LOCATIONAL AND STRUCTURAL POTENTIAL MODEL FOR DEVELOPMENT PLANNING OF URBAN MARKET PLACES

"An Analytical Planning Model for the Study of the Demand and Supply of Activity Spaces, and of the Locational and Structural Potential, in A System of Urban Market Places, and the Formulation of a Development Planning Policy aimed at Achieving Balanced Demand and Supply of Activity Spaces, with the View to Optimising Locational and Structural Potential".

- Case Study of Kaduna City Market Places

A thesis submitted to the Department of Urban and Regional Planning, University of Strathclyde, in fulfilment of the requirement for award of the degree of DOCTOR OF PHILOSOPHY

BY

UCHE OBISIKE NKWOGU
B.Sc. (Hon) Arch., M.Sc. (Arch.), MNIA

December, 1986.

CONTAINS

PULLOUTS

VOLUME I

CHAPTERS 1, 2, 3, 4, 5, 6,& 7.

An Analytical Planning Model for the Study of the Demand and Supply of Activity Spaces, and of the Locational and Structural Potential, in A System of Urban Market Places

DEDICATION

To my parents

OBISIKE NKWOGU (late)
NWAOCHA OBISIKE NKWOGU (Mrs.)

for their desire to give me education.

ACKNOWLEDGEMENT

I wish to express my thanks to Prof. U.A. Wannop, Head of Department of Urban and Regional Planning, University of Strathclyde. His interest in the development of the research subject provided foundation for the study. I also wish to thank Mr. R.M. Boyle, my supervisor, for his candid comments and advice during the development of the research and writing of the thesis. My gratitude goes to Dr. P. Green for his inspiring guidance during one session he supervised my research, when Mr. Boyle was away from the university. Dr. S. Tagg, Head of the Department of Social Statistics Laboratory, deserves my gratitude for his assistance in the design of the questionnaires and analysis of the survey data. Also, I wish to thank Mr. Keith Hayton of Glasgow Planning Exchange for his valuable assistance in the interpretation of the computer outputs. My thanks are also due to Miss Ann Mair and Mrs. Sarinder Hunjan, both of the Social Statistics Laboratory, for their kind assistance during the prolonged data analysis. I must thank all the members of the Department of Urban and Regional Planning, who in one way or the other have contributed to the successful completion of the research study. My typist, Mrs. Edith Carr, deserves thanks for her secretarial services.

I should like to pay my regards to Mr. E. A. Opo-Ola, Asst. Chief Statistician, and his staff at the Federal Office of Statistics,Kaduna,for their co-operation in the execution of the field surveys. Acknowledged also is the invaluable assistance from Alhaji M. S. Abdullahi, the Secretary KCDB, Kaduna, for making available to me necessary information at his command. The Kaduna Local Government Council and the Nigerian Railway Corporation deserve thanks for granting me access to their respective Kaduna city market places for the purpose of the surveys.

I wish to register my thanks to Prof. E.A. Adeyemi and Dr. S.K. Kulshrestha, Heads of Department of Architecture and Town Planning, respectively, of Ahmadu Bello University Zaria, Nigeria, for their contribution during the formative stage of the research design. I should thank Mr. and Mrs. P.U. Igboayaka, Mr. and Mrs. T.C. Mogbo, Mr. and Mrs. I.O. Nwokeji, Mr. Nicholas Nkwogu, Chief B.U. Nwabueze, Mr. V.I. Nkwogu and Dr. E.O. Nkwogu, for their valuable assistance. Thanks to the Federal Government of Nigeria for providing the scholarship which made the research study possible.

Finally, and very importantly, I salute my loving wife, Florence (Dr.), for her consistent encouragement and support, and my children, Chinedu, Nnaemeka, Chinenye, Ekechi and Nkadinma, for the inconveniences they had to cope with during the period of the research study.

ABSTRACT

The thesis focuses attention on the unbalanced demand and supply of activity spaces in urban market places, resulting in the congestion of people and vehicles in selected Nigerian market places. A review of existing approaches to retail analyses shows that none offer a sufficient explanation of this phenomenon in a manner that can be useful for planning purposes. This is because, (i) None of these approaches contains explicit inclusion of time in its structure, and (ii) They are designed to predict what is likely to happen as a result of some assumptions, and not the possible range of performance in relation to defined locational and structural potential of the urban market places.

A new approach to retail study, which includes the above two factors, is then proposed on these assumptions:

(1) That there is strong hierarchical relationship between any pair of demand and supply of activity spaces, (a) for food shopping;
(b) for non-food shopping,
in an urban market place;

(2) That there is strong multiple causal relationship between the growth rate of any demand or supply of activity space, and the locational and structural potential in the urban market place.

Case study materials from Kaduna city market places are used to calibrate the equations arising from the propositions 1(a & b), and 2. The relationships were found to be strong. Examination of the calibrated hierarchical and causal relationships revealed unbalanced distribution, and disproportionate growth rates, of the demand and supply of activity spaces in Kaduna city market places.

Four alternative planning strategies were generated. The performance of each over and above the trend strategy, in achieving balanced demand and supply of activity spaces, and in optimising the locational and structural potential in the market places, was evaluated with equations 2 and 1(a & b). The strategy that achieved the best performance, together with the plan management requirements, was recommended as the adopted plan for the market places in the city.

TABLE OF CONTENTS

	Page
Dedication	i
Acknowledgement	ii
Abstract	iv
Table of Contents	vi
List of Figures	xviii
List of Tables	xxiii
List of Plates	xxxiii
Glossary of Acronyms	xxxv
CHAPTER 1: INTRODUCTION	1
1.0 Introduction	1
1.1 The Problem	1
1.2 The Goal	14
1.2.1 Demand and Supply of Activity Space	14
1.2.1.1 The Shoppers Units of Demand for Activity Spaces	15
1.2.1.2 The Traders Units of Demand for Activity Spaces	16
1.2.1.3 Transport Units of Demand for Activity Spaces	16
1.2.1.4 Supply of Activity Space	17
1.2.2 The System of Market Places	18
1.2.3 Environmental Attributes	24
1.2.3.1 Locational Potentials	24
1.2.3.2 Structural Potentials	24
1.2.4 Nigeria (and Africa)	24
1.2.5 The Objectives	27
1.2.6 The Model	27
1.3 The Constraints	29
1.4 The Scale	30
1.5 The Methodology and Structure	30
1.5.1 The Setting	32
1.5.2 The Case Study of Kaduna City Market Places	33

		Page
CHAPTER 2:	ISSUES INVOLVED IN THE DEMAND AND SUPPLY OF ACTIVITY SPACES IN URBAN MARKET PLACES IN NIGERIA	36
2.0	Introduction	36
2.1	Evolution of Types of Central Areas	37
2.2	Central Areas of Administrative Capitals	43
2.3	Central Area of the Federal Capital City	46
2.4	Central Area Informal Growth	48
2.5	Numerous Petty Traders	50
2.6	Fresh Food Storage Wholesale Shops in the Central Market Place	52
2.7	Accessibility of the Central Area	54
2.8	Social Animation	55
2.9	The Land Use Planners Role in the Development Planning of Urban Market Places as Major Shopping Centres	57
CHAPTER 3:	THE MARKET PLACE AS A MAJOR ELEMENT OF URBAN STRUCTURE	61
3.0	Introduction	61
3.1	Historic Trend of the Urban Market Place	61
3.1.1	Ancient Egypt and Classic Greece and Rome	61
3.1.2	The Market City	63
3.1.3	Medieval-Renaissance Europe	64
3.1.4	The Industrial City	66
3.2	The Nigerian Urban Retail Market Background	67
3.3	Urban Market Place as a Social-Political Element	71
3.4	Urban Market Place as an Economic Element	77
3.4.1	Periodic Markets	81
3.4.2	Bulking and Servicing	85
3.4.3	Daily Markets	87
3.5	Urban Market Place as a Spatial Element	93
3.6	The Evolutionary Scale of Nigerian Urban Market Places	96

		Page
CHAPTER 4:	EXISTING APPROACHES TO RETAIL STUDY	103
4.0	Introduction	103
4.1	The Classical Approaches	104
4.1.1	Spatial Dimension of the Consumers Travel Costs	105
4.1.2	The Economics of Scale	105
4.1.3	The Marginal Analysis	106
4.1.4	Behaviour or Demand Matrix	108
4.1.5	Agglomeration	109
4.1.5.1	Agglomeration (by Hotelling)	109
4.1.5.2	Agglomeration (by Boulding)	110
4.2	Catchment Area and Trade Distribution Techniques	111
4.3	Retail Turnover and Floor-space Predictive Techniques	115
4.3.1	Estimation of Retail Turnover for Planning Purposes	119
4.3.2	Forecasting Consumer Retail Expenditure Trend (1978)	121
4.3.3	Socio-Economic Retail Behaviour for Shopkeepers	122
4.4	Urban Planning Framework for Retail Sizes and Location	127
4.5	Retail Location Models	129
4.5.1	The Central Place Theory	130
4.5.2	Retail Gravity Models	132
4.5.2.1	Reilly Retail Gravity Model	132
4.5.2.2	Retail Market Potential Model	135
4.5.2.3	Opportunity Claimant Model	137
4.5.3	The Retail Component of the Lowry Model	138
4.5.4	The Intervening Opportunities Model	141
4.5.5	The Maximum Entropy Model	144

Page

CHAPTER 5: MODELLING THE CAUSAL RELATIONSHIP BETWEEN THE DEMAND AND SUPPLY OF ACTIVITY SPACES, AND THE LOCATIONAL AND STRUCTURAL POTENTIAL IN AN URBAN MARKET PLACE 149

5.0 Introduction 149

5.1 The Client Groups 150

5.2 The Scope of Urban Retail Institutions 150

5.3 Market Place Activity Space Classification 151

5.3.1 Stallage Spaces 154

5.3.2 Accessibility Spaces 157

5.4 The Mechanics of Distribution of Demand and Supply of Activity Spaces among the Urban Market Places 159

5.4.1 The Structure of the Distribution of Demand and Supply of Activity Spaces among the Urban Market Places 160

5.4.2 The Dynamics of the Distribution of Demand and Supply of Activity Spaces among the Urban Market Places 166

5.5 The Proposed Locational and Structural Potential Model, As Analytical Framework 174

		Page
CHAPTER 6:	EMPIRICAL TEST OF THE PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL, USING KADUNA CITY MARKET PLACES; Part 1: Field Surveys	182
6.0	Introduction	182
6.1	Data Triangulation	183
6.1.1	Measurement of Variables	185
6.2	Questionnaires	188
6.2.1	Classification Survey of Activity Spaces and of Traders in the City Retail Market Places	190
6.2.2	Consumers Shopping Behaviour and Attitude Interview	193
6.2.3	Survey of Locational and Structural Potentials in the City Retail Market Places	198
6.2.4	City Central Retail Market Place Road Vehicle Entry and Departure Census Survey	201
6.2.5	City Central Retail Market Place Traders Marketing Behaviour and Attitude Interview	202
6.3	Development of a Survey Team	204
6.4	Choice of Case Study	208
6.5	Description of Kaduna City Retail Market Places	216
6.5.1	The City Central Market Place (CMP)	216
6.5.2	Railway Station Market Place (RSMP)	233
6.5.3	Panteka Market Place (PMP)	237
6.5.4	Makera-Kurmin Gwari Market Place (M-KGMP)	240
6.5.5	Tudun Wada Market Place (TWMP)	245

Page

CHAPTER 6 (Contd.)

6.5.6 Kawo-Talata Market Place (K-TMP) 249
6.5.7 Ungwan Rimi Market Place (URMP) 253
6.5.8 Barnawa Market Place (BMP) 255
6.5.9 Ungwan Television Market Place (UTMP) 258
6.5.10 Badarawa Market Place (BDMP) 261
6.5.11 Ungwan Shanu Market Place (USMP) 263
6.5.12 Kabala Gabas Market Place (KGMP) 265
6.6 Proposed Kaduna City Central Area Development Programmes 267
6.6.1 Proposed Mogadishu Central Business Core 267
6.6.2 Proposed Market Places by Kaduna Capital Development Board 270
6.6.3 Proposed Market Places by Kaduna Local Government Council 271

CHAPTER 7: EMPIRICAL TEST OF THE PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL, USING KADUNA CITY MARKET PLACES;
Part 2: Data Analysis 285
7.0 Introduction 285
7.1 Primary Analysis:- Exploration of the Survey Data 288
7.1.1 Exploratory Analysis of Classification of Activity Spaces and Traders in Kaduna City Market Places 288
7.1.1.1 Distribution of Floor-Space for Food and Non-Food Among the Competing 12 Market Places in the City 290
7.1.1.2 Distribution of Stalls for Food and Non-Food Among the Competing 12 Market Places in the City 290
7.1.1.3 Distribution of Traders for Food and Non-Food Among the Competing 12 Market Places in the City 292
7.1.1.4 Distribution of Floor-Spaces and Stalls for Food and Non-Food Among the 14 Zones of the CMP 292

		Page
CHAPTER 7 (Contd.)		
7.1.2	Exploratory Analysis of Consumers Shopping Behaviour and Attitude in Kaduna City	294
7.1.2.1	Reliability of the Study Week's Shopping Data	294
7.1.2.2	Households Food-trips and Non-Food-trips	299
7.1.3	Exploratory Analysis of Locational and Structural Potentials in Kaduna City Retail Market Places	305
7.1.3.1	Locational and Structural Potential in the Description of Kaduna City Retail Market Places	314
7.1.4	Exploratory Analysis of Kaduna CMP Road Vehicle Entry and Departure Census	315
7.1.4.1	The Road Vehicle Traffic in the Central Market Place	316
7.1.4.2	The Road Vehicle Accumulation in the Central Market Place	319
7.1.4.3	Road Vehicle Traffic and Accumulation in the CMP as Products of Road Vehicle (auto) Registration in Kaduna State (1974-1984)	333
7.1.5	Exploratory Analysis of Kaduna CMP Traders Marketing Behaviour and Attitude	333
7.2	Secondary Analysis:- Examination of the Distribution of Demand and Supply of Activity Spaces Among Kaduna City Market Places	346
7.2.1	Simple Regression Analysis of the Specific Components of Demand and Supply of Activity Spaces	350
7.2.1.1	Hierarchical Relationship Between Shoppers Trips and Stallage Floor-Space	352
7.2.1.2	Notes on the Examination of the other remaining 5 Pairs of Hierarchical Relationships Between Pairs of Demand and Supply of Activity Spaces	356
7.2.2	The Situation in the Distribution of Demand and Supply of Activity - Spaces Among Kaduna City Market Places	359

		Page
CHAPTER 7 (Contd.)		
7.3	Tertiary Analysis:- Examination of the Causal Relationships Between the Growth Rates of Demand and Supply of Activity Spaces, and the Locational and Structural Potential in Kaduna City Market Places	366
7.3.1	Multiple Regression Output Interpretation Guidelines	369
7.3.2	Correlation Matrix of the Raw Data and Exploration of the Multiple Regression Analysis	379
7.3.3	Causal Relationship Between the Growth Rate of the Shoppers Food Trips, and the Locational and Structural Potentials	386
7.3.4	Notes on the Examination of the other remaining Seven Causal Relationships Between the Growth Rates of Demand and Supply of Activity Spaces, and the Locational and Structural Potentials	395
7.3.5	Comments on the Significance of the Locational and Structural Potentials in Kaduna City Market Place System	397
7.4	Brief Summary of the Data Analysis	408
CHAPTER 8:	CURRENT APPROACHES TO PLAN EVALUATION	411
8.0	Introduction	411
8.1	Cost-Benefit Analysis	413
8.2	Planning Balance Sheet Technique	417
8.3	Financial Investment Appraisal	419
8.4	Check-List of Criteria	422
8.5	Cost-in-Use	424
8.6	Threshold Analysis	425
8.7	Goals-Achievement Analysis	427
8.8	Optimisation Techniques	434

		Page
CHAPTER 9:	EVALUATION OF ALTERNATIVE STRATEGIES FOR DEVELOPMENT PLANNING OF KADUNA URBAN MARKET PLACES USING THE PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL	438
9.0	Introduction	438
9.1	Relevant Set of Objectives	449
9.2	Development of the Alternative Strategies	454
9.3	Selection of the Recommended Strategy	470
9.3.1	Locational and Structural Potential Objectives-Achievement Matrix	470
9.3.2	Preparation of the Locational and Structural Potential Data for the Alternative Strategies	474
9.3.3	Application of the Non-Linear Programmes in the Measurement of Optimisation of Locational and Structural Potentials in the Urban Market Places	481
9.3.3.1	Measurement of the General Objective Achievement	486
9.3.4	CMP Particular Objective Scores Achieved by the Alternative Strategies	493
9.3.5	Balanced Demand and Supply of Activity Spaces in the Urban Market Places	496
9.3.5.1	Improved Hierarchical-Continuum Score	496
9.3.5.2	Improved Slope of Regression Score	500
9.3.6	Application of the Linear Programmes to Test Balanced Demand and Supply of Activity Spaces in the Urban Market Places	505
9.3.7	Adoption of the Recommended Planning Strategy	514

		Page
CHAPTER 9 (Contd.)		
9.4	Validation of Proposed Locational and Structural Potential Model as an Evaluative Technique for Selection of the Most Efficient Strategy	518
9.5	Equity Consideration	523
9.5.1	Breakdown of Achieved Distribution of Demand and Supply of Activity Spaces Among the Market Places by Urban Central Area Structure	525
9.5.2	Breakdown of Achieved Distribution of Demand and Supply of Activity Space Among the Market Places by Administrative Districts	528
9.6	The Flexibility of the Recommended Planning Strategy	533
9.6.1	The Plan Should be Able to Adapt to Variation Within Possible Range of Departure from "Mean Forecast"	535
9.6.2	The Plan Should be Able to Respond to Change in Social Values	536
9.6.3	The Plan Should be Able to Retain as Far as Possible the Option of Switching Over to an Alternative Strategy	540
9.6.4	The Plan Should be Able to Withstand the Effects of Major Happenings which Might Deflect Kaduna City-Region from Expected Course of Development	541
9.6.5	To be Able to Implement the Plan in Phases	542
9.7	The Forecasts for the Adopted Planning Strategy	542
9.8	Phasing of the Adopted Planning Strategy	551

		Page
CHAPTER 10:	PLAN PREPARATION AND MANAGEMENT, RESEARCH FINDINGS, AND POLICY RECOMMENDATION	554
10.0	Introduction	554
10.1	Plan Preparation and Management	554
10.2	The Summary of Research Findings	562
10.3	Physical Design Brief of Requirements	570
10.3.1	Road Traffic	571
10.3.2	Siting and Stationing of Commercial Vehicles	572
10.3.3	Private Car Parking	573
10.3.3.1	Siting and Capacity of Parking	575
10.3.3.2	Dual Use of Parking Spaces	577
10.3.4	Internal Planning of the Market Place	578
10.3.4.1	Unit Dimensions	579
10.3.4.2	Continuity of Display	581
10.3.4.3	Zoning by Commodity	581
10.3.4.4	Zoning by Trade	582
10.4	The Policy Recommendation	583
10.4.1	The Proposals in the Recommended Planning Strategy	583
10.4.2	Flexibility of the Plan	584
10.4.3	Plan Implementation	586
10.5	The Proposals in the Alternative Plan	590
CHAPTER 11:	GENERAL DISCUSSION AND CONCLUSIONS	592
11.0	Introduction	592
11.1	The Performance of the Proposed Locational and Structural Potential Model	592

		Page
11.1.1	System Description and Problem Definition	593
11.1.2	Situation Explanation and Solution Generation	600
11.1.3	Strategy Implementation and Monitoring	606
11.1.4	Strategy Implementation and Monitoring	610
11.1.5	Overcoming Constraints	611
11.1.6	Application of the Model	615
11.2	Proposed Locational and Structural Potential Model as a Development in Land-use/Transport Planning of Urban Market Places	618
11.2.1	Origin and Development of Locational and Structural Potential Model	620
11.2.2	Kaduna City Retail Behaviour in Relation to the 6 Locational and 8 Structural Potentials of Kaduna City Market Places	632
CHAPTER 12:	REFLECTIVE POSTSCRIPT TO STATISTICAL METHODOLOGY AND TO CONCEPTUAL ISSUES OF THE MODEL SPECIFICATIONS.	640
12.0	Introduction	640
12.1	Dynamic/Comparative-Static Analysis	641
12.2	Difficulty in Predicting with Locational and Structural Potential Model	645
12.3	Demographic, Socio-Economic and Environmental Factors Affecting the Model	647
12.4	Multicollinearity Problems in the Regression Analysis	658
12.5	Inclusion of Dummy Variables in Regression Analysis	665
12.6	Statistical Relationship and Causality	669
12.7	Further Tests and Areas for further Research.	675
BIBLIOGRAPHY		678
APPENDICES		A1-A226

LIST OF FIGURES

No.	Title	Page
1.1	Proposed Conceptual Form of An Urban Market Place	19
1.2	Proposed Conceptual Spatial Framework of Urban and Regional Market Places	21
1.3	Nigeria in Africa	26
1.4	Diagramatic Illustration of the Proposed Locational and Structural Potential Model	28a
1.5	Map of Nigeria Showing the Cities of Kaduna, Ibadan, Enugu, Kano and Other Important Towns	34
2.1.1	Colonial Core Area of Ibadan City	39
2.1.2	Colonial Core Area of Kano City	40
2.1.3	Colonial Core Area of Enugu City	41
2.1.4	Colonial Core Area of Kaduna City	42
3.1	The Distribution Structure of Farm Produce	84
3.2	Conceptual Functional Framework of Urban and Regional Market Places	100
4.1	Marginal Analysis Graph	107
4.2	Behaviour and Demand Matrix	108a
4.3	Classical Example of Two Traders on a Beach	110
4.4	Urban Planning Framework for Retail Sizes and Location	128a
5.1	Market Place Activity Space Classification Chart	152
5.2	The Structure of the Distribution of Demand and Supply of Activity Spaces Among the Urban Shopping Institutions	162
5.3	Proposed Locational and Structural Potential Model, As An Analytical Framework	175
6.1	Derivation of the Specific Components of the Cells of the Model from the Questionnaires	189
6.2	Diagram of a Typical Shopping Block - bounded by Shopping Malls	192

No.	Title	Page
6.6.1	Existing Land Use in Kaduna City; (1983)	211
6.6.2	Spatial Distribution of the Market Places in Kaduna City (1984)	215
6.6.3	The Spatial Relationship Between the CMP and the Proposed Mogadishu Central Business Core	227
7.1	The Model - Stage 1 - System Description	286
7.2	Plot of Mean Road Vehicle Traffic in the CMP	321
7.3	Plot of Mean Road Vehicle Accumulation in the CMP	325
7.4.1	Stem-Aleaf of Road Vehicle Traffic at the CMP for every private or commercial vehicle registered in the Kaduna State, Nigeria (1974-83)	332
7.4.2	Stem-Aleaf of Road Vehicle Accumulation in the CMP for every 10,000 private or commercial vehicle registered in Kaduna State, Nigeria (1974-83)	332
7.5	Operational Flow Chart of the Exploratory Analysis of the Survey Data	345
7.6	The Model - Stage 2 - Problem Definition	348
7.7.1	Hierarchical Relationship Between Shopping Trips and Stallage Floor-Spaces	353
7.7.1(a&b)	Standardized Scatterplots of the Hierarchical Relationships Between Shopping Trips and Stallage Floor Spaces	354
7.7	The Model - Stage 3 - Situation Explanation	367
7.8(a&b)	Scatterplots of Standardized Predicted Values and Residuals of Predictive Equation of Growth Rate of Shoppers Food-Trips	387
7.9	Normal Probability (P-P) Plot of the Regression Equation for Prediction of the Growth Rate of the Shoppers' Food-Trips	389
7.10	Plot of Observed and Predicted Growth Rates of the Shoppers' Food-Trips	392

No.	Title	Page
7.11	The Model - Stage 4 - Summary of Existing Situation	409
9.2.1	The Scope of the Four Alternative Strategies and of the Trend Strategy	466
9.3.1	Locational and Structural Potential Objectives - Achievement Matrix	471
9.3.2	The Model - Stage 5 - Alternative Strategy Evaluation 1	482
9.3.3	The Areas Under the Plots of Two Market Places A and B, in the Hierarchical Relationships Between the Shoppers Trips and the Number of Traders	503
9.3.4	The Model - Stage 6 - Alternative Strategy Evaluation 2	507
9.3.6	Multi-Scatterplots and Summary Statistics of the Hierarchical Relationships Predicted by the Alternative and Trend Strategies in the Target Year 2005, Between:	
-1	the Shoppers Food-Trips and the Stallage Food Floor-Space	509
-2	the Shoppers Non-Food-Trips and the Stallage Non-Food Floor-Space	511
9.3.7	The Model - Stage 7 - Summary of Strategy Evaluation	517
10.1	Administrative Structure of Kaduna Local Government Council	556
10.2	Administrative Structure of the Kaduna Capital Development Board	558
10.3	Proposed Framework for Urban Market Place Development Planning	560
12.1	Conditions to be Considered in the Flexibility Tests of the Proposed Locational and Structural Potential Model	639a
Ap.6.1.2	Shopping Block Layout Plan of Kaduna City Central Market Place (1984)	A6
Ap.6.1.3	Shopping Block Layout Plan of the CMP in 1975 Before the Commencement of Construction of Additional Stalls	A7

No.	Title	Page
Ap. 6.2.3	Map of Kaduna City Showing the 5 Administrative Districts and the City's Focal Commercial Core	A34
Ap. 6.2.4	Kaduna Local Government Area 1963 Census of Population and Projection to 1985	A35
Ap. 6.3.3	Map showing Concentric Circles for Internal Level of Measurement of the Locational Potentials of the Urban Market Places	A60
Ap. 6.4.3	Road Vehicle Census Posts at the Kaduna Central Market Place	A65
Ap. 6.5.2	Classification of Commodity Chart	A84
Ap. 6.6.1	The Proposed Development Plan for Mogadishu Central Business Core	A85
Ap. 7.4	Man and his Building - Parking	A99
A. 7.2.1	Hierarchical Relationships Between Shoppers' Trips and Number of Stalls	A103
A. 7.2.1 (a&b)	Standardized Scatterplots of Shoppers Trips and Number of Stalls	A104
A. 7.2.2	Hierarchical Relationship Between Stallage Floor-Spaces and Number of Stalls	A107
A. 7.2.2 (a&b)	Standardized Scatterplots of Stallage Floor-Space and Number of Stalls	A108
A. 7.2.3	Hierarchical Relationships Between Stallage Floor-Space and Number of Traders	A111
A. 7.2.3 (a&b)	Standardized Scatterplots of Stallage Floor-Space and Number of Traders	A112
A. 7.2.4	Hierarchical Relationships Between Number of Stalls and Number of Traders	A114
A. 7.2.4 (a&b)	Standardized Scatterplots of Number of Stalls and Number of Traders	A115
A. 7.2.5	Hierarchical Relationships Between Shoppers Trips and Number of Traders	A118
A. 7.2.5 (a&b)	Standardized Scatterplots of Shoppers Trips and Number of Traders	A119
A.7.3.1(x)	Normal Probability (P-P) Plot (Before Data Transformation) of the Regression Equation for Prediction of Growth Rate of Shoppers Food-Trips	A122

No.	Title	Page
A. 7.3.2	Plot of Observed and Predicted Growth Rates of the Shoppers Non-Food Trips	A125
A. 7.3.3	Plot of Observed and Predicted Growth Rates of the Number of Food Traders	A130
A. 7.3.4	Plot of Observed and Predicted Growth Rates of the Number of Non-Food Traders	A135
A. 7.3.5	Plot of Observed and Predicted Growth Rates of the Stallage Food Floor-Space	A141
A. 7.3.6	Plot of Observed and Predicted Growth Rates of the Stallage Non-Food Floor-Space	A146
A. 7.3.7	Plot of Observed and Predicted Growth Rates of the Number of Food Stalls	A151
A. 7.3.8	Plot of Observed and Predicted Growth Rates of the Number of Non-Food Stalls	A156
Ap. 9.4.	Multi-Scatterplots and Summary Statistics of the Hierarchical Relationships Predicted by the Alternative and Trend Strategies in the Target Year 2005, Between:	
-1	the Shoppers Food-Trips and the Number of Food Stalls	A203
-2	the Shoppers Non-Food-Trips and the Number of Non-Food Stalls	A205
-3	the Stallage Food Floor-Space and the Number of Food Stalls	A207
-4	the Stallage Non-Food Floor-Space and the Number of Non-Food Stalls	A209
-5	the Stallage Food Floor-Space and the Number of Food Traders	A211
-6	the Stallage Non-Food Floor-Space and the Number of Non-Food Traders	A213
-7	the Number of Food Stalls and the Number of Food Traders	A215
-8	the Number of Non-Food Stalls and the Number of Non-Food Traders	A217
-9	the Shoppers Food-Trips and the Number of Food Traders	A219
-10	the Shoppers Non-Food-Trips and the Number of Non-Food Traders	A221
Ap. 9·4·11	Static Concept of Hierarchical Continuum of Shopping Centres	A225

LIST OF TABLES

No.	Title	Page
1.1	Categories of Central-Place and Market-Place Sub-Systems	23
1.2	Locational and Structural Potentials of the Urban Market Places	25
3.1	Categories of Central-Place and Market Sub-System	95
5.1	Summary of Demand for Activity Spaces in the Market Place by the Client Groups	159
5.2	The Primary Components - The Cells - of the Model	177
5.3	The Secondary Components - The Hierarchical Relationships - of the Model	179
5.4	The Tertiary Components - The Causal Relationships - of the Model	180
6.1	Sampling Frame for Consumer Shopping Behaviour and Attitude Survey	195
6.2	Stallage in Kaduna Central Market Place, Immediately after the (1975) Reconstruction	221
6.3	Finance Provision for the Reconstruction of Kaduna Central Market Place (1975)	221
6.4	Comparison of Stallage Activity Space in the Central Market Place in (1984) and (1977)	224
6.5	Stallage Floor-Space and Equivalent Number of Stalls in the Central Market Place (CMP)	225
6.6	Stallage Floor-Space and Equivalent Number of Stalls in the Railway Station Market Places (RSMP)	235
6.7	Activity Space Classification in Panteka (PMP)	239
6.8	Stallage Floor-Space and Equivalent Number of Stalls in Makera/Kurmin Gwari Market Place (M-KGMP)	242
6.9	Stall Fees in Tudun Wada Market Place	246
6.10	Stallage Floor-Space and Equivalent Number of Stalls in Tudun Wada Market Place (TWMP)	247
6.11	Stallage Floor-Space and Equivalent Number of Stalls in Kawo/Talata Market Place (K-TMP)	250

No.	Title	Page
6.12	Road Vehicle Accumulation in Kawo/Talata Market Place on Tuesday (22nd May 1984)	251
6.13	Stallage Floor-Space and Equivalent Number of Stalls in Ungwan Rimi Market Place (URMP)	254
6.14	Stallage Floor-Space and Equivalent Number of Stalls in Barnawa Market Place (BMP)	257
6.15	Stallage Floor-Space and Equivalent Number of Stalls in Ungwan Television Market Place	259
6.16	Stallage Floor-Space and Equivalent Number of Stalls in Badarawa Market Place (BDMP)	262
6.17	Stallage Floor-Space and Equivalent Number of Stalls in Ungwan Shanu Market Place	264
6.18	Stallage Floor-Space and Equivalent Number of Stalls in Kabala Gabas Market Place (KGMP)	266
6.19	Floor-Space Use Allocation in the Proposed Mogadishu Central Business Core	269
6.20	Stallage Space For Proposed Ungwan Muazu Market Place (UMMP)	271
6.21	Stallage Space for Proposed Malali Market Place (MMP)	272
7.1	Stallage Floor-Space in Kaduna City Market Places in 1977 and 1984	291
7.2	Number of Stalls in Kaduna City Market Places in 1977 and 1984	291
7.3	Number of Traders in Kaduna City Market Places in 1977 and 1984	293
7.4	Comparison of the Study Weeks Choices of Shopping Centre with the Usual Weeks Choices of Shopping Centre	296
7.5	The Probability that the Study Weeks Data Represents the Usual Weeks Behaviour Pattern	297
7.6	Crude Study Weeks Food-Trips and Crude Monthly Non-Food-Trips	300
7.7	Rating of the Weeks of the Month for Food Shopping	301
7.8	Calculation Scheme of the Weights of the Locational and Structural Potential Variables	303
7.9	Adjusted Food-Trips and Non-Food-Trips	304

No.	Title	Page
7.10	Influence of Locational Potentials on Household Income Group's Choice of Shopping Centre	307
7.11	Influence of Structural Potentials on Household Income Group's Choice of Shopping Centre	308
7.12	Blockade by Negative Locational Potentials on Household Income Groups' Choice of the Central Market Place	309
7.13	Blockade by Negative Structural Potential on Household Income Groups' Choice of the Central Market Place	310
7.14(a)	Crude Physical Scores of the Locational Potentials	311
7.14(b)	Crude Physical Scores of the Structural Potentials	311
7.15(a)	Standardized and Weighted Scores of the Locational Potentials	312
7.15(b)	Standardized and Weighted Scores of the Structural Potentials	312
7.16(a)	Transformed, Standardized and Weighted Scores of the Locational Potentials	313
7.16(b)	Transformed, Standardized and Weighted Scores of the Structural Potentials	313
7.17	Adjusting Factor for Week of Survey of CMP Road Vehicle Entry and Departure Census	317
7.18	Adjusting Factor for Month of Survey of CMP Road Vehicle Entry and Departure Census	318
7.19	Mean Road Traffic at the CMP	320
7.20	Mean Road Traffic in Each CMP Entry and Exit Carriageway	322
7.21	Mean Road Vehicle Net Accumulation in the CMP	324
7.22	Mean Road Vehicle Accumulation in the CMP	326
7.23	Road Vehicle Space/Accumulation ratios (m^2/veh)	327
7.24	Large Vehicle Approximate Dimensions	328
7.25	Road Vehicles (auto) registered in Kaduna State (1974-83)	329
7.26	Road Vehicle Traffic at the CMP for 10,000 Private or Commercial Vehicles registered in Kaduna State, Nigeria, (1974-83)	330

No.	Title	Page
7.27	Road Vehicle Accumulation at the CMP for every 10,000 Private or Commercial Vehicles registered in Kaduna State, Nigeria (1974-83)	331
7.28(a)	Comparison of demanded stallage floor-space with observed stallage floor-space in the CMP	335
7.28(b)	CMP Traders desire to maintain their location at the CMP	336
7.29(a)	Micro-Details of Trading Activity in the CMP	338
7.29(b)	Traders Mode of Travel to the CMP	339
7.29(c)	Times of Movement of Commodities into the Stalls in the CMP	340
7.29(d)	Number of Regular Assistants in the Stalls in the CMP	341
7.29(e)	Observed Level of Congestion of the Stalls in the CMP	342
7.29(f)	Previous Locations of CMP Traders	343
7.29(g)	Floor-levels (of a three level market place structure) on which commodities are preferred by the shoppers	344
7.30	Correlation Matrix of the Specific Components of Demand and Supply of Activity Spaces	351
7.31(a)	Summary Statistics of the Relationships Between Like-Pairs of Demand and Supply of Activity Spaces, for Food Shopping	357
7.31(b)	Summary Statistics of the Relationships Between Like-Pairs of Demand and Supply of Activity Spaces, for Non-food Shopping	358
7.32	Proportions Between Like-Pairs of the Specific Components of Demand and Supply of Activity Spaces	364
7.33	Correlation Matrix of the Dependent and Independent Variables Before Data Transformation	380
7.34	Appropriate Transformation for Various Curves	384
7.35	Observed and Predicted Growth Rates of the Shoppers Food-Trips	393

No.	Title	Page
7.36	Summary Statistics of the Eight Predictive Equations of the Growth Rates of Demand and Supply of Activity Spaces	394
7.37	The Eight Predictive Equations Calibrated from the Generic Equation (2) for the Growth Rates of Demand and Supply of Activity Spaces	398
7.38	The Number of Times the Independent Variables Appeared out of 8 in Each of the 3 Repeat Sets of the Predictive Equations	399
7.39	Comparison of Part Cor Statistics of X_3 in equation sets with and without Structural Potential Y_8	405
9.1	Average Growth of Demand and Supply of Activity Spaces in Kaduna City Market Places; 1977-1984	439
9.1.1	Distribution of Demand for Activity Spaces to 11 Kaduna City Market Places in 1977 and 1984	440
9.1.2	Distribution of Supply of Activity Spaces to 11 Kaduna City Market Places in 1977 and 1984	441
9.1.3	Rates of Growth of the Demand for Activity Spaces in 11 Kaduna City Market Places Between 1977 and 1984	442
9.1.4	Rates of Growth of the Supply of Activity Spaces in 11 Kaduna City Market Places Between 1977 and 1984	442
9.1.5	Distribution of Demand of Activity Spaces to 11 Kaduna City Market Places Predicted by the Trend Strategy in the target year 2005	443
9.1.6	Distribution of Supply of Activity Spaces in 11 Kaduna City Market Places Predicted by the Trend Strategy in the target year 2005	443
9.1.7	Distribution of Demand Supply of Activity Spaces among Kaduna City Market Place Sub-Groups in the Base Year 1984 and the Target Year, 2005, Predicted by the Trend Strategy	445

No.	Title	Page
9.1.8	Locational and Structural Potentials in Kaduna City Market Places which are included in the predictive equations	452
9.2.1	Proposals within the 9 different policy solutions	463
9.2.2	Proposals in Alternative Planning Strategy; SG1	467
9.2.3	Proposals in Alternative Planning Strategy; SG2	467
9.2.4	Proposals in Alternative Planning Strategy; SG3	468
9.2.5	Proposals in Alternative Planning Strategy; SG4	469
9.2.6	Proposals in the Trend Planning Strategy; SG5	469
9.3.1	Alternative Strategy SG3 Incidence Scores	475
9.3.2	Alternative Strategy SG3 Crude Proposal Scores	476
9.3.3	Alternative Strategy SG3 Crude Prescription Scores	477
9.3.4	Alternative Strategy SG3 Transformed, Standardized and Weighted Prescription Scores of the Locational Potentials	478
9.3.5	Alternative Strategy SG3 Transformed, Standardized and Weighted Prescription Scores of the Structural Potentials	479
9.4	The General Objectives of Optimisation of the Locational and Structural Potentials	486
9.5	Summary of Efficiency Scores by the Alternative Strategies on the General Objectives of Optimisation of the Locational and Structural Potentials in the Market Place	492
9.6	The Particular Objectives of the CMP	493
9.7	Achievement Scores on the CMP Particular Objectives by the Alternative Strategies	494
9.8	Achievement Levels on CMP Particular Objectives by the Alternative Strategies	495
9.9	Tests of the Achieved Balanced Demand and Supply of Activity Spaces in the Urban Market Places	512

No.	Title	Page
9.10	Summary of the Efficiency Scores by the Alternative Strategies on the Achievement of Balanced Demand and Supply of Activity Spaces	513
9.4.1	Summary of the Evaluation of the Alternative Strategies by Kaduna residents	521
9.5.1	Distribution of Demand and Supply of Activity Spaces among Kaduna City Market Place Sub-Groups in the Base Year 1984 and the Target Year, 2005, by the Recommended Planning Strategy	527
9.5.2	Distribution of Demand and Supply of Activity Spaces in the Market Places According to Administrative Districts in the Base Year 1984, and the Target Year, 2005, by the Recommended Planning Strategy	531
9.5.3	The Deviation of District's Demand and Supply of Activity Spaces per 1000 Population from the City's Average Demand and Supply of Activity Spaces per 1000 Population	532
9.6.1	Distribution of Shoppers Trips Among the Shopping Institutions in Kaduna City (1984)	538
9.6.2	Distribution of Shoppers Trips Between Market Place and Non-Market Place Shopping Institutions	539
9.7.1	Rates of Growth of Demand for Activity Spaces in 11 Kaduna City Market Places Predicted by the Recommended Planning Strategy	546
9.7.2	Rates of Growth of Supply of Activity Spaces in 11 Kaduna City Market Places Predicted by the Recommended Strategy	546
9.7.3	Forecast of the Distribution of the Shoppers' Food-trips	547
9.7.4	Forecast of the Distribution of the Shoppers Non-Food-trips	547
9.7.5	Forecast of the Distribution of the Number of Food Traders	548
9.7.6	Forecast of the Distribution of the Number of Non-Food Traders	548

No.	Title	Page
9.7.7	Forecasts of the Distribution of the Stallage Food Floor-Spaces	549
9.7.8	Forecasts of the Distribution of the Stallage Non-Food Floor-Spaces	549
9.7.9	Forecasts of the Distribution of the Number of Food Stalls	550
9.7.10	Forecasts of the Distribution of the Number of Non-Food Stalls	550
App. 6.25	Distribution of Persons per Household by State, Age-group and Sex	A36
App.6.3.4	Number of Square Units of Built-up Area in the Concentric Interval Circles Surrounding the Market Places	A61
App.6.3.5	Residential Population in the Concentric Interval Circles Surrounding the Market Place	A62
App. 7.2 (a-n)	Stallage Floor-Space and Equivalent Number of Stalls Distribution in the 14 Zones of the Kaduna City Central Market Place	A88-A96
App. 7.5A	Motor Vehicles and Licences Issued in Kaduna State by Type of Vehicles, 1976	A100
App. 7.5B	Motor Vehicle Registration Statistics (Data) of Kaduna State 1977-1982	A101
A.7.3.1	Regression Equation for Prediction of Growth Rate of the Shoppers Food-Trips	A121
A.7.3.2	-Regression Equation for Prediction of Growth Rate of the Shoppers' Non-Food-Trips	A124
	-Observed and Predicted Growth Rates of the Shoppers' Non-Food-Trips	A126
A.7.3.3	-Regression Equation for Prediction of Growth Rate of the Number of Food Traders	A129
	-Observed and Predicted Growth Rates of the Number of Food Traders	A132
A.7.3.4	-Regression Equation for Prediction of Growth Rate of the Number of Non-Food Traders	A134
	-Observed and Predicted Growth Rates of the Number of Non-Food Traders	A136

No.	Title	Page
A.7.3.5	-Regression Equation for Prediction of Growth Rates of the Stallage Food Floor-Space	A139
	-Observed and Predicted Growth Rates of the Stallage Food Floor-Space	A142
A.7.3.6	-Regression Equation for Prediction of Growth Rates of the Stallage Non-Food Floor-Space	A144
	-Observed and Predicted Growth Rates of the Stallage Non-Food Floor Space	A147
A.7.3.7	-Regression Equation for Prediction of Growth Rate of the Number of Food Stalls	A149
	-Observed and Predicted Growth Rates of the Number of Food Stalls	A152
A.7.3.8	-Regression Equation for Prediction of Growth Rate of the Number of Non-Food Stalls	A154
	-Observed and Predicted Growth Rates of the Number of Non-Food Stalls	A157
9.2.1.1	Alternative Strategy SG1 Incidence Scores	A159
9.2.1.2	Alternative Strategy SG1 Crude Proposal Scores	A160
9.2.1.3	Alternative Strategy SG1 Crude Prescription Scores	A161
9.2.1.4	Alternative Strategy SG1, Transformed, Standardized and Weighted Prescription Scores of Locational Potentials	A162
9.2.1.5	Alternative Strategy SG1, Transformed, Standardized and Weighted Scores of Structural Potentials	A63
9.2.2.1	Alternative Strategy SG2 Incidence Score	A164
9.2.2.2	Alternative Strategy SG2 Crude Proposal Score	A165
9.2.2.3	Alternative Strategy SG2 Crude Prescription Score	A166
9.2.2.4	Alternative Strategy SG2, Transformed, Standardized and Weighted Prescription Scores of Locational Potential	A167
9.2.2.5	Alternative Strategy SG2, Transformed, Standardized and Weighted Prescription Scores of Structural Potential -	A168

No.	Title	Page
9.2.3.1	Alternative Strategy SG4 Incidence Score	A169
9.2.3.2	Alternative Strategy SG4 Crude Proposal Score	A170
9.2.3.3	Alternative Strategy SG4 Crude Prescription Score	A171
9.2.3.4	Alternative Strategy SG4 Transformed, Standardized and Weighted Prescription Score of Locational Potentials	A172
9.2.3.5	Alternative Strategy SG4 Transformed, Standardized and Weighted Prescription Score of Structural Potentials	A173

LIST OF PLATES

No.	Title	Page
3.1(a)	Trading Apprenticeship Starts from Childhood	70
3.1(b)	Controlling the Children in the Market Place could be a problem for the marketing mothers	70
3.2(a)	Wholesale Marketing of Bulked-up yam; (in the CMP)	78
3.2(b)	Wholesale Marketing of Factory Produce; (in the CMP)	78
3.3	Wholesale Marketing of Tomatoes Bulked-up locally and from the 10 Northern States; (in the CMP)	82
3.4	Wholesale Marketing of Long-Distance Bulked-up Oranges, Onions, Beans and Garri; (in the CMP)	82
3.5	Bulking-up Post near Zaria City Wall at the Junction of the Kano By-Pass and Zaria-Kaduna roads	86
3.6	Forestalling Point on the Zaria-Kaduna Highway. (This is also one such example of regional shopping)	86
3.7(a)	Goods being Transported from U.A.C. in Hand Truck into a CMP Stall	90
3.7(b)	Shoppers arriving at the CMP in Mini-buses, on Motor Cycles and on Foot. (The Motor Cycles are parked on the road and footways)	90
6.1	Kaduna Central Market Place; Before (1975) Reconstruction	217
6.2	Kaduna Central Market Place; After (1975) Reconstruction	218
6.2(a)	Bird's Eye-view of Kaduna Central Market Place (1984)	219
6.2(b)	Bird's Eye-view of Makera District Market Place (1984)	219
6.3	Kurmin Gwari Open-Air Monday Periodic Market (1984)	244
6.4	One of the 3 Main Entrance Gates to Kaduna City Central Market Place	273

No.	Title	Page
6.5	Kaduna Central Market Place: The Wide Main Walkway Showing Storm Water Drainage and Lock-up Stalls (1975)	274
6.6	Kaduna Central Market Place: Garden mingling with Blocks of Lock-up Stalls (1975)	275
6.7	Underground and Covered Storm Water Drainage under Construction at the CMP During the (1975) Reconstruction	276
6.8	The Main Administrative Building During (1975) CMP Reconstruction	277
6.9	Lock-up Stall Blocks Under Construction at the CMP (1975) Evident Rigidity	278
6.10	Open Stall Blocks Under Construction at the CMP (1975)	279
6.11	Kaduna Central Market Place: One Block of Open Stalls (1975), Completed Structure	280
6.12	Elevated Water Storage Tank of 35,000 gallon capacity at the CMP (Erected During the 1975 Reconstruction)	281
6.13	A Typical Refuse Receptacle in the CMP (Erected During the 1975 Reconstruction)	282
6.14.1	Chellarams and Leventis Superstores close to CMP, and along Ahmadu Bello Way	283
6.14.2	Stalls under Construction on the Island of Lagos Street at the CMP	283
9.3	Method of Display and Marketing of Fresh Meat in the Market Places	A226
9.4	Method of Display and Marketing of Grains and Flours in the Market Places	A226

GLOSSARY OF ACRONYMS

BDMP	Badarawa Market Place
BMP	Barnawa Market Place
BPMP	Bulking-up Post Market Place
CBD	Central Business District
CCA	City Central Areas
C.F.A.O.	Compagnie Francaise de L'Afrique Occidentale
CMP	Central Market Place
CSAH	Corner Shops and Hawkers
DMP	District Market Place
FEDECO	Federal Electoral Commission
FSI	Floor Space Index
GBO	G.B. Ollivant
KCDB	Kaduna Capital Development Board
KGMP	Kabala Gabas Market Place
K-TMP	Kawo-Talata Market Place
LGA	Local Government Area
LGC	Local Government Council
L/NMP	Local/Neighbourhood Market Place
M-KGMP	Makera-Kurmin Gwari Market Place
MMP	Malali Market Place
PMP	Panteka Market Place
PZ	Paterson Zochonis
RDMP	Regional District Market Place
RL/NMP	Regional Local/Neighbourhood Market Place
RSC	Regional Shopping Centres
RSMP	Railway Station Market Place
SCOA	Societe Centrale de L'Ouest Africain
SG1	Alternative Planning Strategy Number 1
SG2	Alternative Planning Strategy Number 2
SG3	Alternative Planning Strategy Number 3
SG4	Alternative Planning Strategy Number 4
SG5	Trend Planning Strategy
SMBP	Shops on the Motorway By-Pass
SMP	Special Market Place
SMPDB	State Market Place Development Board
SS/DS	Superstores and Department Stores
ST	Shopping Street (see page 214)
SUDB	State Urban Development Board
SWSB	Study Week Shopping Behaviour
TWMP	Tudun Wada Market Place
UAC	United Africa Company
UMMP	Ungwan Muazu Market Place
URMP	Ungwan Rimi Market Place
USMP	Ungwan Shanu Market Place
UTC	Union Trading Company
UTMP	Ungwan Television Market Place
UWSB	Usual Week's Shopping Behaviour

Notes: See page xxxvi for labels adopted for the commodities. The commodities are arranged according to their classification.

Labels	Commodities
TUBERS	tubers
GRAINS	grains
FLOURS	flours
COOKOIL	cooking oil
LVSTOCK	livestock
FMEAT	fresh meat
FFISH	fresh fish
DMEAT DFISH	dried meat and fish
VEGFRU	vegetables, fruits and nuts
SPICES	spices
PROVIS	provisions (tinned foods)
SMDRINK	snacks and mineral drinks
ALCHO	alcoholic drinks
TOBACCO	tobacco
MCLOTH	men's clothing
WCLOTH	women's clothing
CCLOTH	children's clothing
SHOES	shoes
FNITURE	furniture
ELECTR	electronics and electrical
PDGLAS	plastics, dishes, glasses
LEATHG	leather goods
UTOOLS	cooking utensils and tools
PCYCLE	prams and cycles
CMETIC	cosmetics
CDRUG	chemists and drugs
TJEWEL	toys and jewelleries
BKNERY	books and stationery
BUCOMT	building and construction materials
ASPATS	auto spareparts
BSPATS	bicycle spareparts
RTRANT	restaurants
HAIRDR	hairdressing
PBETT	pools betting
TAILOR	tailors and weavers workshops
LNDRY	laundry services
WCSBR	watch/shoe/bicycle repairs
ELECRP	electronics/electrical workshop
WCRAFT	wood craft workshop
MCRAFT	metal craft workshop
BCHARG VULC	battery charging/vulcanization
HERB INGRID	herbalists ingredients
EMPTIES	empty bottles and containers
FMILLS	flour mills
UNASCERT	unascertained commodity
VACSTALL	vacant stall
NEWSTALL	new stall

CHAPTER 1

THE INTRODUCTION

1.0 The Introduction

The author's attention has often been drawn to the phenomenal congestion of people and vehicles in, and around, the urban central market place, and to the appalling environmental and physical conditions prevalent in many of the other urban market places in the major urban centres of Nigeria. Hence the author began to question whether this urban situation is a problem in itself or a symptom of a deeply rooted problem.

The confirmation of the problem culminates in a goal statement for a detailed research. The research objectives are accordingly formulated. This led to the definition of the constraints, the scale, and the methodology and structure of the research.

1.1 The Problem

Following political, economic, socio-cultural and technological changes in Nigeria since 1861 (when the colony of Lagos was proclaimed), the historic stockade- and agrarian-cities, the village-constellations and the colonial founded new towns have metamorphosed into market-cities. Some of these market-cities are now in a rapid process of

transformation into industrial-cities. Such cities are faced with rapid urbanisation, urban sprawl and rapid population growth, and their central areas are plagued with increasing new and enlarged demand for spaces for various central area activities, such as administration, business, shopping, entertainment and residential uses. Under such pressure of demand for spaces by traders, shoppers, private and commercial vehicles, the city central market place has expanded laterally to its utmost limits and further lateral growth is not readily conceivable because of the physical constraints posed by immediate surrounding commercial and residential buildings.

In addition to the current rapid urbanisation and urban sprawl confronting many of the developing countries, Nigeria's new oil wealth and subsequent accelerated economic activities and education have sharply increased the people's taste for durable goods and services. This has impelled the city central market place to attract more traders, shoppers and vehicles in large number, without providing corresponding required additional spaces for the people and vehicles so attracted.

Secondly, the city central market place which started as a large open space with a few open sheds for redistribution of foodstuffs from the neighbouring villages and merchandise from Europe, has developed into a dominant architectural urban space containing open spaces and covered buildings. Owing to the increased wealth and improved standard of living of the people, there is now the pressing demand for specialized spaces and facilities for marketing and storage of bulked-up fresh food-stuffs from distant periodic markets.

The problem of unbalanced demand and supply of activity spaces in the urban market place is manifested in:

1 congestion of traders, shoppers and vehicles in the city central market place.

2 spilling over of traders, shoppers and vehicles into the streets and lanes adjoining the city central market place.

3 perennial traffic jam in the vicinity of the city central market place.

4 poor access to the city central market place for the public and facilities during business hours.

5 loss of rent and tax by the city authorities.

6 damage to roadside traders wares by bad weather.

7 decay of bulked-up fresh foodstuffs.

8 shabby temporary stalls in and around the city central market place.

9 prevalent empty and vacant stalls in the district and local/neighbourhood market places.

The problem could be likened to using the force of gravity to empty a large volume of liquid into a smaller container, the container gets filled up, overflows and messes up its environment.

Federal and state government approaches to solve the phenomenon (problem) of congestion of people and vehicles in this part of the city central area have tended to focus on road improvement only. If this approach to redevelopment of some market places implies emphasis on movement alone as a desired objective, it seems to have considered social and economic progress to be concomitant with free flow of people, goods and information; which could not be true, to the neglect of a solution that might be found in a review of the space-use of this part of the city central area; a review based on the peoples socio-cultural pattern of activities. This type of policy choice which tends to concentrate expenditure of resources on roads improvement without corresponding investment in public mass transportation system, has even aggravated automobility value and increased use of road vehicles to achieve accessibility of the city central market place by many city residents who are far flung from the city central market place as a result of urban sprawl. Such a policy choice has brought more demand for spaces in the city central market place by traders, shoppers and vehicles at great health, socio-economic and environmental costs.

The approaches also have not been able to view the city central market place as a dominant architectural space for socio-economic activities in the city central area. That is why no efforts have been made to devise ways to manipulate its architectural space in such a way as to provide space for maximum number of inhabitants who in the course of performing their normal out-of-home activities want to engage in a variety of spontaneous socio-economic activities in

the city central market place. From an analytical study of pre-colonial and colonial West African settlements, there is prima facie evidence to assert that the market place has been the biggest and the pivot of the peoples socio-economic life pattern. To quote Onyemelukwe, J.O.C. (1973), "The market (Onitsha market place) served to demonstrate the survival and continued dominance of some market place institutions in an age (1973) when emphasis in central place activities has shifted from the market place to individual blocks of shops and supermarkets in Central Business District (CBD) and city thoroughfares. The market was central and dominant in domestic exchange economy of a greater part of Nigeria and was important in the coordination of local foodstuffs distribution". Though Onitsha, like Aba, Ibadan and Kano, is a regional market centre, that statement, to a lesser degree, is true of the city central market place of any major city in Nigeria.

Again the approaches did not recognise that despite the current rapid industrialization and the flow of people, goods and information, the peoples cultural attachment to the market place has not been altered significantly. The city central market place has continued to preserve most of its cultural institutions, as the place for organising "contribution", making inquiries about intending marriages, religious and ritual performances, etc. According to Professor T. Gihring (1982) "Despite the materialistic tendencies of growing African elites ..... there is little indication that traditional emphasis on communal lifestyle has yet been altered in a significant way. Urban Africans are still by and

large centralizers, gravitating into socially active public places found in many African towns". On a socio-cultural scale, Nigeria in 1861 could be likened to the 12th century mediaeval Britain. The fact that significant socio-cultural change has not occurred too soon in Nigerian society is confirmed by Professor Robert S. Lopez's assertion that "Minds change slowly". (1966)

Again the city central market place has not lost the "locational and structural qualities" which have hitherto made shopping for commodities cheaper in it than in the other shopping establishments in the city, such as the superstores and departmental stores, the district market places, the local/special market places, the shopping streets and shops on the motor-way by-pass. This singular virtue of comparative cheap shopping costs at the city central market place may to a large extent account for the reason why West Africans are still by and large gravitating into the city central market place for their shopping in spite of the friction of congestion of people and vehicles; but for how much longer can this continue without serious health, economic and environmental consequences?

As a natural reaction to the pressure of demand for spaces at the city central market place, spontaneous new market places, such as the Ninth Mile Corner market place near Enugu, and the Alaba 'Wonder' market place, Badagri road, Lagos, have sprung up to relieve the city central market places in these towns of some market load for convenience and comparative goods.

In Kaduna city central market place, additional stallage is being achieved within the perimeter delineated by the 1975 reconstruction of the market place by the following means:

1 squeezing in temporary stalls in any available open space.

2 construction of temporary stalls on designed flower beds and on storm water drainage channels.

3 construction of temporary stalls on designed shoppers access and circulation pathways.

4 adjoining temporary stalls to lavatory blocks.

5 erection of temporary stalls too close to the railway.

6 traders usurption of shopper access and circulation pathways by organised squatting.

7 parking private vehicles and stationing of commercial vehicles on thoroughfares in the CMP vicinity.

8 extension of existing stall blocks into the shopping malls.

In Kaduna also the Local Government has initiated a deliberate effort to relieve the city central market place of some market load for convenience and comparative goods by proposing the establishment of two new local market places at Ungwan Muazu and Malali villages, respectively.

In recognition of the disastrous health, economic and environmental consequences posed by the increasing pressure of demand for spaces at the city central market place and the subsequent uncoordinated establishment of market places in the city, the state governments have begun to constitute market development boards to work in conjunction with the local governments in the location and development of market places. While inaugurating the Lagos State Market Development Board, the Commissioner for Local Government and Chieftaincy Affairs, Lagos State, Alhaji L.O. Olayinka, stated, as was reported by the Daily Sketch, Tuesday July 24, 1984 (see Appendix 1.12 , page A4)

"Location of new market in Lagos State is now the joint responsibility of the newly reconstituted State Market Development Board and the Local Governments.

This is to prevent the uncoordinated establishment of markets in the state..... the Board can also establish, develop, or redevelop the wholesale markets as well as redevelop the retail markets.

Other duties of the Board were the maintenance and regulation of the wholesale markets..... the Board has been empowered to prescribe levy and collect stallage fees, in addition to collecting advance payments from the market allottees.

