. Modeling sustainable urban growth in a rapidly urbanising region using a fuzzy-constrained cellular automata approach (2012). *International Journal of Geographical Information Science*, 26: 151 - 167.

Liu, K., Dong, H., Bi, J., Lu, Z. (2014). Research on Construction of Urban Logistics Information Platform. *In Proceedings of the 2013 International Conference on Electrical and Information Technologies for Rail Transportation (EITRT2013)-Volume I* (365 - 371).

University of Fort Hare
Together in Excellence

Losch, A. (1954). *The Economics of Location*. New Haven, CT: Yale University Press

Loeb, P.D. and Clark, W.A. (2007): The determinants of truck accidents. *Transportation Research Part E*, 43: 442 – 452.

Mabogunje, A. (2002) Re-constructing the Nigeria City: The New Policy on Urban Development and Housing, In; Amole, D. et al (eds), *The City In Nigeria*, Obafemi Awolowo University, Ile-Ife, Nigeria.

Magnusson, R.J. (2013). Medieval Urban Environmental. *History. History Compass*, 11(3): 189 - 200. <https://doi.org/10.1111/hic3.12038>

Malkanthie, M. and Kelum, W. (2017). Reverse service quality gap of 3PL market in Sri Lanka. Academy for Global Business Advancement (AGBA) 14TH World Congress.

Mamman, A.B. (2005). *Transport aspects of livestock marketing at the Achida and Sokoto Kara markets. Being a contribution to „Investigations on Building a Food Marketing Policy evidence Base in Nigeria“.* The United Kingdom Department for International Development.

Manzano F S (2005). *Supply chain practices in the petroleum downstream.* M.sc degree project submitted at Massachusetts Institute of Technology.

Martino, A. (2012). *Milano: from pollution charge to congestion charge.* Paper presented at the Low emission zones for transport in the Benelux? BIVIC – GIBET. Leuven Faculty Club, 28 March 2012.

Marton, M. and Paulova, I. (2010). Applying the theory of constraints in the course of process improvement. *Research papers. Faculty of Materials Science and Technology in Trnava Slovak University of Technology in Bratislava.* Number 29.

Matthews, J.W. (2007). Retail Proximity and Residential Values or Do Nearby Stores. *Journal of the American Planning Association.*

Mazza, L. and Rydin (1997). Urban sustainability: discourses, networks and policy tools. *Progress In Planning* 47(1): 1 - 74. DOI: [10.1016/S0305-9006\(96\)00006-2](https://doi.org/10.1016/S0305-9006(96)00006-2). Accessed December 23, 2016.

McKinnon C (1984). The spatial organization of physical distribution in the food industry. PhD thesis submitted at the University College London.

Melo, M T, S. Nickel and F. Saldanha-da-Gama (2009) Facility location and supply chain management- a review. *European Journal of Operational Research*, 196: 401 - 412.

Milgram, S., (1970). The experience of living in cities. *Science*, 167: 1461 – 1468.

Miller, R. L. (1999). *Economics Today: 1999-2000 Edition*, Reading, Massachusetts: Addison-Wesley.

Miller, D.J. (2012). Is nicotine a stimulant or a depressant? www.conseleorssoapbox.com Accessed May 28th 2018.

Mirchandani, P. B. and Francis, R.L. (1990) (Eds.), *Discrete Location Theory*, Wiley, New York.

Morgan, G.A., Leech, N. L., Gloeckner, G.W., and Barrent, K.C. (2004), *SPSS for Introductory Statistics: Use and Interpretation, second ed.* Lawrence Erlbaum Associates. Mahwah, NJ.

Morgeson, F. V. 2012. Expectations, Disconfirmation, and Citizen Satisfaction with the U.S. Federal Government: Testing and Expanding the Model. *Journal of Public Administration Research and Theory*, 23 (2): 289 – 305. DOI:10.1093/jopart/mus012

Mulligan, G., Partridge, M.D. and Carruthers J.I. (2012) Central place theory and its reemergence in regional science. *Ann Reg Sci* 48:405–431. DOI 10.1007/s00168-011-0496-7. Accessed 3 January 2017.

Munuzuri, J., Cortes, P., Guadix, J., & Onieva, L. (2012). City logistics in Spain: Why it might never work. *Cities*, 29(2): 133-141. DOI: 10.1016/j.cities.2011.03.004. Accessed 4 June 2017.

Murphy, S. and Leach, David Z. (2013). The extent to which heavy goods vehicle driver training is focused on reducing the casual factors of driver stress and fatigue. In: LRN Annual Conference and PhD Workshop 2013, 4th6th September 2013, Birmingham, UK.