The Board is authorised to award contracts for the construction, maintenance and repair of markets.

It can borrow money by means of bank loans, among others, and insure its property against all forms of risk.

The Board members are enjoined to promote peace among the market women and traders.

The Board is urged to rid the state of street traders and illegal structures which provided shelter for pick-pockets, robbers and other undesirable elements.

The Board could seize goods, wares or articles offered for sale in any place and dispose of them as laid down by the Street Trading Edict".

The above citation is only an authority to act. It does not provide a development planning policy to be adopted by the Market Development Board and the Local Government. In its simplest form, planning is merely a concern to control future uncertainty and achieve the desired results. A more complicated conception involves the definition of the desired future state and an elaborate methodology to achieve it. Effective planning in the modern world is a very complicated rigorous process. As an activity it is hungry for facts and for alternative analyses and interpretation of those facts. But, as observed by Professor Harry A. Green, of University of Ife, Nigeria, (1976).

"Most administrative decisions are made on the basis of incomplete information and incomplete analysis. In many instances, decisions cannot be delayed for either more information gathering or for more analysis. Therefore, habit, intuition, judgement and established rules are the methods by which many decisions are made. These are very useful and helpful techniques and will continue to be used as long as data collection and analysis are time-consuming

and expensive propositions. The important point that I wish to interject here is that there should be a conscious and deliberate effort to improve decision making by improving the data and analysis base for decisions involving great risks..... Most local governments do not have special planning units. On the one hand the cost of maintaining the units may seem an unnecessary administrative overhead, and on the other, it may be impossible to recruit planners".

Also there does not exist in the Nigerian urban and regional planning system an analytical technique for comprehending the space-úse requirements of modernising the city central market place with a view to proposing a responsive development policy to facilitate growth and change in the spatially constrained city central market place.

The city central market place, as an urban space, has been recognised to possess some "locational and structural potential" which could be optimised in an effort to achieve supply of spaces for maximum number of inhabitants who make demand for spaces in the city central market place in the course of performing their normal out-of-home activities. In an advertisement of the former American Consulate in Kaduna, now vacant, the Kaduna Capital Development Board expressed its view of the "locational potential" of the Kaduna city central market place in this form:

" MULTI-PURPOSE
ACCOMMODATION
THE DREAM LOCATION OF THE GRUELLING
WORLD OF BUSINESS
OFFICES AND FLATS
AT
CENTRE
OF
BUSINESS HUSTLE AND BUSTLE!

Found within only a stone throw of the Kaduna Central Market and as such at the very nerve-centre of the Kaduna metropolis's economic activities, the suitability of its location is as such unmatched ..... What's more, the exciting hustle and bustle of business men and women, and customers alike from all over this country and the world as a whole is all just there....." (underlined are the authors)

During the preliminary aspect of the research, the author obtained these views,(among other detailed information) of the "locational and structural potentials" of the Kaduna city central market place:

Kulshrestha, S.K. (1984) "Economically the Central Market may be defined as a place where a large variety of goods and services are sold in a traditional manner for the low and middle income group-people. Physically, it comprises a large number of small stalls placed on both sides of narrow streets laid organically in old markets and in a grid-iron pattern in new markets (Kaduna City Central Market Place is a new one). It also has specialised zones for specific type of goods sold. Socially, it is a centre of activities where people meet,

exchange information, spend time by roaming and even find marriage partner and settle marriages".

Abdullahi, M.S. (1984) "The Central Market Place at Kaduna is located approximately in the centre of the metropolis. It is called central in the sense that all economic activities are centred inside it and many other Mini Markets in the metropolis get their supplies from it. The Market is established for the following reasons: To provide a clean and healthy environment where buyers and sellers of various commodities and services can meet, and to provide a market place where other social activities may take place - marriage negotiation, native boxing, wrestling, and Fulani beating tournament, policy announcement, public punishment, etc.".

Mathew, M.D. (Mrs.) "Presently the Central Market Place is a mess. Delivery of goods criss-crosses with the flow of incoming and outgoing customers. This is aggravated by the tolerance of the authorities - allowing motor vehicles to park at the main entrances. There is practically no zoning of activities, e.g. dry goods, hardware, etc. - it's all mixed-up. There is no continuing education (signage) of the people, to familiarise them with the zoning that is existing to limit movement and enhance direct approach to destinations. Motor vehicles should not be allowed to park anywhere - there should be ample parking spaces - But presently it's a free-for-all system".

Abubakar, A. (1984) "The Central Market is that area which includes the area enclosed by walls and the neighbouring streets immediately adjacent to the walls. While most retail and wholesale activities go on in the market, the streets immediately bordering the markets serve as wholesale points and warehouses due to the fact that the central market stalls are limited in height, vehicles are not usually allowed to enter, either due to congestion of small petty traders or due to the original policy of the authorities".

The above resume sums up the reason for focusing the research on the causes of congestion of people and vehicles in the city central market place and its environment of the city central area. This urban phenomenon is a symptom of a practical and well-known problem in major cities in Nigeria today facing administrators and urban and regional planners. Intuitive approaches to improve the situation have even aggravated more congestion of people and vehicles in the city central market place and its environment. As Prof. Jay W. Forrester (1969) pointed out, "Complex systems are counter intuitive.... the intuitive process will select the wrong solution much more often than not". The knowledge of the counter-intuitive propensity of complex systems has led to an increasing interest in AN ANALYTICAL STUDY OF THE DEMAND AND SUPPLY OF ACTIVITY SPACES, AND OF THE LOCATIONAL AND STRUCTURAL POTENTIAL, IN A SYSTEM OF URBAN MARKET PLACES. Since it is only an analytical study that can shed light on the background factors that are generating the urban

situation and provide a basis for solution proposals, it has been decided to research the problem in detail. This enabled THE FORMULATION OF A DEVELOPMENT PLANNING POLICY AIMED AT ACHIEVING BALANCED DEMAND AND SUPPLY OF ACTIVITY, WITH THE VIEW TO OPTIMISING LOCATIONAL AND STRUCTURAL POTENTIAL. The study being a pioneer work in this area of research in urban and regional planning, it set out to answer a goal question.

1.2 The Goal

"What development planning policy, at urban level, can achieve balanced demand and supply of activity spaces in the system of market places, with the view to optimising the locational and structural potential ?"

To clarify the meaning of the goal statement, it is necessary to explain the following terms.

1.2.1 Demand and Supply of Activity Spaces.

1.2.2 System of Market Places.

1.2.3 Locational and Structural Potentials.

1.2.1 Demand and Supply of Activity Spaces

In a behavioural approach to the study of urban and regional planning, it is appropriate to define the client groups' units of demand for activity spaces in the market place. The shopper and the trader constitute the primary client groups.

Transport means form the secondary client group because their demand for activity spaces, however, depends on the activities of the primary client groups. In the course of conducting their normal daily out-of-home activities, the client groups enter the market places and other shopping establishments to engage in a variety of spontaneous human activities which result in demand for activity spaces.

1.2.1.1 The Shopper's Units of Demand for Activity Spaces

The shopper makes shopping trips to the shopping centres in the city-region for the purpose of purchasing food and non-food commodities and also engaging in other social activities. In this study, the term "trip" is used for measurement of shopper's demand for activity spaces in a shopping establishment and is operationally defined as, "a visit made by a household to a shopping centre of which the time spent at the centre is one hour". A trip is, therefore, a unit of shopping time. When the time spent at the centre is a fraction of an hour, a corresponding fraction of trip is consumed, e.g. half trip is consumed when the time spent at the centre is half an hour. When the time spent at the centre is more than an hour, corresponding number of trips are consumed, e.g. two trips are consumed when the time spent at the centre is two hours, and so on. "Food-trip" is a trip made for the purpose of shopping for food commodities, "Non-food-trip" is a trip made for the purpose of shopping for non-food commodities and "Social-trip" is a trip made for the purpose of performing social activities.

"Combined-trip" is a combination of two or three of the following: food-trip, non-food-trip and social-trip. In a combined trip, the trip is equally divided between the activities involved. "Total-trip" is the sum of food-trip, non-food-trip and social-trip, and a trader who has visited a market place for the purpose of marketing his commodities has not consumed trip but has "serviced" trip.

1.2.1.2 The Trader's Units of Demand for Activity Spaces

The trader in the market place services the trips and therefore needs stalls for shelter, display of commodities meant for sale and serving the shopper. Since a trader can only be in one stall at a moment, the "stall" is his unit of demand for activity space. Operationally a stall is defined as "the floor-space of a single compartment occupied and used by a trader in the market place for the purpose of storage, display, sales or actual production or processing or repairs, of commodities". In the market place stalls usually have standard sizes, but may vary from one market place to another.

1.2.1.3 Transport Units of Demand for Activity Spaces

Some shoppers and traders achieve accessibility to a shopping centre by travelling in vehicles belonging to different transport modes. The rate at which a vehicle class arrive at and depart from a shopping

centre determine the vehicle traffic in the entry and exit routes of the centre. The vehicles stay within the centre's boundaries for different time periods and are said to "consume" parking (private vehicles) or stationing spaces (commercial vehicles). The difference in the numbers of arriving and departing vehicles, say in one hour, determine the quantity of parking and stationing spaces consumed, and represent how the vehicles are accumulating at the centre. Therefore "net accumulation" of a vehicle class in a shopping centre is given by the difference in the numbers of that vehicle class arriving at and departed from the centre in one hour. Hence a vehicle accumulation at the hour is given by the vehicle net accumulation at the hour plus the vehicle accumulation at the preceding hour. The number of vehicles found at the centre at the opening time is termed overnight vehicles and represents the vehicle accumulation at that hour.

1.2.1.4 Supply of Activity Spaces

The activity spaces are supplied by the market place. It may be divided into:

1. Stallage floor-space (measured in square metres)
2. Number of stalls - numerical
3. Number of vehicles places - numerical

Stallage floor-space may be divided into food and non-food. Also the number of stalls may be divided into food and non-food. The number of vehicle places may be divided into private and commercial vehicles. Therefore we have accordingly:

1a stallage food floor-space
1b stallage non-food floor-space
2a number of food stalls
2b number of non-food stalls
3p number of private vehicle places
3c number of commercial vehicle places

Market Place Activity Space classification is fully discussed in section 6.2.1, page 190 .

1.2.2 The System of Market Places

The system of urban market places consists of:

1. The Central Market Place (CMP)
2. Special Market Places (SMP)
3. District Market Places (DMP)
4. Local/Neighbourhood Market Places (L/NMP)

An urban market place is a primary customer attractor of which many street-shopkeepers find that it pays to locate in close proximity of an urban market place along any arterial road leading to a market place. This is to enable them to make use of the traffic attracted to the market place. Consequently an urban market place is surrounded by a zone of lock-up shops along its roads. In a big commercial city, such as Ibadan, the lock-up shops surrounding a market place tend to straggle so far that they at times merge with those of other market places to form shopping streets from one market place to another. Therefore, the author's conceptual form of an urban market place is shown in Figure 1.1, page 19.

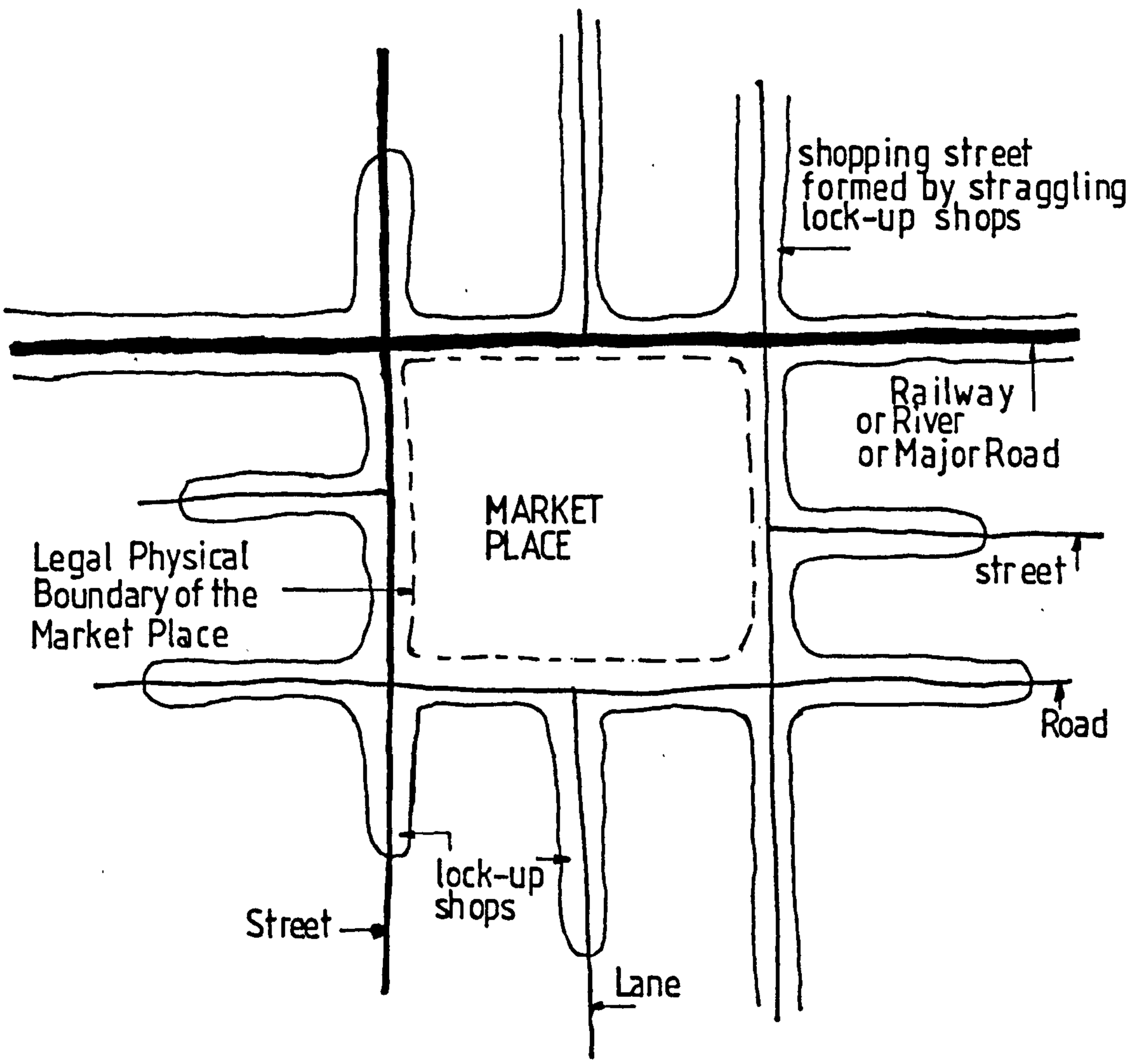


Figure 1.1: Proposed Conceptual Form of An Urban Market Place

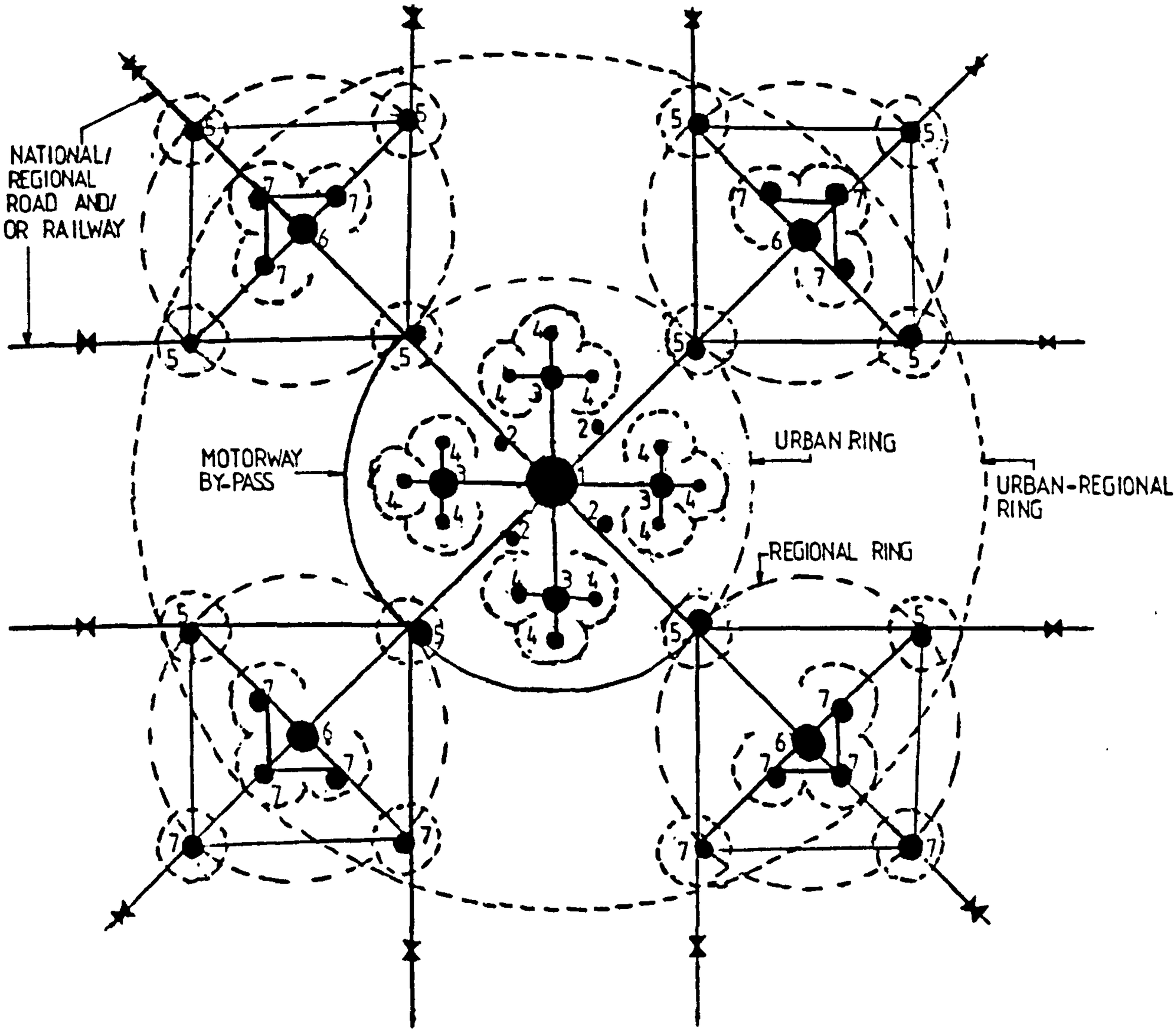
The above 4 sub-groups of urban market places operate within the framework of urban and regional market place system. The regional sub-groups of market places include:

5. Bulking-up Post Market Places (BPMP)
6. Regional District Market Places (RDMP)
7. Regional Local/Neighbourhood Market Places (RL/NMP)

The author's conceptual spatial framework of urban and regional market places is shown in Figure 1.2, page 21 . Marketing in any of these market places could be 'daily', 'daily-periodic' or 'periodic'. They are aptly described as bound together by spatial- and temporal-periodicity. In Nigeria, as in any other third world country, both the social forces of modernisation and attachment to traditional values are exemplified in the co-existence of these 7 sub-groups of market places and some of the Western types of shopping institutions, such as:

a. Super Stores and Departmental Stores (SS/DS)
b. Shopping Street (ST)
c. Shops on the Motorway By-Pass (SMBP)
d. Corner Shops and Hawkers (CSAH)

The above two sub-sets of shopping institutions constitute the urban network of retail outlets which complement and compete with one another in the struggle to provide shopping requirements to the shoppers. The second sub-set are owned and developed by individuals and private organization and as such both their location and structure depend purely on free



URBAN RING	1	Central Market Place	U-CMP	Daily
	2	Special Market Place	U-SMP	Daily/Periodic
	3	District Market Place	U-DMP	Periodic
	4	Local/Neighbourhood Market Place	U-L/NMP	Marketing
	5	Bulking-Up Post Market Place	BPMP	
REGIONAL RING	6	District Market Place	R-DMP	
	7	Local/Neighbourhood Market Place	R-L/NMP	

URBAN-REGIONAL RING

Figure 1.2 : Proposed Conceptual Spatial Framework of Urban and Regional Market Places

market situation. But the Market Place Development Board in addition to the Local Government Council have the constitutional responsibility to locate and develop urban market places; and at the apex of the hierarchy of urban market places is the Central Market Place. (see Appendix 1.1.1 , page A1)

The Central Market Place (often known as the Main Market, or the Central Market), may be defined as: "that continuous delineated territory in the 'city central area' consisting of open spaces and covered buildings, established by the city authority, and devoted exclusively to gathering of people for the purpose of overt sale and purchase of commodities and services, practice of trade and habitual occupation and engagement in a variety of spontaneous social contacts".

It is necessary here to distinguish the City Central Area (CCA) from the 'City Core'. The City Core is not identical with the City Central Area. The former is a smaller or bigger delimited area of central position, whilst the latter is a system reaching far beyond a given area and whose extension and structure depend on the actual and planned central function of the city. The City Central Area performs the chief function of administration, business, shopping and entertainment, and contains the biggest proportion of offices, cultural and civic buildings, shops and the Central Market Place.

U.I. Ukwu (1969) made a classification of central area structure and market place structure. Using empirical evidence, he suggested five categories in each of the two sub-systems as follows:

TABLE 1.1: Categories of Central-Place and Market-Place Sub-systems (underlined word 'Place' added by the author)

Central-Place Sub-System		Market-Place Sub-System
	A	B
1.	Metropolitan Centre	Metropolitan Market Place
2.	Urban Centre	Urban Central Market Place
3.	Urban Neighbourhood or Shopping District Centre	Urban Local or Neighbourhood Market Place
4.	Rural Regional Centre	Rural Central Market Place
5.	Rural Local Centre	Rural Local Market Place

Original Source: Markets in West Africa, p. 155; Hodder, B.W. and Ukwu, U.I., 1969).

The above description is a generalized summary of the complex system within which the urban market places function.

The sub-groups 1-7 constitute the urban-regional ring of market places which have the Urban Central Market Place as the chief distributor. The urban-regional market place system just described lies in the hinterland of the metropolitan market place, not, however, shown in Figure 1.2, page 21.

While it is essential to know the relationships between the urban market place hierarchy and its hinterland market structure, it must be remembered that the thesis' area of concentration is the urban market places. The extents to which these urban market places cause people and vehicles to demand for activity spaces in them are said to be dependent on their environmental attributes.

1.2.3 Environmental Attributes

The environmental attributes of an urban market place may be divided into two main groups, namely - those due to its locational potentials and others due to its structural potentials.

1.2.3.1 Locational Potentials may be defined as,

> "the attributes of a market place, by virtue of its established site location relative to the other land uses in the urban area which cause people and vehicles to demand activity spaces in it, in the course of performing their normal out-of-home activities, and which cause the market place to supply activity spaces".

The specific components of the locational potentials are shown in Table 1.2, page 25.

1.2.3.2 Structural Potentials may be defined as,

> "the attributes of a market place by virtue of its structure, (capacity, quality and disposition of its aspects), which cause people and vehicles to demand activity spaces in it, in the course of performing their normal out-of-home activities, and which cause the market place to supply activity spaces".

The specific components of the structural potentials are shown in Table 1.2, page 25.

1.2.4 Nigeria

The territory of the Federal Republic of Nigeria lies on the West African coast of the Atlantic Ocean. It lies between longitude 2^{o} - 15^{o}E and latitude 4^{o} - 14^{o}N. It is bounded on the north by Niger and Chad Republics and on the East and West by Cameroon and Benin Republics respectively, and on the South by the Gulf of Guinea (see Figure 1.3, page 26).

TABLE 1.2: Locational and Structural Potentials of the Urban Market Places

Primary Components	Specific Components
LOCATIONAL POTENTIALS (X)	X_1 - Railway transport linkage X_2 - Road transport linkage X_3 - Immediate surrounding residential population X_4 - Immediate surrounding places of work X_5 - Immediate surrounding other shopping centres X_6 - Immediate surrounding wholesale shops and warehouses
STRUCTURAL POTENTIALS (Y)	Y_1 - Building design factors Y_2 - Facilities and amenities Y_3 - Parking and stationing spaces for vehicles Y_4 - Security of life and property Y_5 - Environmental qualities Y_6 - Zoning of market place by commodity Y_7 - Preservation of food commodities Y_8 - Food and non-food shopping capacities

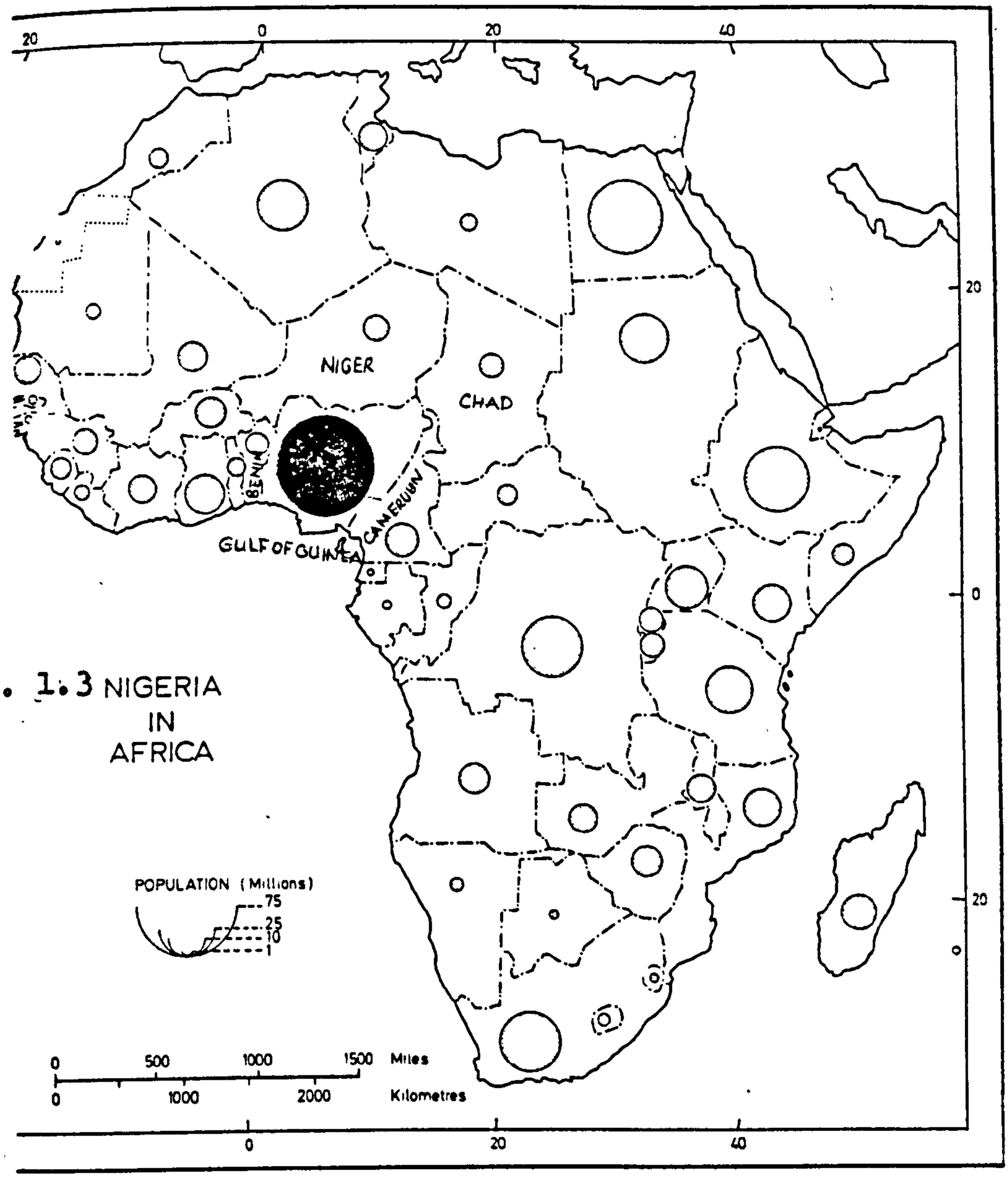


Fig. 1.3 NIGERIA IN AFRICA

1.2.5 The Objectives

In order to attain the above stated goal, the research proposes to develop an analytical planning model that can achieve these objectives:

1. describe the phenomena of demand and supply of activity spaces in urban market places.

2. explain the hierarchical relationships between the specific components of demand and supply of activity spaces distributed among the urban places, and define the problem situation.

3. explain the causal relationships between the growth rates of the specific components of demand and supply of activity spaces, and the locational and structural potential of the urban market places.

4. select the appropriate development planning policy that can achieve balanced demand and supply of activity spaces with a view to optimising locational and structural potential.

1.2.6 The Model

To accomplish the objectives enumerated above, the research turned to existing approaches to retail analyses for help. A detailed review of existing approaches to retail analyses shows that none offers a sufficient explanation of this phenomenon in a

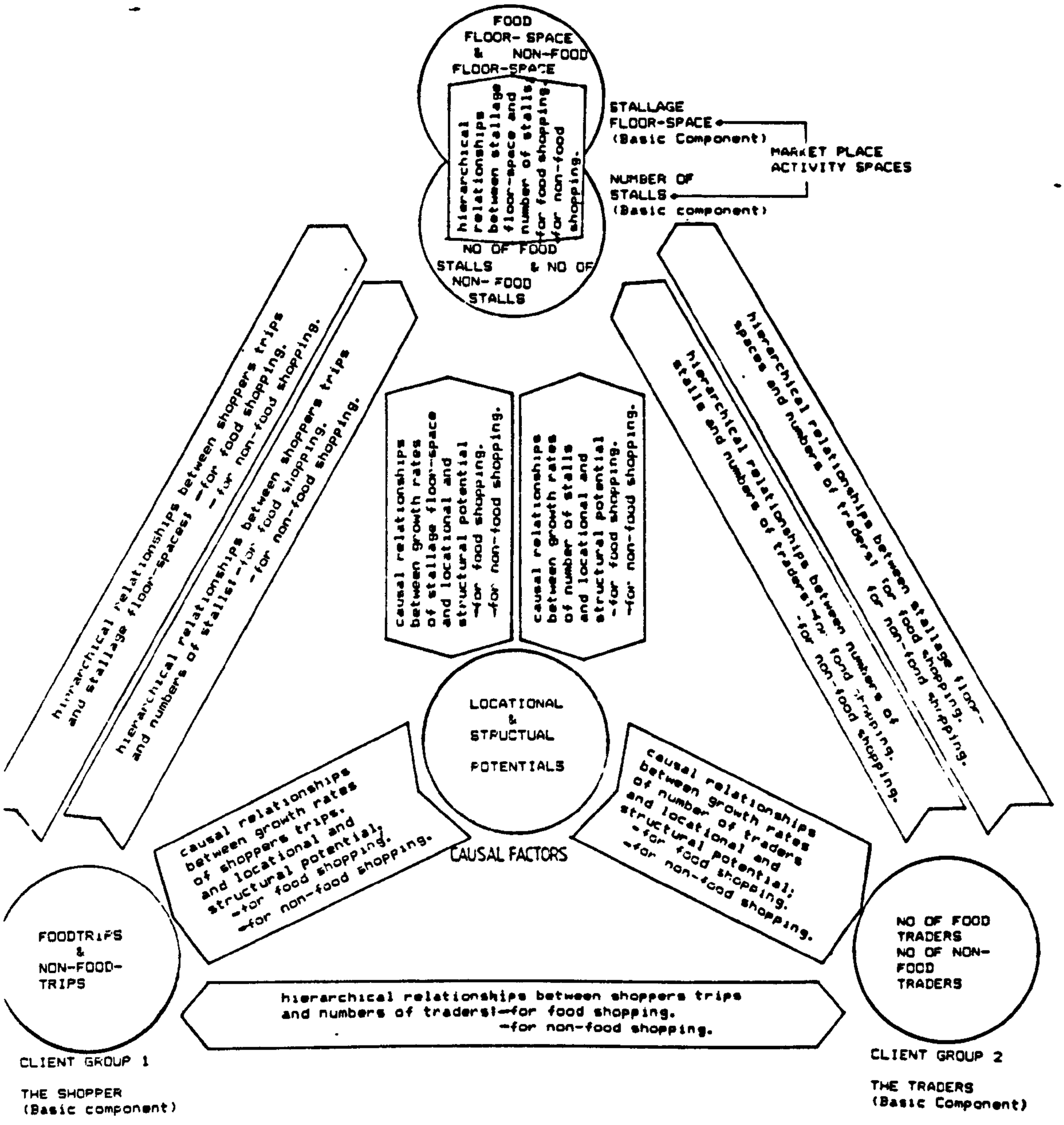


Figure 1.4 :PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL.

The thesis propses to examine the stated relationships

Note : Arrow indicates direction of influence.

manner that can be useful for planning purposes. This inability is due to the fact that (i) None of the existing approaches contains explicit inclusion of time in its structure, and (ii) They are designed to predict what is likely to happen as a result of some assumptions, and not the possible range of performance in relation to defined locational and structural potential of the urban market places.

A new approach to retail study, which includes the above two factors, is then proposed. The proposition is based on the assumptions:

(1a) That there is strong hierarchical relationship between any pair of demand and supply of activity spaces, for food shopping, in an urban market place;

(1b) That there is strong hierarchical relationship between any pair of demand and supply of activity space, for non-food shopping, in an urban market place;

(2) That there is strong multiple causal relationship between the growth rate of any demand or supply of activity space, and the locational and structural potential of the urban market place.

To aid understanding and the systematic examination of the above stated relationships, the proposed locational and structural potential model is illustrated in Figure 1.4, page 28a.

Together, the above proposition indicates how the research hopes to proceed to achieve its goal within known constraints.

1.3 The Constraints

In answering the research questions the study pays regard to the following constraints:

1.3.1 Data dearth: Where data are not available in sufficient amount, reasonable projections and assumptions are made.

1.3.2 Resource constraints: The research has limited itself to such proposals that are feasible under the existing and available resources in the country.

1.3.3 Existing national policies: Although this work proposes to remain within the spirit of these policies, it is not necessarily constrained by them.

1.3.4 Socio-economic and Political Trends
In answering the research question, the study has assumed that the economic and social development growth rates in Nigeria may not fall significantly below the existing levels and those projected for the study period (1984-2005) by the Federal and States Ministries of Economic Planning. Also assumed is that market place location and development in the city is a unified undertaking by the State Market Development Board and the city Local Government Council. Finally assumed are the existence of a democratic system of government committed to social justice and that the Market Development Board and the Local Government Council are equipped to implement, monitor and review a proposed responsive development policy for the urban market places.

1.4 The Scale

The issues raised in the definition of the research problem are the cumulative impacts of political, economic and technological changes and the socio-cultural history of the peoples who occupy the African sub-region covered by the ancient civilizations of Ghana, Mali, Songhai, Kanem-Bornu, the Hausa and Yoruba city-states and the Bantu peoples (see Figure 1.3, page 26). This sub-region covers the present West, Central, East and Southern Africa, i.e. Africa south of the Sahara except the Republic of South Africa. The urban phenomenon of congestion of people and vehicles in the CMP and its environment of the CCA is probably serious today in major cities in West Africa and Nigeria in particular. The other countries in the sub-region will in their turn experience the difficulties of this urban situation if there is no proper timely intervention. The findings of this research, therefore, provide a guide to and a reference in planning for the CMP growth and change in this African sub-region. The findings are also applicable in any developing country where a similar problem exists.

1.5 The Methodology and Structure

Some residents of the city use the CMP more in pursuit of their normal out-of-home activities than others. The questions are: What are the limits of the boundary of influence of the CMP? What are the constraints on it and why can't it provide

activity spaces to all who may want to demand for activity spaces in it, in the course of performing their normal out-of-home activities?

Is the demand for activity spaces in the Central Market Place affected by increased status achievement, or is it a function of differentiated economic and social roles, or yet still, is it a matter of no choice that for some has little utilitarian value? As Anderson, J. observed, quoted by Gihring, T. (1982) "observed behaviour may be expected to reflect the values of the performers. However, ... it also reflects the constraints of environment and personal circumstances", e.g. some people may be placed in a position of being obliged to demand for space in the CMP than choosing it. The study finds it useful to focus on the comparative circumstances and behaviour of selected groups. If disparities in opportunities and constraints are found to exist across groups, policy decision is taken in an effort to eliminate social inequities while ensuring that the market places provide the best use of resources, economic efficiency and greatest convenience to consumers. The study is divided into two parts: (the underlines are the authors').

1.5.1 The Setting

1.5.2 The Case Study

1.5.1 The Setting

After a review of urban market place development, against a background of stances in retail analyses and urban central area development theories, the author prefers to adopt "behavioural approach" to urban and regional planning which seeks to provide solutions to urban and regional planning problems on the basis of the behavioural relationship between people and their urban environment. One such behavioural relationship is that "there are locational and structural potentials in some market places which cause people and vehicles to demand for activity spaces more in them than in other shopping institutions in the city, in the course of performing their normal out-of-home activities". That proposition may be said to represent the basis of this research. The political, economic, technological and socio-cultural trends in Nigeria and their impingement on the demand for spaces at the CMP are described. Also described are the possible urban market place development policy solutions and their prospects in the supply of spaces at the market places. Theories of demand and supply are X-rayed as a background to describing the mechanics of demand and supply of spaces in a perfect urban market place development process. This cumulated in the development of the proposed "Locational and Structural Potential Model" for development planning of urban market places. Empirical study was necessary to test the model.

1.5.2 The Case Study of Kaduna City Market Places

The market places of Kaduna city (see Figure 1.5, page 34) are chosen for case study, and the characteristics of its urban-regional environment, and the factors which conduce to a viable planning unit are described. By employing SPSSX package on the VAX computer, case study materials are used to calibrate the 12 hierarchical equations and 8 predictive equations. The relationships are confirmed very strong.

The scatterplots of the hierarchical equations are examined to ascertain the situation in the existing hierarchical continuum between any pair of demand and supply of activity spaces. The facts arising from the interpretation of the strengths of relationships, of the nature of the hierarchical continuua between the pairs of demand and supply of activity spaces, of the growth rates of the demand or supply of activity spaces, and of the relative importance of the locational and structural potential variables included in the predictive equations, were systematically assembled. They dictated the direction in which to generate the alternative development planning strategies, that can achieve balanced demand and supply of activity spaces, with the view to optimising the locational and structural potentials in Kaduna city market places.

Four alternative planning strategies were developed. To this list was added the trend strategy, that is required to be improved by the planning exercise, and was, therefore, used as the reference to measure the

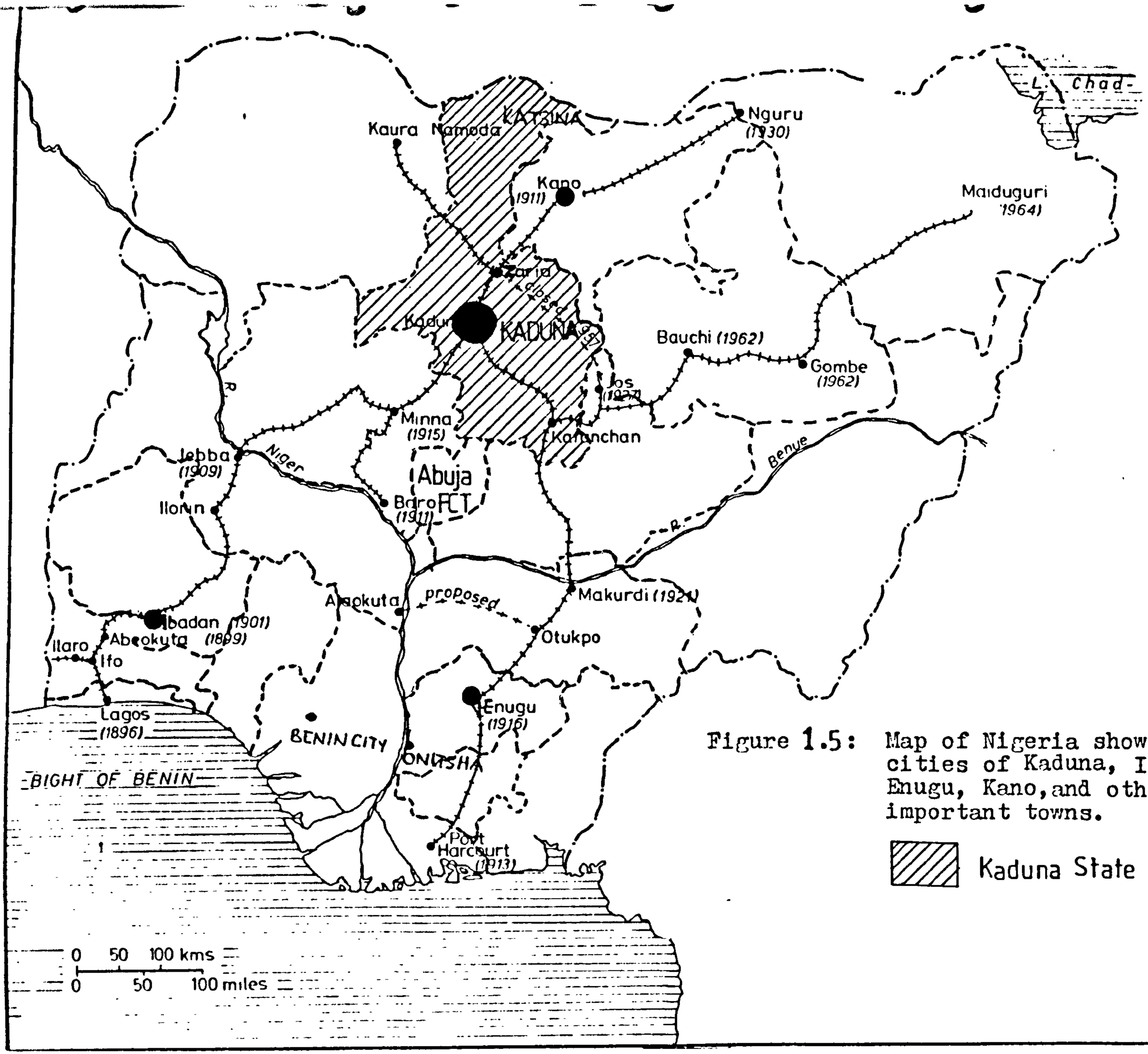


Figure 1.5: Map of Nigeria showing the cities of Kaduna, Ibadan, Enugu, Kano, and other important towns.

Kaduna State

achievement of each alternative strategy. Each alternative prescribed new scores on the locational and structural potentials. The prescribed scores were weighted and applied to the 8 predictive equations to achieve new growth rates and the consequent distribution of the demand and supply of activity spaces in the target year. The achieved distribution of the demand and supply of activity spaces, by the alternatives, were reviewed with the hierarchical relationship equations '1a' and '1b'. The new hierarchical equations provided the statistics which enabled the improvement, in the balance between the demand and supply of activity space, and in the optimisation of the locational and structural potentials, predicted by the alternatives to be ascertained. The strategy that achieved the best overall performance, together with the plan management requirements necessary for its successful implementation, was recommended as the adopted plan, and the second best achieving strategy was recommended as the alternative plan.

In conclusion the performance, constraints and application of the model are summarised. In the form of a reflective epilogue, the proposed locational and structural potential model is shown as a development in land-use/transport planning of urban market places. The tests for flexibility are expanded to include those not actually carried out because of data and time constraints, and the areas for further research indicated.

CHAPTER 2

ISSUES INVOLVED IN THE DEMAND AND SUPPLY OF ACTIVITY SPACES IN URBAN MARKET PLACES IN NIGERIA

2.0 Introduction

During the period 1861-1983 the human settlements of Nigerians have passed through the known crucibles of known epochs in the history of city development. Within this period the scattered villages and stockade cities of the southern rain forest, the scattered homesteads and agrarian cities of the northern savannah have metamorphosed into market cities. Some of these market cities are now in the process of transformation into industrial cities. This period has witnessed Nigeria passing through the politics and administration of city-states, colonial rule, Federal Westminster Parliamentary and Federal Presidential Democracies, and as well as military rulership. Social and cultural changes, though not as fast as the other changes, are also taking place at their own natural slower pace.

These changes have occurred not without noteworthy impacts on the city structure and on the city centres in particular. The city centre being conceptually that part of the city which performs the chief functions of administration, business, shopping and entertainment and contains the biggest proportion of office and civic buildings, shops, the central market place and limited number of high density residential buildings, is usually very susceptible to physical and

structural transformation as dictated by the above-named urban forces of change. It is this physical and structural transformation of the central area of the city and the subsequent congestion of people and vehicles in the urban central market place that form the area of concern of this research work. In order to give a general background of the problem of the congestion of people and vehicles in the central market place, it is necessary to examine those issues which have impelled people and vehicles to demand activity spaces in the urban central area in general and the central market place in particular.

2.1 Evolution of Types of Central Areas

Before colonial rule, which came in a gradual and piecemeal fashion commencing from 1861 (when the colony of Lagos was proclaimed), the savannah city-states such as Kano, Bauchi, Katsina, Zazzau (Zaria), Sokoto, Kanem-Borno (Maiduguri) and forest cities such as Owo, Ile-Ife, Ilesha and Benin had city centres within the walled cities. In the savannah agrarian cities, and to a lesser degree in the forest agrarian cities, the market place formed a second major focus along with the palace connected by a central open space and flanked by administrative functions and residential areas. The scattered homesteads and villages were unified in their spatial layout by the network of periodic central and village market places and religious shrines.

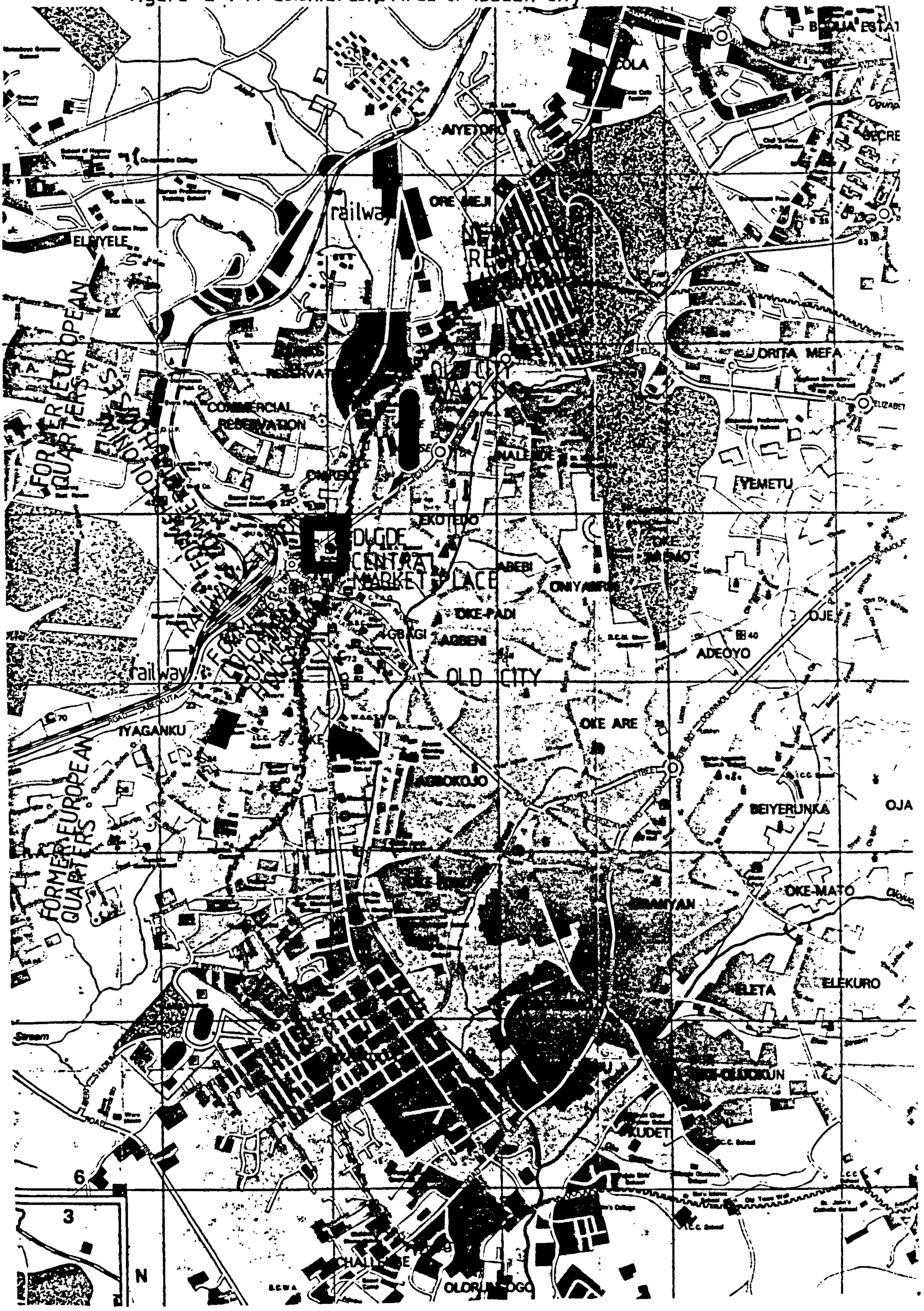
The railways were first constructed by the British Colonial Administration, between 1890-1930. Some of the ancient cities which were not affected by the

railway lines, their old pattern of city centres have survived and are the hubs of their present day central areas. Such cities include Katsina, Maiduguri, Sokoto, Owo and Benin City. This type of city centre is referred to as traditional Nigerian central areas.

Some of the ancient cities which happened to be along the railway lines suffered some setbacks in their city centres. In these cities the colonial administration set up their own administrative and commercial centres near the railway stations outside the city walls. New central market place was usually located by the railway, between the colonial commercial buildings, the old city, the armed forces barracks, and the new native residential areas, which were laid out strictly in the traditional, grid-iron pattern. (See Figures 2.1.1, 2.1.2 pages 39 and 40 respestively) . The new centres have become the modern Central Business Districts (CBDs) of such cities. However, the traditional city centres have managed to survive, performing mostly residual cultural functions. Such cities have dual central areas and are said to possess twin focal physical structures. They are referred to as traditional-modern central areas and they include Kano, Ibadan and Zaria.

The third class is the modern central areas found in modern cities, which are new to Nigeria, having been founded in direct response to the administrative and economic initiatives of the colonial administration. Examples of this class of cities are Portharcourt, Aba, Umuahia, Enugu, Makurdi, Kaduna, Jos and Onitsha. With the exception of Onitsha, all the others are railway towns. In these modern towns the central market place was located by the railway, between the colonial commercial buildings, the barracks, and the native residential areas which were laid out in traditional grid-iron pattern, see Figures 2.1.3 and 2.1.4, pages 41, 42 respectively. Onitsha was laid out in 1911

Figure 2·1·1: Colonial Core Area of Ibadan City.



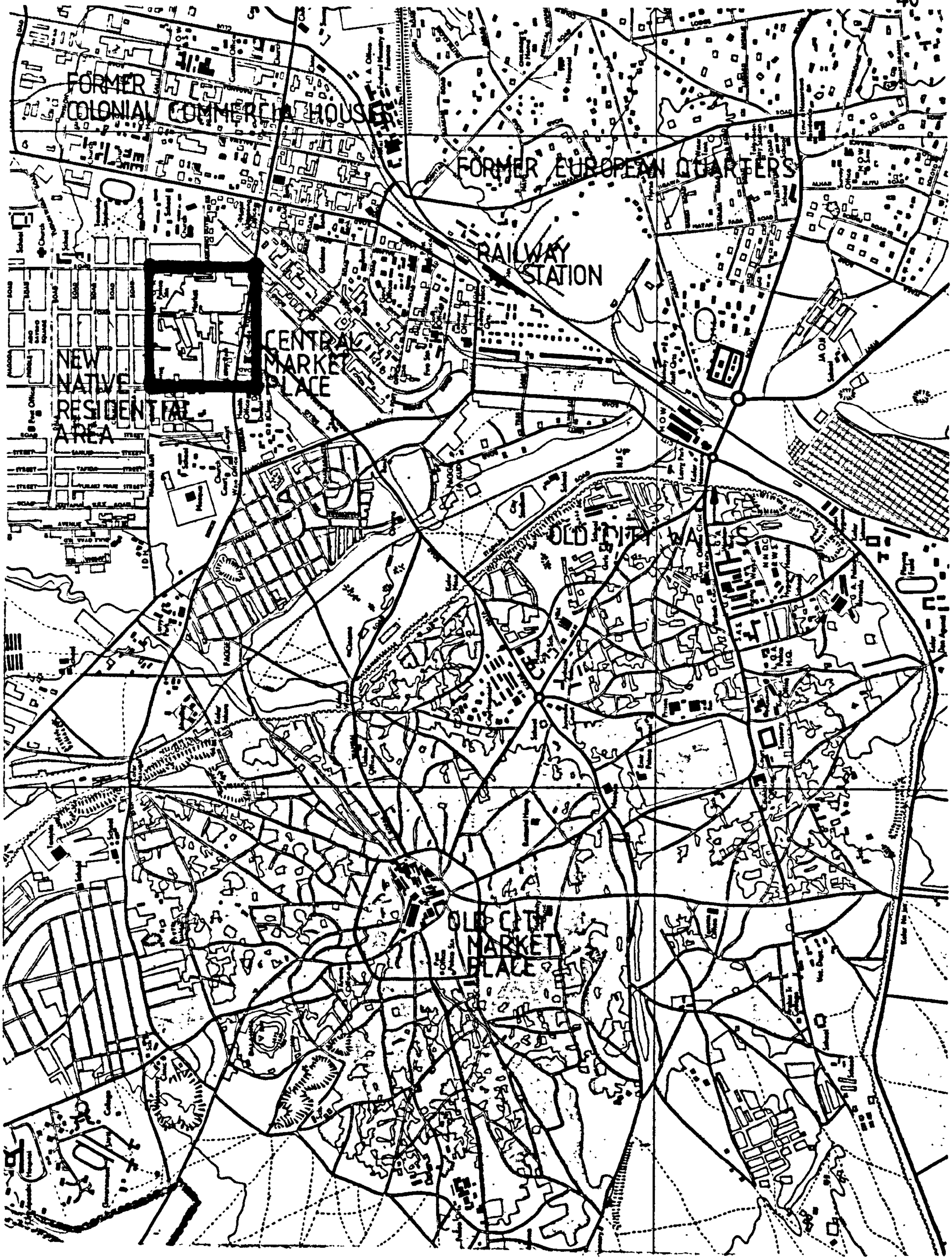


Figure 2.1.2: Colonial Core Area of Kano City

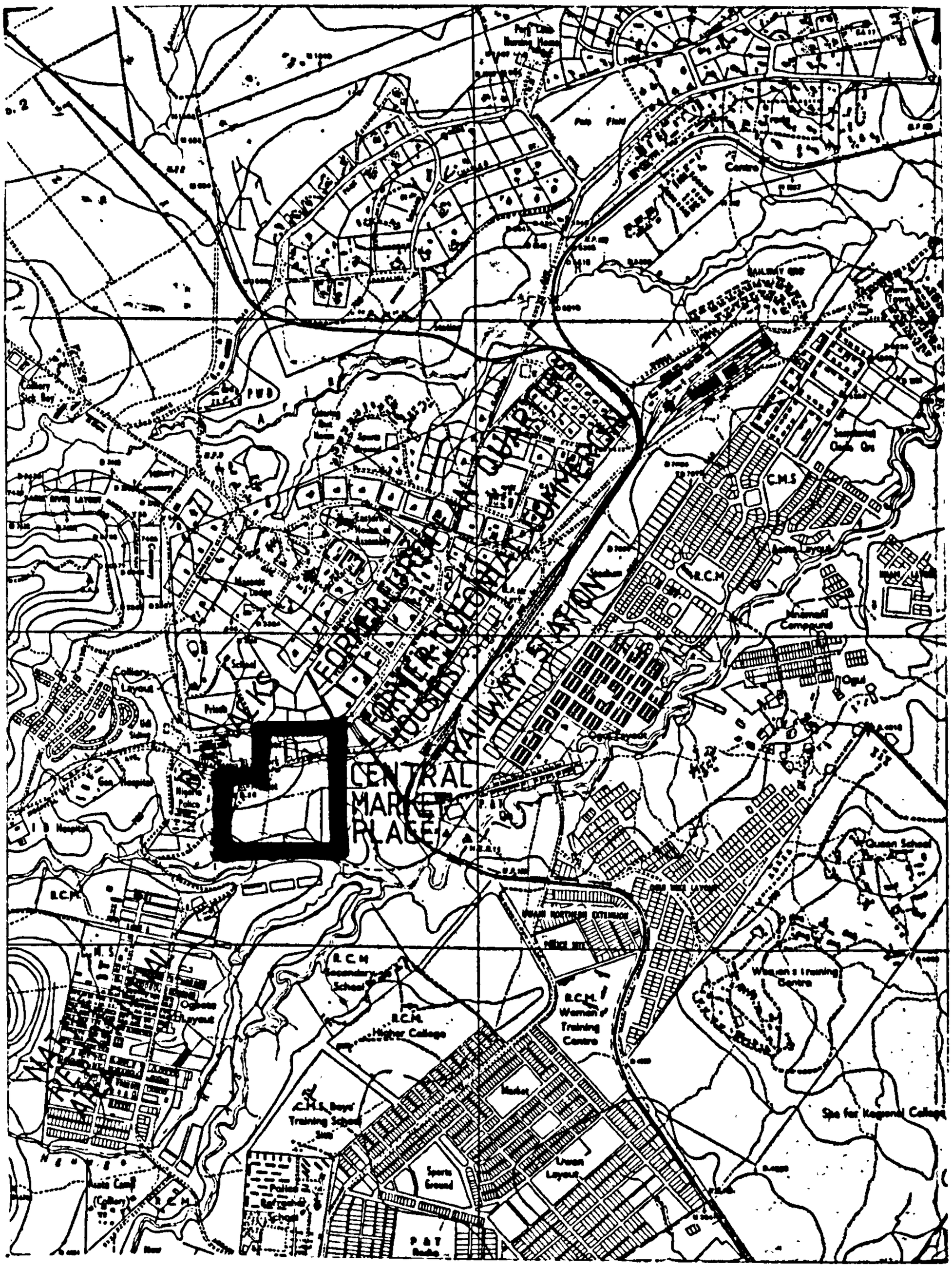


Figure 2.1.3: Colonial Core Area of Enugu City

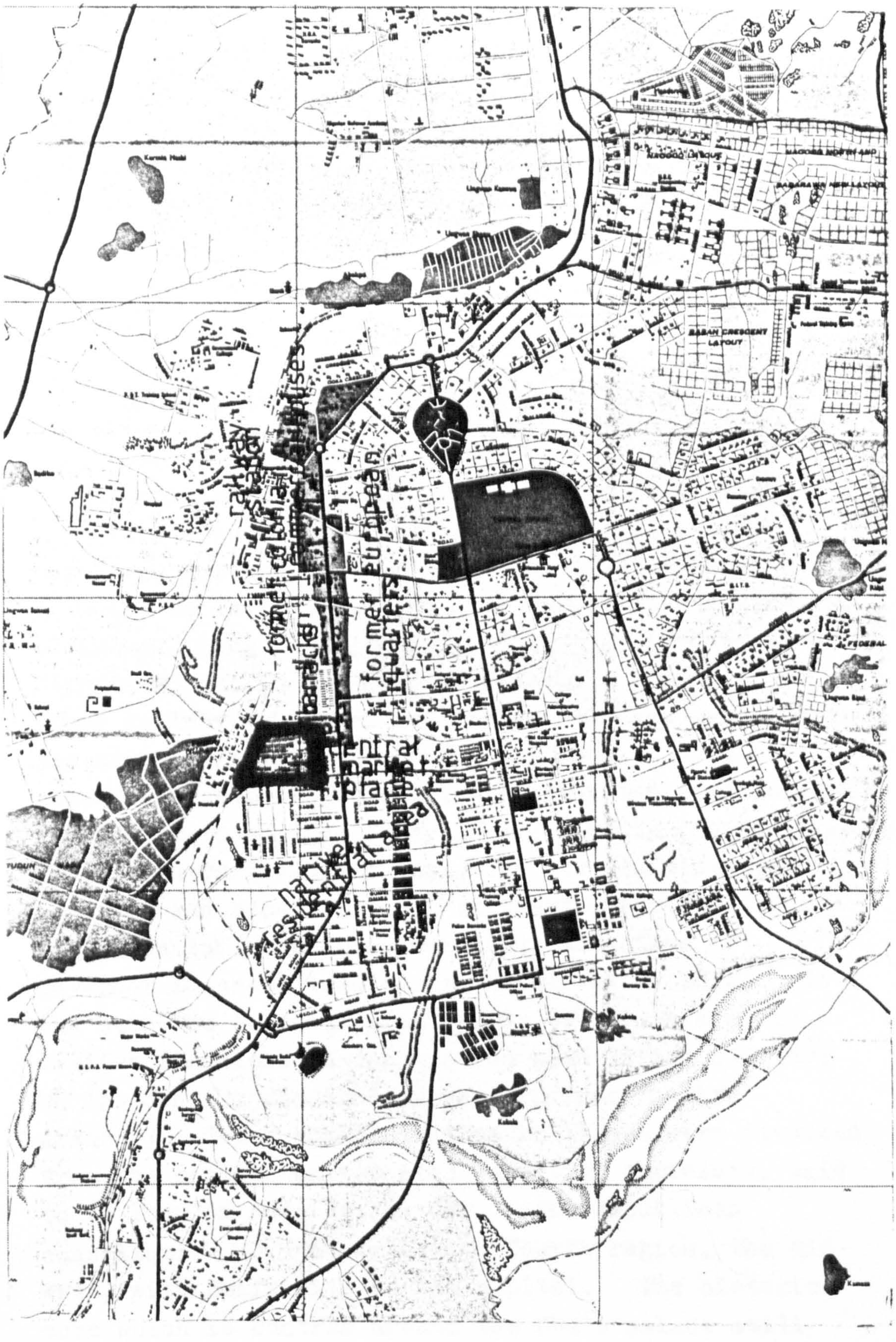


Figure 2.1.4: Colonial Core Area of Kaduna City

as a beach-head for the oil palm export of Iboland on the eastern bank of the river Niger. The administrative and commercial centre was put on the bank of the river, where it has remained and grown, ranking among the largest of traditional West African markets.

2.2 Central Areas of Administrative Capitals

"The basic federal structure worked out at the constitutional conferences in London 1953 and Lagos 1954 made Nigeria a federation of three regions: northern, eastern and western, with Lagos federal district as the capital and with regional headquarters at Kaduna, Enugu and Ibadan. With this constitution Nigeria became independent on October 1 1960". These railway towns had additional roles of legislative and administrative functions. In respect of the colonial location of these legislative and administrative institutions, Professor Thomas Gihring (1977) observed that "so strong was the impact of its administrative policies and separationists standards, that the existing urban landscape still reflects the stamp of Governor Lugard's town design conceived in 1914. It had been the colonial practice to establish administrative functions in conjunction with living quarters on low density compounds separated from 'native' areas". These administrative buildings were divorced from the central market place and are, therefore, said to be located outside the CBD. The Republican constitution of 1963 created a fourth region, the mid-west, with Benin City as its capital. The historic core which is centred around the Oba's palace still

contains the Central Business District with little of indigenous settlement left.

When Nigeria was split into twelve states in the month of May 1967 the territorial amplitudes of the former regional capitals diminished, but this actually did not amount to a decline in the scale of demands made on their central areas because the country was witnessing an economic boom (except the civil war period June 1967 to December 1969). Former provincial headquarters, Sokoto, Kano, Maiduguri, Jos, Ilorin, Portharcourt and Calabar became new state capitals. New administrative and accommodation burdens were imposed on provincial central plans that were ill-equipped for central functions of such magnitude. This meant spontaneous need for large numbers of office and civic buildings, shops, buildings for entertainment, more car parking spaces and bigger central market place. There was increased population and road traffic: existing circulation pattern and road structure became inadequate.

On February 3rd 1976 seven new states were created, and consequently seven, even smaller, former provincial headquarters were upgraded as state capitals and these were Owerri, Akure, Abeokuta, Makurdi, Yola, Bauchi and Minna. These towns had to accommodate new and enlarged central functions of state administration and rapidly expanding economy and urban population. To solve these problems the Nigerian administrators approach has not differed significantly from that of colonial days. To quote Thomas Gihring again, "Post colonial official town planning policies have tended to perpetuate this <u>de facto</u> system of physical separation in siting new institutions".

However, in spite of the creation of states and new state capitals, Kaduna, Enugu and Ibadan have continued to remain regional co-ordinating centres for international bodies, the federal government, commercial and professional organisations. These towns still play much higher central role than other state capitals. At the time of writing, there is a bill before the National Assembly to further divide the existing nineteen states into anything between 40-45 states in addition to the federal capital territory. Nigerians have now grown to regard state creation as a vehicle for more even distribution of development.

Contrary to what obtains in West European countries and the United States of America, there is no simple and neat definition of city central area in Nigerian context, but rather an explanation:

Empirically the location of the seat of government with respect to the central areas in Nigerian cities exhibits three patterns. The seat of government located (i) within the central area itself, (ii) on the edge of the central area, and (iii) outside the central area. Traditional Nigerian capital cities exhibit characteristics of both patterns (i) and (ii). In such cities as Kano and Maiduguri the historic seats of government are located within the central area but towards an edge of the traditional city centre. Forest cities such as Benin and Ile-Ife tended to locate the major seat of government in the centre of the urban area. Only new towns such as Kaduna and Enugu have the seat of government separated from the urban core. The traditional-modern cities contain both traditional and modern central areas which are combinations of either patterns (iii) and (i) or

patterns (iii) and (ii). The basic concept of spatial arrangement of the major functional elements of traditional Nigerian central areas, i.e. patterns (i) and (ii) has been intimated in notes (1) above, and that of modern central areas, i.e. pattern (iii).

However, it is important to note that in spite of all the differences found in the spatial layout of the central areas of major cities in Nigeria, the major cities have one thing in common: they have similar modern central commercial districts in which the city central market place is located by the railway, between the colonial commercial houses, the armed forces barracks, and the native residential areas (both old and new; the old is organic, whereas the new is of traditional grid-iron type.) It is now closely surrounded by more intensively developed commercial and residential buildings of higher Floor Space Indices (FSI). Secondly, that central areas of administrative capital cities consist of two basic zones, the administrative zone and the commercial zone. Some administrative capital cities in addition do have traditional central areas, which are the old cores of such cities.

2.3 Central Area of the Federal Capital City

The central area of the federal capital city of Lagos is an exceptional case, both in function and location - being located on an island and only connected to the mainland by three bridges. Being the national political capital, the biggest seat of the industries, the head offices of large commercial and professional firms and international bodies as well as the largest sea port, the central area is no longer able to cope satisfactorily with demands made on it by recent developments in

administration, commerce and industry. The excessive congestion of people and traffic is responsible for the intractible administrative, social and planning problems which have beset the central area where neither electricity nor telephone services ever seem to have expanded fast enough to meet demands. The Nigerian Federal Government in 1976, therefore, decided to build a new federal capital city with a new central area in Abuja at a geographical centre of the country.

Though the central area plans for Abuja acknowledge the special nature of the seat of federal government, the arrangement of the major functional components have deep roots in the tradition of Nigerian city-states. The symbolic importance of the political centre and its spatial relationships to the major commercial, cultural and residential areas are evidenced in those historic cities. Given the federal government, with its unique structure, as the chief form determinant, the other element establishing the plans for the central area is the central business district (CBD) or the commercial core. The large traditional market is located at one side of the commercial core, easily accessible by lorry from the region and by transit from the city. The full realisation of this package design requires considerable institutional and economic rigor in scheme implementation. The essence of this rigor in implementation has been stressed by the authors of the master plan when they argued that "it should be noted that the combination of the elements described above cannot be considered as isolated or independent from one another; they make up a sequence of movement channels organised in such a way as to allow one to perceive the structure of the city as an uninterrupted flow of visual events. If one element

is removed from the sequence, confusion results. The objective of the sequence is to allow one's perception of the relationship between the parts of the city to unfold in continuous fashion". Such breaks in visual and functional continuity are observed in the central areas of Chandigarh , new capital of Punjab, India, and Cumbernauld[13] new town, Glasgow, where similar schemes have not been implemented with anticipated institutional and economic rigor.

2.4 Central Area Informal Growth

Nigeria has a mixed economy where both the governments and private individuals or organisations participate in real estate development. In central area development, when measured numerically, private developers are executing more developments and redevelopments than the governments. Since the developments exist plot by plot instead of continuous blocks and belong to different people of unequal economic and social standing, individual land ownership and real estate interest strongly oppose comprehensive redevelopment. Therefore central area renewal has been spontaneous and piecemeal. Since comprehensive planning has failed to intervene effectively, the market value of a given terrain determines the usage. Consequently major central area land uses such as offices, shops, tend to locate along axes of communication, in order to take advantage of existing accessibility provisions. Hence direction seems to be more important than distance in determining central area structure. The changes in land-use succession in the proximity of the central market place reflect a shift

from residential to offices, catering, retailing, wholesale and warehouse. The redevelopment schemes often tend to be multi-storey buildings which provide more floor spaces in the buildings than external spaces for traffic - increase in floor space means more people, more traffic, and greater pressure on the external spaces. The private developers do not have the habit of providing car parking spaces within the redeveloped premises. Or, putting it in another way, there is no existing legislation which controls such redevelopments. The vehicles which are attracted to the premises are parked at the edge of the road which has no parking provisions, thereby constituting an obstruction to the use of the road.

In some newly created state capitals such as Bauchi, some large urbanised areas have undergone rapid population growth. The rapid urban growth has led to a situation whereby the existing CBD can no longer function effectively, and as a result market forces are operating to shift the location of the CBD from its traditional place to a more suitable one. Since the nature of this process is rather slow, the shift in the location of the CBD is occurring only gradually. Consequently the population density gradient and spatial distribution of population in the urban area is being altered in favour of the new plausible location of the CBD.

2.5 Numerous Petty Traders

Free universal primary education was introduced in Western and Eastern Nigeria in the 1950s. From 1952 to 1962 enrolment at primary level in Western and Eastern Regions rose from 0.4 to 1.1 million and from 0.5 to 1.2 million respectively. In Northern Nigeria the slow pace was from 0.19 to 0.28 million in the period 1956-1960. From 1963-1970, for example, primary school enrolment was doubled without matching growth at the secondary school level.

Out of the large number of pupils who graduated from primary school every year only about 10% were admitted into secondary schools, leaving most of the 90% to be absorbed into the labour force. The wastage rates (based on the loss between first and last year enrollment for a generation in a given level of education) are highest at the primary school level with only about 37% of the pupils reaching the final year, and of these only 60% (or 22% of the initial entry) pass the primary school-leaving certificate. Retention is better in the secondary schools, although here of the 90% of those entering, who complete the course, 36.2% or more than one third fail the final examination to be absorbed into the labour force. Armed with little or no education, and without any technical skill, these people cannot find places in the offices and industries. The majority of them cannot entertain the idea of staying back in the village to work on the rural farms.

In the wake of rural-urban migration these unemployable young people end up in the central market place to swell the number of people who seek spaces for the

purpose of engaging in retail trades. The service industry, particularly small-scale trade, was and has remained the sector of Nigerian economy where the majority of these immigrants find refuge. This is largely explained by the very low opportunity cost of retail services and especially the virtual absence of barrier to enter into petty trade and other low-prestige tertiary activities.

In recognition of the poor effectiveness of the former system of education at primary and secondary school level, a new programme was introduced in 1981/82 academic year. Far-reaching recommendation has been made in this National Policy for Education (1977). The curriculum at primary school level is to include teaching of local crafts, domestic science and agriculture. The secondary school level provides 3-year junior and 3-year senior secondary school programmes. The junior secondary school will absorb a substantial number of primary school leavers, while the rest will have opportunity provided for vocational training in craft schools where they can learn a specific trade. The junior secondary will be both prevocational and academic, those who leave school at this stage may be sufficiently equipped to go on to an apprenticeship system. The senior secondary school is planned for those capable of completing a six-year secondary education. However, James C. Nwafor (1982) has observed that "undoubtedly, the implementation of the 3-3 year secondary education system and a thorough review of the curriculum to include technical, commercial and other vocational courses will not be completed before the mid-1980s".

Though this programme is designed to restructure the educational system and to reform the contents of the primary and secondary school education in order to meet the requirements of industry and agriculture in the expanding economy, its' realization deserves tenacious scheme implementation in order to help check the soaring population of petty traders in the future. The numerous petty trades effect of the former system will probably remain for the next two generations.

2.6 Fresh Food Storage and Wholesale Shops in the Central Market Place

Rural markets are economically significant as they affect major supplies to the city central markets. A major feature of such rural markets which are located in all kinds of rural settlements or even in the open country, is their periodicity; unlike the daily markets which are found in the cities. The economic importance of these periodic markets stems from the fact that they are not attended by local inhabitants only, but also by 'bulking-up' traders from city centres.

Since periodic markets are in origin most characteristic of food surplus areas, their function is primarily the injection of locally produced food stuffs and crafts into the distributive trade. The dominant interest is therefore in the bulking-up of commodities meant for distribution in the city central market places. They also serve as distributive points for locally manufactured as well as imported goods.

Seasonal differences in rural markets are perhaps more noticeable in the kind and origin of foodstuffs sold

rather than in the number of people attending markets. Usually local foodstuffs for sale have seasonal characteristics, following the time of the yam and maize harvests and the production of palm oil. Yet as the peaks of the various agricultural activities do not easily coincide, and owing to the massive inter-regional trade in foodstuffs between the southern forest zone and northern savannah zone, the activities of the local markets is to some extent maintained throughout the year.

As Nigeria develops agriculturally, economically and culturally, these fresh foodstuffs from distant rural markets arrive as train, truck or van loads at the central market for distribution. Since these bulking-up traders do not go to rural markets daily and since their stocks often last some days before complete disbursement, proper cold storage and warehousing in the central market has become a necessary facility.

Secondly, since the early 1960s, increased local participation in industrialisation and distribution of goods and services has brought about some partial shift in the spatial pattern of warehouse and wholesale shops location within the city. Location of warehouses and wholesale shops is no longer concentrated on railway sidings, in the wharfs or on industrial locations. Local entrepreneurs appear to prefer to locate their warehouses and wholesale shops in the vicinity of the central market in order to be close to their main customers, the retail traders who operate inside the market place.

2.7 Accessibility of the Central Area

Rapid urbanisation resulting in urban sprawl, spatial separation and large urban population growth made the central areas less accessible for many residents of the cities. Taking Lagos as an example: "The annual population growth rate of about 13.6%, due mainly to the phenomenal increase in the number of immigrants from the hinterland, is about five times as fast as the national growth rate of 2.8% ..... Between the years 1871-1963 the total physical extent of the city's administrative territory increased from less than 4km^2 to 65km^2 while the population increased from 28,500 to 0.7 million". The estimated population is now about 2.7 million. "The expansion of the agglomeration over an area of 105km^2 has implied an increasing separation of residence from work and shopping located at the central area". The central market place has remained the main shopping institution for Nigerians. To quote Onyemelukwe again, "The market (Onitsha market) served to demonstrate the survival and continued dominance of some market-place institution in an age (1973) when emphasis in central place activity has shifted from the market place to individual blocks of shops and supermarkets in central business districts and city thoroughfares. The market was central and dominant in the domestic exchange economy of a greater part of Nigeria and was important in the co-ordination of local foodstuff distribution". That statement is generally true for any city central market place in Nigeria. Approaches to improve accessibility of the central area had been accomplished by providing the means to achieve individual spatial mobility. Essentially the policy choice has been the design of better road transportation system to overcome spatial separation mechanically.

The urban sprawl and the concentration of resources on improved urban motorways, without corresponding investment in public mass transportation systems, have resulted in a widening gap between the poor and affluent; where accessibility opportunities have actually decreased for those households lacking private transport. This disparity triggered off automobility value. As a result, at minimum or no convenience at all, people had to buy vehicles in order to maximise accessibility through personal means of spatial mobility and thereby increasing the number of private vehicles seeking opportunities at the central area. This notwithstanding, there is still a low percentage of private car ownership in Nigerian cities.

The use of the railways as a means of public mass transportation within the city is non-existent. Therefore the task of transportation of people and goods is carried out mostly by means of privately owned commercial vehicles - buses, minibuses, trucks and taxis. All these have low passenger carrying capacities, with the result that many of them are needed to execute the task. This has given rise to the phenomenally high number of privately owned commercial vehicles seeking opportunities at the central area and the market place in particular. They have contributed immensely to the traffic congestion in the central area.

2.8 Social Animation

To quote Thomas Gihring again, "There is little indication that traditional emphasis on communal life-style has yet been altered in a significant way.

Urban Africans are still by and large centralisers, gravitating into socially active public places found in African towns". The chief of such socially active places is the market place; people are normally attracted to it for both social and economic activities.

From an analytical study of pre-colonial and colonial African settlements, there exists sufficient evidence to show that central market places had been the biggest opportunity space found in the central area and that the people had demonstrated affinity to it. The central market place had been the focus of their socio-cultural and economic life pattern. Despite the materialistic tendencies of a growing African elite, there is prima facie evidence to assert that self-containment is not yet a dominant value held in West African societies.

As a result of the new oil wealth and subsequent accelerated economic activities and education, the peoples taste for attractive goods in particular has increased. In addition, rapid urbanisation has impelled the market place to attract traffic in great numbers without providing corresponding required opportunities for the traffic so attracted. However, development of such new centres as ninth mile corner near Enugu or Alaba Market, Badagri Road, Lagos, help to relieve the central market of market load for convenience and comparative goods. The numerous petty traders continue to make great demand on the spaces in the central market place. A space applicant who is unable to obtain space inside the market sticks to the neighbourhood of the market along the roadsides linking the market. Since they do not pay stall rents and taxes, to the local authorities, they enjoy the privilege to sell their wares cheaper than their

counterparts inside the market. They attract more custom and thereby cause obstruction along the roads in the neighbourhood of the central market. The local authorities do not have any justification to collect taxes and rents from them because they are not provided with official accommodation. These hawkers display their wares in open streets and often their wares are spoilt or damaged by bad weather. The problem could be likened to using the force of gravity to empty a large volume of liquid into a small can; the can gets filled up, overflows and messes up its environment.

Approaches to improve the traffic congestion in the central areas, in and around the market place, have not been able to recognise the fact that despite the free flow of people, goods and information that the people's socio-political, economic and spatial attachment to the market place institution has not been altered significantly by technological advancement. Consequently the urban market places have remained the major shopping centres of Nigerian, as well as other West African cities. The question is, what is the land use planner's role in the development planning of the urban market places as major shopping centres?

2.9 The Land Use Planner's Role in the Development Planning of Urban Market Places as Major Shopping Centres

In the development planning of a major shopping centre, the land-use planner may be concerned with these aspects of a responsive shopping planning policy.

Firstly, with his knowledge of changes in population distribution, communication and land-use generally, he is well equipped to determine the location and the catchment of a shopping centre within the context of development plans. At the more detailed level, he should be able to control the intensity to which a site is developed, because of the repercussions of the development on such things as traffic generation and congestion.

Secondly, he must exercise his statutory duties of development control to ensure adequate freedom for vehicular movement, safety for pedestrians and satisfactory standard of overall design of shopping centres.

Thirdly, he must examine the economic viability of the proposals not only as an isolated scheme, but in the context of the whole central area, the urban and its region.

Fourthly, there is the positive aspect of planning where the planning authority is responsible for implementing the development scheme, as is the case of urban market places in Nigeria. In this sphere, the planning authority should stipulate the extent and quantity of retail development and the range of facilities the centre should possess. These facilities are in fact, crucial to any centre, and ultimately determine the function it fulfils. To the shopper, they represent the range of goods and services available and hence the degree of choice offered. To the trader they guarantee a safety of investment and ensure a stable future in competition with rival centres.

The most direct means of implementing a shopping policy would be for the planning authority to influence the distribution of facilities and the type of traders entering each centre. Good shopping schemes will stimulate the development of social facilities, thereby providing a worthwhile centre for the community. This is the difference between a social centre and a mere shopping group which is so important to a town's overall status.

Fifthly, a centre may be satisfactorily located in regional, urban or local context, but still fails because of poor detailed scheme, which would specify selling space, storage space, pedestrian circulation pattern, zoning of the commodity units. Others are parking facilities, goods loading and unloading areas and other ancillary uses with respect to the size of the various units.

Sixthly, there is the need for a shopping centre to be on the lines of movement in good relationship with bus stops and other well established facilities whether they be civic, cultural, social or commercial blind-precincts often become failures. Weather protection is another asset, but complex circulation systems and changes in level which fail to cater adequately for prams or old people, are definite deterrents to the shopper. Again the planning authority has control over all these aspects, either negatively through their power to reject unsatisfactory schemes, or positively by the provision of an overall planning framework or planning brief for the town centre into which individual development can fit.

If the role of the planner, as set out above, is accepted, then it follows that the planner is required to treat shopping institutions as important elements of the urban structure. Accordingly the importance of the market place as an element of urban structure deserved some detailed consideration, and this is done in Chapter 3.

CHAPTER 3

THE MARKET PLACE AS A MAJOR ELEMENT OF URBAN STRUCTURE

3.0 Introduction

This chapter traced the historic trend in the evolution of urban market place. Discussed also is the Nigerian urban retail market place scene from socio-political, economic and spatial viewpoints. This enabled the placement of present Nigerian urban retail market place on the evolutionary scale, as the background on which planning decision is required.

3.1 Historic Trend of the Urban Market Place

This section examined the contribution of the market place in the moulding of the socio-political, economic and spatial organisation of the societies from the ancient Egypt through the classic Greece and Rome to the medieval and middle ages commercial revolution which prepared the way for the arrival of the industrial age.

3.1.1 Ancient Egypt and Classic Greece and Rome

In the ancient Egyptian hieroglyph, the earliest hand-writing that one can read, "the idiogram meaning city consisted of a cross enclosed in a circle". The circle in hieroglyph indicated a moat or a wall. The cross represented the convergence of roads which brought in

and redistributed men, merchandise and ideas. The concept of convergence entailed quickening of communication, which is nearly always a great advantage. The moat or wall needed not to be materially erected as long as it was morally present to keep the citizens together, shelter them from the wide world, conscious of belonging to a unique team and proud of being different from the open country.

A master historian of the medieval economics, Henri Pirene, maintains that the supreme test was whether or not a locality acted as a centre of distribution of wealth. He said "..... without a market, one could not speak of a city". This assertion corresponded significantly with the cross-roads definition of the hieroglyph, but made nothing of the wall, that rampart of oneness that urges not only the merchants, but all the citizens to work together like the cells of a living body; nor did it emphasise the glory that was of the Greek and Roman cities where the centre was the public city square, that open air ancestor town hall, which according to Aristotle "was for the land owning patricians, must not be dirtied by merchandise and should not be a thoroughfare for craftsmen and workmen".

The classic Greece and Rome identified themselves thoroughly with the city "..... all Greek and Roman towns, even the most industrious ones, belonged to the agrarian type". While the landed elite moulded in dignified leisure,the style of urban life, commerce was mainly in the hands of freedmen; often acting as straw men for landowners who did not wish to dirty their hands, and crafts were mainly exercised by slaves. Cleon, the tanner, or the leather manufacturer, the only business-man ever to attain a commanding role in the Athenian

democracy, proved a successful politician and general; yet was unanimously denounced as disgraceful and vulgar by the "best citizens and writers". In Rome, the trading class of 'knights' shared the political power with the landowners only when civil war gripped the Republic. Augustus did put the knights back where they belonged morally below the humblest farmer.

3.1.2 The Market City

The mood of urban society radically changed when the merchant became the leader, that is, when the "market city" appeared. This urban type did not emerge at the same time as the 'market', for the market existed in the agrarian city as well and, intermittently, even in the stockade city. It appeared when the market place and the public square became one thing, that was, when the superiority of the landowners was eliminated. This happened more than once, and in more than a geographical area. But nowhere was the transformation as sweeping as in Western Europe, and most particularly in Italy between the tenth and the fourteenth centuries. In Belgium and in many other countries the stockade or suburb of the merchants merged with the high city of the noblemen. In Italy, where merchants had always lived inside the town, the landowners themselves openly engaged in trade, associated as equals with ordinary merchants and other commoners and sold their land to invest the proceeds in commerce. Those who failed to do so gradually sank into economic and political insignificance. Wealth rather than birth thus became the main basis of class distinction, the foundation of power and prestige. Limitless gain displaced golden mediocrity as the supreme goal of the citizen.

The merchants ruled the cities; the most successful medieval communes frankly were governments of business, by businessmen and for business. The merchant rulers expected supranational bodies, such as the Pope, the Emperor, the King, to worry about ethical purposes while they ran the city as a chamber of commerce. If they tended to despise noblemen and craftsmen, it was because the former had lost their wealth and the latter had little chance to acquire it. The merchants believed that the status quo had changed in their favour and wished to see to it that any man may earn his dignified living according to his station. The motto this time was "If you have money, do not stand still nor keep it at home dead, for it is better unprofitably to act than unprofitably to stand by ... even if you gained nothing, you gain enough when you lose nothing of the capital and maintain your trade contacts".

3.1.3 Medieval - Renaissance Europe

According to many Islamic political scientists of the Medieval Ages, a city existed always and only when there was a mosque with a Friday preacher, a bazaar (market place) and a bathhouse. The Western Europe did not emphasise bathing, but was often stated that a set of walls, or an episcopal see, or the presence of a count or a royal charter of incorporation was necessary and sufficient legal condition for the existence of a city. Here the definition seemed to emphasise the central place of workship and administration but was silent about people and opportunities found in the city. But the constant flow of immigrants from the humble security of their villages confirmed

that the opportunities, liberties and pursuit of happiness were enough rewards for their advantures in commerce, industry and banking found in the merchants' city.

The marginal utility of the merchants determined the scope of technological innovations and economic development in the merchant city. It was very broad in scope, but not an all-embracing one. The commercial revolution of the later middle ages stopped short of an industrial revolution. It gave water mills to the fuller, whose work was especially strenuous and to the silk thrower, whose material was very expensive, but equipped the spinstress only with a spinning wheel, the weaver with a pedal loom. The pressure of the demand was not sufficient to warrant a greater investment in labour-saving devices for all stages of production. As a matter of fact, the revolution has started in a milieu where the luxury demand of a few wealthy people offered far greater opportunities than the ordinary consumption of the masses. Although its tendency was to increase the latter and to transform yesterdays luxury into todays treats and tomorrows necessity, it did not fully turn the minds of the merchants from a search for high profit from limited sales to a promotion of massive sales at low profit. According to S.R. Lopez (1966) minds change slowly:

> "it took the economic slump of the Rennaisance, the stern labour relations of the Reformation, the Midas Complex of Mercantalism and lastly, the great scientific and political revolutions of the eighteenth and nineteenth centuries to complete the switch and prepare the industrial city".

3.1.4 The Industrial City

Adam Smith pointed out two centuries ago, "Agglomeration of population beyond a certain degree of density per area, that is to say, emergence of a city, comes about with a certain minimum rise of productivity based on division of labour. The division of labour depends upon the size of the market; and the size of the market, in turn, depends on productivity". Here is an instance of "circular causation" which characterises a large part of socio-economic phenomena, in particular the economic aspect of urbanisation.

The urban phenomenon during the past three hundred years which manifested clearly in this mutually reinforcing character of their economic function, had in its background the evolution of a socio-economic system which is called capitalism. But it is also a fact of history that socialist and communist economic systems have produced very big flourishing cities. Thus it could be safely concluded that urbanisation does not always rest on capitalistic economic system for success. But among the three socio-economic systems the small urban retail trader, that constitutes the bullwark of the urban retail market place, suffered the worst set back in capitalistic economy. The huge department stores, the multiple chain stores and the hypermarkets have combined their efforts to reduce the urban market place to a status of almost insignificance in the city centre structure and service, in Western Europe.

In some cases cattle markets and wholesale markets are found located in proximity of the city centre but never form part of it. In particular, the heavy traffic they generate is not allowed to congest the approaches to the city centre and they are made to use a separate system

of link and service roads. The retail street market is in a somewhat different category. Whenever the central area is redeveloped, any existing retail market place is usually re-established - not, however, as a street market within the shopping centre proper, but on a specially provided site immediately adjacent to it and as near as possible to the market's original location.

The above resume has traced the known crucibles of known epochs in the evolutionary history of the market place as an important factor in the social, political, economic and spatial development of the urban structure. In the succeeding pages are discussed the social, political, economic and spatial significance of the retail market place in the Nigerian urban structure. This enabled the Nigerian urban market place scene to be placed on the evolutionary scale of the urban market place with a view to providing the necessary background for planning decision - Which way forward?

3.2 The Nigerian Urban Retail Market Background

The importance of the market place as a strong factor in the social, political, economic and spatial organisation of the Nigerian communities may be aptly summarised in the words of three geographers who have studied Nigerian market place institutions recently. According to J.A. Gana (1973):

"The market place (Kasuwa), as a physical institutional place for the exchange of goods and services, lies at the core of rural society. Indeed, it may be rightly regarded as the institution which gives spatial expression to the socio-economic framework of rural Hausa communities. Hence the network of market places connected by numerous footpaths and motorways, essentially shapes the spatial system within which the rural economy functions".

In his study of market institutions as central-places I.U. Ukwu (1969) observed:

> "The distinguishing factor in the institutional framework for commercial exchange in Iboland is the central importance of market places. ..... In Iboland the role of fixed central places is not as marked, traditional Ibo society was rural and agrarian. Organised within the context of extreme fragmentation of social and political units, interaction between communities led, not to the development of large centres, but to a proliferation of small ones. As the oft-repreated association of market place, shrine and meeting place shows, these centres were multifunctional and thus analogous to the central places of the modern Western type. But so simple were the organisation and the technical requirements of the various activities that there was often no fixation of activities and physical structures about these centres, no Christall-type 'crystallization of mass about a nucleus'".

B.W. Hodder (1969) analysed markets as institutions, and said:

> "The predominance of women traders in Yoruba markets - already traditional by early nineteenth century - probably resulted originally from the need to adapt marketing and trading to the dangers of movement through the countryside. Even during the earliest tribal wars the mutual need to hold markets seems normally to have been recognised sufficiently to allow transactions to be safely carried out on neutral territory:

the women would go to the market, the opposing warriors remaining at a distance on either side ... Their (women) importance today in Yoruba society is indicated by the fact that they are recognised as a class under the name 'market women'[1]. In the 1950 Lagos census of population, over 80% of the 39,000 classed as traders and sales workers were women; and politically their role has been recognised as considerable. Unlike their counterparts in Iboland, for instance, Yoruba women rarely work in the field, except to help with certain of the harvesting operations. Women in Yorubaland enjoy very considerable social and economic independence. They may be trading on their own account, perhaps with money or goods borrowed from their husbands; and their long tradition of independent marketing and petty trading with their own or at least with their family capital is thought to provide them with a much stronger basis for adjustment to an emancipated status than is available elsewhere[2]".

"Above all, however, marketing, petty trading, or at least attending a market, forms part of the Yoruba woman's way of life; and her reward may lie as much in the social life offered by the markets as in her cash profits. Petty trading in Yoruba is a skill, a pleasure and a necessity, and to walk through almost any market is to appreciate that trading is the essence of social life, from childhood upwards, (see Plate 3.1(a) page 68). There are not only bargains to be made, but gossip and banter and a chance to make assignations. It is as true of Yoruba women as of most West Africans, that they 'do not regard trade as an occupation..... and would not refer to it as such'. Certainly not all women in the market are interested in material profit to the same extent. Those who have a 'pin-money' trade, for instance, do not think primarily in terms of making a profit: the point is rather that they have something for sale in the market".

In traditional Muslem Hausa community trading is an occupation primarily carried out only by men as the wives are thoroughly housewives and at times secluded in the purdah. Among the Ibo, trading is fairly equally executed by men and women. Most Yoruba markets

Plate 3.1(a): Trading Apprenticeship starts from childhood.

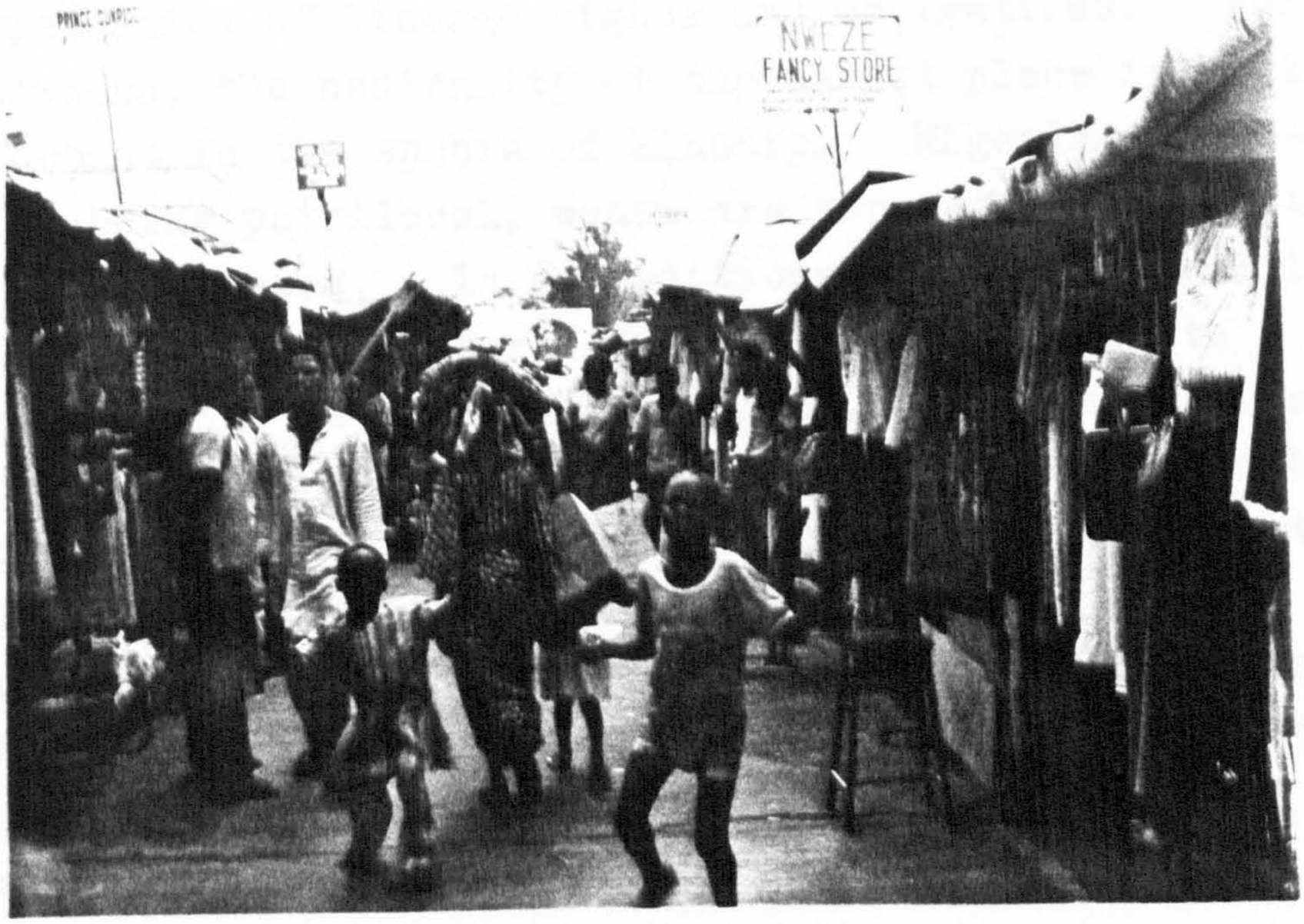


Plate 3.1(b): Controlling the children in the market place could be a problem for the marketing mothers.

contain no more than a handful of men, though there is some seasonal variation in this respect, more men appearing during the slack period in cocoa farming or when there is stock to buy or sell or much heavy work to do in the packing of kola nuts and casava flour.

It is discussed in Chapter 6 how Kaduna is the most cosmopolitan Nigerian city. It is not an original Hausa city-state nor a traditional Yoruba town or typical Ibo settlement, but rather a thorough amalgam of the three cultural and ethnic groups. Consequently the impact of the three groups on the market place institution provided the background for analysing the social, political, economic and spatial elements of the market place in the urban structure.

3.3 Urban Market Place as a Social-Political Element

One of the most significant and interesting ways in which markets fulfil an important social function for women concerns the use of the market as a place for the perpetuation of lineage rights and obligations. For the women, the neutrality of the market place is most important in the sphere of kinship. Nigerian households being patrilocal, women are separated from most of their kinsmen. In a traditional Nigerian community exists a lineage or part of a lineage, tracing its descent from the same male ancestor. The whole lineage itself is part of a vague social grouping, whose members recognise a distant kinship with each other, though the relationship is not traced directly. Women must travel to see their agnates or other kinsmen; and, as Bohannan has pointed out among The Tiv, this leads to worries on the part of the husbands about their hold over their spouses should they visit their natal

households. Worries of this kind do not arise when women can meet their kinsmen in a market. In the market a women can get all the news without creating a 'role conflict' in herself or arousing her husband's apprehension.[3] Moreover, as Marshall has noted, by making use of kinship, residential and associational ties at nearly all points along the distributive network, women today seek to secure their share of the market. The extent to which they have been successful has been correlated with the extent to which they have been able to cultivate and exploit various economic and social relationships as well as with the degree of their operational flexibility within the marketing structure. Clearly, many social patterns of women may be correlated with, affected by, or even have arisen out of women's participation in trade. Many social relationships, in fact, are facilitated, perpetuated and even caused by the marketing complex in urban community.

Spatially, this is particularly interesting in that it often explains why some women ignore nearby markets and attend more distant markets instead. In such cases the women feel that their social obligations and relationships outweigh the consideration of time, even of expense.

Religious aspects of markets may be considered under three headings: fetishes, Christianity and Islam. Most markets have or have had at some time a market fetish, its purpose being chiefly the maintenance of the peace of the market-place. Town spirits are still believed to meet and even to live in trees in or around the market-places. The custom of looping branches off the market trees whenever the reigning

Oba dies is still widespread throughout Yorubaland; for this ensures that the market spirits join in mourning the death of the Oba. At other times, sacrifices are made to these market spirits for the peace, profitable transaction and tranquility of the market, or even the town.

Just as most Ibo and Yoruba markets are associated with some fetish or other, so the early Christian and Muslim missionaries quickly recognised the value of the market as a place for the propagation of the gospel. Market-places were found to be 'useful for preaching'[4] in the phrase of many early missionaries, and many of the earlier churches and mosques were to be found there. The Central Mosque, the Catholic and the Protestant Cathedrals are adjacent to the Kaduna Central Market-place. Government agencies also joined in the exploitation of the market place for propagation of their own work, hence the siting of leprosy clinics on the sites of Kurmin Gwari Monday and Kawo-Talata Thursday periodic markets in Kaduna city.

On the other hand, neither Christianity nor Islam has had any effect at all on the periodicity of markets, which still completely ignores the seven-day week of the Christian and Muslem world. An effect, however, is felt in so far as the size of the market is concerned If a market falls on Sunday, it is rather smaller and begins to get into its stride later - that is, after the morning service - than usual. Generally the overall attendance is smaller than usual. Yet when a market falls on a Friday there does not seem to be marked difference except just after midday when the Muslems withdraw from the market to attend the prayers at the mosque; but they return to usual trading after

about 1-2 hours. During the vehicle entry and departure census at Kaduna Central Market Place, Fridays was one of the days of the week that very high traffic was recorded; Friday traffic was second only to that of Saturday. As far as the religious festivals are concerned, Christian festivals of Christmas and Easter, and the Muslim festivals of Eid el Fitr and Eid el Kabr result in increased marketing activity before the festivals and a sudden decline at the time of the festival itself, and recovery takes up to six weeks.

Apart from their sociological and religious significance, urban market serves as an effective meeting place of urban and rural cultures. By conscious and unconscious imitation, many urban fashions are copied by the villagers who attend urban markets and mix up with townspeople. Or conversely, when urban traders attend rural markets and mix up with villagers, the urban traders outfits are at times looked upon as a model by some interested villagers. In this sense, then, the urban markets play a significant role in bringing social change to the rural areas. As the dichotomy between town and country becomes more and more distinct, this characteristic is likely to become more important.

The socio-political element in the origin of markets can clearly be seen in their precise location, notably by the fact that the chief markets of the old traditional cities or town were normally in front of the residence of the Emir (in Muslim Emirates) or Oba in the case of the Yoruba towns, or the location decided by the community in the case of Ibo settlements.

The main market lying in front of the palace of the Oba is called 'Oja Oba', often contracted to 'Ojaba'. From this it could be seen how it is that the principal market of the town is always in the centre of the town and in front of the house of the chief ruler. Among the Yoruba the term 'Oloja' (one having a market) was used as a generic term or title of all chief rulers of a town, be he king or a chief. It is to this origin of the central market of many Yoruba towns that the practice of paying rents or dues to the chief while in return the chief saw to the maintenance of law, order and security and to the sanitary and physical structure of the market place. In railway new towns, of which Kaduna was one, and in most of the cities nowadays, the status of the market has not changed in the least; what has happened is that the responsibilities and rights of the Oba or Emir have been removed from him and have been conferred on the local government.

One of the most important non-economic functions of urban markets is their use as centres for dissemination of information relating to local and central government administration. This has been recognised by the government for a long time: "I have to inform you", wrote one official to the Oyo Resident in 1935, for example, "that arrangements have been made to issue a statement by bell ringer, in all markets in Oyo Province ..... urging all persons to combine to prevent the circulation of counterfeit coins".[5] Today at the local government level much is done in this way. The spread of knowledge about health matters, the vaccination of people against cholera and similar diseases: all these and similar matters can best be

spread through a market. Markets are also good places for the dissemination of political information and for politicians to meet the local people.

The form and extent of market organisation varies widely from market to market; and to some extent this is reflected in the physical layout of the market. An increasing number of markets are neatly laid out with a regular pattern of covered stalls with concrete walls and corrugated iron roofs. On the other hand, the majority of markets still contain temporary stalls. Other sellers take advantage of any local shade there is - under a tree, for instance, or sit out in the open, especially in the periodic markets.

Most groups of commodities are organised in trade guilds, better described as a cartel, each of which has some kind of organised head, himself (herself) often subject to a powerful head of all market men and women in the market. Trade associations of this kind, however, are of course a modern phenomenon, and cannot correctly be described as an element of traditional market administration.

The organisation of the market from the point of view of order and sanitation, is laid down in the State by a by-law, for instance Ejinrin Market, Western Region By-law, 1953, which states that a person will be committing an offence if he or she "allows a stall which he has hired to be unsanitary or fails to keep it clean" or "deposits refuse in any place other than in a receptacle provided for the purpose".
The various elements of the market place administration are catered for by different people. Thus at Kaduna Central Market Place disturbances are dealt with by the police, trade disputes and general running of the

market place by the market master, sanitation by health officers. There is a squad of fire-fighters.

Urban markets, in fact, demonstrate those characteristics of social institutions as that term is used by social anthropologists: that is, that market places have social organisation, values, material objects and event sequences.[6] Of urban market places, it can be shown that: (i) each market place has a social organisation; (ii) there is a set of notions and ideas or values about what a market should be; (iii) centering on each market place there is a set of events which follow one another in a regular and predictable pattern; and (iv) material objects - goods of one form or another - are exchanged in the markets. The next section concentrates attention on the last two of these characteristics in an analysis of economic element of urban market places.

3.4 Urban Market Place as an Economic Element

Classification of urban market places based on the division between retail and wholesale trading was found to have little value because, as in most other under-developed economies, a clear cut distinction between a retail and a wholesale trader is not yet a significant distinguishing factor. Kaduna central market place included at least some physical confrontation of retail and wholesale trading, see plates 3.2(a), 3.2(b), page 78 . A similarly unworkable classification in the context of Kaduna city focuses attention on the kinds of goods or services provided in the markets: for instance (i) personal service markets; (ii)

Plate 3.2(a): Wholesale marketing of bulked yam (in the CMP).

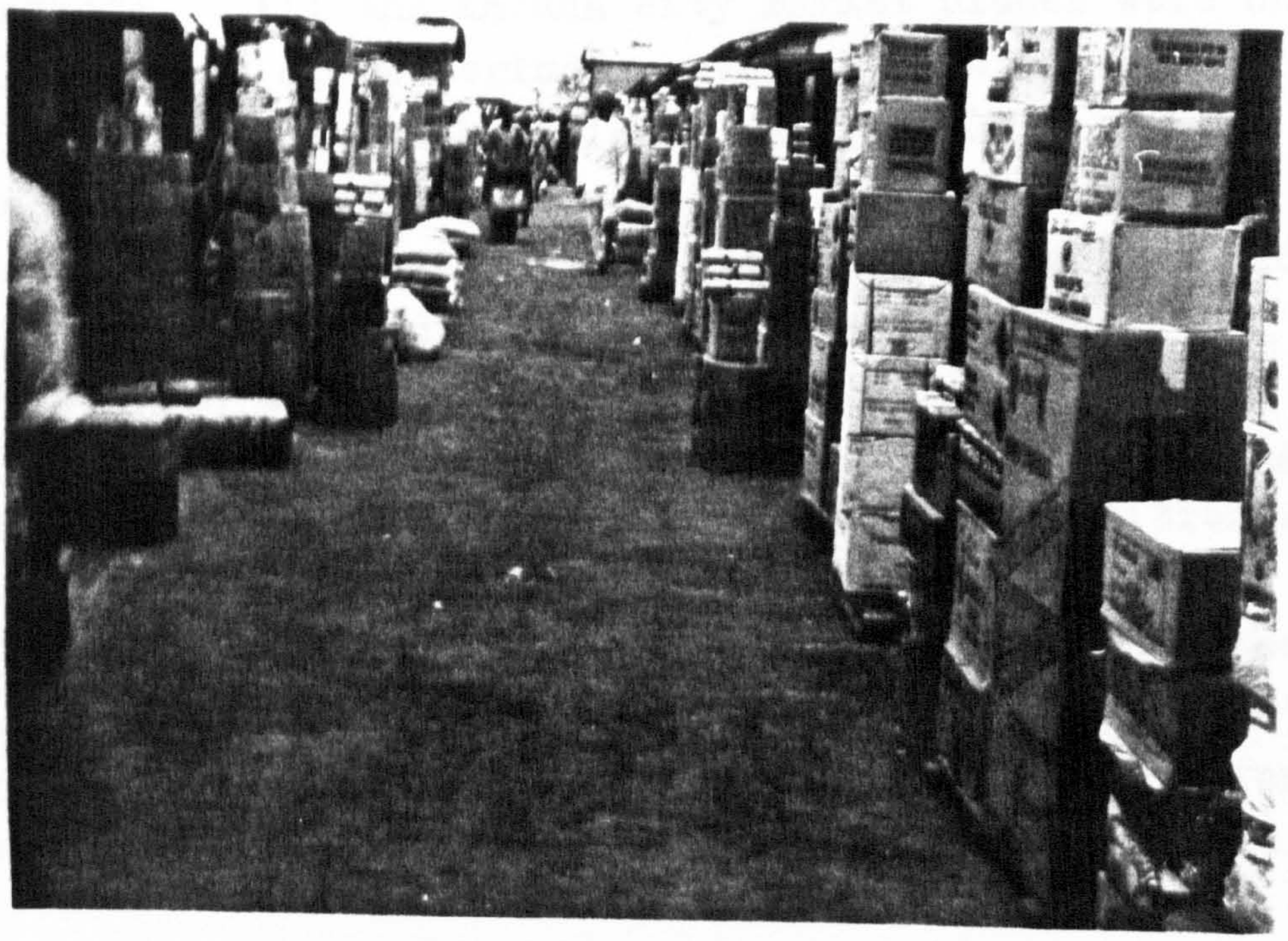


Plate 3.2(b): Wholesale marketing of factory produce (in the CMP).

perishable produce markets; (iii) agricultural staple markets; (iv) manufactured consumer goods markets, and (v) capital goods markets. Most Kaduna markets exhibited important elements of the first four types. Yet another classification has a simpler morphological basis, and may distinguish between street (linear) markets, triangular markets, rectangular markets and circular markets. Such a classification has a high value for the town planner because each of these geometric forms had implied capacity and space organisation restrictions and potentials. In Kaduna city the markets are rectangular due to the fact that these markets are located within residential areas that are laid out in the traditional grid-iron pattern.

Another suggested classification is based upon location in the spatial setting of the city; this is discussed in detail in the next section. The next tentative classification is based upon periodicity. This classification distinguished between (i) periodic markets; (ii) daily markets, and (iii) daily-periodic markets. All the Kaduna city market places were one time or the other periodic, even the Central Market Place was 7-day week periodic market, but with increasing urbanisation, the periodicity aspect has gradually faded away. Periodicity, strongly rooted in the native tradition, was observed in Ungwan Television Market. Although it sits daily, it has 5-day periodicity; being located in the urban fringe and still influenced by the local Kachia tradition and the time factor operating prior to adoption of the 7-day moslem week. Kurmin Gwari, although attached administratively to Makera market, stands on separate ground and is attended only on Monday in association with the leprosy clinic that constituted part of it.

Daily-periodicity is the strongest phenomenon in Kawo-Talata market. It derived such a strength from the fact that it lies near agricultural sites in addition to the Tuesday weekly leprosy clinic.

Marketing activity in Kaduna owes a lot to the periodicity of the urban and rural markets in Iboland and Yorubaland where seasonal crops are bulked for distribution in Kaduna city. The traditional Ibo week, like that of the Yoruba and that of so many other West African peoples, is a 4-day week. Some large markets sit every other week day, is 8-day periodicity. Within the daily and periodic markets there is another form of periodicity, based purely on the time of day when the market sits such as, day, morning or night. Therefore, the full classification is given as:

Periodic Markets (Day or Night)	4-day
	8-day
Daily Markets	Day
	Morning
	Evening/Night

According to A.L. Kroeber (1948) the fairly compact distribution of this African 4-day week points to a common origin. The early Roman, he noted, observed a regular 8-day market and semi-holiday; but how this might be connected with African institution; it cannot be historically linked with it.

3.4.1 Periodic Markets

The dominant economic function of periodic markets is the collection, bulking and distribution of local food products, the products of local food processing, and local craft industrial products. Local foodstuffs, such as maize, cassava, vegetables, like tomatoes and okoro, pots, calabashes, firewood and bundles of wrapping leaves: all are carried by men, often on donkey back, chiefly from within the market ring or rings in which the market lies; see plate 3.3 page 82 .

The secondary, though still important, economic function of periodic markets is as distributing points of goods imported from other parts of Nigeria and from abroad. Thus palm oil and garri from Aba and oranges from the Ibadan area or bicycle from Britain may have been bought from the CMP or other larger towns by traders who then carry their goods into the periodic markets for resale, see plate 3.4 , page 82 .

The movement of local farm or craft produce into the periodic markets is not a simple movement of the producer carrying his produce to the market, though in a few cases this does happen. More commonly, a trader has acted as a first-level intermediary buying goods from a number of farmers to sell at the markets, and even in some cases buying from traders who already have bought from the farmers.

The other main movement of goods into a periodic market concerns the movement from the city of imported goods not obtainable in the immediate locality of a market. Individually the scale of trading may again be very

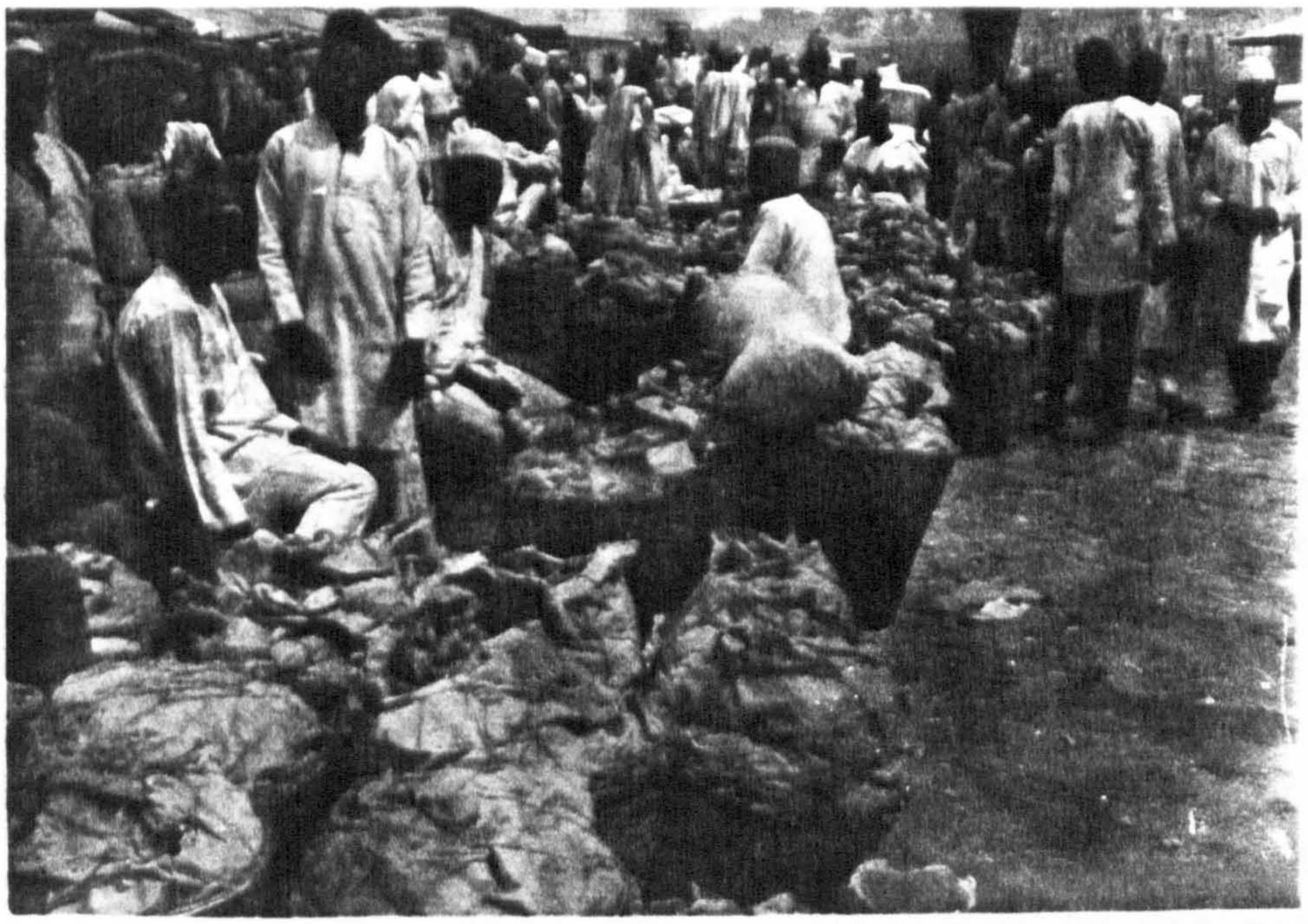


Plate 3.3: Wholesale marketing of tomatoes bulked-up locally and from the 10 Northern States (in the CMP).

Plate 3.4: Wholesale marketing of long-distance bulked oranges, onions, beans and garri (in the CMP).

small, a trader's entire wares of imported goods often being contained in a suitcase, yet these traders clearly serve an important function in bringing within reach of the rural population cloth, imported stock-fish, matches, salt, sugar and all those goods otherwise obtainable only in the city. These traders, of whom there are many, normally visit several markets within a 'ring' before returning to town to replenish their stock, usually held in the CMP, Tudun Wada market, or even in their homes.

In analysing the movement of goods away from the periodic market, three categories of movement may be distinguished, see Fig.3.1 page 84. First, there is the movement to the surrounding settlements in the market ring area. When a trader leaves a market, he will rarely leave without having bought something, even though his main purpose in attending the market was to sell and not to buy; for the market is also his local shop where he can buy his requirements of food, imported materials and the products of local craft industries. In the second place, there is the movement of traders to other markets in the same or neighbouring rings. These traders, buying at one market and selling at another, perhaps after some form of bulking, are clearly aiding the movement of goods through the region or the ring system. Finally, goods will be taken out of a market by bulk buyers from the city and even in some cases by individual buyers from the city who come to buy goods which are either unobtainable or too expensive in the city; or they may be traders who have come to buy goods for sale in urban markets. The market ring is not limited by urban boundary; in some cases it overlaps between urban areas or between urban and its hinterland.