Nakanishi, T. (2006). Supply and Demand Analysis on Petroleum Products and Crude Oils for Asia and the World. *The Institute of Energy Economics, Japan*

Naor, N., Bernardes, E.S. and. Coman, A. (2013). Theory of constraints: is it a theory and a good one? *International Journal of Production Research*, 51(2): 542-554, DOI: 10.1080/00207543.2011.654137. Accessed 29 August, 2018.

National Population Commission (2016). Nigeria Population Estimate. <http://www.population.gov.ng>. Accessed May 5, 2017.

Neufert, E. (1980). *Architects' data*. BSB Professional Books. London.

Nichols, J.B. Oliner, S.D. and Mulhall, M.R. (2010) Commercial and Residential Land Prices Across the United States. Finance and Economics Discussion Series Divisions of Research & Statistics and Monetary Affairs Federal Reserve Board, Washington, D.C.

Nigeria Bureau of Statistics (2008) Annual abstract of statistics.

Nigeria Bureau of Statistics (2016) Annual abstract of statistics.

Obadan, M. I. (1976). Petroleum product shortage in a Nigerian city: An exploratory study of supply in Ilorin. *Nigerian Journal of Economic and Social Studies*, 3 (4)

Obasanjo, O. T., Francis, M. and William, J. J. (2014). Road haulage constraints in the transportation of petroleum products in northern Nigeria. *Journal of Environmental Science, Toxicology and Food Technology*, 8 (3) 1: 1-8.

O'Byrne, B. (2017). Vertical integration in the supply chain; Is it on the rise? *Logistic Bureau*. www.logisticsbureau.com Accessed 20 May 2018.

Odugbemi, O. O. And Ajiboye, A. O. (1998). Transport factor in cash crop production and distribution; The Kolanut Example. *Journal of Transport study*, 2(1) 89 – 106.

Oduwaye, L. (2004). Land Value Determinants in Medium Density Residential Neighbourhoods of Metropolitan Lagos. *Journal of the NITP*, XVII, 1, (October, 2004), 97–111.

OECD (2003). Delivering the Goods: 21st century Challenges to Urban Goods Transport (Paris).

Ogden, K, (1992), *Urban Goods Movement: A Guide to Policy and Planning*, Ashgate, Aldershot.

Ogunbodede E. F. (2008). Urban Road Transportation in Nigeria from 1960 to 2006: Problems, Prospects and Challenges. *Ethiopian Journal of Environmental Studies and Management*. Vol.1 No.1.

Ogunsanya, A.A. (1982). Spatial pattern of urban freight transportation in Lagos Metropolis *Transportation Research* Vol. 16 A No 4.

Ogunsanya, A.A. (1983) Contribution of freight vehicles to urban traffic delays in a Developing Economy; The case of Lagos, Nigeria. *Nigerian Geographical Journal*, 26.

Ogunsanya, A. A. (1984) Estimating intra-urban freight generation and attraction. *Transport Research series A*.

Ojekunle, J. (2004). *Urban freight Transportation in Nigeria*. NITT Perspectives.

Okafor, S.I. (1981) Economic nationality and the spatial behavior of hospital patients. *Malaysian Journal of Tropical Geography*, 4.

Okogba, E. (2017) 46 killed, 96 wounded in Ile-Ife Yoruba-Hausa clash. *Vanguard Newspaper*. 14.

Olagunju, K. (2011), Articulated Lorries management in Nigeria: Road Safety Perspective, a paper presented at the Road Safety forum, organized by the International Road Safety Organisation at Ladi Kwali Hall, Sheraton Hotel & towers, Abuja, 6th May, 2011.

Oliver, R. L. (1977). Effect of expectation and disconfirmation on post exposure product evaluations: an alternative interpretation. *Journal of Applied Psychology*, 62(4): 480-486.

Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(November), 460–469.

Omole, F. K. (2000) Locational analysis of petrol filling stations in Akure, Nigeria, *International Journal of Transport Studies*, 1 (1):16 - 31.

Öner, O. (2015). Retail city: The relationship between place attractiveness and accessibility to shops .IFN Working Paper No. 1055. Research Institute of Industrial Economics.

Oni, S.I., (2008). *Development of inland ports in Niigeria. In: Oyesiku, O.O., Gdamosi, K.T. (Eds.) Port Administration and Development in Nigeria, first ed.* HEBN Publishers, pp. 89-99.

Oni, S.I., and Okanlawon, K. (2006), Nigeria"s transport infrastructural development: an integral part of the national economic empowerment and development strategy (NEEDS). *Journal of Socia and Policy Issues*, 3(2): 7 – 13.

Onyemelukwe, J.O.C. (1978) "The Spatial, Structural Pattern and Dynamics of Liquefied Fuel Distribution in a Traditional City: *The Nigeria Geographical Journal*, 21(2).

Openshaw, S. and Veneris, Y. (2003). Numerical experiments with central place theory and spatial interaction modeling. *Environment and Planning A*, 35(8): 1389 – 1403.

Oyo State Government Official Website (2017). <https://www.oyostate.gov.ng>. Accessed 12 December 2017.

Ozuduru, B.H., Varol, C. and O.Y. Ercoskun (2014). Do shopping centers abate the resilience of shopping streets? The co-existence of both shopping venues in Ankara, Turkey. *Cities* 36: 145-57. DOI: [10.1016/j.cities.2012.10.003](https://doi.org/10.1016/j.cities.2012.10.003). Accessed April 14, 2017.

Pacione, M. (2003). Urban environmental quality and human well being – a social geographical perspective. *Landscape and urban planning* 65, 19-30.

Patterson, P. and L. Johnson. (1997). Modeling the determinants of customer satisfaction for business-to-business professional services. *Journal of the Academy of Marketing Science*, 25(1): 4-17.

Patterson, K.A., Grimm, C.M. and Corsi, T.M. (2003). Adopting new technologies for supply chain management. *Transportation Research. Part E, Logistics & Transportation Review*, 39E: 95.

Papadopoulou, M. P. and Antoniou, C. (2014). Environmental impact assessment methodological framework for liquefied natural gas terminal and transport network planning. *Elsevier Energy Policy* 68, 306 – 319. Retrieved on 26/01/16, Available online at www.elsevier.com/locate/enpol.

Peng, J. & Chao-Ying, J. (2016). Logistic Regression In D. Wyse, E, Smith, L.E. Suter and N. Selwyn *The BERA/SAGE Handbook of Educational Research*, (Chapter 46, pp. 37). SAGE Publications in London.

Perveen, S.; Kamruzzaman, M.; Yigitcanlar, T. (2018). What to assess to model the transport impacts of urban growth? A Delphi approach to examine the space-time suitability of transport indicators. *International. Journal of Sustainable Transport*. 1-17. <https://doi/1080/155683182018.1491077>.

Perveen, S., Kamruzzaman, M and Yigitcanlar, T. (2017). Developing Policy Scenarios for Sustainable Urban Growth Management: A Delphi Approach. *Sustainability*, 9(1787). DOI:10.3390/su9101787

Pickford, J. H. (1963). Highway oriented and urban arterial commercial area. *American Society of Planning*.

Pitfield, D. E. (1978) Freight Distribution Model Predictions Compared: A Test of Hypotheses. *Environment and Planning*, 10.

Popov, L. and Chompalov, I. (2012). Crossing Over: The Interdisciplinary Meaning of Behavior Setting Theory. *International Journal of Humanities and Social Science*, 2(19).

Porter, G. (2005). Competing market; Company rivalry and indigenous market in Nigeria in early colonial period. *7th Marketing History Conference Proceedings*. Vol 7.

Potter, A., and Lalwani, C. (2008). Investigating the impact of demand amplification on freight transport. *Transportation Research Part E*, 44: 835 – 846.

Prosperi, D.C. and Oner, A.C. (2015). Spatial impacts of megaprojects on the form of metropolitan regions: a theoretical inquiry. *International Journal of Society Systems Science*, 7(1): 23 - 46.

Price-Water-Cooper. (2013). Africa gearing up; Nigeria. Pp 61-66.

Proudford M.J. (1937). City Retail Structure. *Economic Geography*, 13(4): 425 - 428.

Quesada, H, Rado, G. and Sanchez, S (2012) Critical factors affecting supply chain management: A case study in the US pallet industry. www.intechopen.com. Accessed August 4, 2016.

Ramos BH, Almeida MFC de, Ribeiro JA and Silveira C.A. (2018), Life, work and health conditions of cargo transportation drivers. *Journal of Nursing UFPE*, 12(1):150-9, <https://doi.org/10.5205/1981-8963-v12i01a22922p150-159> Accessed August 2, 2018

ReVelle, C. S. and H.A. Eiselt, (2005). Location analysis: A synthesis and survey, *European Journal of Operational Research*, 165: 1–19.

Rogers. A. (1969). Quadrat Analysis of Urban Dispersion: 2 Case Studies of Urban Retail Systems. *Environment and Planning*, 1 (2): 155- 171.

Roig-Tierno, N., Baviera-Puig, A. and Buitrago-Vera, J. (2013). Business opportunities analysis using GIS; the retail distribution sector. *Global Business Perspectives*. 13: 226-238.

Ronen, B. and Spector, Y., 1992. Managing system constraints: a cost/utilization approach. *International Journal of Production Research*, 30 (9): 2045–2061.

Rotem-Mindali, O. (2012). Retail fragmentation vs. urban livability: Applying ecological methods in urban geography research. *Applied Geography* 35: 292-299.

Rucks-Ahidiana and Bierbaum (2015). Qualitative spaces: Integrating spatial analysis for a mixed methods approach. *International Journal of Qualitative Methods*. 14.