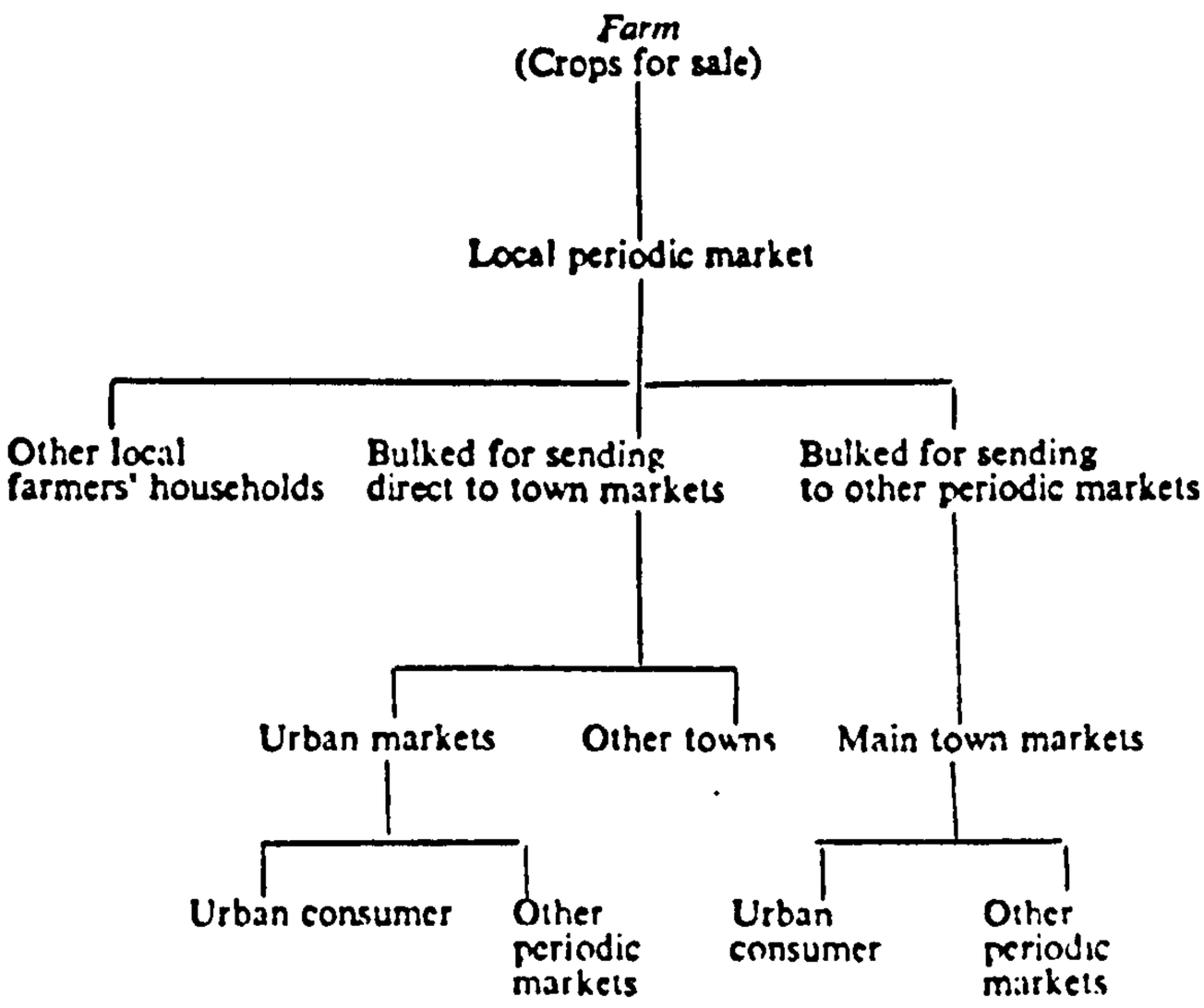


Figure 3.1: The Distribution of Farm Produce.

Source: Markets in West Africa, Ibadan University Press (1969), page 74.

Author: Hodder, B.W. (1969).

The key to the understanding of the economic, as well as the non-economic functions of urban periodic markets lies in the existence of the ring system, (see figure 1.2, page 21) which clearly involves what in sum constitutes large daily movement of people and goods. Within a ring area the majority of the itinerary traders attend more than one market and may in fact attend most of them. The frequent repetition of activities in a periodic market is the result of a number of factors, of which perhaps the two most important are the lack of storage facilities - both on the part of the producer and the consumer.

3.4.2 Bulking and Servicing

A great variety of bulking operations occur. Thus a trader may come to market with a handful of tomatoes and sell them to another trader who is intending to buy a few more small lots before selling to another trader who may then sell to a town trader on the spot. This kind of bulking may sometimes occur on a larger scale and as a result of the ring system.

In association with this bulking process, facilities are increasingly being provided for the machine milling of maize or cassava. The mill is usually in a building on the edge of the market site and the milling of maize and cassava is carried out both for the individual farmer and for the bulk buyer. Other services include bulk packing and selling of an increasing range of commodities, though so far it is most common with two commodities, tomatoes and pepper. The operation is carried out almost exclusively by men, see plate 3.5 page 86 .

Finally, there is the provision of a host of miscellaneous services. At Kurmin Gwari market place, for

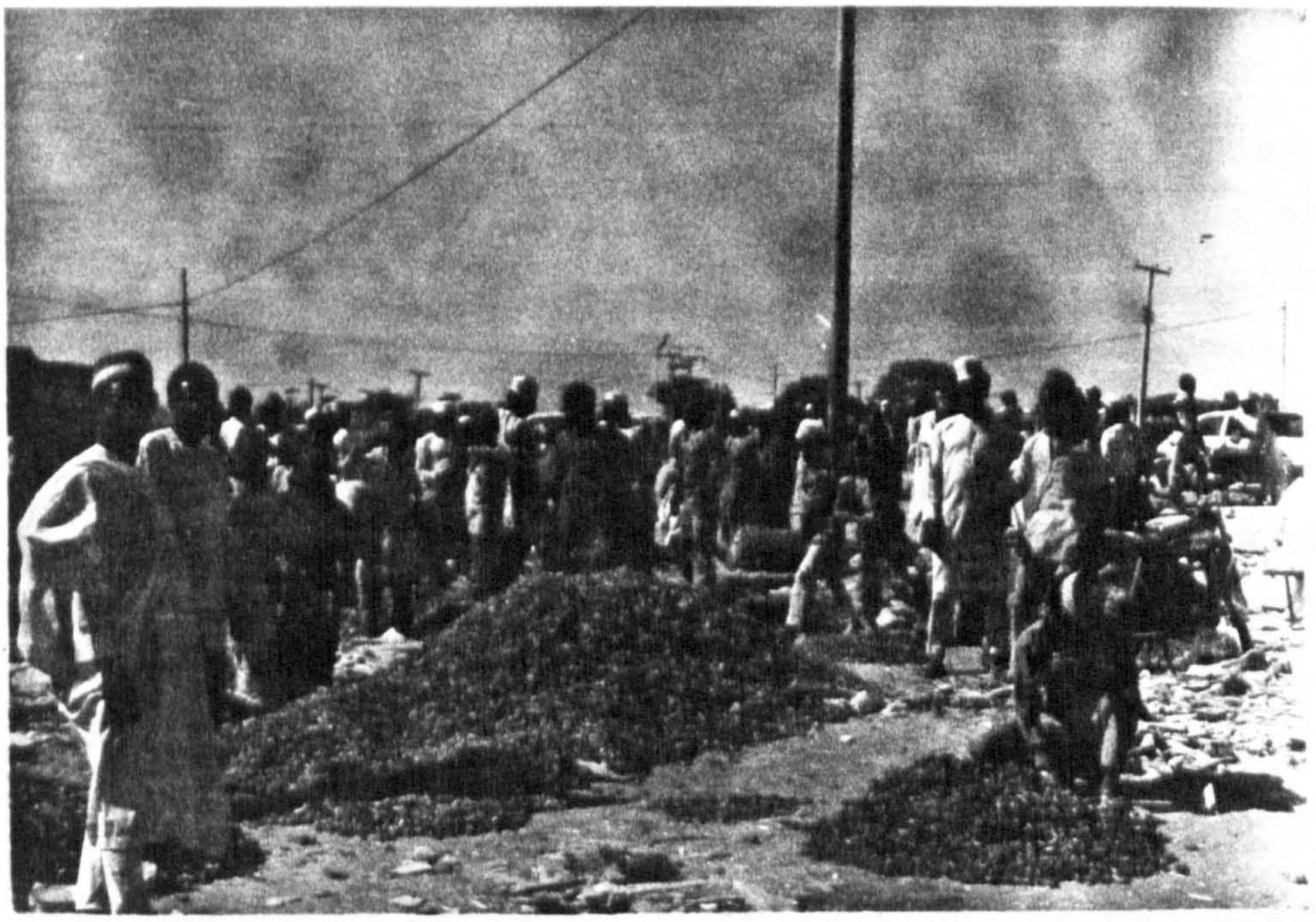


Plate 3.5: Bulking-up post near Zaria city wall at the junction of the Kano By-Pass and Zaria-Kaduna roads.

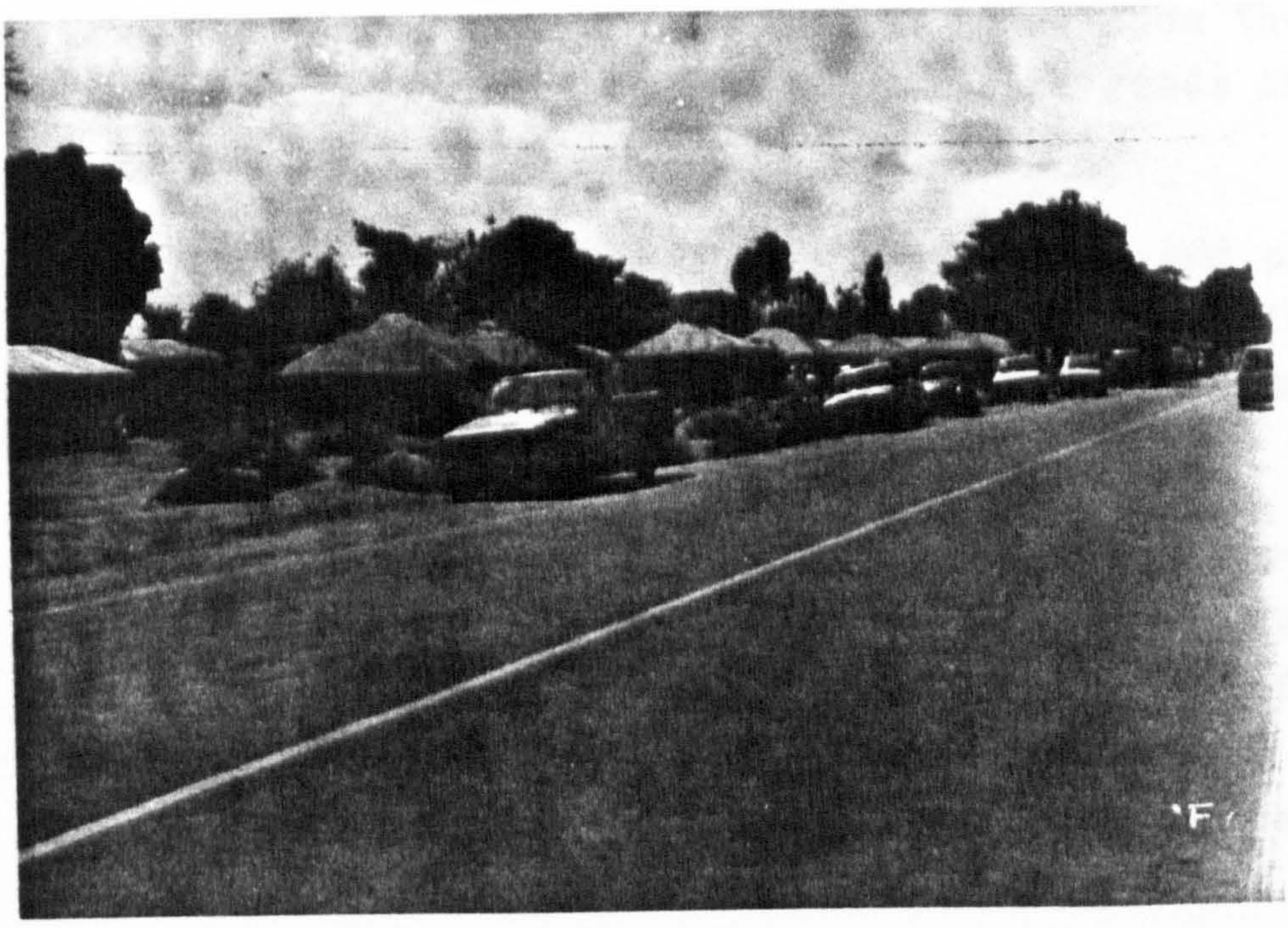


Plate 3.6: Forestalling Point on the Zaria-Kaduna Highway. This is also one such example of regional shopping.

instance, there are normally three blacksmiths working daily on the site. But on the market day there is an influx of about 18 other blacksmiths and traders selling farming implements and cooking utensils to compete with the three permanent blacksmiths. Such itinerant craftsmen like carpenters, barbers, bicycle and watch repairers are a feature of the periodic markets, and they visit the different markets together with the itinerant traders already referred to.

3.4.3 Daily Markets

Although daily markets, by definition, do not operate on a ring system, they are clearly similarly dependent on one another in many ways and show an event sequence of some interest and importance. There are many similarities in characteristics and functions between the various types of daily markets and between daily markets on the one hand and periodic markets on the other. But significant functional differences do exist; and these are to some extent based upon the differing forms of movement of traders and goods into the markets.

As far as the products of indigenous farming and craft industries are concerned, six main ways of marketing or moving the goods into the daily markets of the city may be recognised.

(i) Buyers in the city may go directly to the farms to buy produce and then transport it into the city. For example, yams may be offered for sale at the farms, and bought on the spot by urban middlemen. This method of cash sale is popular with farmers because it

provides large amounts of cash at a time. It is also popular with those farmers whose farms are so far away from the city markets and the farmer cannot transport the yams to the city markets. It does imply both that the farmer has a large plot and that the trader has enough capital to indulge in this large-scale buying and movement of crops from the farms to the town markets.

(ii) The choice here is for the middlemen buyers to intercept the farmer and his men carrying produce from the farm to the main daily market of the city. This method has advantages for both buyer and seller. The buyer, unlike the seller, is conversant with the current price in the city market and can adjust his buying price accordingly. For the seller, this method is convenient in that he does not have to waste time and energy in going into the market to sell, perhaps piecemeal rather than in bulk. This aspect of marketing is in essence similar to the forestalling practised around many periodic markets. Wayside markets have in many cases developed out of these forestalling points along the roads leading to the city; one such market is the bulking post near Zaria city wall at the junction of the Kano By-pass and Zaria-Kaduna roads; see plate 3.5 page 86 . Plate 3.6 page 86 shows another such forestalling point on the Zaria-Kaduna highway. As the picture showed, it is not only traders who buy the produce displayed for sale, but other road users and motorists stop to make such purchases for the use of their households. This is one such example of regional shopping.

(iii) The third method eliminates the middlemen and involves the trader who sells in the main daily markets, and those from the villages around who have preferred

to come right into the main markets themselves; they form part of the sellers in plate 3.3 page 82 .

(iv) The fourth type involved those who go to one or more periodic markets in an adjacent market ring, as has already been noted, constitute the most important kind of movement in terms of volume of produce carried. Local produce will already have been bulked up to a certain point in the periodic markets and it can thus easily be brought into the town daily market by lorry.

(v) Fifthly, there is the long-distance movement of goods - farm or craft industrial products from one part of the 10 Northern States or another, in which such goods as millet, textiles, onions, beans, yams, etc. may be transported by lorry from the main source area to the CMP for distribution to other markets in the city.

(vi) Finally, there is the long-distance movement of goods by motor trucks or train from the Southern parts of Nigeria - the movement of palm oil, garri, imported merchandise from the 4 Eastern States, or cassava flour, kola nuts, fruits from the 5 Western States (including Bendel State).

Goods imported from overseas or from the industries in Nigeria by the large European firms arrive at the Kaduna depots of the importing firms, notably U.A.C.,[7] C.F.A.O.,[8] S.C.O.A.,[9] U.T.C.,[10] P.Z.,[11] G.B.O.,[12], Leventis, Gottschalk, Chellerams. From the depots the goods are transported in vans or handtrucks (see plate 3.7a , page 90) to the CMP, from where they eventually enter the distributive channels.

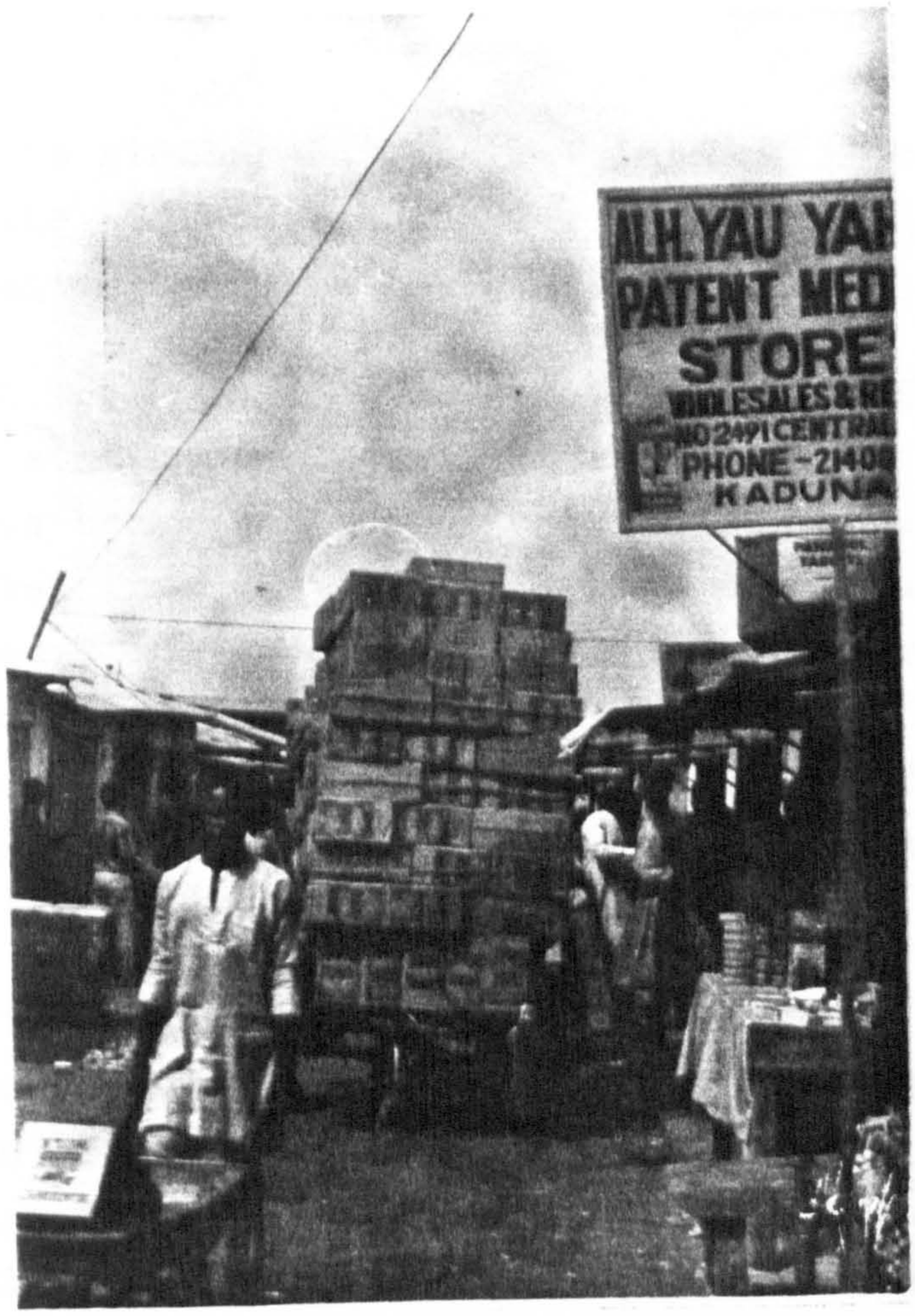


Plate 3.7(a): Goods being transported from U.A.C. in Hand Truck into a CMP stall.

Plate 3.7(b): Shoppers arriving at the CMP in minibus, on motor cycles and on foot. (The motor cycles are parked on the road and footways).

There is similar outward movement of imported goods from the CMP to the smaller towns of the states and the smaller markets in Kaduna city.

Though there is some movement by headloading from the lorry station to the stalls in the CMP, the bulk of produce brought into the market in vans and motor trucks is moved into the stalls in hand trucks and wheel-barrows. Goods brought into the city by train are unloaded at the railway station near the Railway Station Market Place, from where the goods are moved in vans and hand trucks to the CMP and the other market places in the city.

Galletti, Badwin and Diana (1956) argued that the "large numbers selling in the markets, and the small margin of profit which most of them seem to be content, suggest that there is much underemployment of labour, a liking for trade as activity, ... and few other activities offering return for the capital and labour commanded". However, B.W. Hodder (1969) asserted that "While it is important to remember that many African societies are still only beginning to separate out 'economic' from other activities, it would be utterly false to assume that they lack economic sense ..... On the other hand, the observation that this system of distribution is apparently wasteful of time and energy does not necessarily imply that the system is inefficient". Admittedly there is a frequent repetition of process and an inordinately large number of intermediaries. Yet the profits made by all these intermediaries are small, and it is by no means certain that the final retail price would be lower if only one, rather say, three intermediaries were used. Traders

have few overheads and can operate on very low profit margins.

Moreover, for a host of reasons, market traders provide a service which could not be given by shops and stores. Most consumers prefer to buy from market traders rather than retail stores of European firms, which cater largely for the Europeans or wealthier class of Africans. Many of the popular kinds of goods are only to be found in the market places. Illiterates are more at ease in markets where there are no price tags and where bargaining is expected. P.T. Bauer (1954), indeed, goes so far as to argue that in the prevailing social and economic context in West Africa, the present system is the most efficient . In conveying goods from producer to consumer, the market traders substituted labour for capital; and in the process they are provided with a source of cash income in a situation where alternative forms of employment are few, or entirely lacking.

So far the discussion has concentrated on the social and economic context of urban market place. As an institution and process which occur universally, its spatial context is equally important, and that is the matter discussed in the next section of this thesis.

3.5 Urban Market Place as a Spatial Element

In central-place studies the key idea seems to be that of the urban hierarchy, each town being the node of a region, and the centre of a lower order, together with their complementary region becoming in turn oriented to a higher order centre. Although, according to J.U. Marshall (1964), there is some doubt about the general applicability of the numerous empirical and deductive models and, more fundamentally, as remarked by B.J.L. Berry (1961), "Some doubt about the reality of breaks in the central-place rank/size gradient - and hence about the validity of the concept of the hierarchy itself - urban orientation of the analysis is unchallenged. Even studies based on rural communities have as their end product the evaluation of rural centres, which are at the bottom of the central-place hierarchy, and the delimitation of their service areas".

As was pointed out in Chapter 2, in Ibo settlements the role of fixed central places was not as marked as was the cases in Yoruba agrarian cities and Hausa city-states. Organised within the context of extreme fragmentation of social and political units, the Ibos, owing to their republican nature, evolved rotating centres in a rural setting. In the Yoruba towns central activities were focussed on the Oba's palace and palace ground. In the case of the Hausa city-state the Emirs palace and its grounds provided the centralizing effect needed. Be it Ibo, Yoruba or Hausa settlement, the dominant central organizing element is the market place.

Urban development was subsequent to European economic and cultural invasion. The European central-place type of institutions such as wholesale warehouses, buying stations and permanent department stores and retail shops, were an entirely new phenomenon. Most of them were located in the towns. Some were dispersed in rural centres, on market sites in settlements away from them.

For analytical reasons we may regard the exchange system as made up of two sub-systems, the central-place sub-system and the market-place sub-system. For each of these there is a certain hierarchical structure depending on the type and variety of goods and services obtainable at the various centres and on the size of the service area. The two sub-systems are functionally and spatially integrated. Some goods or services tend to remain in one sub-system or the other, moving up and down the hierarchy in their circulation, while others use both channels simultaneously or at different stages.

For a study of the operations of the exchange system, however, classification based on history, form and function could be inappropriate because there are obvious connections between history, form and function. But, however, in a dynamic context, form and function are often out of step. A declining centre - say an old trade post or a periodic inter-group market - may retain some features from its glorious past, while the growing importance of a centre may outstrip its formal standing. Regarding market places, the periodicity of a market is no indication of its size, the range of commodities sold within it, or the size of its service area. A small local market for sauce ingredients may be held daily like the city central market, but the

principal district market in the area may be held only once in eight or seven days. Also the integration of the CMP into its local and rural setting by spatial marketing pattern has gone a long way to reduce the friction of social distance between the urban businessmen traders and the hinterland rural farmers. It has also contributed to the development of the road pattern in the city-region.

U.I. Ukwu (1969) made classification of the various market place institution on the following purely functional criteria:

1. the location of the centre, whether it is urban or rural.
2. its functional rank - metropolitan, central (i.e. regional) or local.
3. sub-system to which it belongs.

Using empirical evidence, he suggested five categories in each of the two sub-systems as follows:

TABLE 3.1 : Categories of Central-Place and Market Sub-Systems

Central-Place Sub-System	Market Sub-System
A	B
1. Metropolitan Centre	Metropolitan Market
2. Urban Centre	Urban Central Market
3. Urban Neighbourhood Shopping District	Urban Local or Neighbourhood Market
4. Rural Regional Centre	Rural Central Market
5. Rural Local Centre	Rural Local Market

Source: Markets in West Africa, p. 155.

3.6 The Evolutionary Scale of Nigerian Urban Market Places

In respect of distribution and sale of bulked foodstuff, it is tempting to compare Nigerian Urban central/special market places with the "fairs" and the Urban district/ neighbourhood market places with the "markets" of Medieval Europe, where a distinction could be drawn between fairs and markets. In the medieval sense of the term, fairs were exclusively associated with long distance trading, and supplied goods from distant sources, whereas markets were for a much more restricted local exchange. As one oft-quoted thirteenth century writer put it, "fairs deal with large things ..... and to them come men from afar. Markets are for lesser things, the daily necessities of life..... and only people from near at hand come."[13] Both in size and function, fairs differed from markets: fairs were larger, served a much wider population and dealt in goods from a much larger area, including goods - especially luxury goods - from other countries.

However, W.D. Hambly, writing in 1935, observed, "the large market places of Nigeria are not a typical Negro trait; they resemble the large bazaars of North Africa and Egyptian towns. There is nothing in the general style and organization of the extensive markets of Ibadan and Ilorin to justify their inclusion with the unpretentious trade of typical Negroes".

One of the important considerations arising out of this study of urban market places is the close association of the daily markets with the growth of retail shopping districts. With accelerated economic growth, and Nigerians being increasingly involved in the

national network distribution of non-perishable goods, the central market place and its retail shopping district now include considerable wholesale and warehousing of non-perishable goods.

This relates to the process which occurred similarly in Western Europe, notably in the eighteenth and nineteenth centuries. Covent Garden, for example, almost entirely changed its functions with the expansion of London: "from being a favoured retail centre of Old London ... its retail functions have narrowed more and more with the enormous increase of fruit and vegetable consumption and the consequent growth of the more convenient peripheral markets, until it has become mainly concerned with wholesale distribution".[14] Similarly, the Paris Halles, now chiefly the headquarters of the wholesale trade, was originally a food market of the primitive type in which townsmen bought from peasants. At the same time, this development of specialised wholesale market was taking place parallel to the growth of retail shops. These shops began to take over many of the functions of the earlier markets. Many sellers began to take shops which at first perhaps only opened on the market days, but which served as stores for the wares they hawked in the surrounding villages on the non-market days. Signs of these kinds of changes are already clear in Tudun Wada and Kaduna city central market places respectively. Most of the roadside traders on Ahmadu Bello Way use stalls in Kaduna city central market place for storage of their merchandise (mostly clothes and shoes) at the end of the day's marketing; and when the CMP opens in the morning, the hawkers use hand trucks to cart away their wares to their locations on the highway. The itinerant second-hand clothes traders have their

depots in Tudun Wada market place from where they take off and return to after attending the periodic markets in the ring.

Before the Nigerian Civil War (1967-70) such prestigious and luxury goods as radios, refrigerators, cookers and even high quality shoes and clothes could only be bought in the European and Asian department stores. By the mid-seventies these items began to appear in the urban market places; and because the market trader marketed them at profit margin much less than the European and Asian shops, these goods were offered for sale at prices affordable by a greater proportion of the population. Consequently, the urban market places became more popular with an increasing percentage of the population. By the end of the seventies those high value goods, in addition to the TV sets, had become usual items of display in the market place. In the lean period of foreign reserve and low official importation of goods, in the early 80s, the smuggling of goods across the border had thrived to the extent that most high quality clothes, shoes and watches were better bought in the urban market place. This seems to imply that the urban market places were competing favourably with the superstores and the shopping streets in the marketing of these luxury and prestigious goods. In the context of the industrialised Western Europe, such luxury and prestigious goods are only bought in the large department stores, multiple chain stores and hypermarkets.

From the foregoing debate, it could be concluded that the Nigerian urban market places exhibit the following characteristics:

1. In respect of marketing of bulked foodstuffs they operate like the fairs and markets of medieval Europe;

2. In respect of wholesale of non-perishable goods they lean towards eighteenth and nineteenth century wholesale shops of Western Europe;

3. In respect of marketing of prestigious and luxury goods they tilt towards the high street shops of twentieth century industrialised Western Europe;

4. In general style and organisation they resemble the large bazaars of twentieth century North Africa and Egyptian towns

Those characteristics which are social, political, economic and physical have indicated the general mood of the Nigerian people who are served by those market place institutions. Those characteristics, no doubt, have arisen out of the genuine demands of the people. This implies that the latitude of the shopping demands of Nigerians spans between the medieval and twentieth century Europe. The pertinent question now is which way forward for Nigeria?

The answer to that question may provide a good guide - to urban and regional planning, to plans for commercial and business expansion and to economic development generally. In an attempt to provide an answer to the above question, B.W. Hodder and U.I. Ukwu (1969) suggested that "all the types and operations of markets in Southern Nigeria and probably throughout West Africa, may be seen as intermediate stages on a single, albeit many-stranded continuum from the most elementary to the

most complicated economies. Simply and diagramatically stated, the argument can be represented as follows:

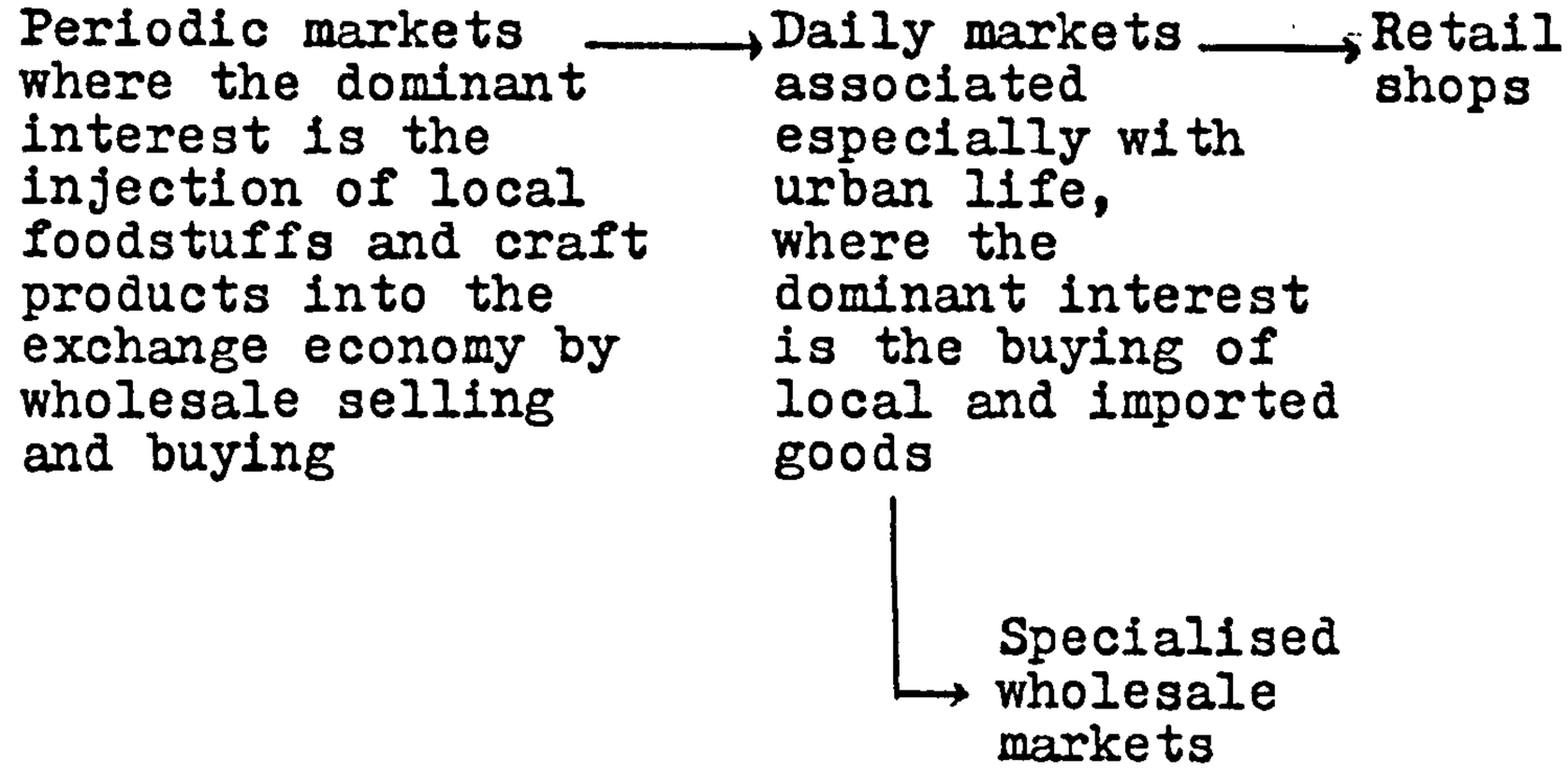


Figure 3.2 : Conceptual Framework of Market Institutions (constructed by Hodder, B.W. and Ukwu, U.I. (1969)).

The above conceptual framework provided the basic postulation which formed the basis on which this land use planning thesis proceeded to examine the highly varied, complex phenomena of demand and supply of activity spaces in Nigerian urban market places, which have resulted in congestion of people and vehicles in the central market places. Since retail trading/ shopping are urban activities which affect and are affected by other land uses and the traffic carried in the urban pathways, the thesis found it useful to begin the examination with the research question:

> "What development planning policy, at urban level, can achieve balanced demand and supply of activity spaces in the market places, with the view to optimising their locational and structural potentials?"

The extents to which the research question above can be appropriately answered by existing approaches to retail study, are discussed in Chapter 4.

Notes and References: Chapter 3

1. Mabogunje, A.L. "Yoruba Market Woman", Ibadan, No. 9, 1959, pp. 5-12.

2. Morris, P. Family and social change in an African city. North Western University, 1961, p. 145.

3. Bohannan, P. has noted this, for instance, among The Tiv, in his unpublished manuscript: The Tiv Market Place, 1961.

4. H. Clapperton and R. Lander, journal of a second expedition into the interior of Africa from the Bight of Benin to Soccattoo. London, 1829; R. Lander, Records of Clapperton's last expedition to Africa. London, 1830, 2 volumes; R. Lander and J. Lander, journal of an expedition to explore the course and termination of the Niger river. London, 1832, 3 volumes. Apart from the invaluable records to be found in the Church Missionary Intelligencer, Proceedings of the Church-Missionary Society and Church Missionary Gleaner, see S. Tucker, Abeokuta, or Sunrise within the tropics. London, 1853; T.J. Bowen, Adventures and missionary labours in several countries in the interior of Africa. Charleston, 1857; and G. Townsend, Memoir of the Reverend Henry Townsend. London, 1887.

5. N.R.O., Oyo Papers, 1935.

6. Behannan P. op. cit., p. 11.

7. United Africa Company.

8. Compagnie Francaise de l'Afrique Occidentale.

9. Societe Centrale de l'Ouest Africain.

10. Union Trading Company.

11. Patterson Zochonis.

12. G.B. Ollivant.

13. Humbert de Romans (1194-1277) quoted in M.W. Thomas, English economic history. London, 1957, p. 64.

14. Wallis, G.E. "History of Covent Garden Market", Economics, Vol. 2, No. 7, 1932, p. 375.

CHAPTER 4

EXISTING APPROACHES TO RETAIL STUDY

4.0 Introduction

The conceptual framework postulated in page 100 provided simple logical structure to socio-political, economic and physical processes which require rationalistic explanation. Thus, because of the superiority of rational thought in helping humans to figure out the material world - a factor which suggests that socio-political, economic and physical processes have underlying rational structure of their own - there is justification for the process of "a priori" theory formulation with a view to explaining material processes. These may later be adjusted in the light of observations, although not in such fundamental ways as to destroy the initial conceptual framework.

Rationalistic explanation, in its clearest form, as presented by Descartes, is the logic of mathematical proof which supplies the criteria by which claims to cognitive knowledge are adjudicated as valid or not. Benton (1977, p. 101) pointed out that as Descartes assumed the rationalist principles of mathematics to be accessible to everyone, then the question of inter-subjective agreement upon criteria would not arise, as is the case with conventionalist epistemology. Thus rationalist thought is tied closely to the level of theory, and is primarily concerned with relationships between concepts which are defined by the observables and by their logical connections and implications.

Nonetheless, two bodies of theory exist in retail study: one using mathematical models and the other relies on more conventional method of specially constructed survey and data analysis.

Therefore, to provide the necessary springboard for a new theory building, it is customary to review the extent to which existing mathematical models and methods of specially constructed survey and data analysis provided the right answer to the research question:

> What development planning policy, at urban level, can achieve balanced demand and supply of activity spaces in the market places, with the view to optimising their locational and structural potentials?

The retail study approaches reviewed are classified under the following sub-headings:

1. The classical approach
2. Catchment area and trade distribution techniques
3. Retail turnover and floor-space predictive techniques
4. Urban planning framework for retail sizes and location
5. Retail location models

4.1 The Classical Approach

The classical approaches consisted of primary considerations of economic, sociological and physical conditions which make sales possible in an ideal situation. Some of these primary considerations constitute the matter of this section.

4.1.1 Spatial Dimensions of Consumers Travel Costs

In the classical economic theory of non-spatial perfect competition, if a retailer raises the price of a good above a common equilibrium value, then he loses all his trade in that good. But when a spatial dimension is introduced into the theory, then this is no longer the case (see for example, Hotelling (1920); Chamberlin (1937); Lerner and Singer (1937); Smithies (1941); Losch (1954); and Isard (1966)). The spatial dimension is introduced by including consumer travel costs with the conventional factors of production; to the consumer the travel costs then have the same effects as a higher price and as a result, if a retailer raises his price, then he loses only a portion of his trade. If it is assumed that in choosing a shop the consumer rationally balances travel costs with selling price, then for a single homogeneous good in a perfectly competitive market, the volume of goods sold and the emergent price can be found for any particular location .

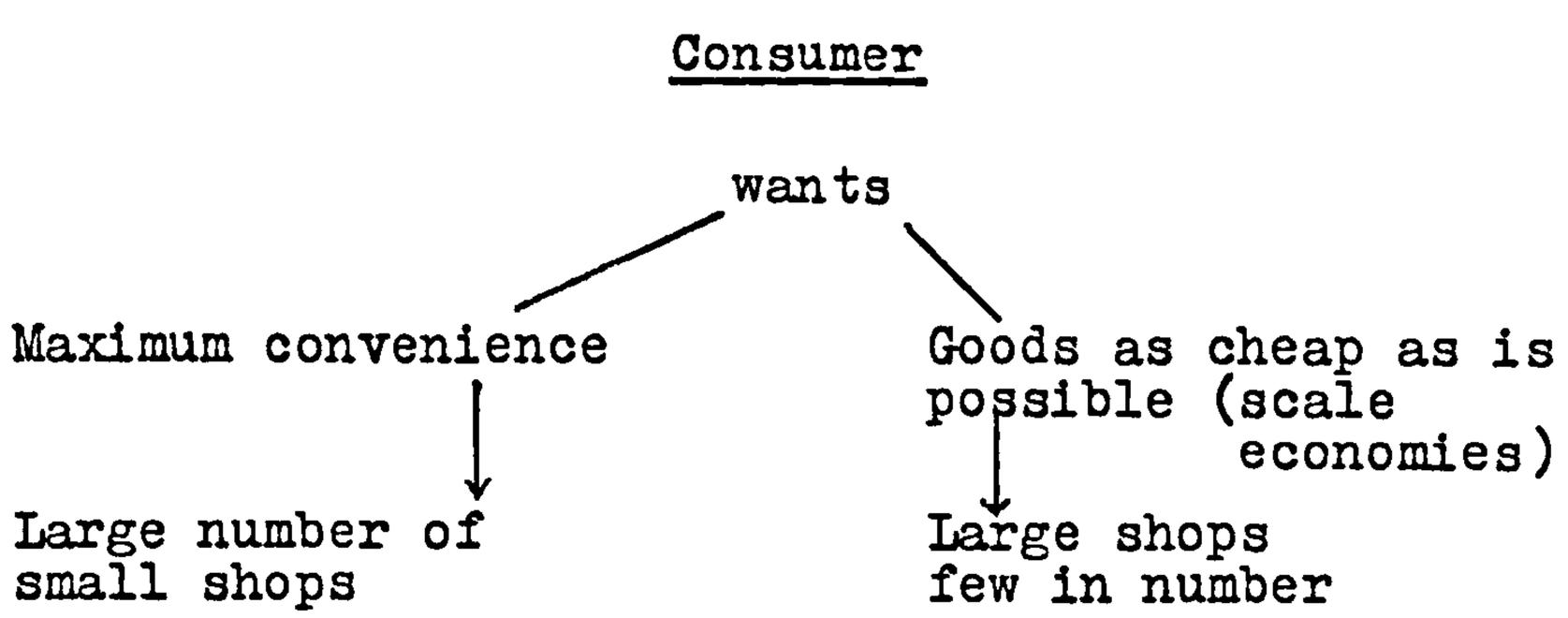
But with more complex consumer behaviour and the presence of inter-related markets for a variety of goods, this approach to retailing becomes so difficult that it is at present rarely used to solve specific planning problems.

4.1.2 The Economies of Scale

- The size and distribution of shops may be considered to depend upon two opposing forces. The consumer desires maximum shopping convenience yet also requires goods to be as cheap as is possible. The first of these implies shops close to place of residence which requires a large number of small shops, but the second

desire implies the need to achieve the economies of scale associated with large shops.

Schematically:



The resulting size and location therefore depend upon the relative magnitude of these opposing forces for a particular good - the balance is dictated by the frequency and cost of purchase. When goods require frequent purchases then convenience predominates, giving rise to corner shops and district shopping centres. But for less frequent and more costly purchases, economies of scale predominate, giving rise to large stores and these are usually located at a central place.

4.1.3 The Marginal Analysis

In a linear and even density market situation, average selling price per unit falls with increasing size of the store, but marginal transport costs per unit rise, see Figure 4.1, page 107 . To the additional consumer the extra transport costs have the same effect as a higher price and the marginal competitive size of a shop occurs when the sum of average selling costs and

marginal transport cost are at a minimum (m), i.e. at the intersection. The minimum ox represents the number of units sold or customers served under competitive market conditions.

This simplistic approach is usually rejected on the ground that it is unrealistic. A consumer does not rationally balance selling price and travel cost per unit item; moreover, attitude and ability to travel depends on a number of socio-economic factors in addition to the financial cost of the journey. Shopping trips are rarely for a single good, therefore the cost of the travel is not to be balanced against the purchasing price of a single good.

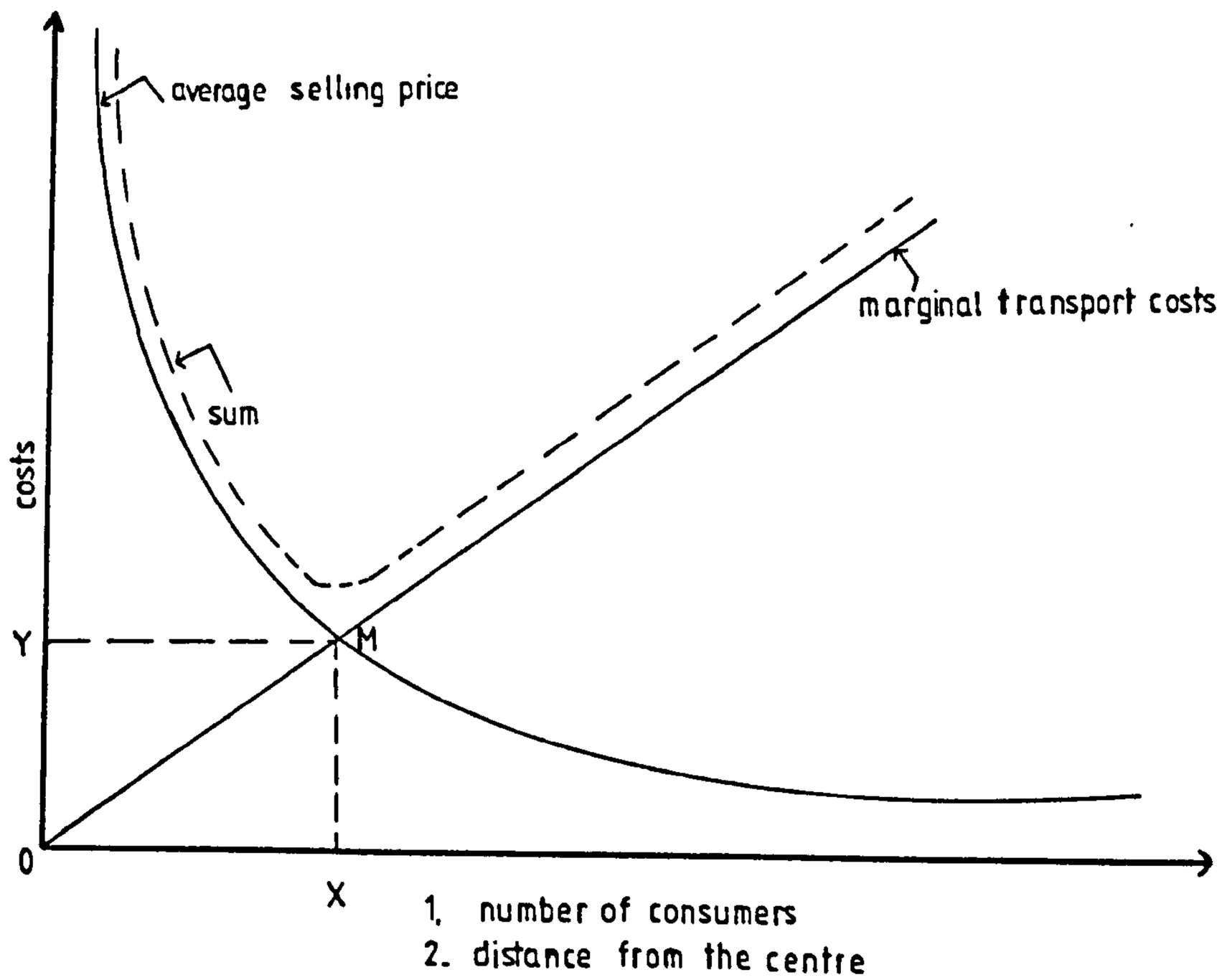


Figure 4.1: Marginal analysis graph.

	POPULATION SUB-SET 1	POPULATION SUB-SET 2	------- -------	POPULATION SUB-SET n-1	POPULATION SUB-SET n	ROW SUMS
COMMODITY 1						
COMMODITY 2						
--------- --						
COMMODITY m-1						
COMMODITY m						
COLUMN SUMS						

Figure 4.2: Behaviour and Demand Matrices.

108a

4.1.4 Behaviour or Demand Matrices

This technique was used independently by Wolfe (1964) and Andrews (1967). The research was undertaken in shopper characteristics and shopping behaviour in which behaviour or demand matrice specify the inter-relationship between the three basic elements, namely:

(a) a population composed of a number of homogeneous sub-set of differing socio-economic structure;

(b) the level of demand generated by each of these sub-sets;

(c) the nature, volume and location of supply which fulfils these demands.

A theoretical demand matrix, Figure 4.2, page 108a is drawn up in which each component represents the total amount of demand by a given population sub-set for a specified commodity. Column sums then give the total demand for all goods for each population sub-set, while row sums indicate the total demand of the population for specified commodities. If the population changes in a known way, it is possible to predict future demands for specified commodities. The matrix below, Figure 4.2, page 108a is for "n" population sub-sets and "m" specified commodities.

The technique applied in isolation does not take on board urban planning issues arising from the distribution system; business and public linkages. Therefore, effects of changes in transportation and distribution factors cannot be appreciated in this technique. Its' application has very limited use in solving urban retail problems.

4.1.5 Agglomeration

In addition to the consideration of economies of scale associated with the size of particular shops, traditional theories also refer to the economies and convenience of agglomeration.

4.1.5.1 Agglomeration (By Hotelling)

Hotelling (1929) considered a classical example of two traders on a beach; see Figure 4.3, page 109.

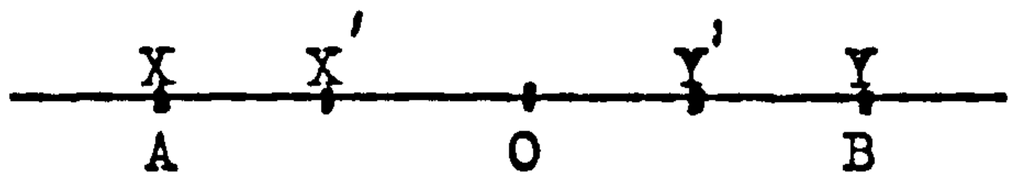


Figure 4.3: Classical Example of Two Traders on a Beach.

The beach provides a linear market in which demand is assumed to be constant along its length. Since retailing is consumer oriented, one might consider that the traders A and B would locate themselves at positions of maximum convenience to the consumers at points X, Y.

Here each would expect to capture 50% of the total market. But these locations do not occur because from this situation A could capture more than 50% of the market by moving to a position X' and the only compensating move B could make is to similarly move to Y'. But all such positions are equally unstable and both traders converge at the centre of the beach O.

4.1.5.2 Agglomeration (By Boulding)

Boulding (1950) considered agglomeration in terms of an analogy based on "biological equilibrium" as distinct from the mechanical equilibrium of the two opposing forces implicit in that of Hotelling. Boulding considered economic institutions in general, but Parker (1966) has applied his remarks to shopping.

"In nature there are three kinds of species - competitive, complementary and parasitic - and their distribution is determined by a biological equilibrium. For shopping the proposal is that the balance between kinds of retail organisation is equivalent to the balance that occurs amongst natural species. The competitive elements exist between all shops of the same kind; all are competing for the total expenditure on that specialist good. But at the same time the shops are also complementary because they cluster together to increase the total volume of trade at their particular location. Finally, a number of stores are parasitic in the sense that they owe their existence to a large store and they attempt to drain off some of the trade drawn to the large store".

For planning, there is no obvious advantage to this approach except that it expands the general framework from which a more quantitative approach may emerge.

4.2 Catchment Area and Trade Distribution Techniques

Soon after the Second World War, Green (1948) attempted to establish a method of determining catchment areas based on the theory that "a town's sphere of influence could be defined as the limit of all its radial bus routes, provided that these routes served no other larger town". No attempt was made to show how a town's influence may overlap that of its' neighbours, it being argued instead that for statistical purposes mutually exclusive areas were preferable. Although the rate of private car ownership is increasing rapidly, the importance of public transport has not since diminished, and is likely always to remain the sole means of transport for several groups of people, and may therefore remain a significant factor in the pattern of shopping journeys and is considered as an integral part of this technique.

Green found that, whilst people from rural areas move into the nearest town to shop, those living in the town itself often move outwards to larger centres. This reflects the shopper's desire to visit better centres than those with which they have daily contact, thereby adding the factor of attraction to that of accessibility.

He also discovered a constant relationship between number of shops and population which approximated to one shop for every 110 persons. This might be compared with the British New Town Committee standard of one shop to every 100-150 persons. Undoubtedly, there is a theoretical relationship between population and retail space and this may be expressed as many persons per certain kind of shop, but complexities arise when people divide their expenditure between

competing shops and it becomes imperative for shops in certain locations to attract a larger clientele to offset site costs and overheads.

Bracey (1953) recognised the disadvantages of "the shop" as a unit of measure. He also realized the inadequacy of merely defining a catchment area and evaluating the population within it. He recognised that the vital question is not only how many people a centre serves, but the degree of attraction which it exerts over them. In his study of Somerset, Bracey surveyed each village in order to discover to which centres its inhabitants looked for certain goods and services. In this way, he was able to measure the relative importance of competing centres to any one community.

His survey showed each centre to be surrounded by a small zone over which it enjoyed almost total dominance; this was termed the "intensive zone". Beyond this was a further area of strong affiliation, varying in size according to the importance of the centre; this was termed the "extensive zone". Finally, there was an outer area, generally found only round the larger centres, where affiliation was present but weak; this was termed the "fringe zone". Fringe zones invariably overlapped and less important centres were often clustered within the area of overlap. Affiliation to a centre was often seen to weaken as distance from it increased, but the decline in intensity of attraction instead of being uniform, occurred in a series of clearly defined steps, the precise position of each of which depended on the location and size of surrounding centres.

A similar study of Cardiganshire made in 1960 by Davies, H.W.E., again revealed three distinct zones

of dependence for large towns and two for the smaller ones. Very small towns and villages were found to have no more than one weakened intensive zone. Both Bracey and Davies defined catchment areas by means of "contours of dependence" and by evaluating the use of each centre, evolved a hierarchy of centres.

Although very effective, this method is lengthy and difficult to project into the future.

Two instances where centres were classified and graded according to the range of shops and service facilities they possessed are, (i) a survey of 133 Midland towns by Lomas (1964) and (ii) The Haydock study of 90 towns in the North West of England by a team of planners whose object was to test the feasibility of siting and developing a new regional shopping centre there. Both of these studies took the key retail service facilities to be found in a town or city centre and on the basis of these important distinguishing criteria, classified the towns of these two regions of England. Both studies were able to grade the shopping centres in a continuum from the most down to the least important. The conclusion these studies drew is that centres do not fall readily into rigid categories; and that there are no easily defined steps in the hierarchy of shopping centres. This is illustrated in Appendix 9 .4.11 ,(from the report of the Shopping Research Group Study) page 884 .

So far attraction has been considered in terms of facilities and hierarchies, but Waide (1963) using Britain's 1950 Census of Distribution, attempted to measure a town's attraction in terms of its retail turnover. To do this, the turnover of each centre was divided by the average regional per capita

expenditure to arrive at a total population served. This population was then compared to that of the town and the difference expressed as a trade import or export. Despite obvious deficiencies, such as assuming that all the expenditure of a town's inhabitants is retained by that town, the method proved extremely useful over rural areas, where it enabled the market town to be seen in its true context.

Waide concluded that spheres of influence overlapped not only for different commodities, but between adjacent centres and this first census had it abundantly clear that there was no defined area within which all the people used a particular centre all of the time, but that there was definitely an inner captive area which was largely self-contained. Habits in the fringe area beyond this were found to vary from centre to centre according to the facilities offered.

The above catchment area and trade distribution techniques have very limited values as models for forecasting retail trade pattern, for they dealt predominantly with static rather than dynamic situations. Their usefulness lies in the fact that from them two factors have emerged as of major importance on which a dynamic model capable of projection into the future can be built. These are -

(1) accessibility - defined as the ease with which a centre can be reached.

(2) attractiveness- defined as the quality of a centre which draws shoppers to it.

4.3. Retail Turnover and Floor-space Predictive Techniques

A technique developed by Greater London Council (1971), as contained in their report "A Forecast of 1981 Retail Turnover and Floor-space Requirement for Greater London" described how these estimates of future retail requirements could be made for broad segments of London. It does not contain criteria needed for forecasting for individual London Borough or shopping centre. The stages involved in the forecast are well illustrated in a flow chart, Figure 1 of the report. The technique is not very useful in a planning scheme which requires to use criteria based on profitability, costs and benefits to the community.

The "SHOPPING RESEARCH GROUP" (The Town Planning Institute West Midlands Branch, 1967) have developed a technique which measured accessibility and attractiveness and explained how these elements could be combined to determine the distribution of expenditure from any given area amongst competing shopping centres.

Accessibility

Based on the assumption that "accessibility is primarily dependent upon journey times, which in turn are dependent upon mode of travel", the group found it simpler to calculate mean journey times for individual centres. The effects of journey time on accessibility (visits per week) was plotted against journey time (minutes). This was derived from a Study of three Northamptomshire towns , in which field survey result from over 1,000 shoppers interviewed revealed a strong relationship between the frequency with which

shoppers visited each centre and the distance they had to travel. Subsequent refinement included substituting journey time for distance and projecting the curve over rather longer distances than those for which field survey results were available. In fact, the relationship shown in the graph . is mathematically comparable to that of Reilly's Law, but using an exponent of 0.5. The accessibility parameters derived from the graph . were used in the Group's subsequent research.

Attraction

The Group considered that the use of certain traders as indices for measuring a centre's status and thus determining its attraction. The indices that were used finally to analyse shopping centres within the West Midland region were the same as those used in the Haydock study. 91 shopping centres were considered and these are shown in the detailed report, and together with the indices they possessed. Since many centres often possessed the same facility more than once, the cumulative total of every facility possessed is shown in bar chart . , where all the centres have been arranged in rank, in which they formed a continuum.

Since the Census of Distribution covered the majority of retailers, it ought to provide a more reliable guide to a centre than analysis based solely on the location of principal specific traders. In order to check the validity of these indices, therefore, they have been plotted against the durable goods turnover for each of the centres for which census figures are available.

The durable goods turnover, which is for the central shopping area of the town, as defined by the British Board of Trade for the 1961 Census of Distribution, was chosen because, like the indices, it contained the major attractive elements of shopping centres. The larger cities showed good correlation but there is a greater scatter amongst the smaller centres. Since the Haydock facilities that are present in these smaller centres are often so few that increase or decrease of one can vary the total by as much as 25%.

The small centres, therefore, needed further consideration. The relative attraction of such centres still depended on their range of shops and so a different range of facilities, which are more commonly present in these centres should be chosen. A group of such facilities has been used to assess the attraction of smaller centres within the West Midlands. The facilities chosen were variety stores, such as Woolworths, which occur only in the more important centres, Crown Post Office, chemists, jewellers, hardware stores and clothing and footwear shops. Experience of the survey conducted in the Black Country was then used to weight each facility according to the frequency with which it occurred and the frequency with which shoppers needed to visit it. The sum of the weightings for all shops represented in any of the smaller centres will give an attraction index for such centre. Again as shown in the report, the larger centres show better correlation and it can be concluded that even smaller indices are required for the very small centres.

Furthermore, analysing towns in the Midlands and North Midland regions for which central area sales figures were published in the Census of Distribution, it was found that clothing shops have a higher concentration of central area sales than any of the other main census categories. This suggested the use of a town's clothing sales as a measure of its central area attraction. This has the advantage of being more quickly obtained than a range of indices and possibly of being more widely representative of the structure of a centre. As with the indices, the Shopping Research Group checked this method by plotting the clothing sales of the whole town against the central area durable turnover and the study showed that there is again a good correlation.

From this work, it is apparent that while indices and clothing sales may give a fair general indication of a town's attraction, they are invariably less reliable than durable turnover. In the use of indices or clothing sales alone, care must be taken in order to avoid the risk of anomalies. Anomalies in themselves may assist to understand the strengths and weaknesses of a centre and could be useful in anticipating further shopping development. In order to avoid the risk of errors and anomalies, it is suggested that both methods should be used as a check against each other.

Having explored ways of measuring accessibility and attraction, the Shopping Research Grcup developed a technique for forecasting the distribution of expenditure among competing shopping centres; the process can be followed in the flow diagram shown in the report.

Since the main requirement for planning purposes still

is to have some forecast of the spatial needs of a centre, both in terms of floor-space and site area, the predicted retail turnover is converted into floor-space by the use of conversion factors in terms of £ per square foot for different trades. The Shopping Research Group even noted that "Within one trade group wide ranges in value have been obtained from different studies and such factors must, therefore, be used with extreme caution.

Furthermore the Shopping Research Group technique, which is relevant to the objective of this study, cannot be used in its original form in the Nigerian situation because of the absence of data from two full Census of Distribution incorporating information on retail turnover.

4.3.1 The Estimation of Retail Turnover for Planning Purposes

Guy, C.M. (1984) suggested a method by which retail turnover and floor-space may be estimated directly. The basic concept of the method is stated as:

(i) The turnover of a retail store is related positively to the number of shopping visits made to the store.

(ii) Store turnover is also related positively to the sales area of the store, because larger stores tend to have a greater variety of goods, and also are more likely to offer price saving to the consumer.

The method assumed that amount of money spent in each shopping visit is greater in larger than smaller stores. It is well known, for example that superstore shoppers spend several pounds on an average visit, whereas small grocery stores are used mainly for minor "topping-up" purposes.

Some type of regression model was derived from the survey data. The survey was two-fold. Firstly, some 500 households recorded all their food and grocery purchases in "shopping diary" form over January - July, 1982, giving details of each store visited and the amount spent there on food and groceries. Secondly, of the majority of the shops used by the panel, they recorded the retail sales area, the goods available and other characteristics. The survey area was Cardiff, UK.

The survey covered 324 stores, of which 85 grocery stores and 47 specialist butcher's shops were isolated for detailed analysis. For the 86 grocery stores, there was a strong correlation between the logarithms of both number of visits and floor-area with the logarithms of expenditure. For the 47 butcher's shops, there was strong correlation between the logarithms of number of visits and the expenditure and floor-area was found to play no role in the equation.

Then the calibrated equations were used to predict expenditure in those grocery stores and butcher's shops not used in the calibrations. The predicted values were found to be very close to survey data.

The model may be used with considerable confidence to predict turnover and floor-area. However, it is a

static model, which does not include time or growth factors, and therefore cannot be used for forecasts. Secondly, keeping of "shopping diary" demands considerable discipline and knowledge to guarantee the reliability of the data. This could not be the case in Nigeria.

4.3.2 Forecasting Consumer Retail Expenditure Trends (revised and updated June, 1978)

Long-term forecasting is inevitably a hazardous, error-prone activity, but nevertheless essential in retail planning in order to guide the future policies and property investment decisions of retailers, developers and local authority planners. For example, plans for a new shopping centre take several years to come to fruition and once built the centre is likely to be used for several decades. It is therefore essential to look at the underlying trends, as described hereunder, rather than to base such plans on current consumer spending patterns or short-term fluctuations about the trend. This type of forecast is normally based on national data. The technique is quite inadequate for local area forecasts.

Forecasting methods

All forecasts of consumer retail expenditure per head must be made in the light of past trend, but should not rely solely on quantitive projection techniques. They should also be based on an informed judgement of likely future changes in consumer behaviour and retailing operations.

For the forecast to 1986, for example, a log-linear regression line has been fitted to the data by shop and goods types for the years 1961 to 1976 and then projected into the future. This simple and robust method gives the best compound growth trend lines in "annual retail expenditure per head", (E), related to 'time' in year (Y). The trend lines are given by the equation:

$$E = \exp (a + b.Y)$$

The coefficients for each relationship are $\hat{a}$ and b; r is the correlation coefficient, i.e. measure of the line's goodness of fit. (exp is expenditure per head the previous year)

'Moving averages' and 'exponential smoothing' techniques are suitable only for short-term forecasting, up to about two years ahead, whilst more advanced quantitative techniques of trend projection analysis or econometric modelling have data requirements that cannot be satisfied using existing sources. Other techniques, such as the Delphi method or market research, are not suitable for making quantitative forecasts, but may aid in predicting the pattern of change over the forecasting period and in estimating the confidence to be placed on the forecast.

Trend projections

Since the trend lines 'smooth' out variations in the expenditure rates from year to year, it is not to be expected that these forecasts will match exactly the actual figures for a particular year derived from the Census of Distribution or Central Statistical Office publications.

The average compound annual percentage rate of growth in per capita expenditure (K) has been estimated directly from the slope of the regression line using the formula:

$$K = (\exp(b) - 1) \times 100$$

In projecting into the future, these growth rates must be applied to the trend expenditure values for 1976 or 1977.

4.3.3 Socio-Economic Retail Behaviour for Shopkeepers

Hillier Parker and May Rowden (1983) studied the issues and possible solutions to be faced by the London Dockland Development Corporation on three main aspects of shopping in Docklands. These were the future provision and siting of district shopping centres to supplement existing inadequate provision for the existing and future population, the most appropriate ways of ensuring the viability of

existing shopping below district level, and the most beneficial ways of dealing with the problems of apparent overprovision of older shopping, notably in converted dwellings and in areas then not favoured by the shoppers.

The consultants stressed the need for a shopping strategy and made policy recommendation which proposed a number of district centres to make up for the inadequacy of existing shopping without undermining the existing centres outside Docklands and the importance of local centres to meet local daily shopping needs. This was not a radical divergence from the 1976 London Dockland Strategic Plan discussed in page 430.

Although the study recognised the circumstances of the local people in relation to local shopping, there was no consultation of the ordinary people who use the shops in Docklands whilst care was taken to elicit the view of 'supply side', the retail investors. Again, although the study stressed the need for a shopping strategy, it did not establish a systematic approach to selecting the preferred development strategy for retailing.

Ethnic retailing in the UK has expanded greatly in the last decade or so. A major research project into the subject was undertaken at Liverpool Polytechnic in 1978/79, by the Department of Social Studies and was sponsored by the Social Science Research Council. The research leader was David McEvoy and the other researchers were H.E. Alderich, J.C. Carter and T.P. Jones. The project examined immigrant businesses in five wards in each of Bradford, Ealing and Leicester, and made a complete inventory of all retail and service business in the study areas. Interviews were conducted with the owners or managers of 100 Asian and 100 White businesses in each city and population data for Asians and Non-Asian were derived for the areas.

The final report (1980) contained wide ranging and comprehensive information about the characteristics of ethnic

retail businesses, shopkeepers and their customers. Following this original research, further interviews were conducted with the owners or managers of the same businesses in 1980, 1982, and 1984. These interviews were restricted to identifying which businesses survived and to obtaining basic details of the replacement businesses. Most of these studies dealt with a variety of aspects of ethnic retailing such as: (i) whether their businesses are at an advantage or disadvantage because of their ethnicity; (ii) whether the attempts of Asian retailers to shield themselves from white competition provided commercial advantages or disadvantages; (iii) how ethnic retail businesses have integrated into British society, characteristics of the shopkeepers, how their businesses are organised and the ethnic composition of their customers; (iv) gives details of the ethnicity and socio-economic background of owners and compares their business practices; (v) looks at the relationship between the population composition of an area and the use of Asian and white owned shops. It found that the proportion of Asians residing in an area and the ethnicity of the shopkeeper have a strong and independent influence on the customer mix; (vi) looks at how ethnic retail business expands as a result of residential change in area; (vii) compares retailing and other types of small businesses operated by the ethnic community in Britain and looks at their development and operation; (viii) looks at details of spending levels, social class of shoppers, purchases of comparison goods and home location of shoppers; (ix) looks at differential pricing in the acquisition of retail premises, and the role of the ethnic estate agency; (x) and compares the above findings between the cities studied.

Granted that these findings are useful for understanding the socio-economic performance and geographical pattern in the city, they are of little relevance to the land-use/transport planner.

Rapid expansion of DIY warehouses and other forms of warehouse operation for electrical and furniture had resulted in considerable increase in the demand for sites and premises leading to higher rent levels and more planning application. Ann Gibb (1981/82) examined local authority statutory and non-statutory policies for retail warehouses. The examination was based on a survey of all English local authority planning departments conducted during 1980 and 1981. Each of the major policy types were examined and trends in policy development were discussed. The views of the Secretary of State, as expressed in Structure Plan Modification were also considered. It was concluded that there was some doubt as to whether policies specially for retail warehouses are appropriate in the structure plan, and suggested that local authorites should consider formulating more detailed non-statutory policies. In an analysis of the issues raised at 52 planning inquiries held between the early 70s and the end of 1980, the substantive issues were examined in terms of five types of retail warehouses; DIY, Builders Merchants, electrical, furniture and household goods. The problem of enforcement was also discussed. The analysis showed that the most important issues were zoning and impact. The location of retail warehouses outside existing centres was shown to have been accepted by inspectors, in the majority of cases, where this was an issue. The report went on to examine the difference between retail warehouses and superstore development. Retail warehouses were found to be twice as likely to be approved as hypermarkets than superstores.

Whereas in the UK the accepted location of retail warehouses is outside existing shopping centres, in Nigeria the emerging indigenous businessmen in the distributive trade prefer to locate their warehouses in close proximity of the central market place, and there is no legislature against such practices.

In his contribution to the continuing discussion of retail and superstores employment, Sparks, L. (1982) used results

of a survey into hypermarket, superstore employment to examine both overall employment levels and employment levels disaggregated by two major characteristics; size of store and store operator. The term superstore was used to refer to large self-service stores offering a wide range of food and non-food merchandise with at least 2,323 square metres net floor-space and supported by extensive car parking. Stores with in excess of 4,650 square metres net floor-space were identified as hypermarkets. These definitions differed slightly from the standard URPI definition given in other URPI publications. Analysis by URPI has revealed a very strong relationship between total turnover and total number of staff.

The last few years has seen tremendous changes in the pattern of retailing and retail development in the UK. According to URPI Information Brief 78/1, in 1971, for example, there were 28 hypermarkets, in 1978 there were 140 already in operation and a further 70 in development stage having received planning permission. In 1972 no-one had heard of catalogue showroom and by 1978 there were 80 such stores operated by Argos and Shoppers World. The resulting distortions to turnover to floor-space ratios can be imagined. With this concept in retailing, the range of goods sold in large variety stores is retailed on a sales floor-space equivalent to two standard units.

Tele-shopping is the subject of much speculation in Britain. By Tele-shopping is meant remote shopping, using computer and/or tele-communication links from consumers to distributor of goods. These links replace the usual shopping trips. They may change both the structure of the distribution industry and the pattern of movement by consumers. According to Howard, E.B., and Davies, R.L. (1983), although not much real change can yet be perceived in shopping patterns in the UK, the potential influence is so great that its development needs careful monitoring.

It is important to distinguish between technological change

in the management and operation of retail (computerized stock control, EPOS development, etc.) and the new technology which allows tele-shopping by the consumer. Tele-shopping can be based on a number of communication technologies including teletext, viewdata, cable television and video cassettes and discs. Tele-shopping is highly developed and practised in the USA. However, the author does not see any considerable impact of tele-shopping in Nigeria in the near future because its operation requires very sophisticated socio-economic and technological structures which take a long time to develop.

4.4 Urban Planning Framework for Retail Sizes and Locations

The basic entities of the urban planning system and their classification into a planning framework are given by Wilson (1968 B), as shown in Figure 4.4, page 128a

The framework which is schematically reproduced in this figure attempts to define the principal sub-models that comprise a comprehensive planning model. Thus it is suggested that the first approximation to a comprehensive model would include:

(i) A spatially aggregated population (of a city or a region and with a population sub-structure defined by socio-economic grouping);

(ii) A spatially aggregated economy (goods and services by sector);

(iii) Residential location;

(iv) Workplace location;

(v) Physical infrastructure (buildings and transportation system);

(vi) Economic activity (goods and services by sectors but now including the inter-related activities of entrepreneurs and employers);

(vii) Transport.

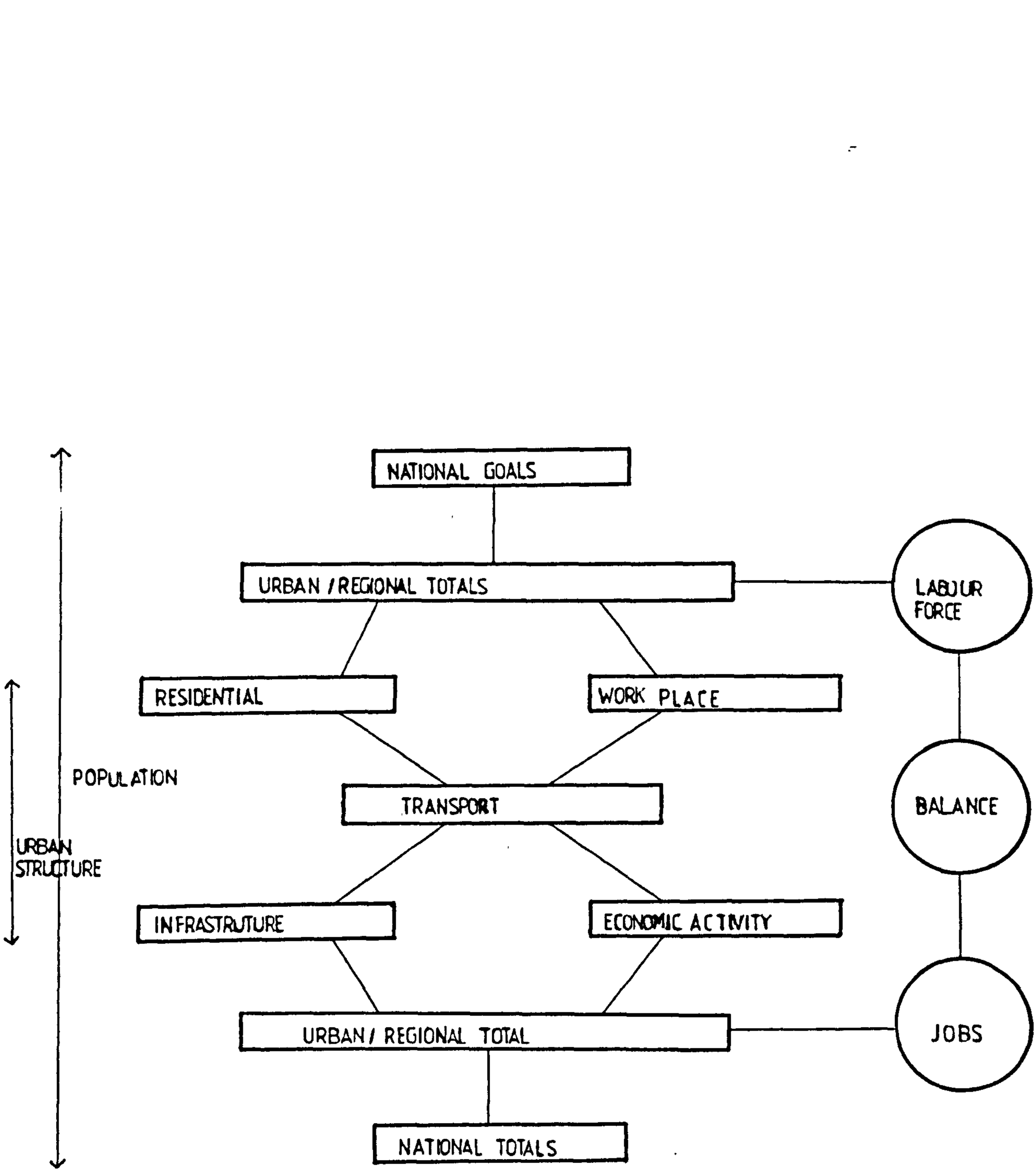


Figure 4.4: Urban Planning Framework for Retail Sizes and Location.

Retail trade size and location involve interaction amongst several of these systems and for a complete understanding of retail trade, consideration of residential location, workplace location, transport system and the ambient purchasing power of consumers would be required.

But in any study of this sort, it is necessary to isolate the principal system of interest as a closed system in which interaction with the surroundings is described through exogenous variables. For retailing, the system is generally considered to be closed spatially and economically and the problem is concerned with size and location of the retail centres required to satisfy the needs of a given population of known purchasing power. The minimum size of the closed system is determined by the mobility of the population in seeking goods and services. Possible deviation from a closed system may arise through

(a) tourists, business visitors, institutions and mail order firms, or

(b) negative deviation may also occur if there is a neighbouring city outside the boundary of the study area.

For the study area,

Sales = Retail expenditure

Total expenditure = population x per capita expenditure

The second assumption is to consider the system to be in internal equilibrium, i.e. shopping patterns are

stable at any moment in time. If deviation from equilibrium does occur (through migration or changes in the transport system) then the system adjusts relatively quickly to equilibrium through corresponding expansion or contraction of the retail system. This relatively rapid readjustment occurs because retailing is highly competitive and because investment in building and equipment is small compared, for example, with that involved in industrial location, and small compared with the potential sales turnover a favourable site may offer.

The model may be better described as an aggregate model in that what is calculated is total sales turnover for the region or town under consideration. There is no way of knowing how much sales and possible floor-space that would go to any shopping centre in the study area.

4.5 Retail Location Models

These models are concerned primarily with the determination of the size and location of retail centres required to satisfy the needs of a given population distribution. They are macro-models in the sense that they aim to reproduce the main locational features of the retail system without including all the complexities of individual consumer behaviour. Their ability to study the retail system has been considered under two approaches, viz: trade areas and shopping pattern.

Trade area approach divides the retail system into a hierarchy of sub-systems, called trade areas, each of

which is nominally closed; a sub-system area depends on the type of goods and this gives rise to an interleaving or nesting of areas. The central place theory is associated entirely with this approach.

In shopping pattern approach the study area is not divided into exclusive sub-areas, but instead the consumer can in principle shop at any centre within the entire system. Patronage of a centre is distributed in a probablistic fashion. The models that belong to this category include retail gravity model, retail component of Lowry Model, the intervening opportunity approach, and entropy maximisation method. They are called interaction models.

However, trade areas and shopping pattern approaches are not mutually exclusive; each contains elements common to the other,for example, it should be possible to construct central hierarchies from the explicit interaction models.

4.5.1 The Central Place Theory

In the development of the "notion" called central place theory, the works of J.H. von Thünen (1826), Walter Christaller (1933) and August Lösch (1939) are the earliest. Although their works are those of a geographer, an economist and a real estate owner, respectively, examining shopping pattern, the following elements of central place theory as enunciated by them have been of continuing importance to planners.

First, is the idea of '<u>central functions</u>' and the existence of a pattern of central places defined by their importance in relation to their surrounding

regions. Actual definition of 'central places' and how to measure their centrality has been a principal concern in translating the theory into tools of land use planning. Each central place has its complementary region or 'hinterland' whose precise size and structure are affected chiefly by the nature of the surrounding land uses, by population distribution, by transport facilities, by 'range' of commodities and services the centre provides.

Secondly, each consumer, ideally, seeks maximum freedom of choice for his purchases together with minimum expenditure - of time, effort and money. The aggregate behaviour of many consumers, therefore, has a framework of maximum distance people are willing to travel for a particular type of commodity and service - thus defining the range - and minimum numbers of shoppers required to provide a sufficient market for any particular type of goods - which is the 'threshold population size'. These bounding constraints have been incorporated into shopping models.

Thirdly, central place theory provided the concept of a 'hierarchy' of central places, each with its own hinterland in which the lower order centres provided only highly dispersed central commodities and services and are themselves within the hinterlands of higher order centres.

A seventh element, 'migrant custom' has been added to the original central place theory by D.G. Price (1970). In the analysis of the relationship between the total number of shops in neighbouring towns in a region and the total turnover achieved in those towns, it has been shown that in addition to the significant

relationship between the two variables, there is an important and interesting pattern of residuals. The influence of over-provision of shops and spatial variation in income both failed to provide satisfactory explanation for regional differences in the distribution of residuals. It is concluded that the important factor influencing the pattern of anomalies is the role of migrant custom between a town and its dependent area. The role of migrant custom varies between central towns with surrounding rural areas to which the classical notion of central place theory apply and those in heavily urbanised areas. The element of migrant custom tends to make the market place system of a city or of a state an open system instead of a closed one.

4.5.2 Retail Gravity Model

The concept of retail gravity model has its foundation in classical physics. It was originally put forward by Reilly in 1931, but since then many versions of it have been developed and applied in different studies.

4.5.2.1 Reilly's Retail Gravity Model

Reilly (1931) first formulated the gravity model to describe the relative attraction that two adjacent cities exerted on neighbouring small communities for the purchase of style and fashion goods. The original 'Law' states that: "Two centres attract trade from intermediate places approximately in direct proportion to the size of the centres, and in inverse proportion to the square of the distance from these two centres to the intermediate place".

$$\frac{T_a}{T_b} = \frac{P_a}{P_b}\left(\frac{D_b}{D_a}\right)^2 \quad \text{.....} \quad (4.3.1)$$

where T_a and T_b are the trade drawn to the cities A and B from the intermediate place. D_a and D_b denote the distances of the cities from the intermediate place considered. P_a and P_b are the populations of the two cities. The market area of the cities can be delineated by the line of equal attraction between them, i.e. where $T_a/T_b = 1$. If DB is the distance from the city B to this line of equal attraction then

$$DB = \frac{D_{ab}}{1 + \sqrt{\frac{P_a}{P_b}}} \quad \text{.....} \quad (4.3.2)$$

where D_{ab} denoted the distance between the two cities.

In its above original form the law has no empirical basis; it was obtained purely intuitively from an analogy with classical physics and as such has been the subject of much criticism (for example, Schwartz, 1962, Thompson, 1966). The exponential value of 2 was estimated by Reilly from field investigation; it was the average of the exponents that fell between 1.5 and 2.75. But in all Reilly made 255 field measurements and found some exponents ranging from approximately zero to 12.5. Thus there is no empirical basis for a retail gravitational interaction in which the exponent is a constant.

In modern form (as for example used in the Haydock Study (1964), D_{ab} is replaced by travelling time 't' or some other variant of distance and the population replaced by retail sales (S)

Thus:

$$D_{I \rightarrow II} = \frac{t}{1 + \sqrt{\frac{SII}{SI}}} \quad \ldots\ldots\ldots\ldots\ldots (4.3.3)$$

is the position of the 'break point' moving from a class I centre to a class II centre for a class II good. SI and SII are retail sales of that good.

For example:

$$D_{I \rightarrow II} = \frac{25 \text{ mins}}{1 + \sqrt{\frac{£8 \text{ M}}{£50\text{M}}}} = 17.8 \text{ mins}$$

This study did not attempt to test the law on the basis of 1961 data available nor to experiment with values of the exponent.

Cardinal, C., Harrison, J. & G. (1964), in a diploma thesis, "Where to shop", attempted to establish a means of measuring the attraction which towns exerted over their catchment areas through the analysis of a survey conducted in three Northhamptonshire towns. The result suggested that "three factors most influencing shopping habits were distance to be travelled, the ease with which the journey could be undertaken and the attraction of the centre visited". The significance of these factors has of course emerged from other techniques discussed, but the theory was now developed that "expenditure could be apportioned amongst competing centres in relation to these factors.

To do this, distance was measured in terms of visits per week, as revealed by the surveys carried out; accessibility was related to public transportation services and level of car ownership and the attraction of a centre was defined by reference to its turnover in durable goods". A very similar Retail Market Potential Model was developed in America in 1965 by Lakshmanan, T.R., and Hansen, W.G.

4.5.2.2 Retail Market Potential Model

The approach was developed by Lakshmanan and Hansen (1965) for retail centres in the Baltimore metropolitan area.

The basic assumption was that over a whole region, generated expenditure must equal total sales. Nevertheless, the turnover in any one centre must be considered in relation to the others. Emphasis was on the shopping area of the buyer and not the market area of the seller. The chances that a buyer chooses a particular centre introduced the notion of the probability of a given centre j being chosen from a "closed set" of centres by a buyer in zone i . (D. Huff, 1962).

In terms of consumer behaviour the model assumes that consumers isolate a "closed set" of shopping centres and then distribute their patronage in terms of the utility of the centre as perceived from their zones of residence. It considers that the shopper is less likely to visit a distance store than one nearby but nevertheless the probability of shopping at a distant location is not zero; more distant centres may be

more attractive because of a wider or preferred variety of goods obtainable there.

Briefly, the model is summarised as: Sales (S_{ij}) in a shopping centre j by the residents of zone i are

(i) directly proportional to the expenditure power available at i

(ii) proportional to the attractive power of the shopping centre considered

(iii) inversely proportional to some function of distance $f(d_{ij})$

(iv) inversely proportion to the rival attractiveness (competition) of other centres.

Mathematically the model is written as:

$$S_{ij} = O_i e_i \quad \frac{\frac{A_j^{\alpha}}{d_{ij}^{\beta}}}{\sum_j \frac{A_j^{\alpha}}{d_{ij}^{\beta}}} \qquad \ldots\ldots\ldots (4.3.2.2)$$

where O_i is the number of residents in i and e_i their <u>per capita</u> expenditure on the goods considered.

A_j is the measure of 'attractive power' of shopping centre j

d_{ij} is the measure of distance of the centre j from the zone of residence i

α and β are exponents.

Lakshmanan and Hansen used floor-space data to measure attractive power and time of journey was used to measure the distance of the centre from the zone of residence.

4.5.2.3 Opportunity Claimant Model

This was a further improvement of the Retail Market Potential Model with the introduction of a further parameter by Parry Lewis and Trail (1968). In this method consumers compete for available opportunities. It is suggested that the competitiveness of consumers decreases with increasing distance from the centre and the effective number of competitors for opportunities in the centre j may be written as

$$C_j = O_j + \leq_i \frac{O_i}{d_{ij}^{\lambda}}$$

This term is included in the retail market potential model to give the spending of residents of zone i which is made at j as proportional to

$$S_{ij} = O_i e_i \frac{\frac{A_j'}{C_j d_{ij}^{\beta}}}{\Sigma_j \frac{A_j'}{C_j d_{ij}^{\beta}}}$$

i.e. the attractive power of a centre is reduced by an amount proportional to the number of people using the centre. In practice a threshold value would be

introduced for C_j so that consumer competition became adverse only when the number of claimants approached the number of shopping opportunities or parking opportunities.

This approach appears to be similar to the introduction of a constraint, on the number of trips to a centre j i.e.

$\leq T_{ij} = D_j$; where D_j is some form of capacity constraint. This constraint, which is common in journey to work studies, introduces a balancing factor $B_j = \left[\leq K_i O_i f(d_{ij})\right]^{-1}$ which is almost equivalent to the factor C_j.

Both the retail market potential model and the opportunity claimant model are accepted and widely used in the United Kingdom and the United States of America. But being static models, they can neither measure growth nor predict rate of growth of the centres under study.

4.5.3 The Retail Component of the Lowry Model

It is an inverse distance form of retail interaction developed as part of the comprehensive model for the city region of Pittsburgh. Both total population and the distribution of basic industry were assumed to be given exogeneously and the model generated estimates of (i) residential population, (ii) retail employment, and (iii) land use for one mile square - the sub-areas of the region.

The approach was based on a number of successive iterations. Firstly, a gravity formalism was used to distribute the required labour force in residential zones around the basic industries. This residential

population was then allocated retail services by a similar gravitational interaction.

In the second round calculation, the residences of the retail employees were introduced and this changed the first estimate of the population distribution and therefore a new market potential must be calculated.

Further iterations proceeded until equilibrium solution for residential location and retail services, subject to given size and density constraints, was obtained.

The basic variables were

A	=	Area of land in thousands of square feet
E	=	Employment (number of persons)
N	=	Population (in households)
T	=	Index of Trip distribution
Z	=	Constraints
U	=	Unusable land
B	=	Basic sector
R	=	Retail sector
H	=	Household sector
k	=	Class of establishments within the retail sector
m	=	Number of classes of retail establishments
i,j	=	Sub-area of bounded region (tracts)
a,b,c		are constants of the model

The basic equations were as follows:

Land Use

$$A_j = A_j^U + A_j^B + A_j^R + A_j^H \quad \ldots\ldots\ldots\ldots\ldots \quad (i)$$

Retail Sector:

$$E^k = a^k N \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (ii)$$

$$E_j^k = b^k \left(\sum_{i=1}^{n} \frac{C^k N_i}{T_{ij}^k} + d^k E_j \right) \ldots\ldots\ldots \quad (iii)$$

$$E_j^k = \sum_j E_j^k \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (iv)$$

$$E_j = E_j^B + \sum_{k=1}^{m} E_j^k \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (v)$$

$$A_j^R = \sum_k e^k E_j^k \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (vi)$$

Household Sector:

$$H = f \sum_j E_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (vii)$$

$$N_j = g \sum_i \frac{E_i}{T_{ij}} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (viii)$$

$$N = \sum_j N_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (ix)$$

Constraints:

$$E_j^k > Z^k \quad \text{or} \quad E_j^k = 0 \ldots\ldots\ldots\ldots\ldots \quad (x)$$

(minimum size of retail establishments)

$$N_j \leqslant Z_j^H \; A_j^H \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad \text{(xi)}$$

(maximum density constraint)

$$A_j^R \leqslant A_j - A_j^U - A_j^B \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad \text{(xii)}$$

The method of solution is to solve equations (i) and (vii) to (ix) in step 1, (ii) to (iv) in step 2, and then to obtain the solution of (v) and (vi) by substitution. The procedure is iterated until an equilibrium solution is reached.

A model of this type was developed for Bedfordshire by Cripps and Foot (1968). An improvement on Lowry framework has been by the inclusion of time progression and stepwise iteration. The improved models include (1) the CONSAD model of Pittsburgh, (2) the Arthur D. Little model of San Francisco, (3) the Empiric model by Hill, and (4) the Differential Shift approach of Voorhees. A review of these models is given by Wilson (1967A).

4.5.4 The Intervening Opportunities Model

The development and first application of the intervening opportunities model to retail allocation was made by Harris (1964) as part of the Penn Jersey Study. The main postulates of the model are that the number of the shopping trips (or sales) from an origin i to a destination (shopping centre) in zone j is proportional to the number of intervening opportunities. Unlike the gravity model, inter-zonal distance does not appear explicitly; instead the number of possible

destination zones are ranked (listed) in order of increasing impedance from the origin.

The probability of interaction between origin i and destination ju is therefore

$$P_{iju} = Q_{iju-1} - Q_{iju} = k_1 (e^{-LV_{ju-1}} - e^{-LV_{ju}}) \quad (i)$$

and the number of shopping trips (or similarly flow of money) from i to ju is

$$T_{iju} = k_i O_i (e^{-LV_{ju-1}} - e^{-LV_{ju}}) \ldots\ldots\ldots\ldots\ldots \quad (ii)$$

This has to satisfy the constraint

$$\sum_j T_{ij} = O_i \quad \text{or} \quad \sum_j S_{ij} = e_i O_i \ldots\ldots\ldots \quad (iii)$$

which gives for an unbounded system $k_i = 1$.

V_{ju} is the cumulative number of opportunities up to and including zone ju.

Hence the intervening opportunities model gives the proportion of trippers proceeding beyond the cumulative number of opportunities

V_{ju} as $e^{-LV_{ju}}$. This is essentially an "absorption model", in which shopping opportunities absorb shoppers with a cross-section L. A restriction of the model as it is shown here is that L is taken to be a

constant over all opportunities and for all groups of population. But not all centres are alike, and different consumers have different preferences in their choice of centre. It also implies that there is no trade-off between distance and the quality or type of store acceptable.

Black (1966) suggested that the cross-section or probability of a consumer finding a good is a function of the total sales within that zone. This approach then yields the following equilibrium model. (To comply with the notation of Black, the sub-script u is excluded).

$$S_{ij} = e_i O_i \frac{S_j^a}{\sum_{k=j}^{k=j+r} S_k^a} \left(e^{-b \sum_{k=1}^{k=j} S_k^a} - e^{-b \sum_{k=1}^{k=j+r} S_k^a} \right) \quad \text{(iv)}$$

and

$$\sum_i S_{ij} = S_{+j} \quad \text{..... (v)}$$

where S_{ij} is the sales in the jth centre due to residents of the ith zone

S_{+j} is the total sales in the jth centre

e_i is the average per capita expenditure on retail goods, whilst a and b are parameters to be estimated

The term $S_j^a \Big/ \sum_{k=j}^{k=j+r} S_k^a$ is k_i for a bounded system and is obtained from the constraint (iii). The summation $\sum_{k=1}^{k=j-1} S_k^a$ is the summation over all zones which lie closer to the ith zone than does the jth zone. The model has $n^2 + 2$ unknowns and $n^2 + n$ equations and could in principle be solved iteratively, but in practice an iterative procedure was tested on the Oxford area and was found to yield an equilibrium solution.

4.5.5 The Maximum Entropy Model

The application of the method of entropy maximisation to problems of retail location was given by Wilson (1967B).

The key to the method is to define a set of variables which completely specify the system, and to enumerate any constraints on these variables. It is possible to do this by using the variables T_{ij} and from these to define a distribution of trips by $[T_{ij}]$. A state of the system is then defined by a particular assignment of shoppers to trip interchange bundles (assignment of individuals to particular origin destination pairs) which satisfy the enumerated constraints.

The basic hypothesis of the method is stated as: The probability of a particular trip distribution occurring is proportional to the number of states that can give rise to the distribution.

The number of distinct arrangements $W(T_{ij})$ that can give rise to the distribution $[T_{ij}]$ is

$$W(T_{ij}) = \frac{T!}{\pi_{ij} T_{ij}!} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (i)$$

where T is the total number of trips. Then the total number of possible states is

$$W = \leq W(T_{ij}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (ii)$$

The procedure is to maximise $W(T_{ij})$ subject to the imposed constraints

This gives the most possible distribution. It turns out that the maximum value so dominates the other terms that it can be regarded as the 'actual' distribution.

If the maximum entropy method is applied to the situation where

$$\leq_j T_{ij} = O_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (iii)$$

and

$$\leq_j T_{ij} C_{ij} = C \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (iv)$$

where O_i is the number of residents in zone i, and C_{ij} is the impedance or generalised cost of travelling between i and the centre j.
The constraint (iv) implies that the expenditure on trips within the study area is a fixed amount C.

Then

$$T_{ij} = O_i \frac{\exp - \beta C_{ij}}{\sum_j \exp - \beta C_{ij}}$$

is obtained as the most probable distribution. If it is assumed that the shopper at a centre j receives some benefit W_j over and above that obtained from going to other centres, then this can be set against transport costs C_{ij} to give

$$T_{ij} = O_i \frac{\exp (\beta W_j - \beta C_{ij})}{\sum_j \exp (\beta W_j - \beta C_{ij})}$$

so that W_j is a measure of the scale economies available to the shopper at centre j, and therefore in this approach $\exp (\beta W_j)$ can be identified as the attractive power of the centre.

Maximum entropy model is essentially a method of making the best estimate from the information that is available; everything that is known about the system is expressed in terms of the constraints. In the Working Note 37 of Hyman (1968), the entropy maximization approach was applied to a number of sellers in a linear market and this consideration opened up the possibility of using the model in a game - theory context. It has been suggested that this hybrid approach could give results on the effects that different levels of information have on the behaviour of sellers and buyers, which is

a tentative first step towards the study of dis-equilibrium, contact, and dynamic retail model. But as of now the model lacks factors which take problems of growth into account.

To conclude the comments on retail location models; each of them describes a mathematical relationship and as such is necessarily a simplified construct of the real world. Inevitably the models exclude some factors that have bearings on the problems of retail location and as a consequence the models must always be used with care and supplemented with experience and human judgement. Nevertheless, the criteria of their reliability for long-term planning is at present judged on the extent they can answer the following questions:

(i) Does the model produce a system that is in equilibrium ?

(ii) Are service and trip lengths in different parts of the area comparable; and

(iii) Does the distribution provide a reasonable simulation of the market process ?

But none of the existing approaches to retail analysis (or a combination of them) could prove to satisfactorily answer the research question: "What development planning strategy, at urban level, can achieve balanced demand and supply of activity spaces in the urban market places with the view to optimising their locational and structural potential ?". This is because:

1. None of those approaches contain explicit inclusion of time in its structure.

2. They are designed to predict what is likely to happen as a result of certain assumptions, and not the possible range of performance in relation to defined locational and structural potentials of the urban market places .

The first shortcoming could be attributed to the poor state of theory development in retailing; and this problem could be overcome by the construction of a retail model that explicitly includes a time factor. The second shortcoming is due to the fact that none of those retail models is a "planning" model, in the pure sense of the word, and therefore, they do not have built into them certain goals and constraints. To answer the above research question, the thesis proposes to construct a retail model that contains the explicit inclusion of time factor, and certain goals and constraints in its structure.

CHAPTER 5

MODELLING THE CAUSAL RELATIONSHIPS BETWEEN THE DEMAND AND SUPPLY OF ACTIVITY SPACES, AND THE LOCATIONAL AND STRUCTURAL POTENTIAL IN URBAN MARKET PLACES

5.0 Introduction

Traditionally, urban market places, connected by networks of footways and motorways, provide a spatial framework, within which a large portion of urban socio-political and economic activities function. It is operationally recognised that the number of traders, who choose to locate in these market places, and the number of shoppers who make trips to the market places, are generated by stochastic phenomena, and are, therefore, subject to considerable variations in time and space.

Nevertheless, the general inability to quantify the socio-political, economic and physical factors, that operate to produce such variations, have usually forced Local Government Councils, and the Market Place Development Board, to turn to intuition for guidance. Consequently, the location and development schemes for the urban market places have continued to aggravate congestion of people and vehicles in the urban central market place.

Turning to a rational approach for a solution, the basic issues are those of understanding, (i) the processes involved in the demand and supply of activity

spaces in the urban market places, and (ii) the relationship between the demand and supply of activity spaces, and the locational and structural potentials of these urban market places. The author's examination of the issues (i) and (ii) culminated in the proposition of the "Locational and Structural Potential Model, for Development Planning of Urban Market Places".

The above examination covered these sections:

1. The Client Groups
2. The Scope of Urban Retail Institutions
3. The Classification of Activity Spaces in the Urban Market Places
4. The Structure of Demand and Supply of Activity Spaces in the Urban Market Places
5. The MECHANICS of Demand and Supply of Activity Spaces in the Urban Market Places
6. The Analytical Structure of the Proposed "Locational and Structural Potential Model".

5.1 The Client Groups

The client groups and their units of demand for activity spaces have been defined in Chapter 1, pages 14 to 17.

5.2 The Scope of Urban Retail Institutions

- The scope of urban retail institutions have been discussed in Chapter 1, pages 18 to 23.

5.3 Market Place Activity Space Classification

This study, being a pioneer work in urban and regional planning, requires a classification of the activity space system of a market place. The suggested classification of the activity space system of the market place is shown in Figure 5.1 page 152. The study revealed the activity space system of the market place as hierarchical and complex and is hereby examined in a manner similar to the classification system observed in "animal" and "plant" kingdoms, thereby borrowing such classification terminologies as:

- genus; plural genera
- phylum; plural phyla
- specie; plural species
- class; plural classes

In order to clarify the classification of market place activity spaces shown in Figure 5.1 page 152 the following definitions are necessary:

Commodity-Space - The basic unit of market place activity space classification is "commodity-space", operationally defined as "the total floor-space devoted to storage, display, sales, actual manufacture, processing, repairs and consumption of a commodity in the market place". The Concise Oxford Dictionary of Current English, seventh edition, 1982, defines commodity as "useful thing; article of trade, especially product as opposite to service". In this exercise commodity includes products and services, both private and public, e.g. yam, cocoyam, potato, etc. are commodities, belonging to the class of tubers. Though

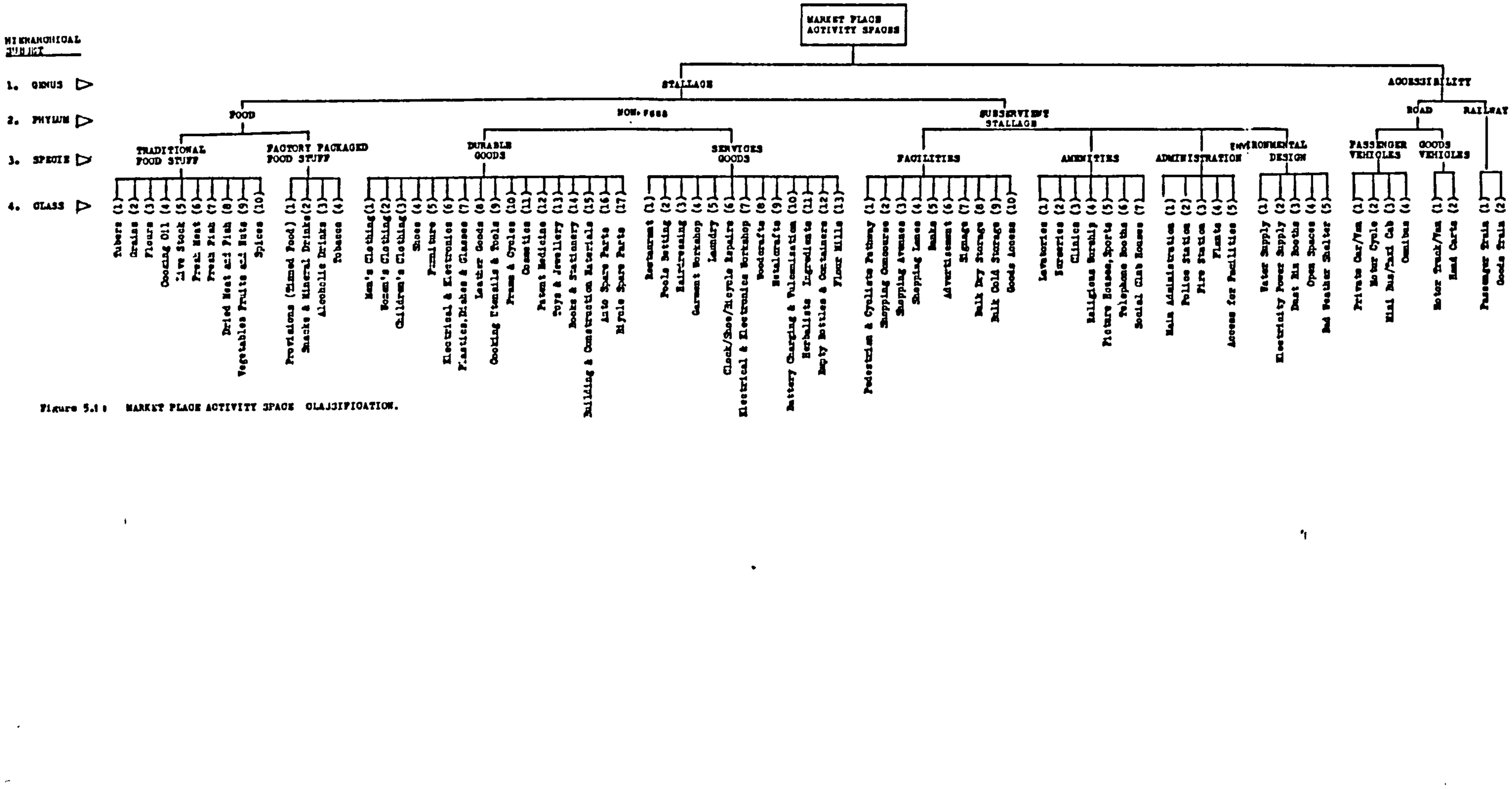


Figure 5.1 : MARKET PLACE ACTIVITY SPACE CLASSIFICATION.

there are varieties of yam, cocoyam or potato of which there might be some real and imagined differences in quality, many purchasers do not mind which of them they take, or as close substitutes. There are myriads of commodities, and it is not considered important to go into the unnecessary details of presenting the types of commodities that exist, but rather to start from the next more meaningful subset, "classes", into which all commodities might fall.

In order to clarify the market place activity space classification, the following definitions are necessary.

Class-space, as "the total floor-space in the market place devoted to storage, display, sales, actual manufacture, processing, repairs and consumption of commodities belonging to the class subset", e.g. tubers-space, grains-space.

Specie-space, as "the total floor-space in the market place devoted to storage, display, sales actual manufacture, processing, repairs and consumption of commodities belonging to the specie subset", e.g. traditional foodstuff-space, durable goods-space.

Phylum-space, as, "the total floor-space in the market place devoted to storage, display, sales, actual manufacture, processing, repairs and consumption of commodities belonging to the phylum subset", e.g. food-space, non-food-space.

- Genus-space, as, "the total floor-space in the market place devoted to storage, display, sales, actual manufacture, processing, repairs and consumption of commodities belonging to the genus subset", e.g. stallage-space and accessibility space.

Market Place-space - as, "the total floor-space devoted to all of the activities of the market place, i.e. the sum of stallage and accessibility spaces".

The above defined quantities are termed the utility values of the market place and are used in the examination of what changes that might have occurred in a market place over a period of time or in the comparison of the uses of a group of market places or both. And the philosophy of the market place activity space classification is enunciated as follows:

Because of the differentiated requirements for bargaining, and transport modes of shoppers and traders, the activity spaces in the market place is divided into two genera: namely, stallage and accessibility.

5.3.1 Stallage Spaces

Because of the shoppers preferred pattern of shopping for food and non-food, the traders who want to locate in close relationship with others who market the same products, or others who market products that are used in association with their products, the hygienic requirements of commodities as specified by the health office, the living requirements of the trader as a human being, and the market place as a social urban space, stallage is divided into three phyla, namely - food, non-food and subservient stallage.

Because of associated usage, handling requirements, common qualities or characteristics of the individual commodities which differ only in minor details and can be intermixed, food is divided into two species;

namely, traditional food stuff and factory packaged food stuff. In the same vein non-food is divided into two species, namely durable goods and services goods.

Because of the hierarchy of zoning and the nature of circulation spaces required by the shopper to enable him to move about and have access to the stalls, and the basic human requirements in the course of his stay in the market, and in addition to the traders requirements to enable him to live and operate his business in health and safety, in the market place daily, between 07.00 to 18.30 hours, the subservient stallage contains four species, namely, facilities, amenities, administration and environmental design.

Because of the trader's preferred association, sequence and frequency of intermixing (necessitated by the shopper's behaviour shopping pattern) of displayed food stuffs and the spatial correlation of commodity stalls, as observed in the surveys of the market places, traditional food stuff is divided into ten classes, factory packaged food stuff into four classes, durable goods into seventeen classes and services goods into thirteen classes, as listed below:

Traditional Food Stuff	Factory Packaged Food Stuff
1. tubers	1. provisions (tinned food)
2. grains	2. snacks and mineral drinks
3. flours	3. alcoholic drinks
4. cooking oil	4. tobacco
5. livestock	
6. fresh meat	
7. fresh fish	
8. dried meat and fish	
9. vegetables, fruits and nuts	
10. spices	

Durable Goods	Services Goods
1. men's clothing	1. restaurant
2. women's clothing	2. pool betting
3. children's clothing	3. hairdressing
4. shoes	4. garment making
5. furniture	5. laundry
6. electrical and electronics	6. watch/shoe/bicycle repairs
7. plastics	7. electrical and electronic repairs
8. leather goods	8. wood crafts
9. cooking utensils and tools	9. metal crafts
10. prams and cycles	10. battery charging and vulcanization
11. cosmetics	11. herbalist's ingredients
12. patent medicine	12. empty bottles and containers
13. toys and jewellery	13. flour mills
14. books and stationery	
15. building and construction materials	
16. auto spareparts	
17. bicycle spareparts	

Because of the sequence in which the shopper's circulation pathways are connected, the number of stall blocks directly associated with each pathway and the quantity of shopper traffic carried in the hierarchy of the market place circulation pathways, and the necessity to provide financial and other social support facilities, facilities are divided into ten classes and amenities into seven classes, as listed below:

Facilities	Amenities
1. pedestrian and cyclist access	1. lavatories
2. shopping concourse	2. nurseries
3. shopping avenue	3. clinics
4. shopping lane	4. religious worship
5. banks	5. pictures and games
6. advertisement	6. telephone
7. signage	7. social club
8. bulk dry storage	
9. bulk cold storage	
10. goods access	

Because of the need to police the market place, prevent and stop fire disaster, provide sanitation, maintain day to day administration, supply water, electric power, collect and dispose of refuse, maintain the open spaces, administration is divided into five classes and environmental design is divided into five classes, as listed below.

Administration	Environmental Design
1. main administration	1. water supply
2. police station	2. electric power supply
3. fire station	3. sanitation
4. plants	4. open spaces
5. access for facilities	5. bad weather protection

5.3.2 Accessibility Spaces

Theoretically it may be possible for a city market place to possess accessibility by road, railway, water and air. But the probability of a market place possessing all of the four accessibility modes decreases from road

to air transport mode, and this is explained by relative low expenditure capacity of a market place compared with air transport fares. Therefore, the probability of using air transport mode to gain accessibility of a market place in a Nigerian city tends to zero and is not included in this study. In Nigeria, which is the reference country of the study, there are very few incidences of the central market place being sited on the sea shore or river bank. Water transport mode is, therefore, excluded from this study. Although road and railway transport modes stand to complement each other in providing accessibility to an urban market place, their technologies, right of way configuration and operational features differ significantly.

Because of the differentiated requirements for parking spaces assigned to private vehicles, where they are left in, for stationing spaces assigned to commercial vehicle stoppage in order to load and unload passengers and goods, and of depots assigned to hand carts, road transport mode is divided into six classes, namely:

Passenger Vehicles		Goods Vehicles
1. private car/van	private	1. motor truck/van
2. motor cycles	private	2. hand cart
3. minibus/taxi cab	commercial	
4. omnibus	commercial	

Because of the differences in the physical structure of railway wagons and coaches, safety and health regulations, handling requirements and economy achieved in separate transportation of passengers and goods, railway transport mode is divided into two classes, namely passenger train and goods train.

In concluding market place activity space classification, the summary of demand for activity spaces by the client groups is shown in Table 5.1, page 159.

TABLE 5.1: Summary of Demand for Activity Spaces in the Market Place by the Client Groups

Activity Space	Client Groups			
	Shopper	Trader	Transport Means	
			Road	Railway
Stallage-Space (Food)	X	X		
Stallage-Space (Non-Food)	X	X		
Subservient Stallage-Space	X	X		
Accessibility-Space	X	X	X	X

5.4 The Mechanics of Demand and Supply of Activity Spaces in the Urban Market Places

The shopping institutions constitute a network of retail outlets which complement and compete with one another in providing shopping requirements to the shoppers. It is only reasonable to suggest that the system which maintains the pattern of demand and supply of activity spaces in the urban market places must depend on an identifiable mechanism. This mechanics of demand and supply of activity spaces in the urban market places consists of two basic components, viz:

1. Structure of the Distribution of Demand and Supply of Activity Spaces among the urban market places.

2. Dynamics of the Distribution of Demand and Supply of Activity Spaces among the urban market places.

5.4.1 The Structure of the Distribution of Demand and Supply of Activity Spaces among the urban market places

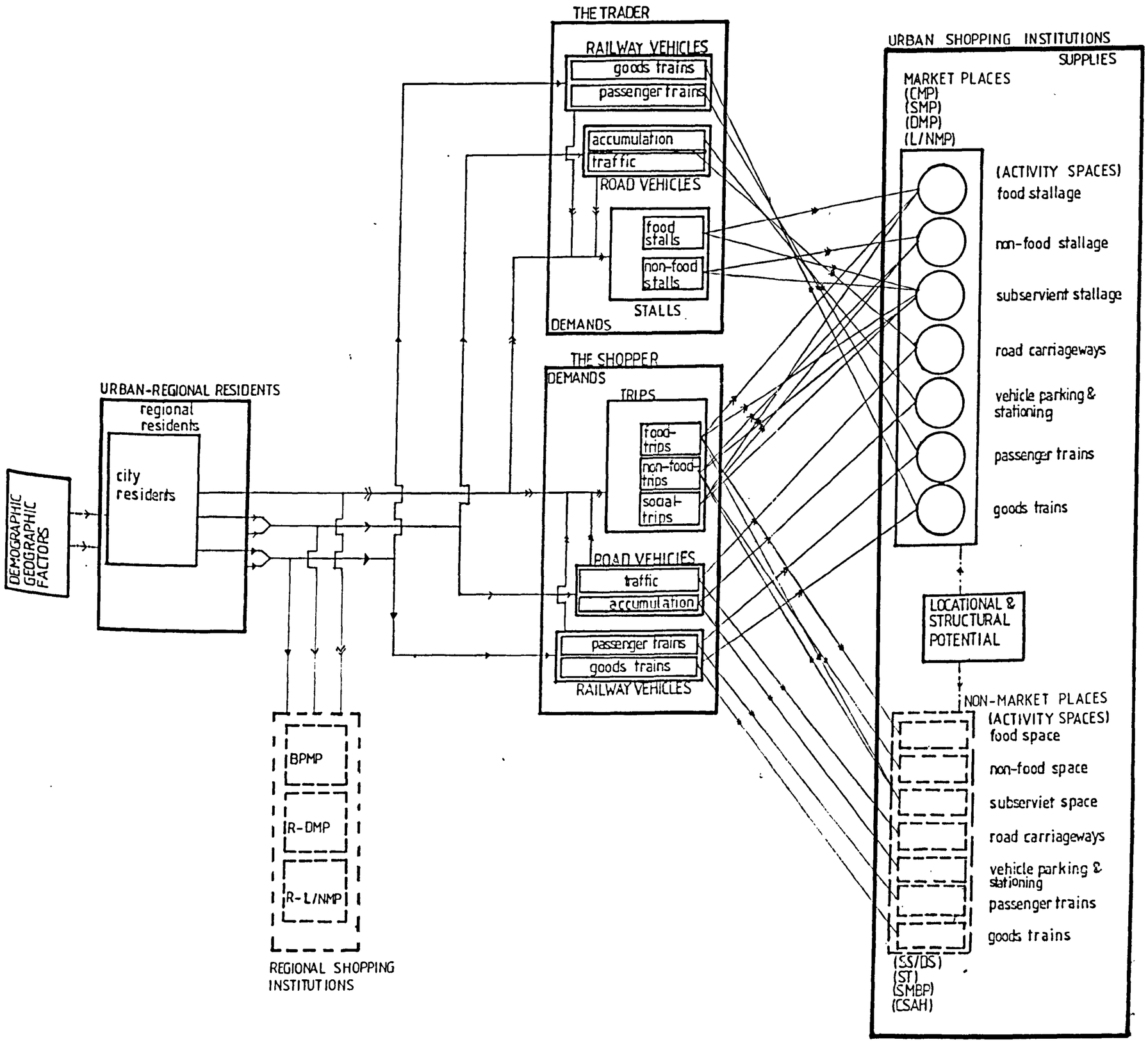
The world is at work and the wheel of economic and social activities is whirling round. The whole economic apparatus under capitalism depends upon sales, and ultimately, upon sales to the final consumers, who buy consumer goods, and are called the shoppers. The traditional architectural space in which the consumer goods are bought and sold are the retail outlets described as shopping institutions. As stated by Benham (1944), "Retail markets ..... are somewhat imperfect". The shopper is, therefore, either compelled or free to choose between the shopping institutions in order to maximize his net gains from his shopping. Some city-regional residents use the central market place more in pursuit of their normal out-of-home activities than others. The question is, what is the boundary of influence of the CMP? Is demand for activity spaces in the CMP affected by increased status achievement, or is it a matter of no choice, that for some, has no utilitarian value? As Anderson, J. points out, "observed behaviour may be expected to reflect the value of the performer. However..... it also reflects the constraints of the environment and personal circumstances", e.g. some people may be placed in a position of being obliged to

use the CMP in order to maximize their net gains from their shopping activities.

The trips consumed by the shopper in the market place are serviced by the trader. As the trader's activity is governed by the concept of opportunity costs which states that "the value of anything produced by a factor or group of factors, will tend to be equal to the value of anything else which a similar factor, or group of factors, is producing. This assumes that factors of production can easily move from one industry to another, and will do so if they can thereby produce something of greater value, thus earning more for themselves". The trader, like the shopper, in deciding which market place to locate in, is compelled to choose between the market places in the city in order to maximize his net gain from his trading activity.

In making these choices, the shopper and the trader distribute their demands for activity spaces among the shopping institutions, as shown in Figure 5.2 page 162 , (the structure of the distribution of demand and supply of activity spaces to the urban shopping institutions). The shopper distributes his demand to all the sub-sets of shopping institution, whereas the trader distributes his demand to the market places only. The results of the distribution of demand for activity spaces by the shoppers and the traders, and the supply of the activity spaces by the shopping institutions are the observed pressures of demand for activity spaces in the shopping centres.

Shopping activity in the urban area may be divided into two main divisions - shopping in the market places and shopping in the non-market places. The non-market



Legend

——→——	DEMAND/SUPPLY
---→---	CAUSAL INFLUENCE
CMP	Central Market Place
SMP	Special Market Place
DMP	District Market Place
L/NMP	Local/Neighbourhood Market Place
SS/DS	Superstores/Departmental Stores
ST	Shopping Streets
SMBP	Shops on the Motorway By-Pass
CSAH	Corner Shops And Hawkers
RSC	Regional Shopping Centres
——→——	FOOT — TRANSPORT
——→——	ROAD — TRANSPORT
——→——	RAILWAY — TRANSPORT
BPMP	Bulking-Up Post Market Place
R-DMP	Regional District Market Place
R-L/NMP	Regional Local/Neighbourhood Market Place

Item of Interest of the Study

Item of Residual Interest of the Study

Figure 5.2 : The Structure of the Distribution of Demand and Supply of Activity Spaces Among the Urban Shopping Institutions

places belong to individuals and organizations, while the market places are within the responsibilities of the local government council. And shopping in the market places represents a major division of the urban shopping activities.