- Sansone, M and Colamatteo, A. (2017). Trends and Dynamics in Retail Industry: Focus on Relational Proximity. *International Business Research*; 10(2): 1-11.
- Santos, J., & Boote, J. (2003). A theoretical exploration and model of consumer expectations, post purchase affective states and affective behavior. *Journal of Consumer Behavior*, 3(2): 142-156.
- Sapsford, R. and Jupp, V. (1996). *Data collection and Analysis*. Sage, London.
- Savage, I. (1989). The economic underpinning of transportation safety control. Department of Economics, Northwestern University, Evanston, IL, August (Mimeo).
- Schoemaker, J., Allen, J., Huschebeck, M. & Monigl, J. (2006) Quantification of Urban Freight Transport Effects (Rijswijk: BESTUFS).
- Sekoai, P.T. and .Kelvin. O.Y. (2016) Biofuel Development Initiatives in Sub-Saharan Africa: Opportunities and Challenges. *Climate*, 4: 33; DOI: 10.3390/cli4020033. Accessed September 13, 2017.
- Serra, D. and ReVelle, (1994) Competitive location in discrete space. *Journal of Economic literature*. Economic working paper 96.
- Short, J. (2014). Analysis of Truck Driver Age Demographics across Two Decades. American Transportation Research Institute <http://atri-online.org/2014/12/03/analysis-of-truck-driver-age-demographics-across-two-decades/> Accessed 24 May 2018.
- Simatupang, T M, Wright, A C and Sridharan, R (2004). Applying the theory of constraints to supply chain collaboration. *Supply Chain Management: An International Journal*, 9:1
- Simmons, J. (1964). The Changing Pattern of Retail Locations. University of Chicago Department of Geography, Research Paper 92.
- Smith, C.A. (1974) 'Economics of marketing systems: models from economic geography', *Annual Review of Anthropology*, 3:169 – 201.

Smith, C.A. (1975) Examining stratification systems through peasant marketing arrangements: an application of some models from economic geography. *Journal of the Royal Anthropological Institute*, 10: 95 –122.

Smith, C.A. (1976) Exchange systems and the spatial distribution of elites: the organization of stratification in agrarian societies, in C.A.Smith, *Regional Analysis, vol. 2: Social Systems*, New York: Academic Press, 309–74.

Smith, D. M., (1994). *Geography and Social Justice*, Blackwell, Colchester, VT.

Sokona Y (2012) Energy, security, fossil fuels & opportunities for low carbon development: Towards green growth in Africa. Africa Development Report.

Somuyiwa, A. O. (2010). *Analysis of Logistics Cost in the Supply Chain Management of manufacturing companies in Southwestern Nigeria, 2002-2006* (Unpublished Ph.D Thesis). Olabisi Onabanjo University, Ago-Iwoye.

Sourirajan, K. L. Ozsen, and Uzsoy, R. (2007). A single-product network design model with lead time and safety stock considerations, *Institute of Industrial and Systems Engineers Transactions* 39: 411–424.

Spector, R. E. (2006). How constraints management enhances Lean and Six sigma. *Supply Chain Management Review*, 10(1): 42-47.

Speece, M. (2005) Ethnodomination of marketing channel revisited. Retailing environments in developing countries/edited by Allan M.Findlay, Ronan Paddison, and John A.Dawson. Taylor & Francis e-Library, London.

Spreng, R. A., MacKenzie, S. B., & Olshavsky, R. W. (1996). A reexamination of the determinants of consumer satisfaction. *Journal of Marketing*, 60: 15-32.

Spreng, R. A., & Page, T. J. (2003). A Test of Alternative Measures of Disconfirmation. *Decision Sciences*, 34 (1): 31-62.

Stantchev, D. and Whiteing, T. (2006). *Urban Freight Transport and Logistic: An overview of the European Research Policy*. European Commission, Directorate for Energy and Transport.

Starkies, D. N. M. (1967). *Traffic and Industry: A Study of Traffic Generation and Spatial Interaction. Geographical Paper, London School of Economics, 3.*

Stockholm Environment Institute. (2013). Transport and Environment in Sub-Saharan Africa. Policy Brief. www.sei-international.org. Accessed November 12, 2016.

Storeygard, A. (2016). Farther on down the Road: Transport Costs, Trade and Urban Growth in Sub-Saharan Africa. *Review of Economic Studies*, 83: 1263–1295 doi:10.1093/restud/rdw020. Accessed January 23, 2016.

Suarez-Vega, R. Santos-Penate, D. and Dorta- Gonzalez (2012). Location models and GIS tools for retail site location. *Applied Geography*, 35: 12-22.

Sun Y (2000), Urban Development and Retail Structure in Beijing. A PhD Thesis Submitted to the Department of Geography. University of Saskatchewan. Saskatoon.