The "basic components" of the demand and supply of activity spaces in an urban market place consist of the shoppers, (T) and the traders, (Q), on the one hand, and the stallage floor-space, (Z) and the number of stalls, (R) on the other hand. Each of these basic components may be divided into food and non-food "special components". The observed pressures of demand and supply for activity spaces in an urban market is produced by the situation in the relationship between "like-pairs of the specific components" - (food like-pairs, and non-food like-pairs).

'a' and 'b' are notations to indicate:

(i) 'a' for food shopping
(ii) 'b' for non-food shopping

Note: 'a' and 'b' should be taken as part of the symbol to the left, with which they occurred.

For food shopping, the relationship between any like-pair is given by the generic hierarchical equation:

$$D_{a_1} = \propto D_{a_2} + C_a \quad \ldots\ldots\ldots\ldots\ldots \quad (1a)$$

where D_{a_1} and D_{a_2} would be substituted by any pair of the following "food specific components" which are then formed into "food like-pairs of specific components".

The shoppers food-trips	T_a
The number of food traders	Q_a
The stallage of food floor-space	Z_a
The number of food stalls	R_a

α and C_a are the slope and constant of the food hierarchical equation, respectively.

There are a total of 6 food hierarchical equations to be solved.

For non-food shopping the relationship between any like-pair is given by the generic hierarchical equation:

$$D_{b_1} = \beta D_{b_2} + C_b \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1b)$$

where D_{b_1} and D_{b_2} would be substituted by any pair of the following "non-food specific components" which are then formed into "non-food like-pairs of specific components".

The shoppers non-food-trips	T_b
The number of non-food traders	Q_b
The stallage of non-food floor-space	Z_b
The number of non-food stalls	R_b

β and C_b are the slope and constant of the non-food hierarchical equation, respectively.

There are a total of 6 non-food hierarchical equations to be solved.

The scatterplot of each equation is expected to reveal the continuum that exists in the hierarchical relationship between the like-pair of the specific components - (food like-pair or non-food like-pair). Therefore the thesis proposes to examine:

(i) the strength of the relationship, and

(ii) the existing continuum in the hierarchical relationship,

between these food and non-food like-pairs of the specific components:

1.1a	the shoppers food-trips and the stallage food floor-space,	$(T_a - Z_a)$
1.1b	the shoppers non-food-trips and the stallage non-food floor-space,	$(T_b - Z_b)$
1.2a	the shoppers food-trips and the number of food stalls,	$(T_a - R_a)$
1.2b	the shoppers non-food-trips and the number of non-food stalls,	$(T_b - R_b)$
1.3a	the stallage food floor-space and the number of food stalls,	$(Z_a - R_a)$
1.3b	the stallage non-food floor-space and the number of non-food stalls,	$(Z_b - R_b)$
1.4a	the stallage food floor-space and the number of food traders,	$(Z_a - Q_a)$
1.4b	the stallage non-food floor-space and the number of non-food traders,	$(Z_b - Q_b)$
1.5a	the number of food stalls and the number of food traders,	$(R_a - Q_a)$
1.5b	the number of non-food stalls and the number of non-food traders,	$(R_b - Q_b)$

1.6a the shoppers food-trips and the number of food traders, $(T_a - Q_a)$

1.6b the shoppers non-food-trips and the number of non-food traders, $(T_b - Q_b)$

The above 12 hierarchical relationships constitute the 6 hierarchical relationships of Figure 5.3 page 175 , (the proposed locational and structural potential model). It is only common sense that one may ask, what factors are acting to bring about these hierarchical relationships which are manifested in the observed pressures of demand and supply of activity spaces in the urban market places. These causal factors may be said to constitute the MECHANICS of demand and supply of activity spaces in the urban market places, but then what are those dynamic factors and what are their relationships with the eight specific components?

5.4.2 The MECHANICS of the Distribution of Demand and Supply of Activity Spaces among the urban market places

The "actual price" of a commodity in the market place is the sum of:

1. the retail price paid by the shopper to the trader.
2. the monetary "value" of the difficulties the shopper suffered by shopping in that market place.

These difficulties include time, efforts and inconveniences and possibly the extra fares. The difficulties are caused, aggravated or minimized (if not completely eliminated), depending on the personal circumstances of the shopper, by some factors termed locational and structural potentials in the market place. Locational and structural potentials are listed in Table 1.2 page 25 and have been defined in Chapter 1, page 24.

Detailed description of locational and structural potentials in a market place are given in section 6.2.3 page 198.

Secondly, the "retail price" of the commodity in the market place is composed of:

1.1 the traders purchase price

1.2 operational cost attributable to the market place

1.3 average retail mark-up (average profit margin).

Operational costs attributable to the factors in the market place include rent on stalls, turnover rate and associated risks, transportation of commodity in the market place, inconvenience, time, efforts and possibly, extra fares. These operational cost factors are strongly dependent on the locational and structural potentials in the market place. If costs 1.1 and 1.3 are held constant, a high operational cost would push the retail price high and therefore reduce the number of prospective buyers and consequently reduces the traders net profit. Since trading activity, like any other private business, is governed by the concept of opportunities, the trader, therefore, would prefer to locate in the market place which would enable him to maximize his net profit by reducing operational costs.

The foregoing debate suggests that the locational and structural potentials in a market have double actions on the actual price of the commodity and is capable of aggravating or minimizing the actual price of the commodity in the market place and thereby capable of decreasing or increasing the demand for activity spaces by both the shopper and the trader in the market place. To quote Benham (1944):

> "A change in price does not come about by itself. It is the result of a change in conditions which alters the supply schedule or the demand schedule or both. If the change affects only the demand, the normal sequence will be an increase in demand leading to a rise in price which induces an extension of supply or, in the opposite case, a decrease in demand leading to a fall in price which induces a contraction of supply. Conversely, if the change affects only the supply, the normal sequence will be an increase in supply leading to a fall in price which induces an extension of demand or, in the opposite case, a decrease in supply leading to a rise in price which induces a contraction of demand".

Hence, if differences exist in the retail price of a commodity in the market places in a city, fluctuation must be observed in the distribution of the shopper's and the trader's demand for activity spaces in the market places. If a market place 'A' offered a commodity to the shopper at an actual price less than others, shoppers will stream towards it, until its commodity is sold out, or the price raised up to that asked by the other market places, or (exceptionally, when 'A' holds a large proportion of the total stocks) until rival market places are constrained to reduce their prices to the level of A's. Conversely, if a market place 'B' asks more than his rivals for the same commodity, B will find no purchasers, for although some shoppers will be prepared, if necessary, to pay more than the price ruling at the moment, they will not deal with one market place if they can get the same commodity more cheaply from others.

Assuming that there is no general change in the value of money and that the traders in the city market places are supplied the commodity at the same source and at the same price, and if differences exist in the actual price of the commodity in the market places in the city, the variation in the actual price can largely be explained by the differences in the locational and structural potentials in the market places.

The urban market places draw their clients, the shoppers and the traders from the same catchment area; the urban-region. Therefore, it may be said that the demographic, geographic, socio-political and economic characteristics of the shoppers and traders, who may want to demand activity spaces remain the same for

all of the urban market places. Conceptually, if each urban market place were to lose all its locational and structural potentials, each would be reduced to a dot; and probably all of them occupying the same spot. This concept is clearly demonstrated in the definition, and in the measurement parameters of the locational and structural potentials, detailed in section 6.2.3, page 198. Consequently, if in an urban, the market places have varying growth rates for the specific components, the only assumption is that the varying growth rates are largely dependent on the locational and structural potentials of the market places.

The study, therefore, proposes to examine the strength and form of the causal relationships between the growth rates of the specific components, and the locational and structural potentials in the market places. The growth rates of the specific components are:

2.1a	Growth rate of the shoppers food-trips	dT_a
2.1b	Growth rate of the shoppers non-food-trips	dT_b
2.2a	Growth rate of the number of food traders	dQ_a
2.2b	Growth rate of the number of non-food traders	dQ_b
2.3a	Growth rate of the stallage food floor-space	dZ_a
2.3b	Growth rate of the stallage non-food floor-space	dZ_b
2.4a	Growth rate of the number of food stalls	dR_a
2.4b	Growth rate of the number of non-food stalls	dR_b

'a' and 'b' are notations to indicate:

(i) 'a' for food shopping
(ii) 'b' for non-food shopping

Note: 'a' and 'b' should be taken as part of the symbol to the left, with which they occurred.

$X_1, X_2, \ldots\ldots, X_{n-1}$ and X_n	are the locational potential variables in the urban market places. (n is a positive integer); see Table 1.2 page 25 for the specification of the locational potential variables
$Y_1, Y_2, \ldots\ldots, Y_{m-1}$ and Y_m	are the structural potential variables in the urban market places (m is a positive integer); see Table 1.2 page 25 for the specification of the structural potential variables

For food or non-food shopping, the above proposition is expressed by the generic predictive equation:

$$dD_o = \left[L_1 X_1^i + L_2 X_2^i + \ldots\ldots + L_{n-1} X_{n-1}^i + L_n X_n^i\right]$$

$$+ \left[S_1 Y_1^i + S_2 Y_2^i + \ldots\ldots + S_{m-1} Y_{m-1}^i + S_m Y_m^i\right]$$

$$+ K + E \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Specifications of the generic equations:

i is an exponential parameter to which the locational (X) and structural (Y) potential variables may be raised to obtain the best predictive equation.

L_1, L_2 ..... L_{n-1} and L_n are locational potential coefficients

S_1, S_2 ..... S_{m-1} and S_m are structural potential coefficients

K is a constant

E is an error term

The term, D_o, in the generic equation, (2), may be substituted, in turn, with the terms, T_a, Q_a, Z_a and R_a, to obtain the 4 food predictive equations. Similarly the term, D_o, in the generic equation, (2), may be substituted, in turn, with the terms, T_b, Q_b, Z_b and R_b to obtain the 4 non-food predictive equations. The eight predictive equations express the causal relationships between:

2.1a Growth rate of the shoppers food-trips, and the locational and structural potentials; (dT_a - X&Y)
2.1b Growth rate of the shoppers non-food-trips, and the locational and structural potentials; (dT_b - X&Y)

2.2a Growth rate of the number of food traders and the locational and structural potentials; (dQ_a - X&Y)
2.2b Growth rate of the number of non-food traders, and the locational and structural potentials; (dQ_b - X&Y)

2.3a Growth rate of the stallage food floor-space, and the locational and structural potentials; (dZ_a - X&Y)
2.3b Growth rate of the stallage non-food floor-space and the locational and structural potentials; (dZ_b - X&Y)

2.4a Growth rate of the number of food stalls and the locational and structural potentials; (dR_a - X&Y)
2.4b Growth rate of the number of non-food stalls, and the locational and structural potentials; (dR_b - X&Y)

The eight predictive equations constitute the 4 causal relationships; two equations in each;(connecting the 4 basic components to the locational and structural potential component), see Figure 5.3 , page 175 (the proposed locational and structural potential model).

5.5 The Proposed Locational and Structural Potential Model As An Analytical Framework

In order to facilitate the proposed examination of

(i) the existing continuum and the strength of the hierarchical relationship between the like-pairs of the specific components;

(ii) the strength and form of the causal relationships between the growth rates of the specific components and the locational and structural potentials in the market places;

the thesis has proposed the "analytical model" shown in Figure 5.3 page 175 . The model was generated from the contingency approach to a stochastic system, one aim of the research, as discussed in Chapter 1, being to improve existing understanding of the interplay between the shopper, the trader, the stalls and floor-spaces, and the locational and structural potentials in the market places. The procedure used in the generation of the model is known as "Triangulation Technique". The term triangulation is taken from the land surveying, navigation and military strategies that use multiple reference points to locate an object's exact position. The use of this technique in social science research is based on the premise that the weakness in a single data generation method will be offset by the counter-balancing strength of another. The assumption is that the multiple and independent measures do not share the same weakness or potential for bias (Rohner, 1977, p. 34).

In the social sciences the use of triangulation techniques can be traced back to Campbell and Stanley (1963)

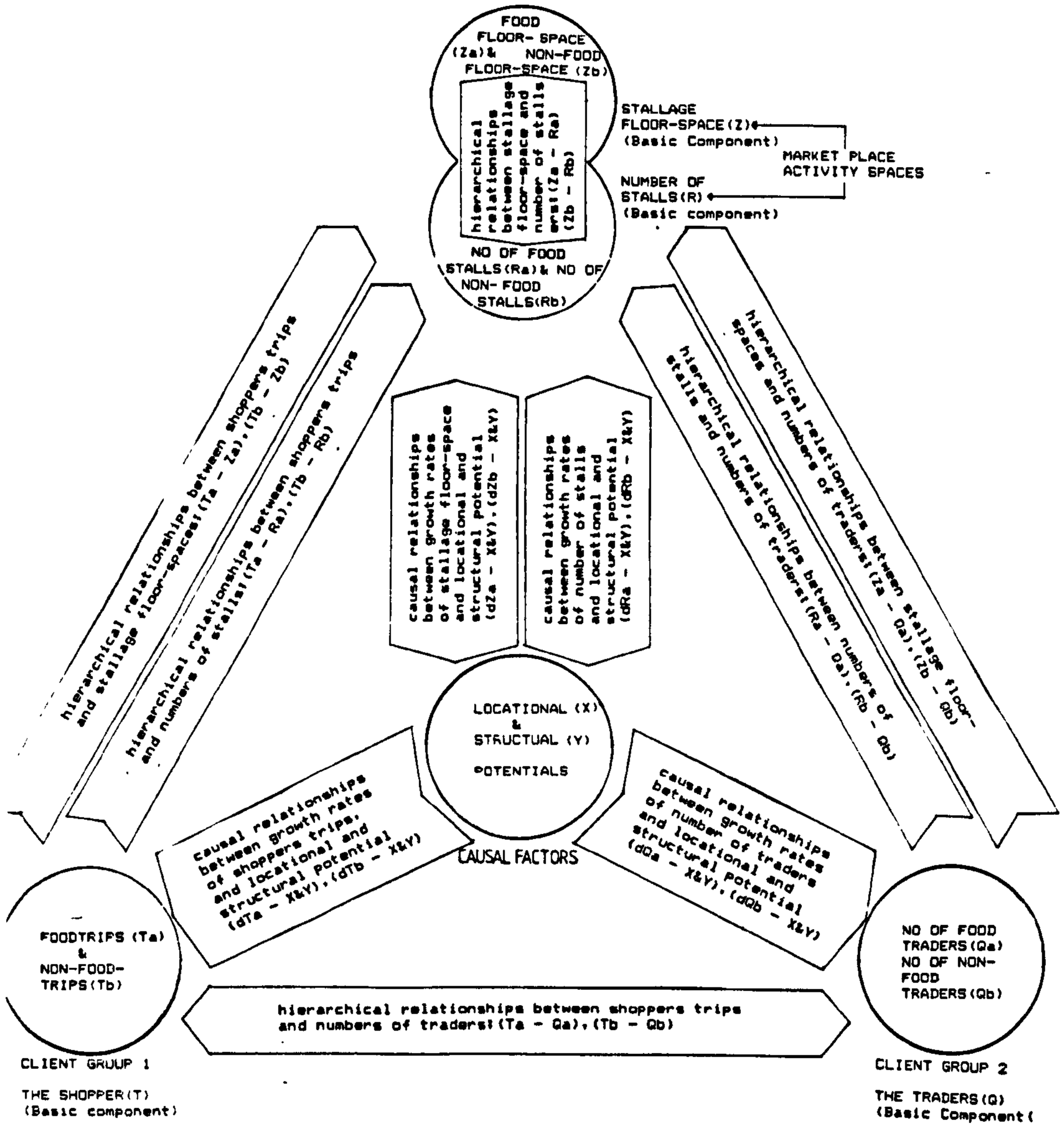


Figure 5.3 :PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL.

The thesis propses to examine the stated relationships

Note : Arrow indicates direction of Influence.

and more recently has been strongly advocated by Webb et al. (1966), Smith (1975), Denzin (1978) and Mitchel et al. (1981). The proposed model, based on triangulation techniques, used in the analysis of the demand and supply of activity spaces in the city retail market place system is provided in Figure 5.3 page 175. It should be understood as a diagramatic aid to analysis, illustrating the possible interdependencies between the variables and providing a diagramatic representation for the systematic examination of: firstly, the existing continuum and the strength of the hierarchical relationships between the like-pairs of the specific components; and secondly, the strength and form of the causal relationships, between the growth rates of the specific components, and the locational and structural potentials in the market places.

The models' analytical structure are delineated as:

(i) four "basic cells" and one "causal cell"
(ii) six "hierarchical relationships"
(iii) four "causal relationships"

The five cells constitute the "primary components" of the locational and structural potential model. The "secondary components" are the 6 hierarchical relationships which connect the basic cells (one bond between two basic cells). The "tertiary components" of the model are the 4 causal relationships which connect each of the 4 basic cells to causal cell. These components are listed in Table 5.2 page 177.

TABLE 5.2: The Primary Components - The Cells

Symbol and Name of the Primary Components		Symbol and Name of the Specific Components
4 Basic Cells	SHOPPERS' TRIPS (T)	T_a the shoppers' food-trips T_b^a the shoppers' non-food-trips
	TRADERS (Q)	Q_a the number of food traders Q_b the number of non-food traders
	FLOOR-SPACES (Z)	Z_a the stallage food floor-space Z_b the stallage non-food floor-space Z_f the stallage floor-space Z_g the accessibility floor-space Z_u the market place floor-space
	NO. OF STALLS (R)	R_a the number of food stalls R_b^a the number of non-food stalls
1 Causal Cell	LOCATIONAL POTENTIALS (X)	X_1 railway transport linkage X_2^1 road transport linkage X_3^2 immediate surrounding residential population X_4 immediate surrounding places of work (include location near industrial sites) X_5 immediate surrounding other shopping centres X_6 immediate surrounding wholesale shops and warehouses (including location near agricultural sites)
	STRUCTURAL POTENTIALS (Y)	Y_1 building design factors Y_2^1 facilities and amenities Y_3^2 parking and stationing places for vehicles Y_4 security of life and property Y_5 environmental qualities Y_6^5 zoning of market place by commodity Y_7 preservation of food commodities Y_8 food and non-food capacities

The analysis is required to be carried out in three stages, namely:

(i) primary analysis
(ii) secondary analysis
(iii) tertiary analysis

The primary analysis is devoted to the description of the primary components of the model. The quantities of the specific components, which are expected to vary in magnitude between the market places and also over time period are obtained in order to provide data for the secondary and tertiary analyses. The specific components to be described are listed in Table 5.2 page 177.

The secondary analysis is devoted to the explanation of the secondary components - the hierarchical relationships of the model. At this stage the existing continuum and the strength of the hierarchical relationships, between the like-pairs of the basic specific components of the model are derived, using the hierarchical equations 1a and 1b; see pages 161 and 162 . The hierarchical relationships between like-pairs of the specific components, to be explained are listed in Table 5.3 page 179.

The tertiary analysis provides explanation of the tertiary components - the causal relationships of the model. Derived at this stage are the strength and form of the causal relationships between the growth rates of the basic specific components of the models, using the predictive equation 2 , see page 171. The causal relationships between growth rates of the specific components, and the locational

TABLE 5.3: The Secondary Components - The Hierarchical Relationships

Serial Number	Hierarchical Relationship Between Like-Pairs of the Specific Components	Symbol of Hierarchical Relationship
1.1a	the shoppers' food-trips and the stallage food floor-space	$T_a - Z_a$
1.1b	the shoppers' non-food-trips and the stallage non-food floor-space	$T_b - Z_b$
1.2a	the shoppers' food-trips and the number of food stalls	$T_a - R_a$
1.2b	the shoppers' non-food-trips and the number of non-food stalls	$T_b - R_b$
1.3a	the stallage food floor-space and the number of food stalls	$Z_a - R_a$
1.3b	the stallage non-food floor-space and the number of non-food stalls	$Z_b - R_b$
1.4a	the stallage food floor-space and the number of food traders	$Z_a - Q_a$
1.4b	the stallage non-food floor-space and the number of non-food traders	$Z_b - Q_b$
1.5a	the number of food stalls and the number of food traders	$R_a - Q_a$
1.5b	the number of non-food stalls and the number of non-food traders	$R_b - Q_b$
1.6a	the shoppers' food-trips and the number of food traders	$T_a - Q_a$
1.6b	the shoppers' non-food-trips and the number of non-food traders	$T_b - Q_b$

TABLE 5.4: The Tertiary Components - The Causal Relationships

Serial Number	Causal Relationship Between Growth Rates of the Specific Components, and the Locational and Structural Potentials	Symbol of Causal Relationship
2.1a	growth rate of the shoppers' food-trips and the locational and structural potentials	$(dT_a - X \& Y)$
2.1b	growth rate of the shoppers' non-food-trips and the locational and structural potentials	$(dT_b - X \& Y)$
2.2a	growth rate of the number of food traders, and the locational and structural potentials	$(dQ_a - X \& Y)$
2.2b	growth rate of the number of non-food traders, and the locational and structural potentials	$(dQ_b - X \& Y)$
2.3a	growth rate of the stallage food floor-space, and the locational and structural potentials	$(dZ_a - X \& Y)$
2.3b	growth rate of the stallage non-food floor-space, and the locational and structural potentials	$(dZ_b - X \& Y)$
2.4a	growth rate of the number of food stalls, and the locational and structural potentials	$(dR_a - X \& Y)$
2.4b	growth rate of the number of non-food stalls, and the locational and structural potentials	$(dR_b - X \& Y)$

and structural potentials to be explained, are listed in Table 5.4 page 180 .

To test the above proposed locational and structural potential model, data from the field survey conducted by the author in Kaduna city, Nigeria, in 1984, was used. The field surveys are described in Chapter 6.

CHAPTER 6

EMPIRICAL TEST OF THE PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL, USING KADUNA CITY MARKET PLACES; PART 1: FIELD SURVEYS

6.0 Introduction

This chapter describes the data collection concept and techniques, and the analysis methods. The complexity of the study, and the variety of types of data and the difficulty faced with internal validity factors (Campbell and Stanley, 1963) led us to employ an unusual research design. This research design involved collecting data from diverse sources, and in multiple forms. The types of data required to be collected for this design and the sources from which they were best obtained led us to employ a wide range of research methods. We are not aware of any other research project which has used such a wide range of methods. The several techniques used in this study were developed, especially for this project, from standard data collection procedures. It is hoped that these developments, described in more detail in the chapter, and also in Chapter 7, will prove helpful to other researchers tackling similar kinds of problems in the future.

6.1 Data Triangulation

The use of multiple methods of data generation or triangulation aimed to achieve control and to improve analysis of the various cells,and their relationships in our model,by collecting different kinds of information on the same phenomenon. With the overall objective of maximizing the amount of data, several research techniques were adopted to complement each other. First, we administered structured interview questionnaire to households to obtain the behaviour pattern of shopping trips distribution to the shopping establishments in the city by the city residents. Second, we carried out road vehicle entry and departure census at the City Central Market Place. Third, we carried out census survey of the stalls in all the traditional retail market places in the city to obtain classification of the traders, stalls and floor-spaces in them. Fourth, we administered structured interview questionnaire to the traders in the City Central Market Place to obtain micro-detail information on stallage and trading activities in the City Central Market Place. Fifth, we carried out (i) a semi-structured interview of the administrators of the market places, and (ii) physical survey of these market places to obtain their locational and structural potential scores. Sixth, we acquired data from consultants, institutes, the Federal, the State and Local Government offices. Our analysis took into account all these sources of information and consequently it has been both complex and extensive. Several advantages can be gained by the use of triangulated data sources and collection methods. These include:

* Collected data can be cross-checked and matched if need be.

* The research results can be stated with greater confidence.

* It often stimulates the development of inventive methods of analysis and interpretation.

* It enables existing theories to be questioned and further developed.

As triangulation involves a variety of data methods, thus the approach encompasses data measurement, interpretation and design techniques that range from the very simple to the highly complex. Jick (1979) quoted by Mitchell, F.H.H. et al. (1981) has defined four points on the triangulation complexity continuum.

1. Scaling, the simple quantification of quantitive and qualitative measures. In the study, coding frames were developed to obtain the quantities of the variables involved in the road vehicle entry and departure census at the City Central Market Place and in the classification of traders, stalls and floor-spaces in the market places. Complex coding frame was developed for scoring the locational and structural potentials in the market places.

2. Reliability, the use of one method in an anecdotal manner to support or strengthen the results obtained from another method, such as the use of field observations, maps and photographs to strengthen statistical results, see plates 3.7(b),7.12 pages 90, respectively. Also, detailed insight into the households usual choice of shopping centres,gained from the earlier part of

the household interview, were used to support statistical results obtained from the study weeks data on the household's shopping behaviour.

3. Convergent Validation, the use of complementary methods to arrive at an interpretation mutually supportive: In the study the strength of the relationships between the following, the shoppers' trips, the number of traders, the number of stalls, the amount of floor-space, the locational and structural potentials in the market place were used to explain the form and causal influence of the locational and structural potentials on the demand and supply of activity spaces in the congested City Central Market Place.

4. Constructional Description, the use of various methods to examine the same data from multiple perspectives which generate a deeper and enriched understanding: Several statistical techniques were employed in analysis of the data. These included frequency distribution, crosstabulation, breakdown and regression analyses. It was the nature of data requirements of these statistical techniques that determined the 'levels' at which the variables were measured.

6.1.1 Measurement of Variables

A variable is an observable entity which can take on more than one 'value' or 'characteristic' and they are the object of the statistical analysis. Their proper measurement entails assigning values or scores to the observed phenomenon. Value is simply a coded symbol to represent the status of the observed phenomenon.

Some variables, such as the size of a household, have obvious numeric values which can be used for the measurement. Some other variables require arbitrary coding scheme to identify the various conditions. An example of this type could be assigning the number one to a male respondent and the number two to a female respondent. The third set of variables require a grading coding scheme, e.g. where opinions are sought, or a matter of qualitative value, these are graded choice of possibilities, ranging from very strong positive to very strong negative. Since it was intended to analyse the data with the aid of a computer, using the SPSSX package, numeric values (codes) were employed because they are easier for the computer to manipulate. Any of the above three 'rules' which defined the assignment of an appropriate value determined the level of measurement of the variable.

The statistical techniques to be used in analysis of data were considered in respect of the levels of measurement of the variables. Frequency distribution, crosstabulation and breakdown can be performed for any level of measurement, but regression analyses require data measured mainly at what is called the 'interval' or 'ratio' levels. Since the computer does not know what level of measurement underlines the numbers it received, for each variable an appropriate rule was used in determining the level of measurement.

If the values used served merely as 'labels' or 'name' for the category, then the measurement was at the 'nominal' level, for instance a household's district of residence is a nominal variable. When all of the categories can be ranked according to some criterion or order, we have the 'ordinal' level of measurement.

For example, the classification of social classes of households as low, middle or high income groups is ordered according to social status. In addition to the criterion of ordering, the 'interval' level of measurement includes a definition of the distance between the categories in terms of fixed and equal units. A thermometer records temperature in terms of degrees and 1^{o} increase in temperature implies the same amount of additional heat whether the change is at the lower end of the scale or at the upper. The 'ratio' level of measurement has all of the properties of interval scale with the addition that a zero point is inherently defined by the measurement scheme. Thus, when we measure the size of the floor-space of a stall, a zero floor-space is naturally defined.

Because the meaning of the numeric codes used for variables are not always apparent, the questionnaires are designed to thoroughly facilitate the coding schemes. This includes the data record, the column numbers where the variable is located in the SPSSX data file and the numeric codes for the values of the variables. A code book was prepared. It is the document that described each variable. This included the variable's meaning, the value labels used and their meaning, where the variable is located in the data file and the brief label used to reference the variable in the SPSSX. Armed with the above guidelines for the measurement of the variables, the task of designing

- the questionnaires was ushered in.

6.2 Questionnaires

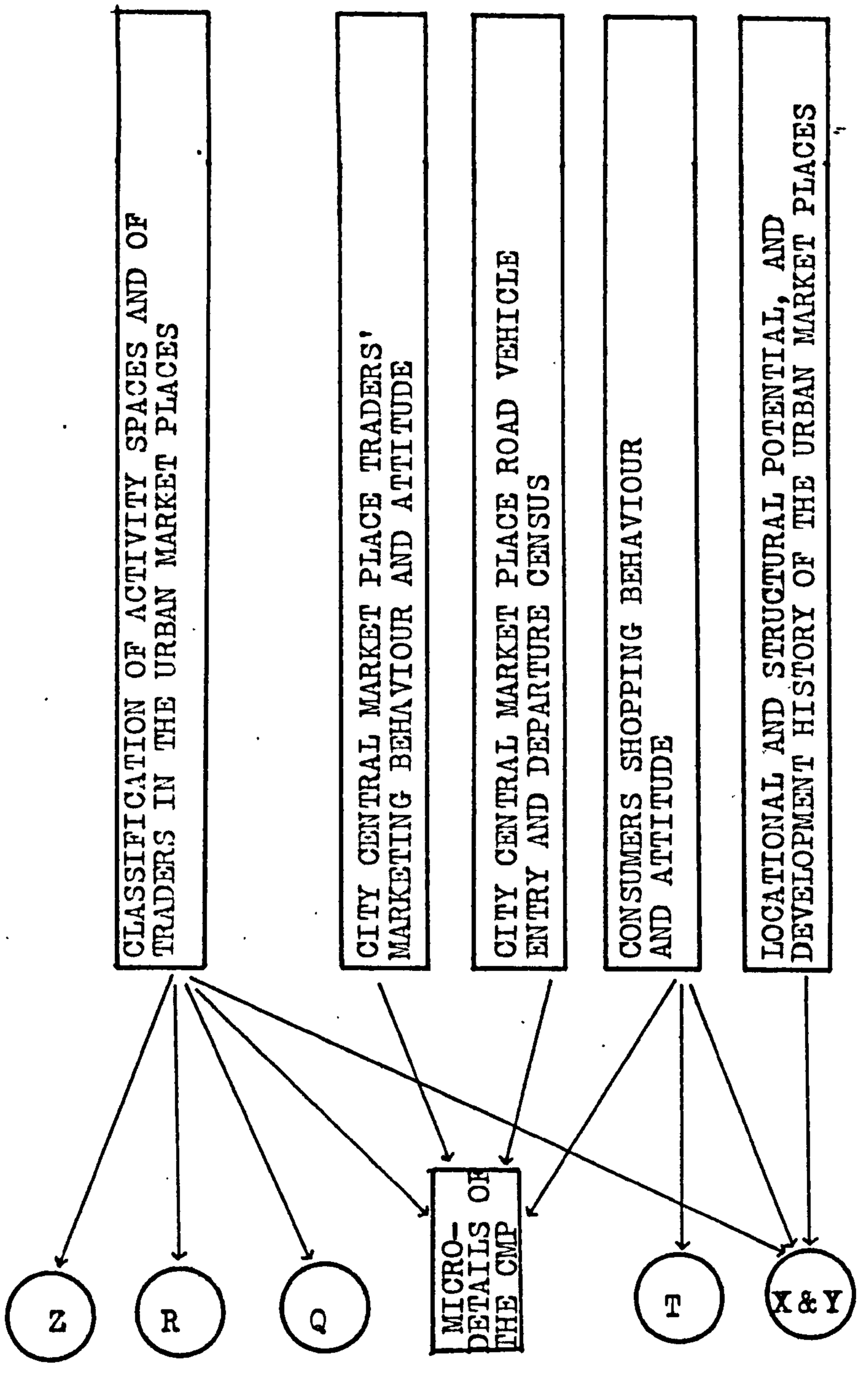
Before questionnaire design commenced reference was made to numerous other questionnaires from several countries in related fields, including surveys carried out by companies, by planning consultants, by research institutes and by other researchers. In order to facilitate coding, very few of the questions were open ended and some were multiple choice. Where opinions were sought there was normally a choice varying from very strong positive to very strong negative.

Three questionnaires and two survey sheets were designed to cover five distinct components of the city retail market place system, namely:

- the Shopper ..... Cell (T)
- the Trader ..... Cell (Q)
- the Stalls ..... Cell (R)
- the Floor-spaces ..... Cell (Z)
- the Locational and Structural Potentials..... Cell (X and Y)

The questionnaires and survey sheets were designed to seek out answers to a range of questions. These are related to the cells of the Locational and Structural Potential Model, Figure 5.3 page 175 in the following way, as indicated by the arrows in Figure 6.1 page 189.

In some cases the same information was sought from more than one group. This enabled checks to be made for data accuracy and conflicting individual or group perceptions.



Survey Questionnaires

The Cells of the Model

Fig. 6.1: Derivation of the Specific Components of the Cells of the Proposed Locational and Structural Potential Model from the Questionnaires.

The first version of the questionnaires and survey sheets were drafted and piloted by the author, using six different households and two different market places in the city. The schedule for chasing up an interview is given on the cover page of the questionnaire. The longest and the shortest times taken to complete the questionnaires or survey sheets were noted. Few modifications to the pilot were found necessary and were made.

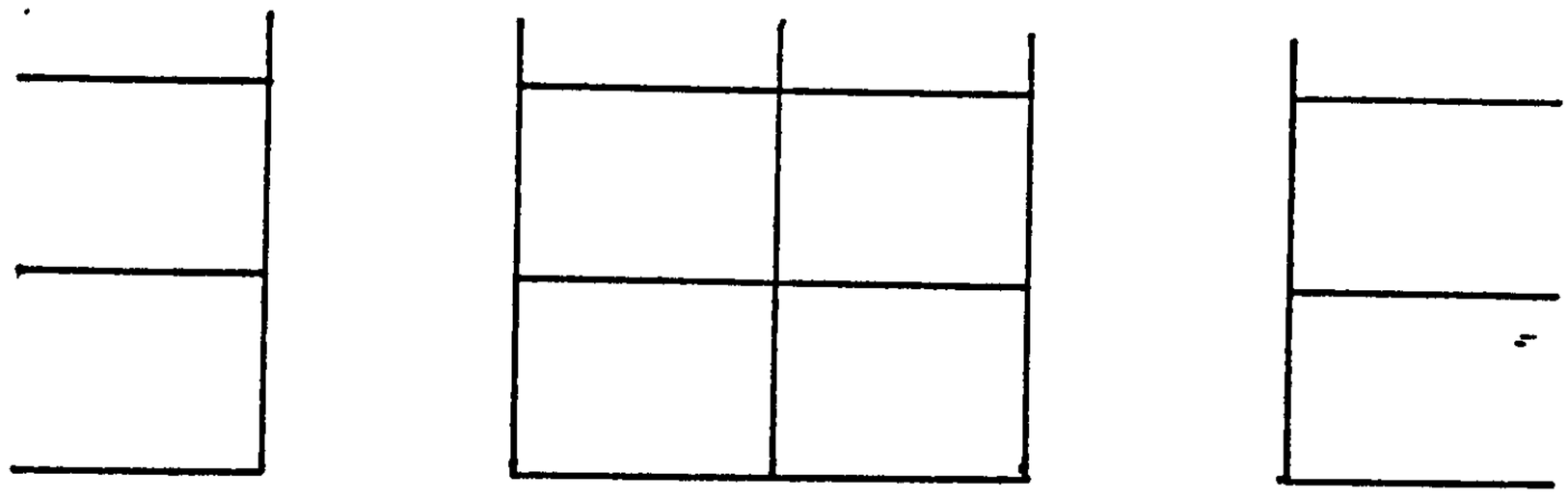
6.2.1 Classification Survey of Activity Spaces in the City Retail Market Places

The first objective of classification survey of activity spaces in the city retail market places was to obtain the number of traders engaged in the sale of the classes of commodities and hence the number of food and non-food traders in the market places. The second objective was to obtain the number of stalls devoted to the classes of commodities and hence the number of food, non-food and vacant stalls, and the number of new stalls under construction, in the market places. The third objective was to ascertain the amount of floor-spaces devoted to the sale of the classes of commodities and hence the food and non-food floor-spaces in the market places. Accordingly, activity space classification survey sheet, Appendix 6.1.1 page A5 , was designed for the collection of information in the market places in order to satisfy the above outlined three objectives. To carry out the classification survey of the activity spaces in the city retail market places, the following procedure was designed.

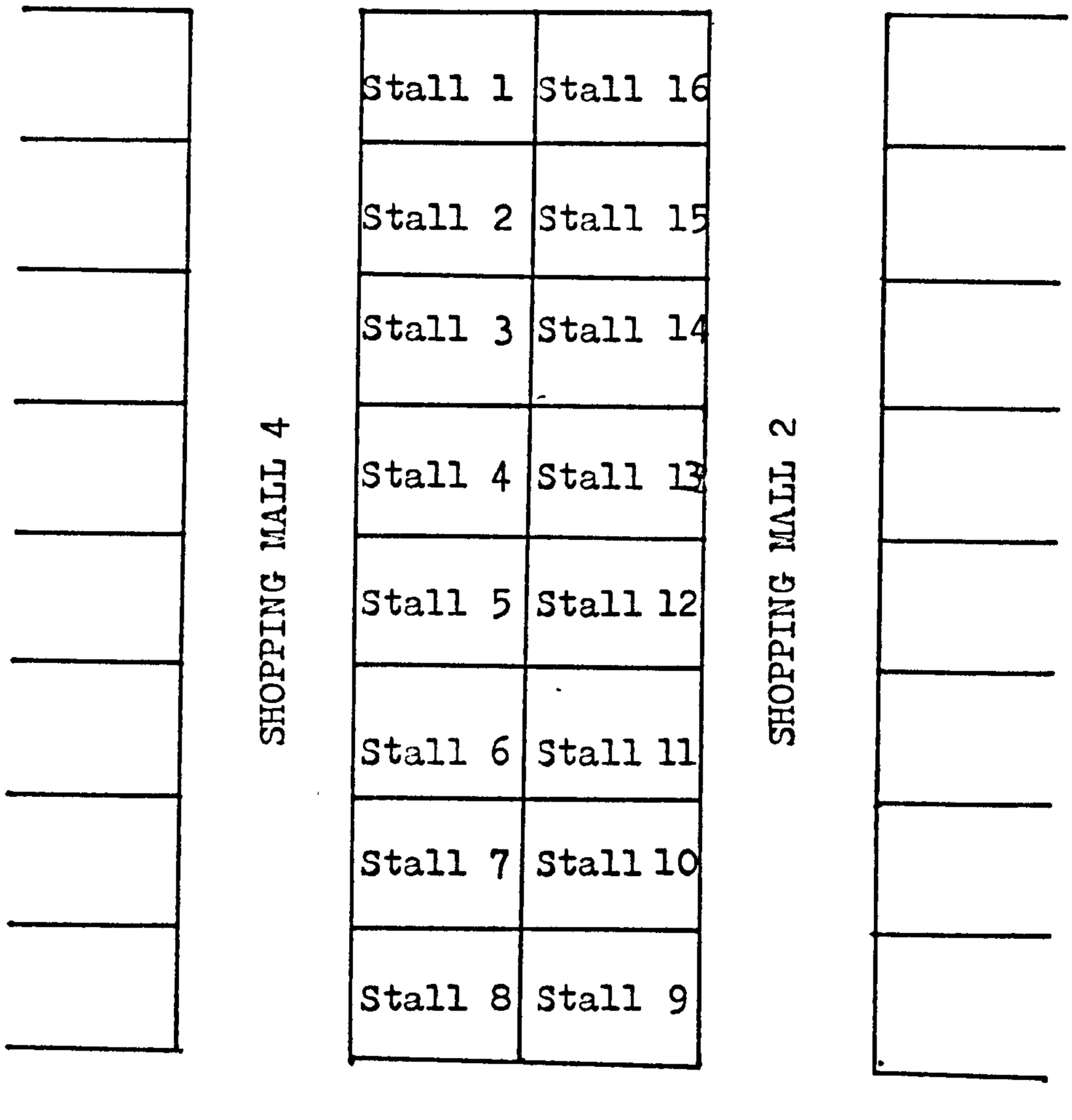
A market place is divided into separate 'shopping blocks', see Figure 6.2 page 192. A shopping block is bounded on all sides by 'shopping malls', but is not sub-divided by any such mall. The block may or may not be under a single roof. For these purposes pathways primarily used for access to the rear of the stall and small paved spaces in the rear of the block are not regarded as shopping malls. As described in Chapter 6, page 229, there are three categories in the hierarchy of shopping malls, namely,'shopping concourse','shopping avenue' and 'shopping lane'. A shopping block might be delineated by any combination of these categories of shopping malls.

The classification of activity space survey sheet was used in conjunction with a cut-out from the largest scale Ordinance plan available, and stalls within the shopping block numbered serially as shown in Figure 6.2 page 192 . The shopping block plan of Kaduna City Central Market Place is shown in Appendix 6.1.2 page A6 . If the largest scale available is 1:2,500, rough photographic enlargement to about 1:500 scale are obtained, or photographic copies of design drawing of the market place to about 1:500 scale are obtained from the market place authority or their representatives.

Additional shopping blocks, not contained in the Ordinance plan are accurately sketched in. Open spaces used for trading and other activities are also accurately sketched in. The additional shopping blocks, open trading and other activity spaces are distinctly numbered from the original shopping blocks. Any discrepancy in the layout of the shopping blocks



SHOPPING MALL 1



SHOPPING MALL 3

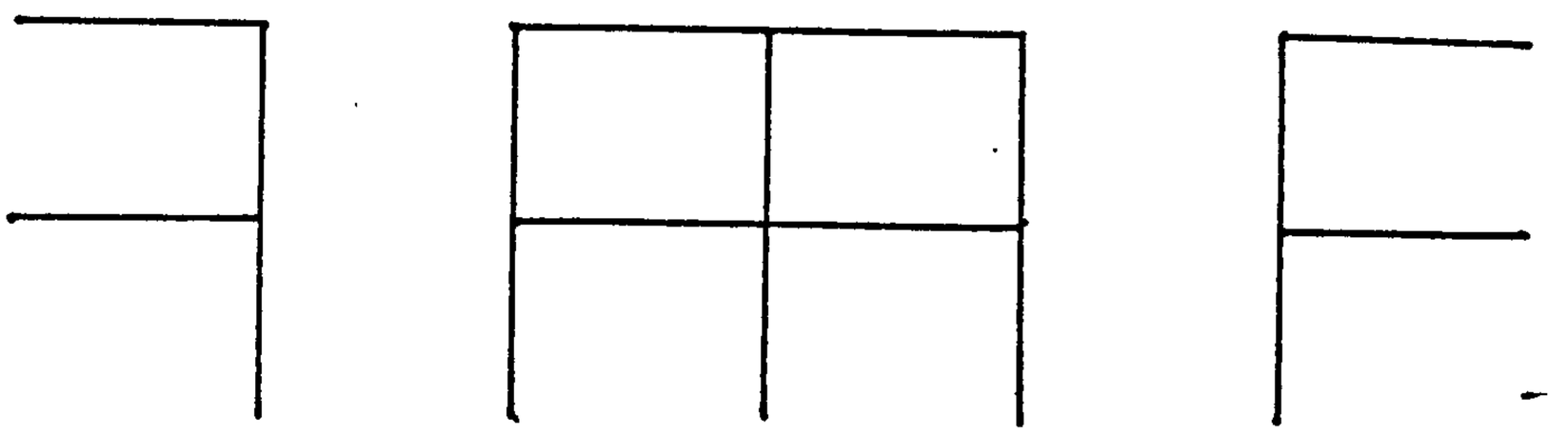


Figure 6.2: Diagram of a Typical Shopping Block bounded by Shopping Malls.

between what exist on site and what is contained in the Ordinance plan is rectified before numbering of shopping blocks, stalls, open trading and other activity spaces is carried out. In the open trading spaces, a trader's squatting space is treated as a stall in the shopping block.

The field surveyors then obtained for each stall in every shopping block, open trading and other activity spaces, the information shown in the classification of activity space survey sheet - Appendix 6.1.1 page A5 . The survey was carried out in all the city retail market places.

6.2.2 Consumer Shopping Behaviour and Attitude Interview Questionnaire

The theme of the survey was to obtain information on the behaviour pattern of shopping trips distribution to the shopping establishments in the city by the city residents. The data source for the survey came in the form of structured interview-based questionnaire requesting information (A) on area of residence and on socio-economic characteristics of the household, (B) on the usual choice of shopping centres and the study weeks choice of shopping centres for food commodities, (C) on usual choice of shopping centres for non-food commodities, (D) on shopping at the City Central Market Place, and (E) on personal details of the main shopper of the household. Consequently the questionnaire is divided into 5 sections, (A - E). Sample of the questionnaire is shown in Appendix 6.2.1 page A8 .

Considering the exploratory nature of the study, and the primary objectives of an analysis which is to seek out patterns and consistencies in the data rather than

draw inference about the population, it was felt that a randomly selected sample would not be necessary. Cluster sampling was, therefore, employed to ensure sufficient representation of each zone of the city. The survey sample was selected in 4 stages, see Table 6.1 page 195 .

Stage one zoned Kaduna Capital Territory (KCT) into clusters - survey areas. The frame for this stage was the administrative map of KCT. The map shows the 5 Local Government Council administrative districts, see Appendix 6.2.3 page A34.
The use of this method was necessary because retail market place location, development and administration lie within the responsibility of the Local Government Councils, see Appendix 1.1.1 page A1 . The KCT was, therefore, stratified into 5 clusters, which confined strictly with the administrative boundaries of the districts.

Stage two gave the sample of households. The Kaduna State Ministry of Economic Development has given the estimated population of each administrative district of KCT for 1984, see Appendix 6.2.4 page A35, and the average size of households was obtained from household survey by the Federal Office of Statistics, see Appendix 6.2.5 page A36. The figures for the population of the districts and the household size are shown in columns 2 and 3 of Table 6.1 page 195, respectively. Therefore the calculated number of households in each district, and KCT as a whole, are given in column 4 of the same table. Since a sample of about 450 households was aimed at, the sampling interval of households is given as 276, (124142/450) and is shown in column 5. The distribution of the

TABLE 6.1 Sampling Frame for Consumer Shopping Behaviour and Attitude Survey

Administrative Districts of Kaduna Capital Territory	Estimated Population 1984	Average House-hold size	Number of Households	Household Sampling Interval	Sample of Households (by Calcul-ation)	Sample of Households (by Project-ion)	Specificat-ion of the Square Grid	No. of Interviews Achieved	Percentage of Interviews Achieved
1	2	3	4	5	6	7	8	9	10
DOKA	183,472	5	36694	276	132	137	Size of square grid = 0.5x0.5 cm No. of squares cover-ing built-up area = 137 Select centre point of every square	123	90 123/137
MAKERA	83,697	5	16739	276	61	74	Size of square grid = 2.0x2.0 cm No. of squares cover-ing built-up area = 74 Select centre point of every square	67	91 67/74
TUDUN WADA	146,970	5	29394	276	107	94	Size of square grid = 1.5x1.5 cm No. of squares cover-ing built-up area = 94	74	79 74/94
KAWO	142,970	5	28594	276	104	103	Size of square grid = 1.5x1.5 cm No. of squares cover-ing built-up area = 103 Select centre point of every square		75 77/103
GABASAWA	63,603	5	12721	276	46	49	Size of square grid = 3.0x3.0 cm No. of squares cover-ing built-up area = 49 Select centre point of every square	45	91 45/49
KADUNA CAPITAL TERRI-TORY	628,712	5	124142	276	450	457		385	85 385/457

sample of households by districts is calculated as shown in column 6. Hence it must be emphasized that households were sampled at a constant interval of 276 throughout the KCT.

The third stage entailed translation of the above calculation on to the ground. The frame for this was the KCT built-up area map, scale 1:25,000. A square grid (from a beam projector) was projected on the built-up area map of an administrative district. The projector was adjusted until the number of squares covering the built-up area was about the number of sample of households in the district. The projected square grid was traced on to the district map. The built-up plots which lie on the centre points of the squares were selected as the sample of built-up plots for the purpose of 'listing'. The map used for the identification of the built-up plots is scale 1:5,000. The process is repeated for each administrative district. Table 6.1, col.8, page 195, shows the details of selections of the sample of built up plots. It is necessary to note that there is some discrepancy between the theoretical sample of built-up plots and the practically achieved sample of built-up plots. This is explained by the technical process of the projector;

Selection of the households for the interview was done in stage 4. The selected built-up plots, 457, were visited and the households in each listed, using the listing sheet shown in Appendix 6.2.2 page A33 . Where a single household inhabited one built-up, that single household was selected for the purpose of the interview. In the cases where a built-up was

inhabited by more than one household, one in the dominant category of the households was selected as being the representative household of the built-up plot. However, it is common knowledge that where a number of households inhabited a built-up plot, such households tend to have similar consumption behaviour and attitude. For this reason, the surveyor was instructed that where the first selected household declined the interview, the next representative household should be approached for the interview. This was to be continued until a successful interview was obtained from the built-up plot or finally given up if there was no co-operation coming from the households in that particular case. The schedule for chasing up an interview is given on the cover page of the questionnaire.

The frame was based on the premise - that the number of built-up plots in an administrative district reflect the number of households in that district, and that the household population density in the built-up area of an administrative district is uniform.

The above sampling frame could not be said to be perfect. Rather it was the best that could be worked out when the original plan for obtaining a sampling frame failed. The last officially accepted population census in Nigeria was that of 1963, and there did not exist an updated census data that could be used as a sampling frame. It was originally planned to construct a sampling frame based on the electoral register, prepared by the Federal Electoral Commission (FEDECO) for the 1983 general elections. But this register was discredited by the Academic Senior Staff Union of

of Nigerian Universities and some other authorities. The discredited electoral register was not even attainable by an individual such as the author, see Appendix 6.2.6, page A 37 . However, there is no guarantee that statistical results obtained via the electoral register sampling frame would be better than the ones obtained by the sampling frame developed above.

6.2.3 Questionnaire on Locational and Structural Potentials in Urban Market Places

Sample of the questionnaire designed for obtaining data on the locational and structural potentials of the urban market places is given in Appendix 6.3.1, page A38 . The questionnaire is divided into two sections. Section A was aimed at obtaining information on the history notes of the market places. It is designed in such a way that it could be self completed by the market place administrator or administered to him by the field surveyor in cases where the administrator was unable to do so. The latter turned out to be the case in most of the market places.

Section B was meant to obtain information on the locational and structural potentials in the market place. The six locational and eight structural potentials in the city market places are listed in Table 1.2, page 25. The main task in the design of this section was the device of criteria that will measure the 14 locational and structural potential variables at interval or ratio level, because they have to be used in regression analysis. The schedule in Appendix 6.3.2 , page A54 , sets out the

calculation scheme of the locational and structural potential scores of the market place. One such scheme is required for each market place. The scheme is to be read in conjunction with the Appendix 6.3.1, Section B, page A47.

Each of the 14 variables was completely knocked down into its component sub-variables; and using the concept of "apparent or absolute magnitude"[1], the sub-variables were ordered in some form of interval level of measurement. The sub-variables codes and their locations in the questionnaire are shown in columns 2 and 3 of the scheme, respectively. The interval level of measurement of a sub-variable is shown in column 4 and the sub-variable can take on more than one value, as shown in the questionnaire. The variables and sub-variables are not serially placed on the questionnaire; the only reason for this was that the placement of the questions have to facilitate the execution of the questionnaire as to produce proper measurement, and reduce time costs.

It is necessary to elucidate the measurement techniques of some locational potentials whose influence on the market place depend considerably on their physical distances away from the site of the retail market place. Such variables are contained in questions Q19A-I of the questionnaire, and measurements within ¼, ½, 1 and 2 km. radii of the market place, respectively, are indicated. Appendix 6.3.3, page A60, shows four concentric circles, of radii ¼, ½, 1 and 2 km. respectively, drawn with each market place as centre. These radii are based on the concept of distances, other things being equal, the shopper may willingly walk, or choose mechanized mode of travel, to the market place.

If a market place is within ¼ km. radius most shoppers will be obliged to use it, and most still (most of most) will be willing to walk the distance to the market place. If the market place is within ½ km. radius, but outside the ¼ km. radius, more shoppers will be obliged to use it, and more still, (more of more), will be willing to walk the distance. If the market place is within 1 km. but outside the ½ km. radius, many shoppers will be obliged to use it, and many still, (many of many), will be willing to walk the distance. If the market place is within 2 km. radius but outside the 1 km. radius, few shoppers will be obliged to use it and few still (few of few), will be willing to walk the distance. If the market place is outside the 2 km. radius, fewer shoppers will be obliged to use it and very few will be willing to walk the distance .

The above argument is also valid for the trader. As a corollary to the above theorem, the apparent magnitude (causal influence) of a locational potential, measured from the market, decreases with increase in the distance of the locational potential from the market place.

Going back to measurement of variables discussed in section 6.1.1 above, the concentric circles around a market place determine the interval levels of measurement of the influence of the sub-variables in question Q19A-I on the market place. Appendices 6.3.4 and 6.3.5 pages A61 and A62, are the schemes used in calculating the interval level of measurement of sub-variable, X3.1; (Q19.A), immediate residential population surrounding the market places in the city.

6.2.4 Road Vehicle Entry and Departure Census at the City Central Market Place

The road vehicles are used by some shoppers and some traders who want to achieve accessibility of the City Central Market Place by mechanized transport means for various reasons. The aim of the road vehicle entry and departure census at the City Central Market Place was to determine the quantity of traffic, carried by the entry and departure routes, and the quantity of parking spaces demanded by private vehicles and stationing spaces demanded by commercial and goods vehicles, and hand carts as well. A sample of the road vehicle entry and departure census survey sheet is given in Appendix 6.4.1, page A63 .

The notations used on the survey sheet are explained as follows: IN = entry, OUT = departure, C = commercial vehicle, P = private vehicle. The census covered the following classes of road vehicles, viz:

- private car/van } private vehicles
- motor cycle }
- minibus/taxi cab } commercial vehicles
- motor truck }
- omnibus } quasi-commercial vehicles
- hand cart }

Each little box on the survey sheet was designed to contain 5 strokes; one stroke for a vehicle counted, to form a small group of five vehicles. It enabled the recording to be seen very clearly. A full stroke was used to represent private car/van, omnibus, minibus/taxi, while a half stroke was used to represent

motor cycle, motor truck and hand cart. The census commenced at the official opening hours of the City Central Market Place and stopped at the closing hour. (Kaduna CMP, 7.00 am - 6. 0 pm). The study was concerned in knowing the critical demand for activity spaces by the road vehicles and not in how traffic tailed out before the opening and after the closing hours of the City Central Market Place. Therefore, it was not needed to extend the study beyond the opening and closing hours. The census was recorded on the hour intervals, e.g. 7-8 am, 8-9 am ..... 3-4 pm, 5-6 pm, continuously without a break or stop. The road vehicle entry and departure census data was obtained for one week, i.e. 7 continuous days. Appendix 6.4.2, page A64 , is a sample of the road vehicle census working sheet, into which a day's data was transferred after counting. The working sheet shows 12 census posts. This was because the case study has 12 entry and exit routes. In another case study, it could be more or less. The location of the census posts ensured that all vehicles entering into or departing from the City Central Market Place were recorded. The location of the road vehicle census posts at the Kaduna City Central Market Place is shown in Appendix 6.4.3, page A65 .

6.2.5 City Central Market Place Traders Interview Questionnaire

The structured interview questionnaire, in Appendix 6.5.1 page A66 , was designed to elicit micro-detail information on the stallage and trading activities in the City Central Market Place. The questionnaire is divided into three sections. Section A contained

questions about the traders stall, and section B questions were about his trading activities in the City Central Market Place. Section C obtained some general information about the trader.

During the classification survey of activity spaces in the city market places, section 6.2.1 above, an updated shopping block plan of the City Central Market Place had been prepared and the shopping blocks, stalls, open trading and other activity spaces had been serially numbered. This was used in the preparation of the sampling frame for the interview of the traders at the City Central Market Place. The survey aimed at obtaining interviews from a sample of about 150 traders. There were about 8500 stalls and about 2200 squatting traders in the Kaduna City Central Market Place. The traders were, therefore, sampled at constant interval of 71;(10 700/150).

Squatting traders in the open spaces were equally sampled at the same interval of 71.
As the surveyor moved through the squatting traders in the open spaces he enumerated them and obtained interviews at intervals of 71. Carrying the sampling interval over from one open space to the next required a simple adjustment. After obtaining interviews from one open space and the number of squatters left was say, 8; this figure was subtracted from 71 and the result, 63, indicated the first number to be selected for interview in the second open space. This is followed by 134, 205 and so on.

The traders willingly granted the interview, probably they had thought that the survey would lead to a re-development scheme for the City Central Market Place. Many of the traders, including those not interviewed but who had taken note of the presence of the survey team, quietly requested to know whether a reconstruction of the market place was imminent. A total of 120 interviews were obtained from the sampled traders, out of which 118, 78.67% of the intended 150, was admitted for analysis.

6.3 The Development of a Survey Team

The survey team comprised 15 enumerators and three supervisors, all from the Federal Office of Statistics, Kaduna, and the researcher as the co-ordinator. The Federal Office of Statistics participated in the scheme as part of their ad hoc survey programme and a quid pro quo for co-operation was to offer them statistical information obtained from the research, when the thesis had been completed.

Though the survey team was composed of personnel from the Federal Office of Statistics who are professionally trained in the job of statistical data collection, briefing sessions were considered necessary to introduce the survey research project, explain the questionnaires and survey sheets, the use of the show cards and give detailed guidelines on how to record information and conduct the interviews properly.

The survey team was advised that:

* The setting for the interview was important - the respondent was to be interviewed in his house, in the case of the shopper; in his stall, in the case of the trader; and in his office, in the case of the market place administrator.

* It was important to stress confidentiality. Avoid the presence of third party.

* Treat everything as data. An example of this was found in the survey team's pilot survey that most of the traders interviewed had no objection to being located on the first or second floor of a 3 storey market place structure, provided that "the other traders selling the same commodity were located on the same floor" - a very significant condition.

* Follow all given lines of enquiry in the questionnaire. Again, particularly useful was the phenomenon of respondents giving negative answers. Far from being of no value, they gave rich avenues for exploration.

* Use the show cards in the appropriate places with diligence:- The practice of using show cards and other visual aids with the questionnaire has been increasing over the years. It is generally a valuable practice, making the questionnaire more interesting and easier to understand. An interviewer cannot be expected to produce a string of show cards in quick succession without fumbling, creating confusion and irritation. In these circumstances, even

the most diligent interviewer may end up leaving out some cards. The show cards were therefore stapled together, to form a small booklet of show cards, following the order in which the cards would be referred to. The show cards were produced in a form that they did not mark or deteriorate rapidly with use, because show cards that are untidy or difficult to read are a burden rather than an aid. Throughout an interview the respondent held to one booklet of show cards and referred to the pages as directed by the interviewer.