Tapas, M. and Sheuli, M. (2015) Region, Periphery and the City Core: Transformations in Morphology and Growth Symbiosis: A Case of Kolkata City and Region Growth symbiosis of Kolkata region RSA Conference, 2015.

Teller, C. and Elms, J. R. (2011). Urban Place Marketing and Retail Agglomeration Customers. *Journal of Marketing Management*, in print, DOI: 10.1080/0267257X.2010.517710. Accessed 12 January, 2017.

Thomas C.J. and Bromley, D.F. (2003). Retail revitalization and small town centres: the contribution of shopping linkages. *Applied Geography*. 23: 47–71

Tisot, C. M., & Thurman, S. K. (2002). Using behavior setting theory to define natural settings: A family centered approach. *Infants and Young Children*, 14(3): 65-71.

Ubogu, A. (2011). The Potentials of Rail-Road Integration for Port-Hinterland Freight Transport in Nigeria, *International Journal for Traffic and Transport Engineering*, 1(2): 89-107.

Ubogu, A.E., Ariyo, J.A., and Mamman M. (2011), Port-hinterland trucking constraints in Nigeria, *Journal of Transport Geography*, 19 (1):106-114.

Udo, R.K., (1978); *Geographical Regions of Nigeria*. London, Heinemann, 4th edition.

UNDP/World Bank (2003) *Regional Petroleum Transport System for West Africa Originating in Nigeria*; Sub-Saharan Petroleum Products Transportation Corridor Analysis and Case Studies; Energy Sector Management Assistance Programme (ESMAP) pp36-41.

UNODC World Drug Report (2015). Vienna; UNODC. [https://www.unodc.org/documents/wdr2015/World Drug Report. 2015. pdf](https://www.unodc.org/documents/wdr2015/World_Drug_Report_2015.pdf), accessed 12 March, 2018.

United States Annual Energy Information Administration (2013) *Annual Energy Outlook*.

US (DOT), Department of Transportation, 2010. *The Transportation's Role in Reducing US Greenhouse Gas Emissions*. http://ntl.bts.gov/lib/32000/32700/32779/DOT_Climate_Change_Report_April_2010_-_Volume_1_and_2.pdf Accessed July 13, 2018.

Vance, J.E. (1962). *Emerging Patterns of Commercial Structure in American Cities*. In *Proceedings of the IGU Symposium in Urban Geography Lund 1960*, ed. K. Nohrg, 485-518. Lund, Sweden: C.WK Gleerup Publishers.

Vance, J. E. (1970) *the Merchant's World: The Geography of Wholesaling*. Prentice Hall, Englewood Cliff.

Walmsley, D.J. & Weinand, H.C. (2008.) Is Central Place Theory relevant to an understanding of retail provision and planning? *Urban Policy and Research*, 8(1990)2: 69-75.

Watson, K and Polito, T. (2003). Comparison of DRP and TOC financial performance within a multi-echelon, multi product physical distribution environment. *International Journal of Production Research*, 41 (4): 741-765.

Waxell, A (2015). *Geography and the retail industry: A special focus on the Sweden*. Centre for Research on Innovation and Industrial Dynamics. Uppsala Universitet.

WebMD (2018). Cola Nut; Uses, side effects, interactions, dosage. www.webmd.com. Accessed May 30th 2018.

Wicker, A. W. (2002). *Ecological psychology: Historical contexts, current conception, prospective directions*. In R. B. Bechtel & A. Churchman & (Eds.), *Handbook of environmental psychology*. New York: John Wiley & Sons. (pp. 114-126).

World Bank. (2007), Nigeria: Competitiveness and Growth, In: Poverty Reduction and Economic Management 3, Country Department 12, Africa Ref: A(2), Report no. 36483-NG.

World Bank (2002) *Cities on the move*; a World Bank urban transport strategic review.

Wrigley, N. and Lowe, M. S. (2002). *Reading Retail. A Geographical Perspective on Retailing and Consumption Spaces*. Arnold. London.

Yannis, G. Golias, J. & Antoniou, C. (2006) Effects of urban delivery restrictions on traffic movements, *Transportation Planning and Technology*, 29(4):295 - 311.

Yim, Y. (1990). *Travel distance and market size in food retailing*. The University of California Transportation Center, Working Paper. UCTCN o. 124, Berkeley, CA.

Yim, Y. (1993). *Shopping trips and spatial distribution of food stores*. The University of California Transportation Center. University of California at Berkeley. UCTC No. 125.

Zaheer, A. (2014). Impact of retail management in the growth of Indian economy. *International Research Journal of Marketing and Economics*, 1 (7): 1 -14.

Zawadi, R and Ariel, B. H. (2015). Qualitative spaces; Integrating spatialanalysis for a mixed methods approach. *International Journal of Qualitative Methods*, 15: 92 - 103.

Zhen, M. Gao, X., and Yuan. H (2017). An empirical study on environmental efficiency assessment in urban industrial concentration. *International review for spatial planning and sustainable development*, 5(2): 17 - 34

Zhou, J. (2009). *Study on the spatial structure of large scale retail stores based on space syntax; Case study in Wuhan*. Msc Thesis submitted to the International institute for Geo-information and Earth Observation Science, Eindhoven Netherland.

Zunder, T. H. & Ibanez, J. N. (2004). Urban freight logistics in the European Union: The Impact of Urban Freight Transport. *European Transport*, 713(28): 77 - 84.

Zunder, H. T., Aditjandra, P.T. Schoemaker, J.T. Vaghi, C. Laparidou, K. and Österle, I. (2016). Engaging city stakeholders to achieve efficient and environmentally friendly urban freight movements. *Transport Research Arena*. DOI:10.1002/9781119307785.ch19. Accessed February 9, 2017.



University of Fort Hare
Together in Excellence

APPENDICES

APPENDIX 1 QUESTIONNAIRE 1



University of Fort Hare
Together in Excellence

UNIVERSITY OF FORT HARE

FACULTY OF SCIENCE AND AGRICULTURE DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL SCIENCES

Dear Respondent,

This questionnaire has been designed to collect data for a PhD degree in Geography and Environmental Sciences. The research is on **The Analyses of Retail and Transport Geography of Petroleum Products Distribution in Ibadan Metropolis, Nigeria**. You are kindly requested to respond to **ALL** the statements in the following questionnaire. There is no right or wrong answer and you are encouraged to be honest and truthful in your expression of options. Please your name is not required. These will be dealt anonymously and confidentially and will be used for academic purposes only. Your sincere responses would therefore be highly appreciated. Thanks for your anticipated cooperation.

Adeyinka Peter AJAYI (+234 8033593676; +27719042094). e-mail 201700738@ufh.ac.za

SECTION A

Kindly fill in the space to supply the necessary information by putting a tick where applicable. Kindly fill in your responses on the available spaces.

1. **Age:** 21-25 () 26-30 () 31-35 () 36-40 () 41-45 () 46- 50 () 51- Above ()
2. **Sex:** (a) Male () (b) Female ()
3. **Marital status:**(a) single () (b) married () (c) divorced() (d) widow/widower () (e) separated ()
4. **Education level:** (a) (Nil) (b) Primary School Cert (c) SSCE/WASC (d) OND (e) B.Sc./HND (f) Postgraduate () (d) Others
5. **No. of years in present position**.....
6. **No of years with present employer**
7. **Years of work experience:** (a) 1-5years() (b) 6-10years() (c)11-15() (d) 16years-above()
8. **Name of Retail Outlet:**
9. **Ownership structure of the Outlet:** (a) IPMAN () (b) Multinational () (c) NNPC/NIPCO ()
10. **Ownership status:** (a) Fully owned () (b) Dealership () (c) Franchise ()
11. **Location of Retail Outlet:**
12. **Job Status in the organization:**
 - I. Owner of the enterprise ()
 - II. Employed by an outsourcing organization for the oil company()
 - III. Employed directly by the oil company on permanent basis()



University of Fort Hare
Pursuing Excellence

SECTION B

Instructions: Below are numbers of statements, please mark [√] in the box to indicate the extent to which you agree with each statement applies as it relates to activities of this retail outlet.

SD= Strongly Disagree, D=Disagree, A= Agree, SA=Strongly Agree, ID=Indecisive.

N/O	Determinants of location and operational structures of retail outlets	SD	D	A	SA	ID
1.	The cost of landed property on which the retail is sited is the major consideration behind the present location					
2.	Nearness to a major highway/busy routes is the cause					
3.	The high population of the neighborhood is the reason					
4.	Nearness to a motor park/market					
5.	The location is easily accessible for haulage trucks and patronizing vehicles					
6.	Closeness to competitors					
7.	It is solely the Town Planning Authority decision					
8.	This location has met the expectation behind its choice					
9.	The station is benefiting from optimal locational decision					
10.	Most of our customers are motorists buying PMS/Diesel					
11.	Sizeable numbers of our customers are non-motorists buying PMS/Diesel for domestic uses (Gen set)					
12.	We provide auxiliary services(free air/shop mall/ eatery etc) to customers					
13.	Our auxiliary services accounts' for a sizeable number of our patronage					
14.	We have enough space and maximize it					

15.	The retail outlet will be better sited somewhere else					
16.	I'm aware of the Health, Safety and Environment stipulations guiding the conveyance of dangerous goods(Petroleum Products)					
17.	There is adequate safety measures in place should there be a fire outbreak in the station					
18.	I have detailed information about the State Fire Service Organization and will call them in any emergence					
19.	The outlet operate eco-friendly policy					
20.	We do have incidents of water sometimes getting into our underground tanks after heavy downpour					
21.	We had incident (s) of fire outbreak in the past					
22.	The town planning laws guiding the location of retail outlets are good and ideal					
23.	I believe stations located at the suburbs are more easily accessible for me as a hauler than those in the middle of the city					

24. If you are not satisfied with the present location of the retail outlet, where will you prefer as an alternative.....