The survey team's pilot survey was held on each questionnaire and survey sheet and the survey team was reassembled for further briefing sessions. The initial guidelines were reinforced with guidelines issued to Elton Mayo researchers at the beginning of the second phase of his research in the Hawthorne Works (E. Mayo, 1949). These were:

1. Give your whole attention to the person interviewed and make it evident you are doing so.

2. Listen - do not interrupt.

3. Never argue; never give advice.

4. Listen to:

   (a) what he wants to say

   (b) what he does not want to say

   (c) what he cannot say without help

5. As you listen, plot out tentatively and for subsequent correction, the pattern that is being

set before you. To test this from time to time summarize what has been said and present for comment (e.g. 'Is this what you are telling me') Always do this with greatest caution, that is clarify, do not add or distort.

6. Remember that everything said must be considered a personal confidence, and not to be divulged to any one. (This does not prevent discussion of a situation among professional colleagues. Nor does it prevent some form of public report when due precaution has been taken.)[2]

The second briefing sessions served the double purpose of enabling us to explain exactly what we had learned from the team's pilot and what we wanted out of the interviews and observations, and also to learn any problems or useful information picked up by them in the course of the pilot study.

The execution of the observations and interviews went very smoothly; but for one incident. One of the interviewers fell a victim of the discretion of the security officers at the government house. After he had shown his identity and explained the purpose of the consumer shopping behaviour and attitude interview at the gate, the security officers allowed him in. Later the security officers discovered that a mistake had occurred; they turned round and beat up the interviewer and handed him over to the police. He was detained for questioning and was finally released on the 6th day.

To prevent reoccurrence of this type of incident, the officials at the National Security Organization Office

at Kaduna have advised that any researcher intending to carry out this type of survey research should first obtain clearance and protection from the National Security Organization and the Nigerian Police respectively.

At the end of the field surveys, the completed questionnaires were carried to the University of Strathclyde, Glasgow, to commence the analysis of the data, using SPSSX package on the VAX computer. The coding of the data on the computer survey sheets was a daunting task. It lasted 5 months, January to May, 1985. At a time two post graduate town planning students were employed to assist in the coding, for four weeks each, during the intervening Easter holidays.

6.4 Choice of Case Study

To test the proposition that there exist strong relationship and causal influence between the demand for activity spaces by the shopper and the trader, and the locational and structural potential in a city retail market place, the city of Kaduna, Nigeria, was selected for case study. Figure 1.4, page 34, shows some features of Kaduna city in the Nigerian context.

The city of Kaduna was selected for the following reasons: Firstly, the complexity, the variety of data types and the problem of control faced with internal validity test required the selection of a town where reliable data could be successfully collected in sufficient quantity. Secondly, the problem of

generalization required the selection of a city not so atypical as to make the external validity test too strong for the analysis to stand.

The author's particular attention to the problem of expansion pressures and constraints on the City Central Market Place in Nigeria was aroused in August, 1974. That was when the present Kaduna City Central Market Place was under expansion and reconstruction, and he was doing a long vacation job as a graduate architecture student in Godwin and Hopwood (Architects), Kaduna, Nigeria. Subsequently, in the following long vacation job, he participated in Zaria Study: Central Area Functions in Sabon Gari, under the Urban and Regional Planning Department of Ahmadu Bello University (ABU), Zaria, Nigeria. Zaria town is second only to Kaduna city in Kaduna State of Nigeria. The author had lived and practised as an architect in Kaduna city for 6 years and is currently a lecturer in the Department of Architecture, ABU, Zaria. ABU is the biggest academic institution near Kaduna city and is about 80 km. away from the city. The author, therefore, is conversant with where, when and how to collect reliable data in Kaduna city.

Kaduna is about the fifth most populated city in Nigeria, but it is the most cosmopolitan, even more cosmopolitan than metropolitan Lagos; it has the fairest mix of the major ethnic groups in Nigeria and this is evident in the variety and location of traditional foodstuffs sold in the market places within the city. The population of the city rose from 3,000 in 1919 to 150,000 in 1963. Its' population in 1985 was estimated at 664,000 by the Ministry of Economic Development, Kaduna State, growing at a constant rate

of 7% per annum, see Appendix 6.2.4 page A35 . Like any other Nigerian town, both the social forces of modernisation and attachment to traditional values are represented in Kaduna and its town plan reflects clearly a typical sample of the stamp of Lord Lugard[3] town design (see Figure 2.1.4, page 42).

Kaduna City Central Market Place is a recent design prepared to standard specifications by a reputed firm of architectural and planning consultants; this eliminates any bias that could be introduced into the data as a result of faulty design. The size and scale of Kaduna City Central Market Place is typical of City Central Market Place in the major Nigerian cities; it being less than the regional market places of Kano and Ibadan or the bee-hive-market-cities of Onitsha and Aba, where it is difficult to delineate the City Central Market Place from the rest of the city. Kaduna being located in the middle belt forest, considerably midway between the predominantly Muslem north and the predominantly Christian south, its CMP activities are equally influenced by both Muslem and Christian religious practices; for example, the market places are open for marketing throughout the seven days of the week (Friday and Sunday inclusive).

Kaduna town was founded in 1917 on the river Kaduna by Lord Lugard as the administrative centre of the protectorate of Northern Nigeria, where Kaduna river was crossed by Lagos - Kano railway. The early growth of Kaduna owned much to the growth of the colonial economy. In 1927 it became a major railway junction and passenger exchange point for trains from Kano, Kaura Namoda, Portharcourt and Lagos. See Figure 1.4, page 34. Kaduna subsequently became the

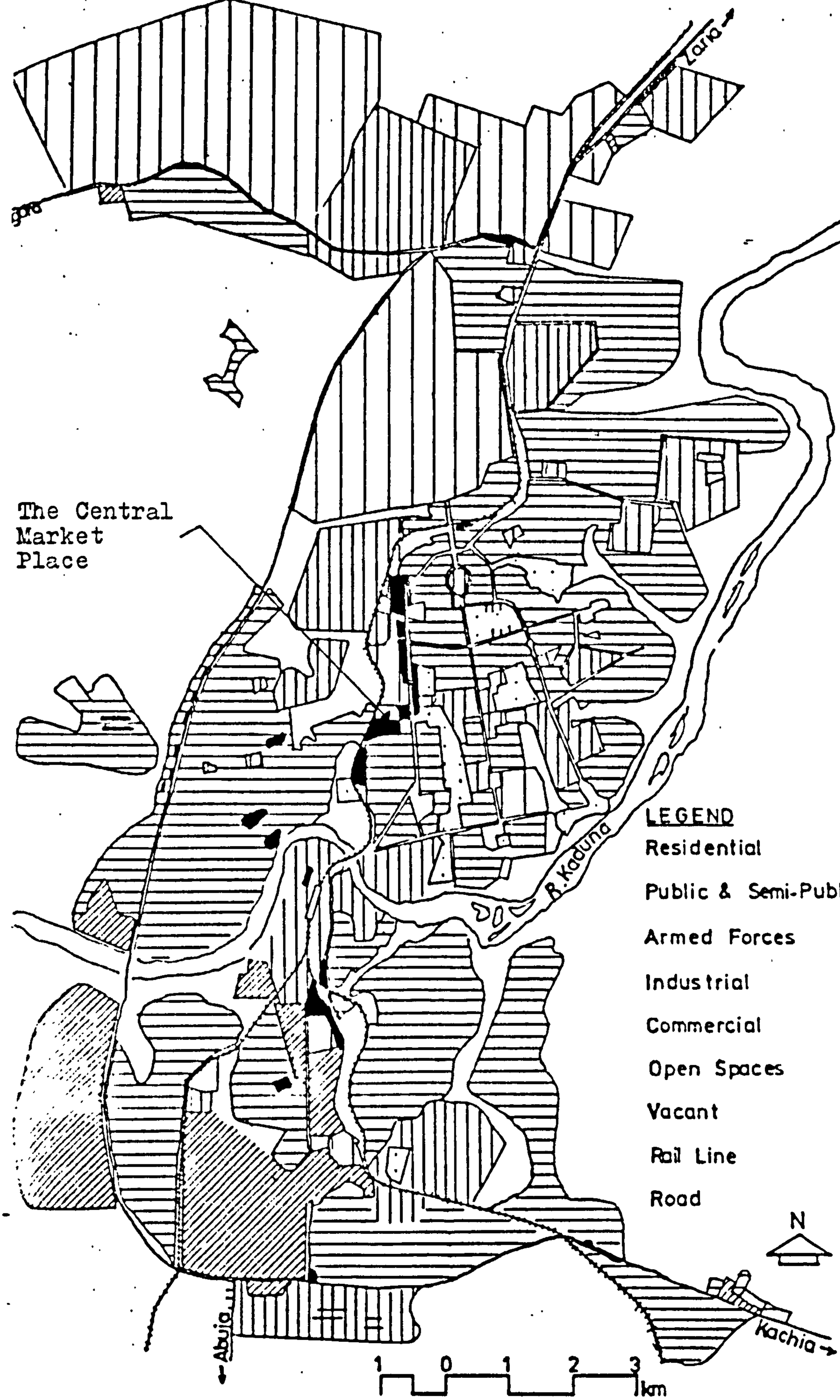


FIG. 6.6.1: Existing Land Use in Kaduna : 1983.

Source: Kaduna Master Plan; Review and Proposals for 2015.

headquarters of the Northern Region in 1954 (when the regions were created) and has since grown to be a major commercial, industrial and administrative centre, though now only the state capital of Kaduna State.

Kaduna city is made up of the north and south; with river Kaduna as the dividing landmark, by design, see Figure 6.6.1, page 211. The north, which was the European commercial-cum-administrative area was separated from the south, which was the African township by both the river and a 450 metre wide open space, which in 1964 had become the site of the Ahmadu Bello Stadium. Today the north retains its administrative functions, and is also the site of educational, commercial and military institutions. Kaduna being one of those new towns founded in direct response to the administrative and economic initiatives of the colonial administration, the administrative offices and commercial houses were located in relation to the railway. As usual, the Kaduna CMP was sited in the north between those commercial houses, the railway, army barracks and the native residential area laid out in the usual traditional grid-iron pattern. The old European reservation has become the Government reservation area, where top-level civil servants reside. However, the Government reservation area is now being privatised. Recently, extensive housing and residential areas have been developed, both in the north and south of the city, and the city is somewhat linear with the CMP at the approximate geometrical centre, see Figure 6.6.1, page 211.

Kaduna city being located in Zaria Emirate, a major food growing area of Northern Nigeria, is surrounded by intensive agricultural activities and rural periodic market places where bulking-up of foodstuffs is of very

great importance. Kaduna is a major industrial centre, with textile mills, beer, soft drinks, metal works and building material factories and pulp-and paper industries. A Peugeot automobile assembly plant began to function in 1975 and a big petroleum refinery plant has since started production in 1980 . "About 36% of its labour force engage in manufacturing activities, with another 30% in commerce,"[4] Kaduna is second only to Kano in the whole of Northern Nigeria. Retail market accounts for about 85 % of the city's commercial activities, and the city's retail market place system comprises of:

1.1 - The Central Market Place (CMP)

2.0 - two special market places, namely:

- 2.1 Railway Station Market Place (RSMP)
- 2.2 Panteka Market Place (PMP)

3.0 - four district centre market places, namely:

- 3.1 Makera/Kurmin Gwari Market Place (M-KGMP)
- 3.2 Tudun Wada Market Place (TWMP)
- 3.3 Kawo/Talata Market Place (K-TMP)
- 3.4 Ungwa Rimi Market Place (URMP)

4.0 - five local market places, namely:

- 4.1 Barnawa Market Place (BMP)
- 4.2 Ungwa Television Market Place (UTMP)
- 4.3 Badarawa Market Place (BDMP)
- 4.4 Ungwa Shanu Market Place (USMP)
- 4.5 Kabala Gabas Market Place (KGMP)

5.1 - Leading Superstores including Leventis, Kingsway Chellarams, UTC (Union Trading Company). (SS/DS)

6.1 - The major shopping thoroughfares include

6.1 Ahmadu Bello Way
6.2 Lagos Street
6.3 Ibadan Street
6.4 Ogbomosho/Katsina/Jos Roads
6.5 Ibrahim Taiwo Road
6.6 Constitution Road

Shopping Streets (ST)

7.1 - Shops on Tudun Wada By-Pass (SMBP)

8.1 - Corner shops include kiosks by street junctions, housewife's retail counters in front of the house, and the hawker who moves about with his wares balanced on his head or mounted on hand drawn cart.(CSAH)

9.1 - Regional shopping centres include periodic market places in the rural setting, food-market halts on the highways and market places in the other cities, such as Kano or Zaria. (RSC)

The spatial distribution of items 1.1 - 4.5 above, in the Kaduna city structure, is shown in Figure 6.6.2, page 215 .

The above resume sums up the facts of Kaduna city to show that its selection for the case study would stand internal and external validity tests of the stated proposition, shown in page 28.

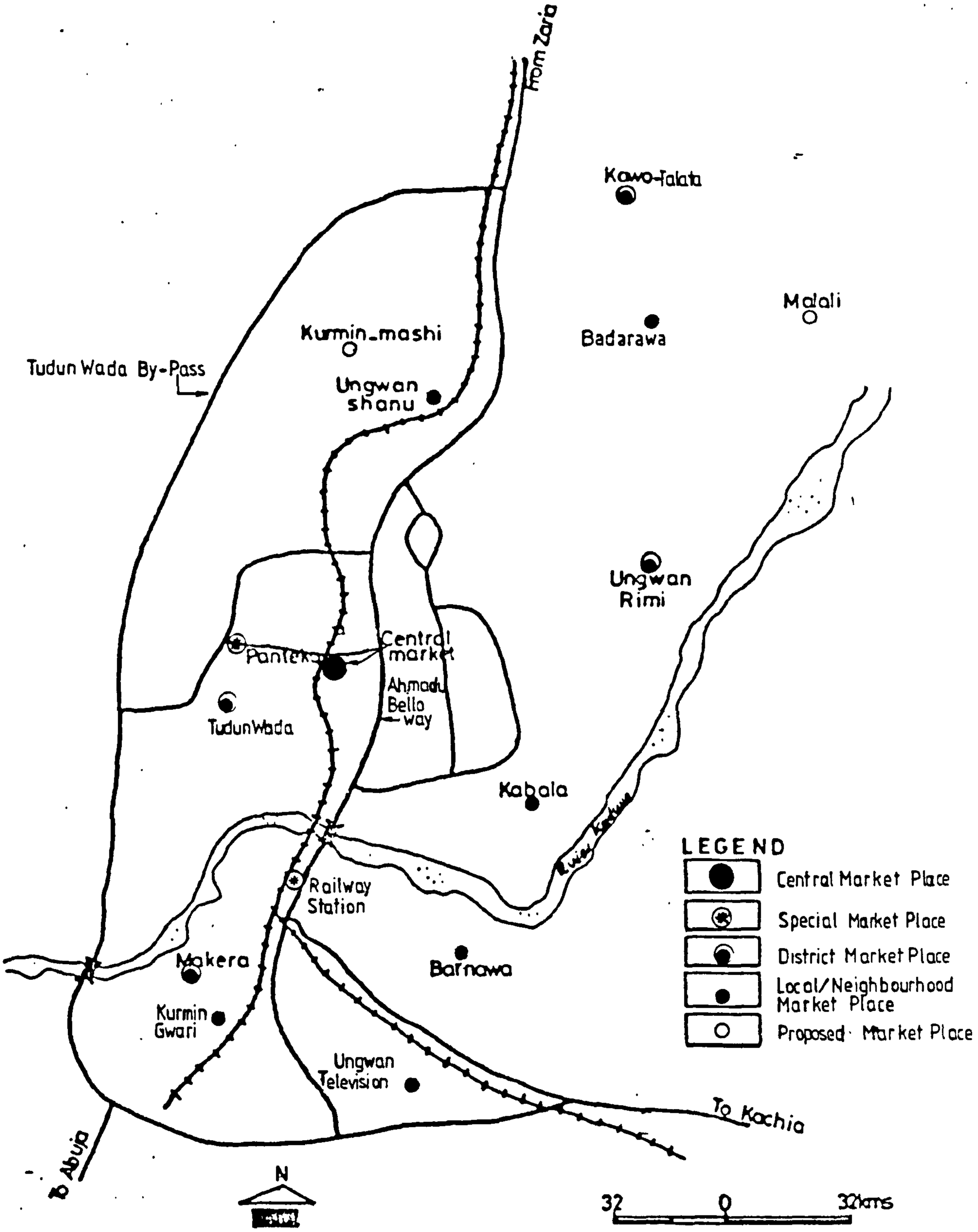


Figure 6.6.2: Spatial Distribution of the Market Places in Kaduna City.

6.5 Description of Kaduna City Retail Market Places

This section describes each of the twelve retail market places in Kaduna Capital Territory. The description consists of a short development history and of the locational and structural potentials of the retail market place.

6.5.1 The City Central Market Place (CMP)

The City Central Market Place, a daily market, was part of the Kaduna Township founded in 1917 by Lord Lugard. The market place was established for the following reasons: to provide a clean and healthy environment where merchandise from the colonial warehouses and food stuffs from the hinterland may be gathered for redistribution, and to provide a market place where social activities may take place. These include marriage match-making, native boxing and wrestling, Fulani beating tournament, policy announcements and public punishment. A bird's eye-view photograph of the old market place structure in 1973 just before the commencement of the reconstruction is shown in Plate 6.1, page 217 . The photograph depicts the very poor state of the market place structure which necessitated the reconstruction and expansion. A bird's eye-view photograph of the reconstructed market place in 1975 just after the reconstruction is shown in Plate 6.2, page 218 .

Plate 6.1: Kaduna Central Market. Before reconstruction. (1975).

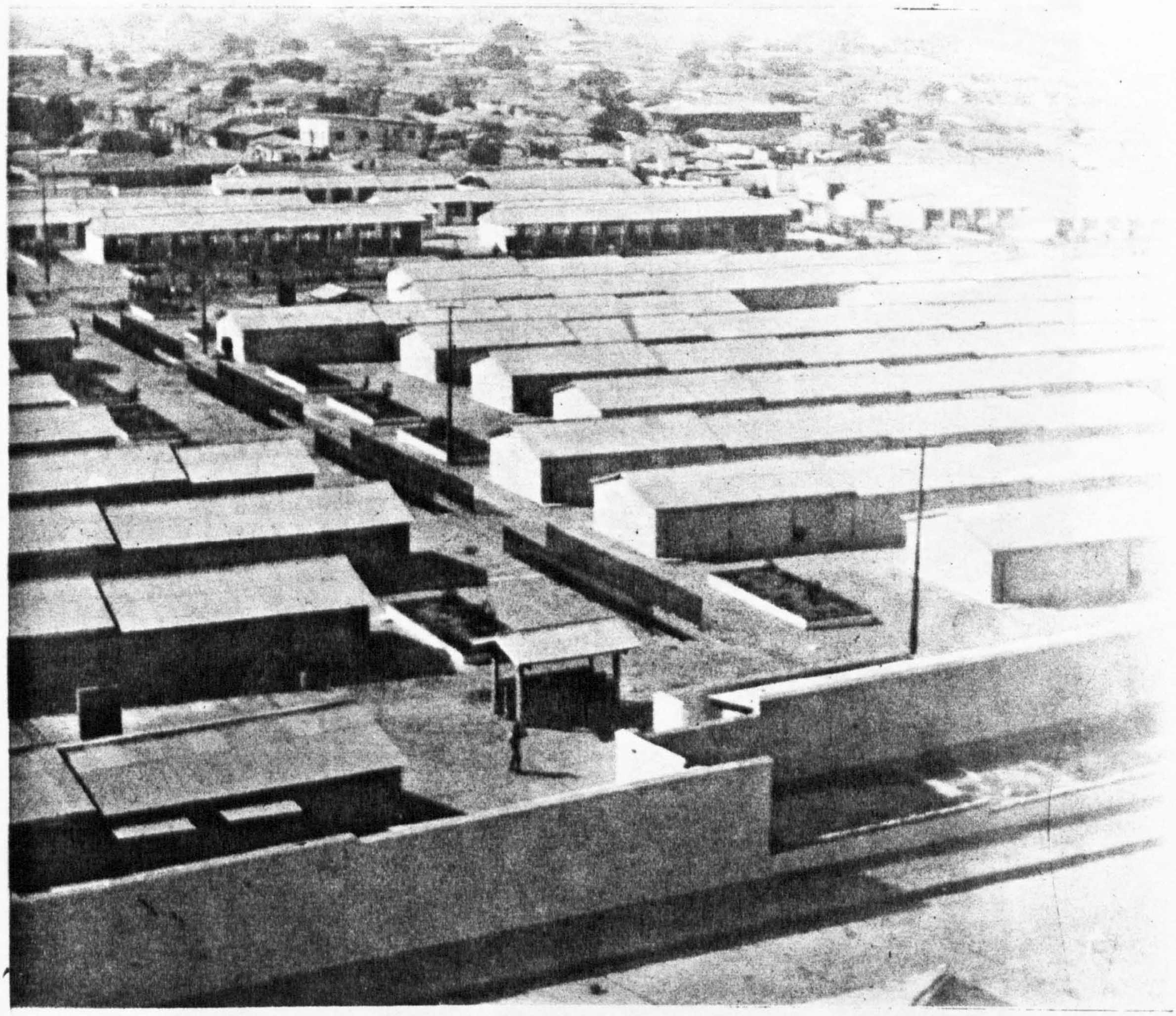


Plate 6.2: New Kaduna Central Market. Panoramic View. (1975)

Plate 6.2(a): Bird's eye-view of the Central Market Place. (1984)

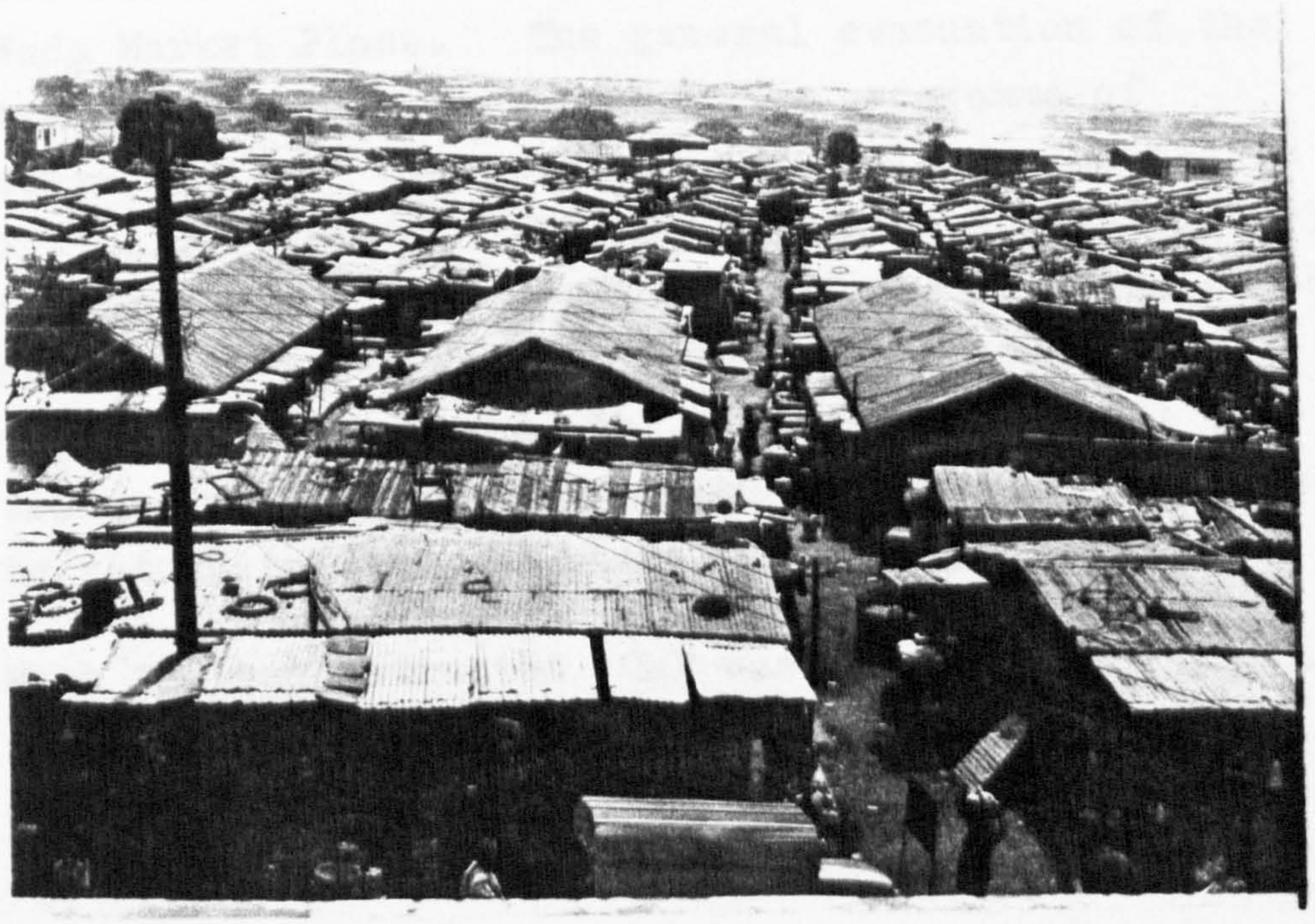


Plate 6.2(b): Bird's eye-view of Makera District Market Place. (1984)

Plate 6.2(a), page 219, shows a bird's eye-view of a section of the CMP in the study year, 1984. The grey roofs indicate some of the additional free standing stall blocks and the extensions to the old stall blocks. Most of the old roofs are brown. The photograph was taken at 10.00 am when the CMP was still in the process of waking up. Its full swing period is marked by the plateau, between 12 noon and 4.00 pm, of the road vehicle accumulation graphs in Figure 7.3, page 325.

By Minutes 21/72 of the First (Business) Meeting of the Kaduna Capital Development Board on the 17th April 1972, the Board set in motion the project for the reconstruction of the Kaduna Central Market Place. Although the official starting date of the Contract was first of June 1973, there was an exodus of traders to Tudun Wada Market Place in the late part of May when massive site clearance of about half of the market place area started. Later the remaining traders on the other half of the CMP decided that they too wished to move to the temporary site near Tudun Wada Market Place. The general evacuation of the traders led to a revision of the programme of construction. The project was no longer phased as initially planned. It was therefore completed early in 1975, almost one year ahead of the original scheduled date. This was an incalculable benefit from the viewpoint of time and cost. However, not all the traders who left to Tudun Wada Market Place were able to return to the CMP when it was reopened in 1975.

When the reconstructed CMP was reopened in 1975, the stallage and finance provision are given in Tables 6.2 and 6.3, page 221.

TABLE 6.2 : Stallage in the City Central Market Place Immediately After the Reconstruction in 1975

Description	Number	Monthly Rent per stall
Lock-up stall	1894	₦ 30.00
Open stall - full area	42	₦ 15.00
Open stall - half area	839	₦ 7.50
Restaurants in the Road Vehicle Park	8	₦ 50.00
Restaurants in the stallage area	8	₦ 40.00
Fresh Meat stalls	60	₦ 25.00
Fresh Fish stalls	20	₦ 25.00

TABLE 6.3: Finance Provision for the Reconstruction of Kaduna City Central Market Place, 1975

Cost of Project	₦ 3,150,000.00
Loans guaranteed by the State Government	
(i) Union Bank (Nigeria) Ltd.	₦ 1,150,000.00
(ii) National Insurance Corporation of Nigeria	₦ 1,000,000.00
Kaduna Capital Development Board	₦ 650,000.00

Since 1975, additional stallage spaces in the CMP are being achieved within the perimeter delineated in the 1975 reconstruction, by the following measures:

(i) extension of existing stall blocks

(ii) squeezing in temporary stalls in any open space

(iii) erection of temporary stalls on designed flower beds, and on storm water drainage channels

(iv) erection of temporary stalls on designed shoppers access and circulation pathways

(v) adjoining temporary stalls to lavatory blocks

(vi) erection of temporary stalls too close to the railway

(vii) traders usurption of shoppers access and circulation pathways by organized squatting

(viii) parking of private vehicles and stationing of commercial vehicles on thoroughfares

One major consequence of the above reactionary growth is the dislocation and disintegration of the zoning pattern of the CMP. When the CMP was reopened in 1975 the location of the commodities was strictly zoned. But as traders change from one commodity to the other, irrespective of the official zoning, the zoning continued to deteriorate. All official efforts to check the disintegration of the zoning pattern seem not to have been a success. By 1977 the market place authorities had repaid the loans used to finance the reconstruction and thereafter the rents shown in Table 6.2, page 221, were halved. Also by 1977,

only two years after the reconstruction, the available number of stalls had been all allocated and construction of the additional stalls started.

Table 6.4, page 224, gives a comparison of the stallage activity spaces in the CMP in 1984 and 1977. The table shows that since 1977 for food shopping activity, the stallage floor-space, the number of stalls and the number of traders have increased by 13258 m^2, 2714 and 3089, respectively, and for non-food shopping activity the stallage floor-space, the number of stalls and the number of traders have increased by 15073 m^2 and 3228 and 5018, respectively. This meant that since 1977, for food shopping, the stallage floor-space, the number of stalls and the number of traders have increased by 256.8%, 277.7% and 316.2%, respectively, whilst for non-food shopping, the stallage floor-space, the number of stalls and the number of traders have increased by 88.4%, 170.4% and 264.4%, respectively. The additional stallage floor-space, 28,331 m^2 for food and non-food was cannibalized from the subservient stallage and accessibility floor-spaces. This meant that since 1977 the subservient stallage and accessibility spaces in the CMP have decreased by 28,331 m^2.

In 1976 there was burglary at the CMP and the thieves were apprehended. The estimated cost of the goods stolen was ₦2,000.00 and there was another burglary in 1978. In this case watches and jewellery valued at ₦34,000.00 were stolen from the stalls. On the 10th December 1983 a stall suffered fire disaster. The fire did not spread and the estimated cost of goods destroyed by the fire was ₦2,000.00. Some of the problems afflicting the CMP are poor refuse collection

TABLE 6.4: Comparison of Stallage Activity Spaces in the City Central Market Place in 1984 and 1977

	FOOD									NON-FOOD								
	Stallage Floor-Space			Number of Stalls			Number of Traders			Stallage Floor-Space			Number of Stalls			Number of Traders		
	figure m^2	Change in the Interval		figure	Change in the Interval		figure	Change in the Interval		figure m^2	Change in the Interval		figure	Change in the Interval		figure	Change in the Interval	
		figure	percent		figure	percent		figure	percent		figure	percent		figure	percent		figure	percent
1984 Study Year	18420	13258 m^2	256.8	3691	2714	277.7	4066	3089	316.2	32119	15073 m^2	88.4	5122	3228	170.4	6912	5018	264.9
1977 full allocation	5162			977			977			17046			1894			1894		

TABLE 6.5: Stallage Floor-Space and Equivalent Number of Stalls in the Central Market Place (CMP)

	Commodity	Floor-Space	Equivalent No. of Stalls	Floor-Space (m^2)	No. of Stalls	Floor-Space (m^2)	No. of Stalls
1	TUBERS	759.7500	224.8333				
2	GRAINS	767.2500	168.8333				
3	FLOURS	1489.5000	237.3333				
4	COOKOIL	932.2500	186.1667	12076.50			
5	LVSTOCK	412.5000	64.0000	2471.5			
6	FMEAT	1347.0000	233.0000				
7	FFISH	350.2500	71.6667				
8	DMEAT DFISH	1002.0000	244.6667			Food	18419:75
9	VEGFRU	3442.5000	758.1667			Food	3690.66
10	SPICES	1573.5000	282.8333				
11	PROVIS	4706.2500	774.0000	6342.75			
12	SMDRINK	1363.5000	305.5000	1139.00			
13	ALCHO	39.0000	5.0000				
14	TOBACCO	234.0000	54.5000				
15	MCLOTH	3630.0000	611.3333				
16	WCLOTH	4642.5000	715.1667				
17	CCLOTH	2712.7500	477.1667				
18	SHOES	3318.0000	523.1667				
19	FNITURE	830.2500	111.0000				
20	ELECTR	524.2500	103.0000				
21	PDGLAS	4261.5000	574.8333	27787.50			
22	LEATHG	1386.7500	335.0000	4528.19			
23	UTOOLS	1237.5000	182.0000				
24	PCYCLE	102.0000	12.8333				
25	CMETIC	1903.5000	322.1667				
26	CDRUG	624.0000	76.1667				
27	TJEWEL.	1279.5000	301.1667				
28	BKNERY	705.0000	98.5000				
29	BUCOMT	324.0000	47.5000				
30	ASPATS	18.0000	2.5000				
31	BSPATS	288.0000	34.6667				
32	RTRANT	786.0000	114.8333				
33	HAIRDR	261.0000	35.5000	3775.50		Non-Food	32119.5
34	PBETT	15.0000	2.5000	514.00		Non-Food	5122.33
35	TAILOR	1762.5000	213.8333				
37	WCSBR	394.5000	64.1667				
38	ELECRP	460.5000	68.1667				
41	BCHARG VULC	96.0000	16.0000				
45	UNASCERT	1113.0000	160.3333				
	TOTAL	51095.2500	8813.0000	25	25	51095. 8813.	

and disposal, lack of water for the toilets at times.

The functional size of the CMP is represented by the stallage floor space and equivalent number of stalls shown in Table 6.5, page 225 .

Locational Potentials

The Kaduna City Central Market Place, as shown in Figure 6.6.1 page 211, is located in the central commercial core of the city in the quadrangle defined by Lagos - Kano railway to the West, Ibrahim Taiwo Road to the South, Lagos Street to the East and the extended Hospital Road to the North. The main road vehicle approach to the CCMP is Gombe Road from Ahmadu Bello Way. The other major direct accesses to the CCMP are Lagos Street, Ibrahim Taiwo Road, Broadcasting Road and extended Hospital Road. From Kano Road the CCMP is accessed through Calabar, Benin, Warri and Bayajida Streets; see Figure 6.6.3, page 227.
The highest concentration of warehouses flank both sides of Calabar, Benin, Warri and Bayajida Streets.
From the northern border the CMP is accessed directly through the Mogadishu Barrack Road (former Mogadishu army barracks).
The former Mogadishu Barracks is the site for the proposed new city centre. Preliminary construction for the new city centre, whose sketch design is given in Figure 6.6.3, page 227, has started under the umbrella of Mogadish Property Development Company Ltd. The CMP is adjacent to the dual carriage Ahmadu Bello Way. On both sides of this dual carriage, which completely bisects the city land mass longitudinally, can be seen the highest concentration of shops and offices. Gombe Road is a logical extension of

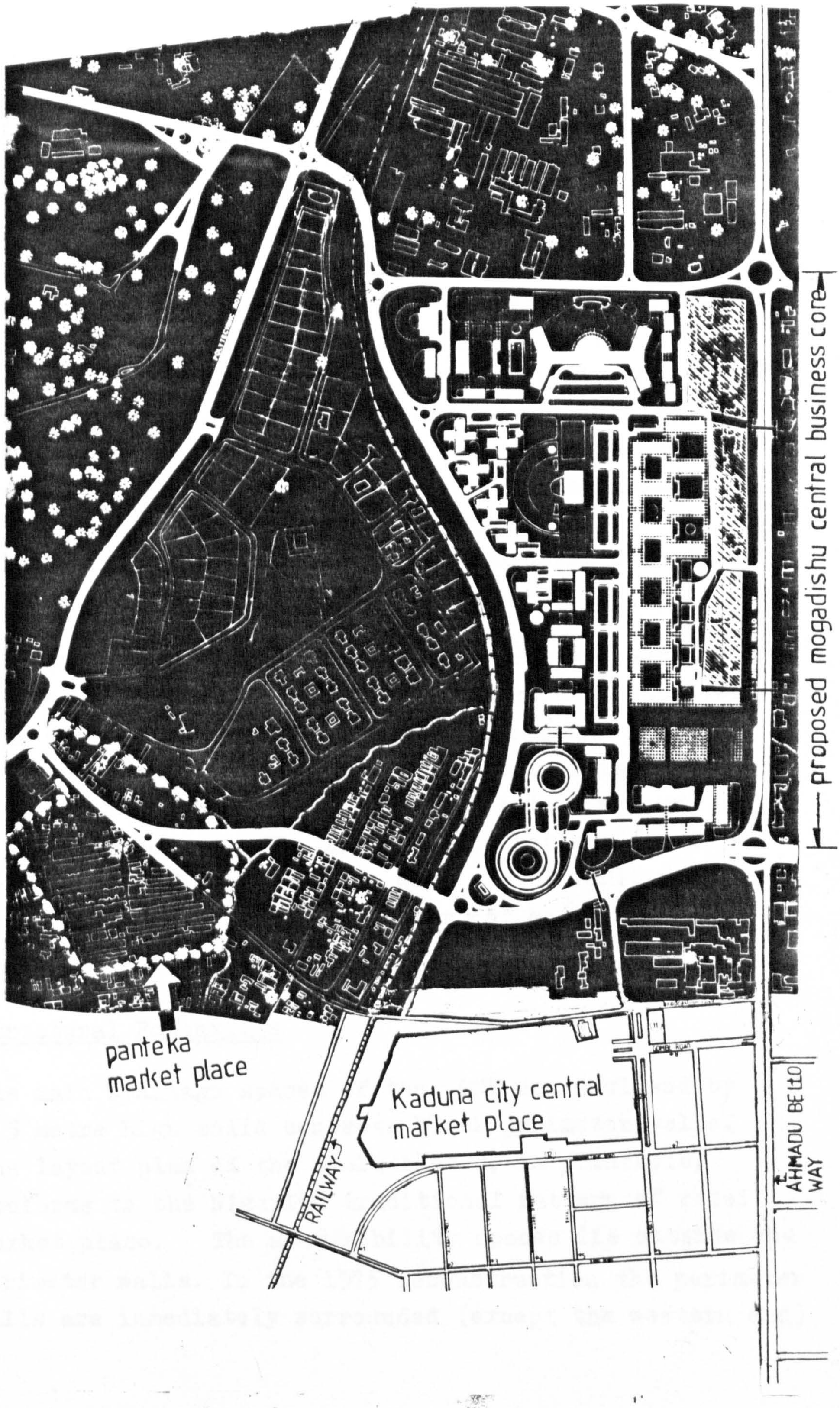


Figure 6·6·3 : Kaduna City Central Market Place and the Proposed Mogadishu Central Business Core; scale 1 :10,000

Ibadan Street which together with Lagos Street, Ahmadu Bello Way, Ogbomosho and Katsina Roads define the city's focal commercial core.(See Appendix 6.2.3, p. A34.

The CMP is to the north edge of the old native residential quarters of Doka district, at its junction with Tudun Wada district.Doka and Tudun Wada districts together contain about 53% of the city's residential population, see Table 6.2.4, page 227 . Of the four major superstores in the city, Leventis and Chellarams (Plate 6.14.1, page 283) are located on the Ahmadu Bello Way within ½ kilometre radius of the CCMP while the third, Kingsway, also on the Ahmadu Bello Way, is located within one kilometre radius. The State Secretariate and the Local Government Council offices lie within two kilometre radius.

The CMP plays the dual roles of the city's central market place and the district centre market place for Doka district. The CMP 'motor' station is the nerve centre of the city's internal commercial transport system and the main interchange for both intra- and inter-city buses. The Lagos - Kano railway (south - north) passed by the western wall of the CMP, but has provided no station for passengers or goods.

Structural Potentials

The main stallage spaces of the CMP are enclosed by 2.5 metre high solid concrete block perimeter walls. The layout plan of the stall blocks, in principle, conforms to the Nigerian traditional pattern of retail market place. The accessibility spaces lie outside the perimeter walls. In the 1975 reconstruction the perimeter walls are immediately surrounded (except the western end)

by wide pedestrian pathway which links the stallage space with the accessibility spaces. Also the reconstructed CMP spaces were sufficiently zoned, using design hedges and landmarks as elements of space demarcation; and these facilitated identification and description of locations inside the CMP. There are four main entrance and exit gates, see Plate 6.4, page 273, one on each side of the quadrangle CMP. Opposite gates are joined by wide "shopping concourse". The two shopping concourses cross at right angles, thereby dividing the CMP into four main sectors. Each sector in turn is divided into two by a "shopping avenue". The four shopping avenues join up in twos to form two continuous shopping avenues running across the East - West shopping concourse. Thirdly, the grounds bounded by the shopping concourses, shopping avenues and perimeter walls are seriated by "shopping lanes", all running in the East - West direction and parallel to the East - West Shopping Concourse, to complete the grid-iron layout and form the "shopping blocks". (See Appendix 6.1.2, page A6).

It seems the design layout concept was to facilitate fire-fighting in the shortest possible time, hence the layout observed strict application of the rules of castrametation (layout of legionary camps at the peak of the Roman military campaigns). They were invariably laid out according to the traditional grid-iron, with predetermined rectilinear defensive perimeter walls. The perimeter was usually square or rectangular, with two cross streets forming the basis of the street structure - the "decumanus" through the centre of the camp, and the "Cardo" usually bisecting the decumanus at right angles, towards one end, Secondly, the

streets completed the grid layout and form the building blocks known as "insulae".

The whole floor-space of the CMP is surfaced with concrete slabs, except for the amenity gardens inside and outside the perimeter walls; see plates 6.5, 6.6 and 6.7, pages 274, 275 and 276. Some of these gardens contain mature trees that were preserved during the last reconstruction. Most of the flower garden bases have since become base supports for temporary stall blocks. The CMP is well served with underground and covered storm water drains, see Plates 6.5, 6.7 pages 274,276. The network of roads is properly cambered and paved, including the reinforced concrete road extension of Broadcasting Road to serve heavy goods vehicles outside the perimeter walls. Manned level crossings are established where Broadcasting and Ibrahim Taiwo Roads cross the North - South railway. But this does not preclude the railway constituting a hazard in this extremely busy and noisy environment.

The entrance into the walled stallage space is by four big gates, having road vehicular and pedestrian traffic components. There are two smaller pedestrian traffic gates introduced at a later stage to provide ventage access to some sectors that are considered "access-starved" by the 1975 reconstruction plan. There is flood security lighting covering the whole stallage space. The market wardens are in uniform, and there are police and fire brigade posts. The main administration building is a permanent concrete block structure situated close to the cross point of the two shopping concourses, see Plate 6.8, page 277 .

Plates 6.9 and 6.10, pages 278 and 279, show the permanent lock-up stall blocks and open stall blocks ready for receiving roofing materials during the 1975 reconstruction. The stalls in the lock-up stall blocks are simply tiny small cells sandwiched between rigid and solid load-bearing wall structures. The open stall blocks are framed structures and the spaces within are subject to greater flexibility in use if desired. A typical partitioning pattern used to subdivide an open stall block into stall units is shown in plate 6.11, page 280. That was a common feature of the 1975 reconstructed CMP. Plate 6.14.2 page 283, exposes the structure of the temporary stall blocks. This plate shows blocks of temporary stalls being erected on the island in Lagos Street. At the CMP, Lagos Street is a dual-carriage with the island in the centre of the road.

Seven large toilet blocks, equipped with squat water closets and urinals, each with its own septic tanks and soakaway pits are judiciously located along the perimeter walls; at least one block in each of the four sectors of the stallage space. There are washing up points with associated soakaway pits to all areas of the open stalls, including the meat and fish stall blocks and the restaurants. There are ten refuse collection points and seven water supply taps for the general public; supplied through a general reticulation starting from an elevated water storage tank of 35,000 gallon capacity, see Plate 6.12 page 281.

The market place office used to have an inter-com connected to all control and administrative points within the market boundaries. There used to be a mobile public address equipment for making general

announcements. There was also a powerful siren for fire alarm and informing the public about closing time.

There is a large work-yard equipped with workshops, offices and stores, and rest rooms for firemen. There are parking bays for works vehicles, including mechanized septic emptiers, telescopic platform for use when maintaining the high flood security lamps. Also there is a land-rover, firemen's ladder and 14 fire hydrants located at strategic points throughout the market place. The disposal of the market refuse tipped outside the walls adjacent to the railway was long overdue. Plate 6.13 page 282, shows a typical receptacle where refuse is collected within the walls before it is taken outside by market place workers to the refuse depot outside the perimeter walls.

Between Lagos Street and the eastern perimeter walls is a large paved park, meant for commercial and private vehicles. About ¼ of this park had been used for open stockpile of grain, fruit and nuts. Another ¼ had been usurped by organized squatting traders. A single row of stalls had been rected round the inside perimeter of this park. Of the park what was devoted to stationing of commercial vehicles was 3,650 m^2, to the practical exclusion of private vehicles. That was less than half the original estimated required floor-space in this park. Because of the high level of congestion of vehicles in the park, large motor trucks could not get adequate room for manoeuvre and therefore they tend to stay out. They could be seen stationed at the part of the Mogadishu city centre premises close to the radio broadcasting estate. The CMP zone 11, a motor park,

approximately 1750 m^2 meant for taxi cabs, was being used for stationing of taxi cabs and minibuses. Most taxi cabs that could not penetrate that extent from the extension of hospital road tend to stop at the T junction beside the radio broadcasting premises to load and unload passengers. The only designed and used vehicle park for private cars was the one between the mosque and the meat cold store on Ibrahim Taiwo road, approximately 840 m^2. The total floor-space available to vehicles (both private and commercial) visiting the CMP was 6,240 m^2.

6.5.2 Railway Station Market Place (RSMP)

As the name implies, this market place exists on premises of Nigerian Railway Corporation. The market place sprung up in 1927 with the establishment of the railway junction and passenger exchange point for trains from Kano, Kaura Namoda, Port Harcourt and Lagos, see Figure 1.4 page 34.

Some food traders whose food was becoming bad because of extremely warm weather and bad preservation, and some others who needed money to continue their journey began to sell off some of their food stuffs on wholesales. With time, some of the Kaduna residents who bought these food items from the travelling traders sat down by the railway station to retail the commodities. This was tolerated by the goodwill of the railway authorities. Gradually the scale of this retailing exacerbated and the railway authorities objected to it and tried to eject the retailers without success. Later the railway decided to charge the retailers some fees and the market place came to stay.

It is both daily and periodic; Tuesday and Friday when goods trains bring food stuff, especially yam, from the middle belt south of Kaduna. The retailers started by marketing their commodities in the open air. Later they began to use sticks and grass to construct their stalls. Corrugated iron roofing sheets came to be used later, and now the traders have started to use plywood board for walls of the stalls. The existence of the market place is still tolerable by the Nigerian Railway Corporation, but demand for further expansion of it may not be accommodated and may persuade the Railway Authorities to sacking the marketing activities from the premises. The functional size of RSMP is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.6, page 235 .

Locational Potentials

The Railway Station Market Place is located between the Kaduna railway station and Kachia Road, see Appendix 6.2.3, page A34 . Kachia Road seems like an extension of Junction Road to the south of Kaduna River. Junction Road is the major of the two southern prongs of Ahmadu Bello Way at the City Administrator's Office (Maigaji Gari). The extension of Ahmadu Bello Way to the north is Ali Akilu Road (often called Zaria road). It leads out of the city to Zaria in the north. The above stretch of road forms the dual carriage way which constitutes a sort of spine for the city's linear structural layout.

The railway and Kachia Road run parallel in the north-south axis. Aliyu Makama Road from Barnawa (East)

TABLE 6.6: Stallage Floor-Space and Equivalent Number of Stalls in the Railway STATION MARKET PLACE (RSMP)

	Commodity	Floor-Space	Equivalent No. of Stalls	Floor-Space (m^2)	No. of Stalls	Floor-Space (m^2)	No. of Stalls
1	TUBERS	230.0000	63.8333				
2	GRAINS	1251.0000	230.5000				
3	FLOURS	387.0000	73.0000	3262.00	644.00	3610	706.00
4	COOKOIL	414.0000	71.0000				
6	FMEAT	60.0000	10.0000				
7	FFISH	30.0000	5.0000				
8	DMEAT DFISH	276.0000	46.0000				
9	VEGFRU	503.0000	126.8333				
10	SPICES	111.0000	18.5000				
11	PROVIS	123.0000	21.5000	348.00	61.50		
12	SMDRINK	192.0000	32.5000				
13	ALCHO	21.0000	3.5000				
14	TOBACCO	12.0000	4.0000				
15	MCLOTH	18.0000	4.0000				
16	WCLOTH	12.0000	2.5000				
17	CCLOTH	6.0000	1.0000				
18	SHOES	9.0000	2.0000				
21	FDGLAS	222.0000	39.5000				
22	LEATHG	39.0000	8.0000				
23	UTOOLS	15.0000	2.5000				
25	CMETIC	18.0000	4.0000				
26	CDRUG	21.0000	3.5000	6567.00	415.00	6975	489
28	BKNERY	6.0000	1.0000				
29	BUCOMT	6198.0000	346.0000				
30	ASPATS	3.0000	1.0000				
32	RTRANT	282.0000	50.5000				
33	HAIRDR	9.0000	2.0000				
34	PBETT	12.0000	2.0000	408	74.00		
35	TAILOR	75.0000	12.5000				
37	WCSBR	15.0000	4.0000				
38	ELECRP	15.0000	3.0000				
46	VACSTALL	324.0000	54.0000				
	TOTAL	10909.0000	1249.1667	10909	1249.16	10909	1249.16

Food
Food
Non-Food
Non-Food

forms a X junction with Kachia Roads,with the market and the railway station to the West of Kachia Road. This X junction is popularly known as Barnawn round-about. Both Kachia and Aliyu Makama Road are bus routes. There are some Federal and State Government Departments, including the College of Environmental Studies of Kaduna Polytechnic, located along Aliyu Makama Road and close to the X junction. The UTC (Union Trading Company) superstores is located within ½ kilometre radius of the Railway Station Market Place, and along Kachia Road.

The location is in a government residential reservation and the immediate surrounding residential population is scanty. In the background of the market place can be seen a post office and police station which are '<u>ceteris paribus</u>' of Nigerian Railway Station.

<u>Structural Potentials</u>

There is no perimeter wall completely surrounding the market place. In the early seventies the market place activities were overflowing into Kachia Road,and this constituted a serious road hazard. A limiting perimeter low concrete block wall was therefore erected in 1974-75 along the Kachia edge of the market place to stop the overflow into the road. There is no special zoning of commodities. Each trader built his or her stall on the plot allotted to him or her,and sold whatever he or she liked. There is no conceived layout plan; the plots are allocated at the whims of the officiating railway staff. The construction and orientation of the stall are uncoordinated and full of rough and sharp edges. The shopping lanes are narrow and winding, and muddy when it rains.

A large section of this market is devoted to the sale and saw-milling of timber, brought mostly by train from the Southern States. Two flour mills and three mini-mosques are located in the market place.

6.5.3 Panteka Market Place (PMP)

Panteka Market Place was established in 1970. The foundation traders were moved from the City Central Market Place. These were the traders who sold mainly furniture, building and construction materials and road vehicle parts in the CMP by the railway. The overflow of trading activities to the railway often resulted in fatal railway accidents. The government decided, therefore, to create Panteka Market Place for marketing of furniture, building and construction materials, and road vehicle parts.

By the Kaduna Local Government Council Minutes of the general purpose committee meeting number 10/1978, of 31/7/78, fees for Panteka Market Stalls were set as:

permanent stalls	₦2.00 per month
temporary stall	₦1.00 " "
plank stall	₦10.00 " "
building materials stall	₦5.00 " "

Since the inception of the market place, there has been no planned reconstruction, but rather organic growth and spontaneous redevelopment. The Panteka Market Place can aptly be described as a 'beehive workshop market place'. The market place is full of bustle as the workshops engage in forging furniture, farming implements, utensils and fakes of most items sold in the superstores. The functional size of the PMP is

represented by the stallage floor-space and equivalent number of stalls shown in Table 6.7, page 276 . The fire disaster of 19th May, 1978, burnt down about half of the whole market place, and as our respondent put it "many rich people became poor overnight" . Panteka has been a hide-out and refuge for vagabonds, and thieves of various descriptions.

Locational Potentials

It is located, see Appendix 6.2.3 page A 34 , where the extension of Broadcasting Road across the North-South railway forms a T junction with Polytechnic Road. The market place is bounded in the North by the Polytechnic staff quarters, and to the South by Tudun Nupewa residential quarters. To the East and West it is bounded by a brook and Polytechnic Road, respectively. Polytechnic Road is a busy route. But for the Tudun Nupewa residential quarters, the Panteka Market Place is located in a low residential estate. It is only about 120 metres away from the CMP. Traders squatting on both sides of the extended Broadcasting Road link up the two market places. What looked like an extension of the CMP across the railway is officially part of Panteka Market Place and is administered as such. It was called zone 14 in the Classification Survey of activity spaces in the CMP.

Structural Potentials

Because of the low water table, as signified by the brook, the site is usually muddy during the wet season, especially when rain falls. The foundry workers in

TABLE 6.7: Activity Space Classification in Panteka Market Place

Commodity Class	Commod. Space (Sum)	Stall Space (Mean)	No.of Stalls	
02 Grains	148	29.6000	5	
03 Flours	23	23.0000	1	
04 Cooking oil	75	25.0000	3	
05 Livestock	108	54.0000	2	
06 Fresh fish	50	12.5000	4	
09 Vegetables, fruits and nuts	246	27.3333	9	650m^2 24 stalls
11 Provisions (tinned foods)	76	15.2000	5	
12 Snacks and mineral drinks	339	21.1875	16	415m^2 Food: 1065 Food: 45
15 Men's clothing	9	9.0000	1	
19 Furniture	2025	36.8182	55	
23 Cooking utensils and tools	2509	29.8690	84	
26 Chemists and drugs	21	10.5000	2	
28 Books and stationery	66	16.5000	4	
29 Building and construction materials	15832	60.4275	262	25866m^2 667 stalls
30 Auto spare parts	5404	20.8649	259	
32 Restaurants	1340	32.6829	41	
35 Tailors, weavers workshop	188	18.8000	10	
36 Laundry services	196	32.6667	6	
37 Watch/she/bicycle repairs	221	20.0909	11	
39 Wood-craft workshop	10276	42.6390	241	24031m^2 678 stalls
40 Metal-craft workshop	9992	32.7607	305	
41 Battery charging and vulcanization	232	38.6667	6	
42 Herbalist ingredients	469	27.5882	17	
43 Empty bottles and containers	1117	27.2439	41	
46 Vacant stalls	528	35.2000	15	
Total	51490	36.6477	1405	51490m^2 1405 stalls

Non-food: 49897m^2 Non-food: 1345 stalls

51490m^2 1405 stalls

Note: Mean Stall Floor-space for food = 23.67m^2
Mean Stall Floor-space for non-food = 37.10m^2

the market place draw water from the shallow wells on the site. Since the market place was opened there has not been any organized reconstruction. The stall allottees built their stalls to their own specifications and as a result the layout of the market place depicts absence of a pattern.

There are 6 WCs for males and 6 WCs for females and one pit latrine, 15 bathrooms not properly utilized, 2 shallow water wells. Some businessmen have their full office located here (5 in number). There are two gigantic heaps of metal scraps that require careful disposal. Some other peculiar items found included lodgings, 3 mosques and a fertilizer depot.

6.5.4 Makera-Kurmin Gwari Market Place (M-KGMP)

It is the district centre market place for Makera District. Together with the district offices, post-office and police post, they constitute the district centre. However, the influence of the market place is far flung, as it attracts clients from places as far as Zaria. In 1963 there were 72 local government owned permanent stalls and an open market place. Construction of temporary stalls commenced in 1966 and thence the market place has gradually expanded to completely fill the quadrangle in which it is sited. The official fees are ₦2.00 and ₦1.00 per month on permanent and temporary stalls respectively. But the rents collected by the stall allottees from the traders range from ₦6.00 to ₦15.00. Each trader sells whatever he wants in his stall. There is no official effort made to restrict what each trader sells in his stall.

There was a fire incident in 1973 and another in 1980 and the estimated damage in the latter was valued at ₦300.00 per stall. There was no reliable record of the number of stalls involved. It was in the latter fire disaster that the market place administrator's office was destroyed, and since that time the market place administration has been housed in a kiosk. Burglary of the stalls happens in about two to three monthly intervals. Two fighting is rampant among the traders. The traders are frequently changing their locations within the market place owing to inability to make profitable sales in some locations. The functional size of Makera-Kurmin Gwari Market Place is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.8, page 242.

Locational Potentials

The daily Makera Market Place is situated on Makera Road at the junction where it is crossed by the extension of Muhammud Ladan Road across the railway siding to Defence Industries Corporation. Muhammud Ladan Road formed a T junction in front of St. Gerard's Hospital on Kachia Road. Makera and Muhammud Ladan Roads constitute a bus route. Two other fifth distributor roads (development roads) which provide frontage to residential plots complete the quadrangle which bounds Makera Market Place. There are no perimeter walls. There are a few departmental shops, such as Lernards Shoe Shop, and offices along Makera Road. It is primarily sited in the midst of residential buildings providing accommodation for the majority of the work force of the industrial Kaduna South.

TABLE 6.8: Stallage Floor-Space and Equivalent Nº of Stalls in the Makera/Kurmin Gwari Market Place (M-KGMP)

	Commodity	Floor-Space	Equivalent No.of Stalls
1	TUBERS	312.0000	75.5000
2	GRAINS	695.0000	182.3333
3	FLOURS	978.5000	178.8333
4	COOKOIL	359.5000	70.6667
5	LVSTOCK	84.0000	16.0000
6	FMEAT	339.0000	57.5000
7	FFISH	182.5000	36.6667
8	DMEAT DFISH	291.5000	57.3333
9	VEGFRU	1726.0000	472.1667
10	SPICES	308.5000	67.6667
11	PROVIS	473.0000	92.8333
12	SMDRINK	748.0000	177.1667
14	TOBACCO	12.0000	2.0000
15	MCLOTH	326.5000	93.1667
16	WCLOTH	623.5000	155.6667
17	CCLOTH	424.0000	112.6667
18	SHOES	426.5000	96.3333
19	FNITURE	131.5000	29.1667
20	ELECTR	18.0000	3.0000
21	PDGLAS	530.0000	105.8333
22	LEATHG	51.0000	10.5000
23	UTOOLS	519.5000	118.8333
24	PCYCLE	3.0000	1.0000
25	CMETIC	456.5000	103.3333
26	CDRUG	39.0000	11.0000
27	TJEWEL	111.0000	34.5000
28	BKNERY	66.0000	15.0000
29	BUCOMT	504.0000	84.0000
31	BSPATS	54.0000	9.5000
32	RTRANT	450.0000	85.0000
33	HAIRDR	237.0000	40.0000
34	PBETT	12.0000	2.0000
35	TAILOR	943.0000	157.1667
37	WCSBR	354.0000	66.0000
38	ELECRP	12.0000	2.0000
39	WCRAFT	513.0000	86.0000
40	MCRAFT	465.0000	85.0000
41	BCHARG VULC	72.0000	14.0000
42	HERB INGRID	43.5000	10.0000
43	EMPTIES	99.0000	16.5000
44	FMILLS	12.0000	2.0000
46	VACSTALL	894.0000	149.0000
	TOTAL	14900.0000	3184.8333

Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No. of Stalls
		6509.5	1486.6667 Food Stalls
5276.50	1214.67		
1233.00	272.00		
4284.00	983.50		
3212.00	565.33	7496.5 m^2	1549.1667 Non-Food Stalls
14900.00	3184.83	14900.00	3184.83

Structural Potentials

A bird's eye-view photograph of a section of the Makera Market Place is shown in Plate 6.2(b) page 219. The picture reveals the undisguised poor physical structure of the market place. It represents the true physical structure of the city retail market places except the CMP. The shopping lanes are muddy ground, and are narrow. The lack of perimeter fence makes the border very porous and compounds the problem of security after marketing hours. Other problems facing the market place included lack of good drinking water supply and absence of water closets and urinals.