25. Do you believe that the present distributional pattern of fuel retail Outlets in Ibadan are ideal? (i) Yes (ii) No

26. Suggestions on how to improve distributional pattern of fuel retail outlet

APPENDIX 2: QUESTIONNAIRE 2



University of Fort Hare
Together in Excellence

UNIVERSITY OF FORT HARE

FACULTY OF SCIENCE AND AGRICULTURE, DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL SCIENCES

Dear Respondent,

This questionnaire has been designed to collect data for a PhD degree in Geography and Environmental Sciences. The research is on “The Analyses of Retail and Transport Geography of Liquefied Petroleum Products Distribution in Ibadan Metropolis, Nigeria”. You are kindly requested to respond to ALL the statements in the following questionnaire. There is no right or wrong answer and you are encouraged to be honest and truthful in your expression of options. Please your name is not required. These will be dealt anonymously and confidentially and will be used for academic purposes only. Your sincere responses would therefore be highly appreciated. Thanks for your anticipated cooperation. Adeyinka Peter AJAYI (+234- 8033593676; +27719042094) E-MAIL 201700738@ufh.ac.za

SECTION A

Kindly supply your answer in the space that corresponds to necessary information by putting a tick (your answer or writing your responses where necessary)

1. **Age:** 21-25 () 26-30 () 31-35 () 36-40 () 41-45 () 46- 50() 51 - Above()
2. **Sex:** (a) Male () (b) Female ()
3. **Marital status:**(a) single () (b) married() (c) divorced () (d) widow/widower() (e) separated ()
4. **Education level:** (a) (Nil) (b) Primary School Cert (c) SSCE/WASC (d) OND (e) B.Sc./HND (f) Postgraduate () (d) Others
5. **(i) No. of years as a driver.....** (ii) **No. of years as a tanker driver.....**
6. **No of years with present employer**
7. **Years of work experience:** (a) 1-5years () (b) 6-10years () (c) 11-15 () (d) 16years- above ().....
8. **Ownership structure of the Outlet:** (a) IPMAN () (b) Multinational () (c) NNPC/NIPCO ()
9. Do you have knowledge of Health, Safety and Environment on Oil shipment
Yes () No ()

10 Location of Retail Outlet

11 Job Status in the organization:

- (i) Employed by 3pls ()
- (ii) Employed by an outsourcing organization for the oil company()
- (iii) Employed directly by the oil company ()

SECTION B

This section is entirely meant for haulers (drivers). Please get the attention of the research team if help is needed. Read each of the following statements and indicate how much you agree or disagree with a tick [√] under appropriate number: **1 - Strongly Disagree: 2 – Disagree: 3 – Agree: 4 – Strongly: Agree 5 - Indecisive**

	ASSESMENT OF OPERATING ENVIRONMENT	1	2	3	4	5
1.	I feel I'm a valuable member of the organization					
2.	I am comfortable with my terms of employment(salary, working hours)					
3.	I feel there are rooms for my growth and secure about my future here					
4.	I get blamed for vehicular breakdown or delay in delivery schedule					
5.	I compromise on safety in order to meet delivery schedules at times (over speeding, over loading)					
6.	There is an update insurance policy against accidents for goods and vehicles when in-transit					
7.	As a hauler my view on haulage vehicle conditions are taken serious by the authorities					
8.	I get regular health check-up by the organization health care service provider					
9.	There is a life insurance policy on me, should in case of any mishap					
10.	The vehicles in our fleet are in tip-top condition and have proper registration					
11.	I get my dues, particularly my annual leave as					

	at when due					
12.	I attend training on the best global practices for the shipment of Petroleum Products					

SECTION C

Kindly indicate how “**TRUE**” each of the following statements applies to you with regard to your current job assignment. **1 - Not at all true, 2 - Not true; 3 - Somewhat true; 4 - True; 5 - Completely true**

	INTELLIGENT TRANSPORT SYSTEM	1	2	3	4	5
1.	I am aware that some haulage truck that have, GPS, Radio Frequency Identity (RFID) Route Analyst, Tracker etc					
2.	I operate (drive) a truck with a GPS.					
3.	The organization provides me with a mobile phone which they also service for me to use during operational hours.					
4.	I operate (drive) a truck with a RFID					
5.	I operate (drive) a truck with a Route Analyst					
6.	I operate (drive) a truck with a Tracker.					

Kindly indicate your level of agreement or disagreement with each statement by ticking [√] one of the seven alternatives next to each statement with regard to your current job assignment.

Strongly Disagree (1): Disagree (2): Agree (3): Strongly Agree (4): Indecisive (5)

	PERCEPTIONS ON INFORMATION SHARING/QUALITY ADDITIONAL SERVICES/GENERAL INFORMATION	1	2	3	4	5
1.	I get regular updates on work decisions from other sections					
2.	My relevance in the operation of the company is limited to driving					
3.	I submit written report/complete delivery report after completion of task					
4.	My input from the field is used as part of feedback					

	mechanism for better planning					
5.	The input/suggestions of the haulage units are sought before procuring vehicles/ spare parts for the unit					
6.	The leaders of haulage section have input in selection process of new intake in the unit					
7.	The company holds regular monthly/quarterly/annual meetings for all staff.					
8.	At meetings we are allowed to freely contribute on what can move the organization forward					
9.	We regular updated by our supply chain partners (Depot owners) on products availability.					
10.	Our supply chain provide free parking space for us when we come for loading					
11.	Our partners (Depot owners) treat us well and are professional in their disposition to us					
12.	Conditions of roads within the city is worse than interstate roads for haulage vehicles					
13.	I'm aware of the fact that haulers generally keep multiple homes/families because of long distance driving					
14.	I'm aware that haulers generally drink and smoke cigarette to be alert when driving.					
15.	I do drink/smoke cigarette to be alert.					
16.	I do take other stimulants to get energy and be alert (Cannabis)					
17.	I have never taken cannabis but don't blame haulers who do.					
	Nature of Operational Constraints Experienced. Please quantify these constraints in order of magnitude with 1 being the lowest and 5 the highest	1	2	3	4	5
1	Bad roads					
2	Frequency of Accidents on roads					
3	Incessant Police/Security check points					

4	Hold ups and traffic jams within cities					
5	Lacking of parking lots within cities and on interstate roads					
6	Vehicular break downs					
7	Small sizes of city roads					
8	Other road users					

SECTION F

1 Suggestions on how Petroleum Products can be shipped more safely and road crashes involving haulage tanks prevented

.....

.....

.....

.....

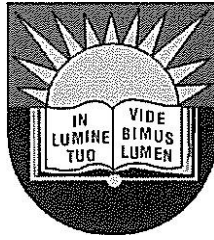
.....



Thank you.

University of Fort Hare
Together in Excellence

APPENDIX 3: ETHICAL CLEARANCE CERTIFICATE



University of Fort Hare
Together in Excellence

ETHICAL CLEARANCE CERTIFICATE

REC-270710-028-RA Level 01

Certificate Reference Number: MAZ051SAJA01

Project title: The analyses of retail and transport Geography of petroleum products distribution in Ibadan Metropolis, Nigeria.

Nature of Project Doctor of Philosophy in Geography and Environmental Sciences

Principal Researcher: Adeyinka P. Ajayi

Supervisor: Dr S. Mazinyo

Co-supervisor:

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the abovementioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document;
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research.

The Principal Researcher must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.


Special conditions: Research that includes children as per the official regulations of the act must take the following into account:

Note: The UREC is aware of the provisions of s71 of the National Health Act 61 of 2003 and that matters pertaining to obtaining the Minister's consent are under discussion and remain unresolved. Nonetheless, as was decided at a meeting between the National Health Research Ethics Committee and stakeholders on 6 June 2013 University ethics committees may continue to grant ethical clearance for prescripts of the previous rules have been met. This certificate is granted in terms of this agreement.

The UREC retains the right to.

- Withdraw or amend this Ethical Clearance Certificate if
 - Any unethical principal or practices are revealed or suspected;
 - Relevant information has been withheld or misrepresented;
 - Regulatory changes of whatsoever nature so require;
 - The conditions contained in the Certificate have not been adhered to.
 - Request access to any information or data at any time during the course or after completion of the project.
- In addition to the need to comply with the highest level of ethical conduct principle investigators ITI must report back annually as an evaluation and monitoring mechanism on the progress being made by the research. Such a report must be sent to the Dean of Research's office. The Ethics Committee wished you well in your research.

Yours sincerely



31/08/2018

Professor Pumia Dineo Gqola
Dean of Research

28 August 2018

APPENDIX 4: PLAGIARISM SIMILARITY INDEX

ORIGINALITY REPORT

12%			6%
SIMILARITY INDEX	9%	5%	STUDENT PAPERS
	INTERNET SOURCES	PUBLICATIONS	

PRIMARY SOURCES

Submitted to University of Johannesburg

1

Student Paper 4%

eprints.covenantuniversity.edu.ng 2

Internet Source 1%

www.uk.sagepub.com 3

Internet Source <1%

en.wikipedia.org 4

Internet Source <1%

arxiv.org 5

Internet Source <1%