The Kurmin Gwari Market Place is a logical periodic component of Makera Market Place. It was opened in 1967 when construction of temporary stalls overwhelmed the open part of Makera Market Place in 1966. It was founded in association with a leprosy clinic. This was to enable the patients to sell their produce when they attended the clinic on Mondays, from where it derived its periodicity. The previous site is now occupied by the Assemblies of God Church, Kurmin Gwari. Its present site is by the railway siding to the Defence Industries Corporation in front of the Asbestos Cement factory, see Plate 6.3 page 244. The factory buildings can be seen at the background, while the leprosy clinic can be seen at the extreme left of the photograph.

Even though the marketing is periodic, there are some blacksmiths and calabash carvers sitting in daily to do their work. There is also a commercial bank at the southern border. The present ground area, about

Plate 6.3: Kurmin Gwari Open-Air Monday Periodic Market (April, 1984)
(Photograph by the author during 1984 Field Survey).

4.7 hectares, is unpaved and about ¾ of its 1972 size, when it was transferred to this site. Some persons have erected some structures in some parts of it. The number of traders attending the market in 1984 was about 3 times that of 1972.

Space allocation in the open market place is by natural selection: when one trader locates in a spot, his likes begin to congregate around him. But a trader normally keeps to his position whenever he attends the market. Attendance is now exceeding the available ground space and scrambling for ground space is becoming a feature of the market place.

The traders display their commodities on mats or tarpaulines spread on the ground in double banked rows. They form a big organic layout with wavy circulation network. Some of the problems facing the market place are lack of protection against bad weather, tap water supply, toilets and urinals.

6.5.5 Tudun Wada Market Place (TWMP)

Until 1973 Tudun Wada Market Place, see Appendix 6.2.3, page A34 ; was quite small and overshadowed by the CMP. It received a great impetus in 1973 when the reconstruction of the CMP commenced and almost all the traders moved to Tudun Wada Market Place. Between 1973 to 1975 it virtually served as the CMP for the city. After the reconstruction of the CMP, the traders who were unable to go back remained behind in Tudun Wada Market Place. In the period 1973-1978 and 1984 the stall fees were as follows: Table 6.9, page 246 .

TABLE 6.9: Stall fees in Tudun Wada Market Place

Type of Stall	1973-1978	1984
temporary stall	₦0.60	₦1.00
permanent stall	₦1.00	₦2.00
fresh meat and fish stall (permanent)	₦1.00	₦2.00
temporary restaurant	₦2.00	₦2.00
permanent restaurant	₦4.00	₦6.00

The functional size of Tudun Wada Market Place is represented by the stallage, floor-space and equivalent number of stalls, as shown in Table 6.10, page 247 .

Locational Potentials

Tudun Wada Market Place is sited in the heart of the dense residential area of Tudun Wada district. It is bounded to the South by Ibrahim Taiwo Road, to the East by Dutsima Road, which eventually empties into the Tudun Wada By-Pass to the West. To the North and West are Aminu Street and Jaji Road, respectively. Ibrahim Taiwo/Gamagira Road is the biggest thoroughfare tangential to the Market Place. Secondly, the Polytechnic Road which carried some shops and workshop, including the Kaduna Polytechnic, is close by and forms a X junction with Ibrahim Taiwo Road. This junction is popularly known as Tudun Wada round-about. Ibrahim Taiwo and Polytechnic roads are busy routes.

TABLE 6.10: Stallage Floor-Space and Equivalent Number of Stalls in Tudun Wada Market Place (TWMP)

	Commodity	Floor-Space	Equivalent No.of Stalls	Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
1	TUBERS	93.0000	17.0000				
2	GRAINS	225.0000	37.5000				
3	FLOURS	509.0000	84.8333				
4	COOKOIL	617.0000	103.8333				
5	LVSTOCK	6.0000	1.0000				
6	FMEAT	912.0000	152.0000	3810.00	642.50		
7	FFISH	102.0000	17.0000				
8	DMEAT DFISH	131.0000	21.8333				
9	VEGFRU	930.0000	161.0000				
10	SPICES	285.0000	47.5000				
11	PROVIS	669.0000	115.5000				
12	SMDRINK	453.0000	75.5000				
13	ALCHO	78.0000	13.0000				
14	TOBACCO	12.0000	2.0000	1212.00	202.00	Food 5049	Food 849.00
15	MCLOTH	678.0000	113.0000				
16	WCLOTH	1173.0000	195.5000				
17	CCLOTH	576.0000	96.0000				
18	SHOES	639.0000	106.5000				
19	FNITURE	45.0000	7.5000				
20	ELECTR	36.0000	6.0000				
21	PDGLAS	862.0000	143.6667				
22	LEATHS	144.0000	24.0000				
23	UTOOLS	756.0000	126.0000	5656.00	942.67		
24	PCYCLE	6.0000	1.0000				
25	CMETIC	351.0000	58.5000				
26	CDRUG	54.0000	9.0000				
27	TJEWEL	138.0000	23.0000				
28	BKNERY	90.0000	15.0000				
29	BUCOMT	60.0000	10.0000				
30	ASPATS	24.0000	4.0000				
31	BSPATS	24.0000	4.0000			11365	1894.6667
32	RTRANT	696.0000	116.0000				
33	HAIRDR	135.0000	22.5000				
35	TAILOR	3063.0000	510.5000				
36	LNDRY	1104.0000	184.0000				
37	WCSBR	303.0000	50.5000	5685.00	947.50	Non-Food	Non-Food
38	ELECRP	6.0000	1.0000				
39	WCRAFT	198.0000	33.0000				
40	MCRAFT	42.0000	7.0000				
41	BCHARG VULC	12.0000	2.0000				
42	HERB INGRID	126.0000	21.0000				
45	UNASCERT	54.0000	9.0000				
46	VACSTALL	726.0000	121.0000				
	TOTAL	17143.0000	2864.6667	17143	2864.67	17143.	2864.67

Tudun Wada Market Place has no common boundary with Tudun Wada district headquarters. The district headquarters is within ½ kilometer radius of the market place.

Structural Potentials

The market place is completely surrounded by built-up residential plots. There are no protective perimeter fences of any form and the market borders are porous. The market place has no official opening or closing time and some sections of it seem to be active all day and night. It is the largest market for second-hand clothes. The laundry men who provide laundry services to the second hand clothes dealers are scattered in some sections of the market place. Some second-hand clothes dealers use the Tudun Wada Market Place as their base and launching pad from which they take off to the periodic market places scattered in the Kaduna city-region market rings.

The layout is the usual traditional grid-iron pattern, but there does not seem to be any hierarchy in the shopper circulation pathways. There is no properly designed storm water drainage system. There are 32 water closets and 12 urinals, many of which have been in disuse for a long time. More than 66% of the stalls are temporary structures. About 50% of the shoe repairers in Tudun Wada Market Place engage in actual manufacture of shoes.

The population of traders in the market place has been on the decline since 1978 and the original zoning pattern seems to be disintegrating as traders change

from one commodity to the other. In 1982 and 1983, there were fire incidents, both originating from the location of the laundries. The estimated value of the damages was ₦9,400.00 and ₦28,050.00 respectively. In 1984 another fire disaster started from a petrol depot in the market place and the estimated damage was valued at ₦53,793.00.

Some of the peculiar items observed in the market place include 5 flourmills, 2 mosques, 2 lodgings, a large open space for stacking barrels of cooking oil and a disused road vehicle park measuring 54 x 108 metres approximately.

6.5.6 Kawo-Talata Market Place (K-TMP)

Kawo-Talata Market Place, see Appendix 6.2.3 page A34, was established in 1936 at a site near Kaduna-Zaria road and moved to its present site at the district headquarters in 1970. It is a daily and Tuesday periodic market. The periodicity aspect came about by the leprosy clinic which offered treatment to patients on Tuesdays. Similar to Kurmin Gwari, the patients brought along with them some produce to sell. The leprosy clinic is still operative. The Talata, the periodic component, is an open air market whereas the daily market contains residential lock-up and open stalls.

In 1970 the stall fees were 1 kobo daily or 40 kobo per month. In 1984 the permanent and temporary stalls had fees of ₦2.00 and ₦1.00 per Tuesday Talata market. The functional size of Kawo-Talata Market Place is represented by the stallage, floor-space and equivalent number of stalls shown in Table 6.11, page 250.

TABLE 6.11: Stallage Floor-Space and Equivalent Number of Stalls in Kawo/Talata Market Place (K/TMP)

	Commodity	Floor-Space	Equivalent No.of Stalls
1	TUBERS	742.5000	233.5000
2	GRAINS	1911.0000	604.0000
3	FLOURS	1051.5000	251.5000
4	COOKOIL	268.5000	53.5000
5	LVSTOCK	120.0000	22.0000
6	FMEAT	330.0000	58.0000
7	FFISH	165.0000	28.0000
8	DMEAT DFISH	468.0000	117.5000
9	VEGFRU	2252.0000	669.3333
10	SPICES	675.5000	170.8333
11	PROVIS	480.0000	109.5000
12	SMDRINK	393.0000	95.0000
13	ALCHO	49.5000	9.0000
14	TOBACCO	36.0000	7.5000
15	MCLOTH	359.0000	131.3333
16	WCLOTH	453.5000	154.8333
17	CCLOTH	154.5000	60.5000
18	SHOES	259.5000	78.0000
19	FNITURE	105.0000	30.0000
20	ELECTR	59.0000	11.3333
21	PDGLAS	676.5000	137.0000
22	LEATHS	162.0000	49.0000
23	UTOOLS	258.5000	63.3333
24	PCYCLE	57.0000	9.5000
25	CMETIC	159.0000	59.0000
26	CDRUG	75.0000	21.5000
27	TJEWEL	109.5000	30.0000
28	BKNERY	12.0000	2.0000
29	BUCOMT	154.5000	14.5000
31	BSPATS	96.0000	20.0000
32	RTRANT	141.0000	25.0000
33	HAIRDR	184.5000	31.5000
35	TAILOR	228.0000	38.0000
37	WCSBR	306.0000	60.0000
38	ELECRP	6.0000	1.0000
39	WCRAFT	243.0000	41.0000
40	MCRAFT	90.0000	16.0000
41	BCHARG VULC	27.0000	5.0000
42	HERB INGRID	18.0000	4.0000
43	EMPTIES	12.0000	2.0000
44	FMILLS	156.0000	26.0000
45	UNASCERT	36.0000	6.0000
46	VACSTALL	216.0000	36.0000
	TOTAL	13756.5000	3592.5000

Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
		7984.00	Food 8960
		2208.17	Food 2432.1667
958.50	221.00		
3150.50	871.83		
1411.50	249.50		Non-Food 4580
			Non-Food 1124
13756.5		13756.5	
3592.5		359.5	

In 1974 there was a midnight fire disaster; a restaurant keeper did not put out his firewood fire before leaving the market place at the end of the day's business. In 1980 there was another midnight fire incident. In a thunderstorm, in 1978, the roof of a stall collapsed on a little girl. She had fractures, but survived. In 1981 there was a flood disaster after a heavy rainfall and the flood destroyed grain and flour stocks. Burglary is frequent - on the average of one a month.

There is a good turnout of road vehicles at the Market Place on Tuesday Talata. The following figures were an observation of road vehicle accumulation on the 22nd May, 1984.

TABLE 6.12: Road Vehicle Accumulation in Kawo-Talata Market Place on Tuesday, 22nd May 1984.

Type of Road Vehicle	12.15pm	2.00pm	4.50pm
Fuel tanker	1	2	1
Motor trucks	8	10	6
Minibus	64	84	54
Taxi-cabs	15	25	13
Private cars/vans	96	83	35
Police vans	2	2	1
Army vans	-	1	-
Total	186	206	110

The ground space proposed for a road vehicle park, measuring approximately 55 x 90 metres, since 1970, is yet to be developed and put into proper use.

Locational Potentials

Kawo-Talata Market Place is located in the same quadrangle, at the district headquarters with the following functions: the district office, police station, customary court, postal agency and a social club. A very large mosque is under construction in an adjacent quadrangle. The State Government has built a new cold meat warehouse in the market place, but it is yet to be put into use. The location is off Kaduna-Zaria road, in the thick of residential houses. it is completely bounded by these fifth distributor roads: Kawo, Masanawa, Kakuri and Darma to the West, North, East and South, respectively. It is very close in proximity to the agricultural farm estates of the upper Kaduna River. The farmers bring their produce to the Talata Tuesday market for sale.

Structural Potentials

Kawo-Talata market place has no perimeter fence. A shopping avenue runs through the centre and all the shopping lanes cross it at right angles. There are no storm water drainage gutters and the shopping malls are not paved. The stalls are temporary structures and the twenty water closets have been out of use. The district authority insist on the maintenance of the planned zoning of the market place by commodity class; and it has remained as such. Unlike Kurmin Gwari-

Monday market, Talata-Tuesday market is located together with its parent residential Kawo Market Place. But like Kurmin Gwari, space allocation is by natural selection; when one trader locates at a spot, other traders selling similar commodities or commodities that are used in association or as a substitute begin to congregate around him, forming wavy shopping lanes that result in a big organic open market layout. The eventual outcome of this kind of sitting arrangement is a sort of zoning by commodity class. Some peculiar items in the market place include 15 flourmills, security house for the night guards, pools betting office and 3 fertilizer depots, and club-house.

6.5.7 Ungwan Rimi Market Place (URMP)

The market place was opened in February 1978 and was reconstructed a year later, see Appendix 6.2.3, page A34 . When it was opened there were 650 stalls and 756 after the reconstruction. The open stalls are permanent structures owned by the Local Government Council. The fees are ₦6.00 per month. The lock-up stalls are temporary structures owned and built by the traders. The land fees for the temporary stalls are ₦3.00 per month. When a trader applies for a stall, he is required to indicate the commodity to be sold in the stall. This would influence decision on the location to be allotted to him. The functional size of Ungwan Rimi Market Place is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.13, page 254 .

TABLE 6.13: Stallage Floor-Space and Equivalent Number of Stalls in Ungwan Rimi Market Place (URMP)

	Commodity	Floor-Space	Equivalent No.of Stalls
1	TUBERS	32.0000	5.3333
2	GRAINS	133.0000	22.1667
3	FLOURS	110.0000	18.3333
4	COOKOIL	84.0000	14.0000
5	LVSTOCK	36.0000	6.0000
6	FMEAT	183.0000	30.5000
7	FFISH	48.0000	8.0000
8	DMEAT DFISH	71.0000	11.8333
9	VEGFRU	284.0000	47.3333
10	SPICES	298.0000	49.6667
11	PROVIS	160.0000	26.6667
12	SMDRINK	128.0000	21.3333
13	ALCHO	3.0000	.5000
15	MCLOTH	17.0000	2.8333
16	WCLOTH	49.0000	8.1667
17	CCLOTH	8.0000	1.3333
18	SHOES	64.0000	10.6667
19	FNITURE	10.0000	1.6667
20	ELECTR	2.0000	.3333
21	PDGLAS	120.0000	20.0000
22	LEATHC	5.0000	.8333
23	UTOOLS	58.0000	9.6667
25	CMETIC	37.0000	6.1667
26	CDRUG	32.0000	5.3333
27	TJEWEL	18.0000	3.0000
28	BKNERY	28.0000	4.6667
29	BUCOMT	50.0000	8.3333
32	RTRANT	204.0000	34.0000
33	HAIRDR	108.0000	18.0000
35	TAILOR	263.0000	43.8333
37	WCSBR	138.0000	23.0000
38	ELECRP	3.0000	.5000
39	WCRAFT	12.0000	2.0000
40	MCRAFT	18.0000	3.0000
43	EMPTIES	3.0000	.5000
46	VACSTALL	1482.0000	247.0000
	TOTAL	4299.0000	716.5000

Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
291.00	48.50	1279.00	213.17
		Food 1570	Food 261
498.00	83.00		
		Non-Food 1247	Non-Food 207
749.00	124.83		
4299.00	716.50	4299.00	716.50

Locational Potentials

The Ungwan Rimi Market Place is located at the headquarters of Gabasawa district, together with a police station, a mosque and a customary court. It is connected to Tafewa Balewa Way by Shehu Laminu Road. Shehu Laminu Road seems like an Eastward extension of Golf Course Road. It is on a bus route but in a low residential population density. But for the recent Federal Government low cost housing estate, the area was primarily a government reserved residential area, where upper level public servants resided.

Structural Potentials

The layout is very compact, with most of the shopping blocks in parallel monotonous rows; only separated by narrow shopping lanes. There is no perimeter fence. On the northern boundary the market place seems to fade away into the residences without an easily noticeable break. The market place administration is housed in a permanent stall.

6.5.8 Barnawa Market Place (BMP)

The market place was founded in 1954 to serve the following villages: Barnawa, Kakuri Narayi, Ungwan Maruwa and Ungwan Bade. Because of the nearby farms, vegetables are cheap. Initially the stalls were built of thatched roofs. Corrugated iron sheet roofs were introduced in 1967 and there was a reconstruction of the market place in 1979. The stall locations are allotted by the Kaduna Local Government Council and

the stalls (temporary) are developed by the allottees. It is illegal for an allottee to build a permanent structure on his lot. License fee of ₦25.00 per annum is paid for a workshop and a monthly fee of ₦1.00 is paid for non-workshop stalls. The functional size of Barnawa Market Place is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.14, page 257.

Locational Potentials

Barnawa Market Place is located in the midst of residential quarters about 100 metres West of Aliyu Makama Road adjacent to a primary school. It is also a minibus terminal.

Structural Potentials

Cows and other livestock are kept by the main entrance to the market place. The animals are not enclosed in a pen and as such they constitute a hazard to the users of the main entrance to the market place. These animals are slaughtered on an exposed concrete slab on the ground.

In 1974, a stall was burnt down when a gallon of petrol brought inside it caught fire and in 1979 a fire started from a welder working on a kerosene tank. The fire caused the death of 5 people. There are occasional floods which cause damage to traders wares in the market place. Rainstorms often blow the roofs of stalls off and burglary occurs occasionally. The traders now pay their fees with reluctance.

TABLE 6.14: Stallage Floor-Space and Equivalent Number of Stalls in Barnawa Market Place (BMP)

	Commodity	Floor-Space	Equivalent No.of Stalls	Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
1	TUBERS	18.0000	3.0000				
2	GRAINS	180.0000	30.0000				
3	FLOURS	144.0000	24.0000				
4	COOKOIL	54.0000	9.0000				
6	FMEAT	144.0000	24.0000				
7	FFISH	17.0000	2.8333				
8	DMEAT DFISH	42.0000	7.0000				
9	VEGFRU	316.0000	52.6667				
10	SPICES	166.0000	27.6667				
11	PROVIS	131.0000	21.8333				
12	SMDRINK	245.0000	40.8333				
14	TOBACCO	6.0000	1.0000				
15	MCLOTH	33.0000	5.5000				
16	WCLOTH	24.0000	4.0000				
18	SHOES	12.0000	2.0000				
19	FNITURE	3.0000	.5000				
20	ELECTR	3.0000	.5000				
21	PDGLAS	24.0000	4.0000				
23	UTOOLS	42.0000	7.0000				
25	CMETIC	6.0000	1.0000				
26	CDRUG	8.0000	1.3333				
27	TJEWEL	12.0000	2.0000				
28	BKNERY	5.0000	.8333				
29	BUCOMT	69.0000	11.5000				
31	BSFATS	18.0000	3.0000				
32	RTRANT	267.0000	44.5000				
33	HAIRDR	60.0000	10.0000				
35	TAILOR	354.0000	59.0000				
36	LNDRY	27.0000	4.5000				
37	WCSBR	45.0000	7.5000				
38	ELECRP	6.0000	1.0000				
39	WCRAFT	108.0000	18.0000				
40	MCRAFT	66.0000	11.0000				
41	BCHARG VULC	36.0000	6.0000				
45	UNASCERT	30.0000	5.0000				
46	VACSTALL	450.0000	75.0000				
	TOTAL	3171.0000	528.5000				

	Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
Food	1081.00	180.17	1478	246.3333
Non-Food	382.00	63.67	1243	207.1667
	259.00	43.50		
	969.00	161.50		
	1810	317.50	1810	317.50

There is a boundary fence. Even though marketing activities stop inside the market place at 7.00 pm, the shops fronting the main road remain open till midnight. The stalls are laid out in the traditional grid-iron pattern and the shopping lanes are unpaved and muddy when rain falls. The trader sells whatever commodities he likes. Usually the commodities to be sold are not stipulated when the application is lodged for stall lot. The Market Master is a trader in the market place and administration is carried out from his stall as a secondary duty. Lavatory facilities are absent and hides and skins are handled in the open. Other peculiar items found in the market place include 6 corn-mills, a mosque, 2 Arabic classrooms and one lodging.

6.5.9 Ungwan Television Market Place (UTMP)

Ungwan Television Market Place, see Appendix 6.2.3, page A34 , was established in 1959 as an open air market place. Erection of stalls did not start until 1960. When it was established its present site was the only available space that could be found in the village. It derived its name from the site which was a wireless station (television). There were fire disasters in 1977 which were put out by the fire brigade. There are three recorded occasions of burglary and the items stolen were 4 bags of rice, 5 bags of beans and 5 bags of maize, respectively. The functional size of Ungwan Television Market Place is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.15, page 259 .

TABLE 6.15: Stallage Floor-Space and Equivalent Number of Stalls in Ungwan Television Market Place (UTMP)

	Commodity	Floor-Space	Equivalent No.of Stalls	Floor-Space (m²)	No.of Stalls	Floor-Space (m²)	No.of Stalls
1	TUBERS	127.0000	27.6667				
2	GRAINS	260.0000	51.3333				
3	FLOURS	152.0000	27.3333				
4	COOKOIL	201.0000	33.5000				
5	LVSTOCK	6.0000	1.0000				
6	FMEAT	72.0000	12.0000	1434.00	298.50		
7	FFISH	27.0000	4.5000				
8	DMEAT DFISH	67.0000	11.1667				
9	VEGFRU	478.0000	121.1667				
10	SPICES	44.0000	8.8333				
11	PROVIS	65.0000	10.8333				
12	SMDRINK	135.0000	28.0000	209.00	40.33	Food1643.	
14	TOBACCO	9.0000	1.5000			Food 388.833	
15	MCLOTH	18.0000	3.0000				
16	WCLOTH	24.0000	4.0000				
17	CCLOTH	6.0000	1.0000				
18	SHOES	12.0000	4.0000				
20	ELECTR	6.0000	1.0000				
21	PDGLAS	18.0000	4.0000				
22	LEATHS	8.0000	1.3333				
23	UTOOLS	47.0000	7.8333	184.00	34.17		
25	CMETIC	12.0000	2.0000				
26	CDRUG	6.0000	1.0000			438	
27	TJEWEL	15.0000	3.0000			76	
29	BUCOMT	12.0000	2.0000				
32	RTRANT	66.0000	11.0000				
33	HAIRDR	108.0000	18.0000	254.00	42.33	Non-Food	
35	TAILOR	35.0000	5.8333			Non-Food	
37	WCSBR	21.0000	3.5000				
39	WCRAFT	6.0000	1.0000				
41	BCHARS VULC	18.0000	3.0000				
46	VACSTALL	1080.0000	180.0000				
	TOTAL	3161.0000	595.3333	3161	595.3333	3161	595.3333

Locational Potentials

The federal highway from Kachia on reaching Sabo Tesh Southern extreme of Kaduna City, bifurcates. The left side prong is the Tudun Wada By-Pass and the right side prong continues as Kachia Road into the city, passing by the Federal Open Prison. Within the bifurcation lies Ungwan Television village. By Ungwan Television village, the Tudun Wada By-Pass is elevated on a high embankment, to provide a viaduct underneath for the ground level Port-Harcourt Kaduna railway. The Port-Harcourt Kaduna railway runs parallel to Kachia road, between Kachia road and Ungwan Television village, and there is no level crossing into this village from Kachia road. The village is therefore secluded from both Tudun Wada By-Pass and Kachia Road. Ungwan Television Market Place lies to the North of the village just before the wireless field. The market place is a bus terminal.

Structural Potentials

The stalls are temporary structures with corrugated iron sheet roofs. The lock-up stalls have corrugated iron sheet walls. The layout plan is organic and each trader sells whatever he likes in his stall. The shopping malls do not exhibit any hierarchy and are unpaved. There is no perimeter security fence. The village head officiates as the market administrator from his residence which is adjacent to the market place. It can be said that the market place is located in association with the village head's residence. Although there are many vacant stalls, the P & T would not tolerate further expansion of the market place into the wireless field. Some of the problems

confronting the market place are lack of water supply and toilets for the traders, and absence of night guards.

6.5.10 Badarawa Market Place (BDMP)

Locational Potentials

Badarawa Market Place, see Appendix 6.2.3 page A34, is a daily market. It was established in 1967 at the confluence of three streets, where it functioned like a street market place. With increasing demand, the location became inadequate and in 1976 it was moved to its present location. The market place completely fills a quadrangle of 33 x 33 metres, completely surrounded by four streets amid high density residential plots. In 1967 the fees were ₦0.75 per stall per month. Before March, 1984, the stall fees were ₦1.00 per month and by March, 1984, it became ₦2.00 per month. It is a bus terminal.

Structural Potentials

The applicant is required to specify the commodity to be sold and the market authorities endeavour to maintain the existing zoning by commodity. The peculiar items found in the market place include, concrete block moulder's office and flourmill. There are no toilets and water supply taps. The functional size of the market place is indicated by the stallage floor space and number of stalls shown in Table 6.16, page 262.

TABLE 6.16: Stallage Floor-Space and Equivalent Number of Stalls in Badarawa Market Place (BDMP)

	Commodity	Floor-Space	Equivalent No.of Stalls	Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
1	TUBERS	14.0000	2.3333				
2	GRAINS	169.0000	28.1667				
3	FLOURS	45.0000	7.5000				
4	COOKOIL	42.0000	7.0000				
6	FMEAT	18.0000	3.0000				
8	DMEAT DFISH	34.0000	5.6667				
9	VEGFRU	282.0000	47.0000	610.00	101.67		
10	SPICES	6.0000	1.0000				
11	PROVIS	47.0000	7.8333				
12	SMDRINK	46.0000	7.6667				
13	ALCHO	12.0000	2.0000				
14	TOBACCO	6.0000	1.0000	111.00	18.50	Food 721	Food 120.1667
15	MCLOTH	12.0000	2.0000				
16	WCLOTH	9.0000	1.5000				
18	SHOES	6.0000	1.0000				
19	FNITURE	12.0000	2.0000				
20	ELECTR	3.0000	.5000				
21	PDGLAS	3.0000	.5000				
22	LEATHG	3.0000	.5000				
23	UTOOLS	9.0000	1.5000	92.00	15.33		
25	CMETIC	2.0000	.3333				
26	CDRUG	6.0000	1.0000				
27	TJEWEL	6.0000	1.0000				
28	BKNERY	3.0000	.5000				
29	BUCOMT	18.0000	3.0000				
32	RTRANT	114.0000	19.0000			487	81.1667
33	HAIRDR	30.0000	5.0000				
35	TAILOR	113.0000	18.8333				
37	WCSBR	12.0000	2.0000				
38	ELECRP	60.0000	10.0000	395.00	65.83	Non-Food	Non-Food
39	WCRAFT	36.0000	6.0000				
40	MCRAFT	24.0000	4.0000				
41	BCHARG VULC	6.0000	1.0000				
46	VACSTALL	972.0000	162.0000				
	TOTAL	2180.0000	363.3333	2180.00	363.3333	2180.00	363.3333

6.5.11 Ungwan Shanu Market Place (USMP)

Locational Potentials

Ungwan Shanu Market Place, see Appendix 6.2.3 page A34, is a daily market founded at its old Abakpa location in 1957. The then local authority built 28 permanent stalls in 2 blocks of 14 stalls each. Part of the old market place is on Nigerian Railway Corporation land and the rates therefrom are due to the railway authorities. The rates on the part that is on urban land are due to the Local Government Council. There are also temporary stalls belonging to the traders. It was moved to the Nigerian Defence Academy site and was later returned to its new site between the national museum and the railway in 1983. Ungwan Shanu Market Place functions on two sites along the railway; the present new site and the old Abakpa site. The functional size of Ungwan Shanu Market Place is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.17, page 264.

Structural Potentials

The new site is a narrow strip of land running between Lagos-Kano railway and the national museum. The railway comes in between the market place and the village that it is meant to serve. The villagers have to climb over the railway to reach the market. The long shopping blocks are laid parallel to the railway without frequent breaks to allow shoppers to reach the blocks at the rear. As a result of this, traders are not willing to take up the stalls in the

TABLE 6.17: Stallage Floor-Space and Equivalent Number of Stalls in Ungwan Shanu Market Place (USMP)

	Commodity	Floor-Space	Equivalent No.of Stalls	Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
1	TUBERS	95.0000	15.8333				
2	GRAINS	214.0000	35.6667				
3	FLOURS	158.0000	26.3333				
4	COOKOIL	231.0000	38.5000				
5	LVSTOCK	18.0000	3.0000				
6	FMEAT	252.0000	42.0000	1855.00	309.17	2140.	356.667
7	FFISH	27.0000	4.5000				
8	DMEAT DFISH	134.0000	22.3333				
9	VEGFRU	675.0000	112.5000				
10	SPICES	51.0000	8.5000				
11	PROVIS	174.0000	29.0000	285.00	47.50	Food	Food
12	SMDRINK	96.0000	16.0000				
14	TOBACCO	15.0000	2.5000				
15	MCLOTH	18.0000	3.0000				
16	WCLOTH	45.0000	7.5000				
17	CCLOTH	3.0000	.5000				
18	SHOES	33.0000	5.5000				
19	FNITURE	39.0000	6.5000	297.00	49.50		
21	PDGLAS	18.0000	3.0000				
22	LEATHG	24.0000	4.0000				
23	UTOOLS	36.0000	6.0000				
25	CMETIC	60.0000	10.0000				
27	TJEWEL	15.0000	2.5000				
28	BKNERY	6.0000	1.0000				
32	RTRANT	228.0000	38.0000				
33	HAIRDR	39.0000	6.5000				
35	TAILOR	119.0000	19.8333	488.00	81.33	785	130.8333
36	LNDRY	6.0000	1.0000				
37	WCSBR	48.0000	8.0000				
39	WCRAFT	12.0000	2.0000				
40	MCRAFT	18.0000	3.0000				
43	EMPTIES	18.0000	3.0000			Non-Food	Non-Food
46	VACSTALL	2250.0000	375.0000				
	TOTAL	5175.0000	862.5000	5175	862.5	5175	862.5

rear blocks. If the stalls were laid on short end perpendicular to the railway, penetration into the market place would have been easier. At the old site at Abakpa there is an adult education class, a police post and a church. There is no perimeter fence and the narrow shopping lanes are muddy when heavy rain falls. There are four flourmills and a cooking gas depot.

6.5.12 Kabala Gabas Market Place (KGMP)

Locational Potentials

Kabala Gabas Market Place, see Appendix.6,2.3 page A34, is a daily and Wednesday periodic market. It was established in 1976 when the Local Government Council erected 16 permanent stalls for the meat traders. Every other stall is deemed temporary and erected by the individuals to whom the stall plot was allotted to. In 1976 stall fee was ₦0.60 per month and 1984 stall fee was ₦1.00 per month for the temporary stalls and ₦2.00 for the permanent stalls. Also there are 25 mud-wall stalls that attract fees of ₦3.00 per month. When the market place was opened, there was no zoning by commodity; the traders built their stalls and sold whatever they liked. By 1984 market place authorities started implementing some zoning by commodity. New applicants for stalls were required to stipulate what commodities are to be sold in the stalls when the application was being lodged.

However, when the original owner sold or let the stall the new trader was not bound to deal in the commodities indicated in the application. After the allocation of the stall space, the developer often exceeds the floor-space specified in the approval and thereby encroaching on the spaces that did not belong to them. As a result of this, floor-spaces of the stalls are not uniform. A thunderstorm in 1979 caused damages estimated at a cost of ₦1,800.00. The only case of reported burglary

TABLE 6.18: Stallage Floor-Space and Equivalent Number of Stalls in Kabala Gabas Market Place (KGMP)

	Commodity	Floor-Space	Equivalent No.of Stalls	Floor-Space (m^2)	No.of Stalls	Floor-Space (m^2)	No.of Stalls
1	TUBERS	33.0000	5.5000				
2	GRAINS	94.0000	15.6667				
3	FLOURS	123.0000	20.5000				
4	COOKOIL	57.0000	9.5000				
6	FMEAT	144.0000	24.0000				
7	FFISH	18.0000	3.0000				
8	DMEAT DFISH	47.0000	7.8333				
9	VEGFRU	94.0000	15.6667				
10	SPICES	96.0000	16.0000				
11	PROVIS	78.0000	13.0000				
12	SMDRINK	158.0000	26.3333				
13	ALCHO	2.0000	.3333				
15	MCLOTH	2.0000	.3333				
16	WCLOTH	2.0000	.3333				
17	CCLOTH	2.0000	.3333				
18	SHOES	22.0000	3.6667				
19	FNITURE	37.0000	6.1667				
20	ELECTR	8.0000	1.3333				
21	PDGLAS	13.0000	2.1667				
23	UTOOLS	17.0000	2.8333				
26	CDRUG	6.0000	1.0000				
29	BUCOMT	56.0000	9.3333				
32	RTRANT	375.0000	62.5000				
33	HAIRDR	54.0000	9.0000				
34	PBETT	12.0000	2.0000				
35	TAILOR	337.0000	56.1667				
37	WCSER	48.0000	8.0000				
38	ELECRP	36.0000	6.0000				
39	WCRAFT	324.0000	54.0000				
40	MCRAFT	30.0000	5.0000				
41	BCHARG VULC	96.0000	16.0000				
46	VACSTALL	1662.0000	277.0000				
	TOTAL	4083.0000	680.5000				

706.00 117.67 — Food 944 157.3333
238.00 39.67 — Food
165.00 27.50
1312.00 218.67 — Non-Food 1477 246.1667
Non-Food
4083 680.0
4083 680.0

was that of a sewing machine valued at ₦100.00. The functional size of Kabala Gabas Market Place is represented by the stallage floor-space and equivalent number of stalls shown in Table 6.18, page 266.

Locational Potentials

Kabala Gabas Market Place is located on an odd space bounded on the South, West, North and East by Kabala village, Kabala housing estate, Police barracks and a cemetery.

Structural Potentials

The market place has no perimeter fence and a great portion of the market place is in disuse and devastated. The shopping lanes are not paved, but narrow. Some peculiar items in the market place include four flour-mills, lager beer and cooking gas depots.

6.6 Proposed Kaduna City Central Area Development Programmes

This section examined what the State Government, the Kaduna Capital Development Board and the Kaduna Local Government Council, in conjunction with the Market Place Development Board, have planned or lined up as measures for the development planning of the congested CMP and the city market place system in general.

6.6.1 Proposed Mogadishu Central Business Core

Kaduna State Governments had shown a vested interest in the development of Mogadishu Site into a central business zone. Mogadishu site lies to the North of Kaduna City Central Market Place. The radio broadcasting premises only intervene between the CMP and the proposed Mogadishu central business district. Mogadishu site used to be the Army Barracks. In the past two to three different development programmes have been prepared by successive Kaduna State governments. Each of these development plans reflects different political and economic concepts of property development and ownership.

At the time of this research survey the development programme on hand was that under the umbrella of Mogadishu Property Development Company Ltd. The State Government has established this limited company for the development and management of the Mogadishu Central business zone. The development programme prepared for this site by Bestarc International Associates is shown in Appendix 6.6.1, page A85 .

According to that programme the stated main purpose of the development plan is to utilize the Mogadishu site in the most effective way as far as economy, social needs and aesthetic requirements may be concerned. It would be the core of Kaduna City Centre and, as such, it would satisfy most of Kaduna's needs and would tie up with the functional and aesthetic aspirations of the city of one million population. Mogadishu development would be the concentrated magnet for shopping, commerce, business, culture and entertainment. It would serve also as an administrative centre culminating in the City Hall. It would offer over 300 high standard permanent residential units and would provide comfortable shelter for many visitors to the city, in a five storey, 500 room hotel.

Besides the numerous traffic control measures, such as traffic lights and road signs and markings that would be introduced, it is further suggested that the section of the Broadcasting Road that goes in front of Kaduna State Radio should be made one way. This would provide traffic out of the CMP only. Furthermore, Hospital Road would be extended and developed to join the Polytechnic Road at Panteka Market Place. Space allocation to the major land uses proposed in the development plan are shown in Table 6.19, page 269 . The estimated cost of the project in 1983 was ₦205 million.

TABLE 6.9 Floor-Space Use Allocation in the Proposed Mogadishu Central Business Core

Type of Function	Floor Area (Hectare)	% of Total Floor-Area
PUBLIC AND SEMI-PUBLIC	6.15	15.11
1. Civic Centre Complex comprising:		
(i) City Hall	0.25	
(ii) Assembly Hall	0.30	
(iii) Conference Hall	0.20	
(iv) Exhibition	0.50	
(v) Company's Administration	0.25	
2. Military and Natural History Museum	0.70	
3. Arts, Crafts and Cultural Centre	0.50	
4. Entertainment Complex	2.00	
5. Health Centre	0.15	
6. Post Office	0.10	
7. Police Station	0.50	
8. Fire Station	0.70	
COMMERCIAL/BUSINESS	10.55	25.92
1. Offices	1.75	
Shopping Arcade, Retail and Service Shops	2.60	
2. Hawkers Stand and Mini-Market	0.50	
3. Wholesale Shops and Warehouses	0.60	
4. Department Stores	0.50	
5. Restaurants and Cafeteria	0.20	
6. Banking and Insurance Centres	0.40	
7. International Hotel	3.00	
8. Showrooms and Airlines Booking Centres	0.60	
9. Petrol Station	0.20	
10. Cinema	0.20	
LIGHT INDUSTRIAL	1.45	3.56
1. Printing Press	0.20	
2. Tailoring and Dry Cleaning	0.20	
3. Electronics Assembly and Repairs	0.20	
4. Watch Assembly and Repairs	0.10	
5. Workshops	0.20	
6. Others	0.55	
RESIDENTIAL	2.00	4.91
1. 6 Blocks of Luxury Flats	2.00	
SPORTS AND GREENS	5.25	12.90
1. City Square	2.00	
2. Sports Halls	0.50	
3. Swimming Pool	0.50	
4. Play Grounds	0.55	
5. Green Areas	1.70	
VEHICLE PARKING	6.20	15.24
1. Open car parking spaces	3.70	
2. Multi-Storey Car Parking	2.50	
ROADS AND PEDESTRIAN WAYS	9.10	22.36
TOTAL	40.70	100.00

The development programme for Mogadishu site deserves considerable comments in its own right. However, only very limited comments are made where it concerns the City Central Market Place. Taking into cõnsideration that Hospital Road crosses Independence and Ahmadu Bello Ways, its proposed extension to link up Polytechnic Road at Panteka Market Place would necessitate a big interchange for buses and taxi-cabs to be located between the CMP and Mogadishu Central Business Centre. Such an interchange would be inevitable, but the proposed Mogadishu Development Programme was naive about it.

The proposal did not consider the possibility of future use of the train for inter-city mass transportation of goods and people along the existing North-South railway which passed by the CMP and Mogadishu Development Plan. Such a consideration would repay in the need for a train station at the Mogadishu and at the CMP, or one train station to serve both the CMP and the Mogadishu estate. It would also be necessary to consider the train station(s) in relationship with the bus and taxi-cab interchange.

The CMP is expanding and encroaching on the Mogadishu site. The proposal was also naive on the probable consequences of the CMP activities on the proposed program for Mogadishu site.

6.6.2 Proposed Market Places by Kaduna Capital Development Board

The CMP has been under the management and control of KCDB since the 1975 reconstruction. As a means of solving the problem of congestion at the CMP, the

KCDB has planned to develop some other retail market places in the city. The author was told that the project was in the hands of a firm of consultants who had not yet submitted their report to the KCDB.

6.6.3 Proposed Market Places by Kaduna Local Government Council

The Kaduna Local Government Council in their own capacity as the bona fide authority responsible for the location, development and management of retail market places have planned two new local market places to be sited in Ungwan Muazu and Malali village respectively. The proposed provision of stalls for the new retail market places are given in Tables 6.20 and 6.21, pages 271 and 272, respectively.

TABLE 6.20: Stallage Space for Proposed Ungwan Muazu Market Place (UMMP)

Commodity Class	No. of Stalls	Total Floor Space m^2	
Hardware	48	288	
Hardware/provisions	16	96	
Building materials	80	480	293 stalls
Books and stationery	30	180	1818 m^2
Electrical appliances	30	180	for
Textiles	58	348	non-food
Household goods	11	66	
Tailoring	20	180	
Provisions/medicine	30	180	
Provisions/cosmetics	30	120	176 stalls
Colanut	20	120	986 m^2
Grains	20	120	for food
Fresh meat/fish	30	180	
Fruits and vegetables	30	180	
General goods	16	96	

Note: Average floor-space of a stall is 6.00 m^2.

TABLE 6.21: Stallage space for proposed Malali Market Place (MMP)

Commodity class	No. of Stalls	Total Floor-Space m^2	
Household goods	16	96	
Furniture	16	96	
Timber products	40	240	
Building materials	40	240	330 Stalls, 1980 m^2 for non-food
Books and stationery	30	180	
Textiles	58	348	
Machine Tools and Spareparts	16	96	
Electrical goods	30	180	
Hardware	64	384	
Tailoring	20	120	
Fruits and vegetables	30	180	
Restaurants	16	96	
Grain	20	120	158 Stalls, 1068 m^2 for food
Fresh meat and fish	30	180	
Livestock	16	96	
Provision/services	30	180	
Yams and potatoes	16	96	
Colanuts	20	120	
Taxi park			
Lorry park			
Bank			
Mosque			

Note: Average floor-space of a stall is 6.00 m^2

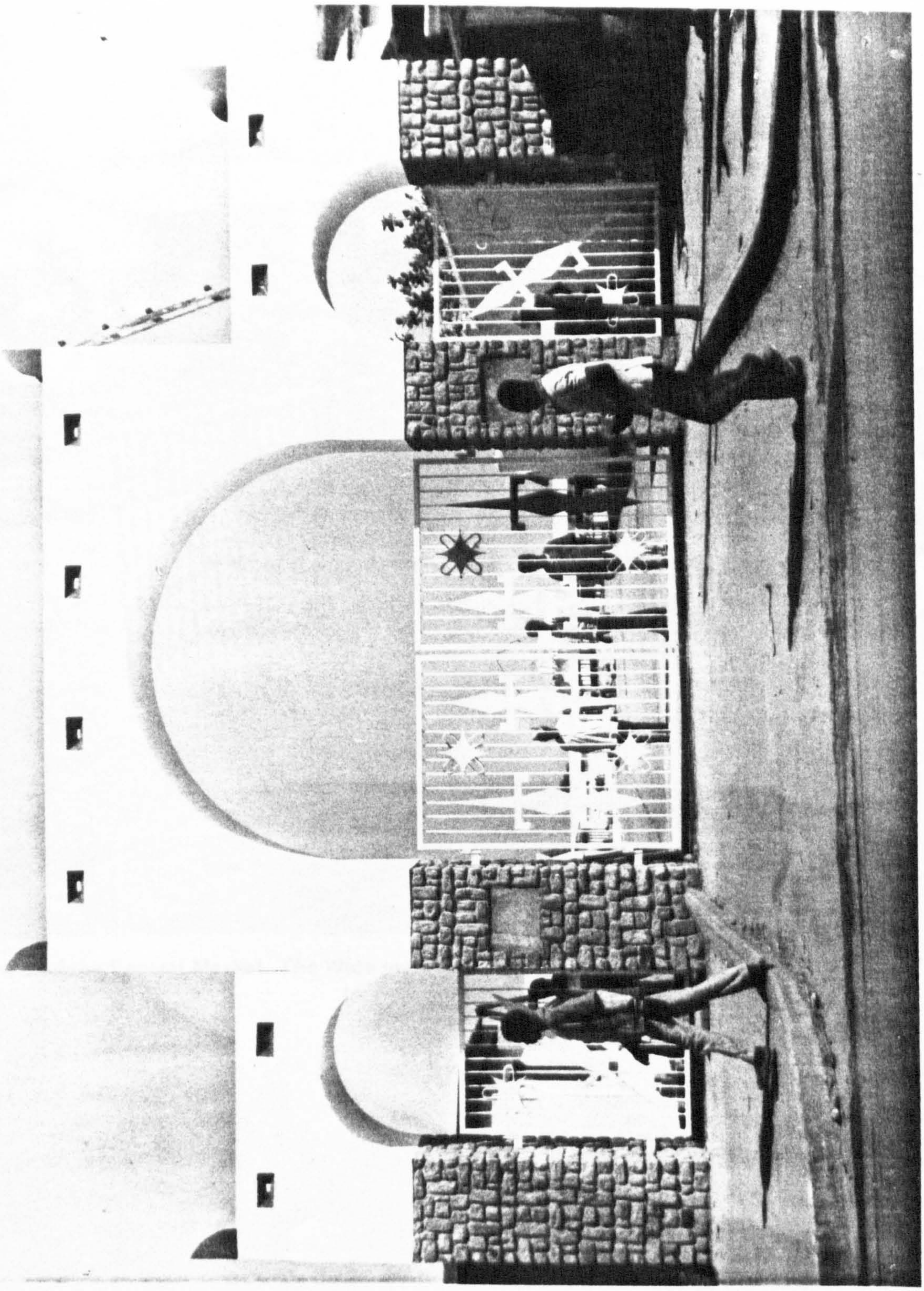


Plate 6.4: One of the 3 Main Entrance Gates to Kaduna City Central Market.

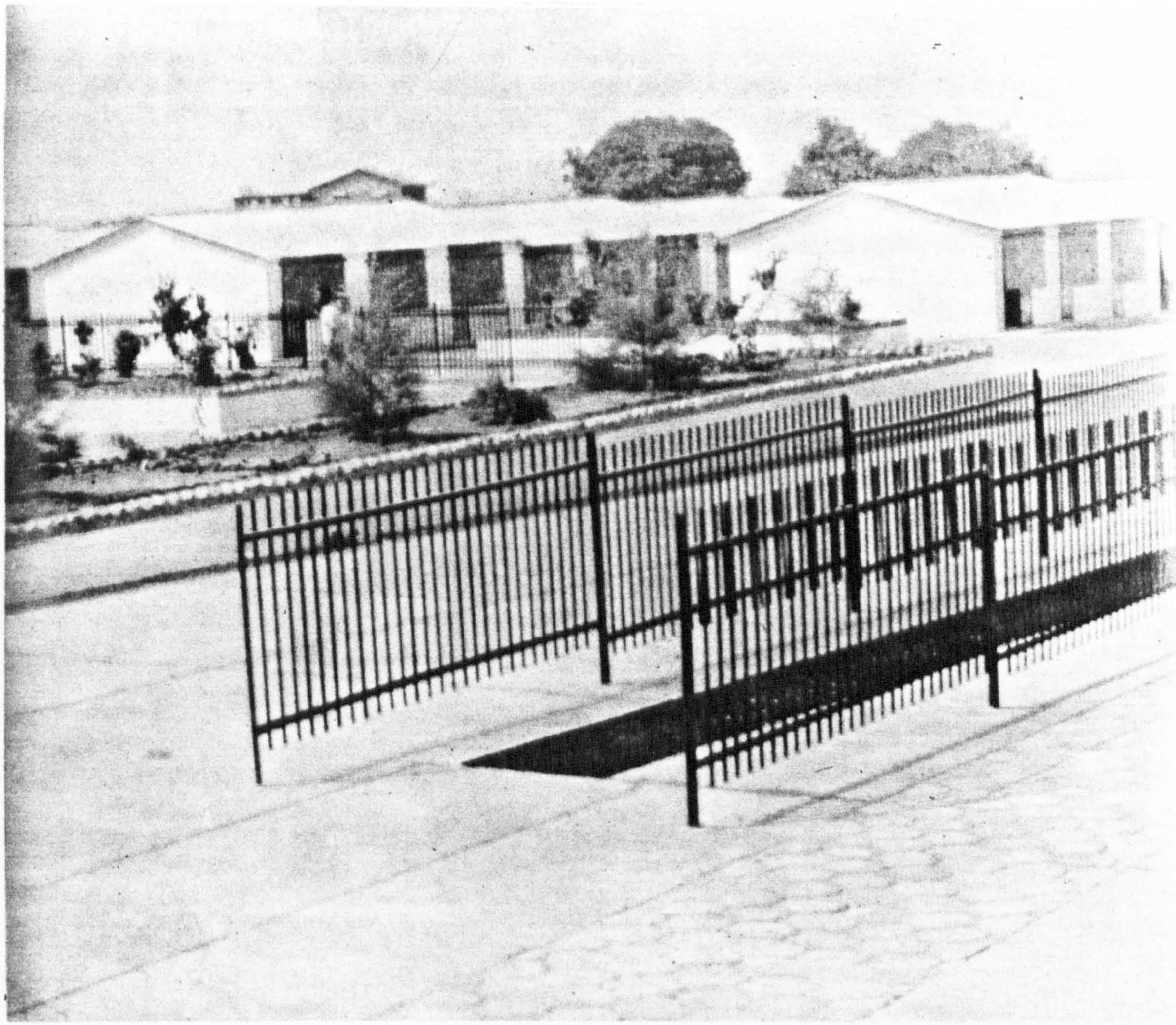


Plate 6.5: New Kaduna Central Market. The Wide main walk-way showing storm water drainage and lock-up stalls (1975).

Plate 6.6: **New Kaduna Central Market. Gardens mingling with blocks of lock-up stalls.** (1975)

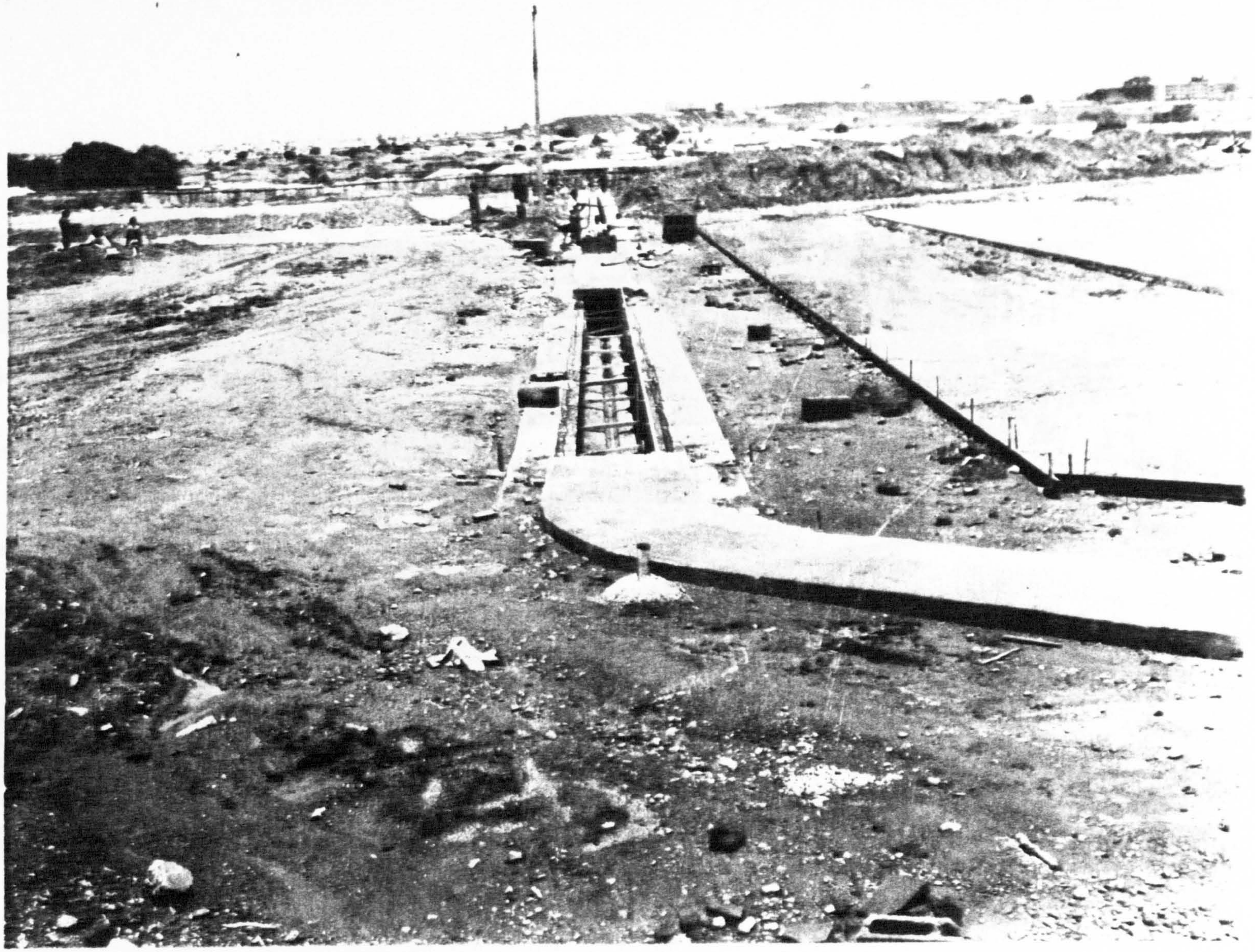


Plate 6.7: Underground and Covered Storm Water Drainage under Construction at the CMP During the 1975 Reconstruction.

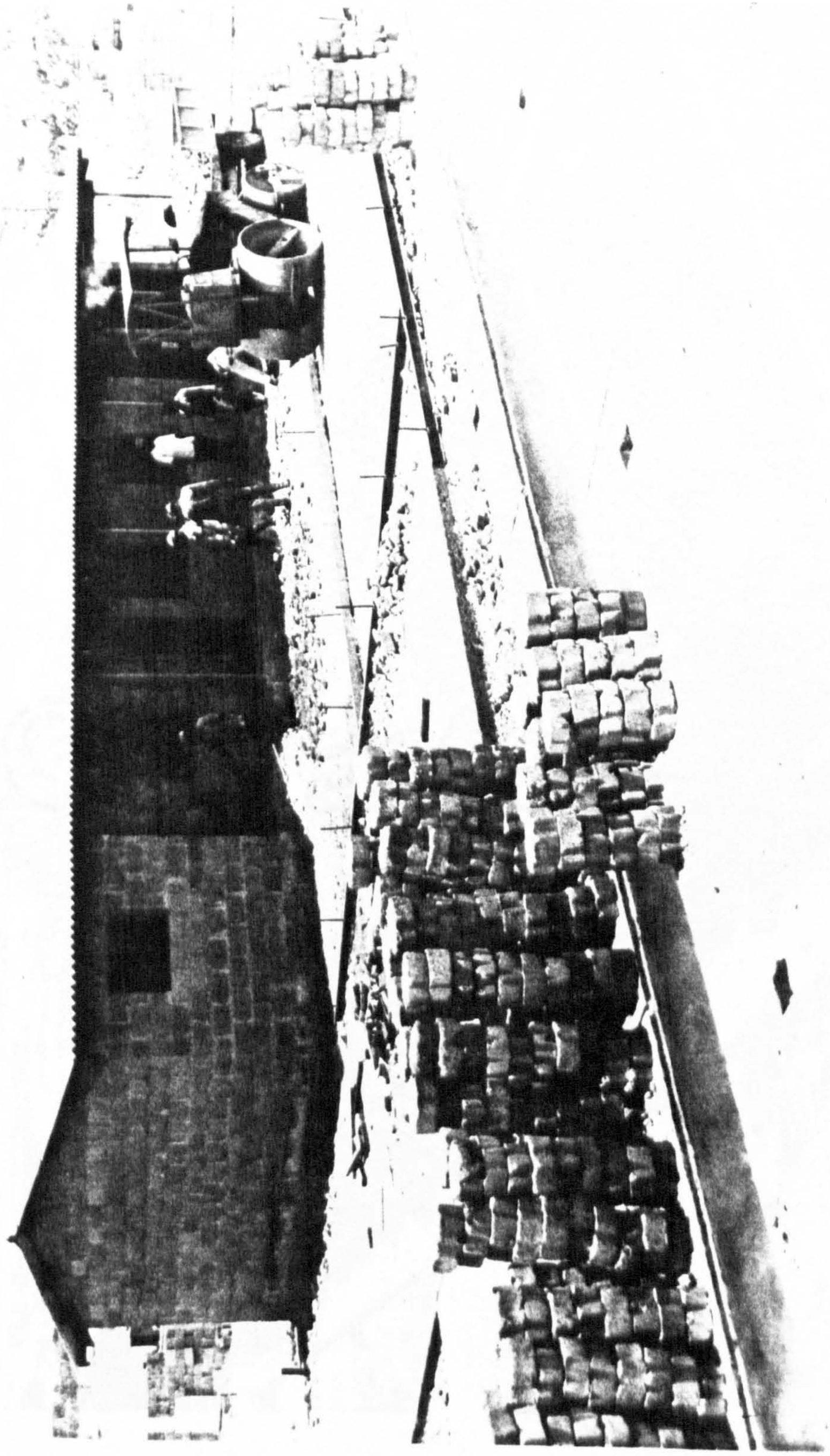


Plate 6.8: The Main Administrative Building During 1975 CMP Reconstruction.

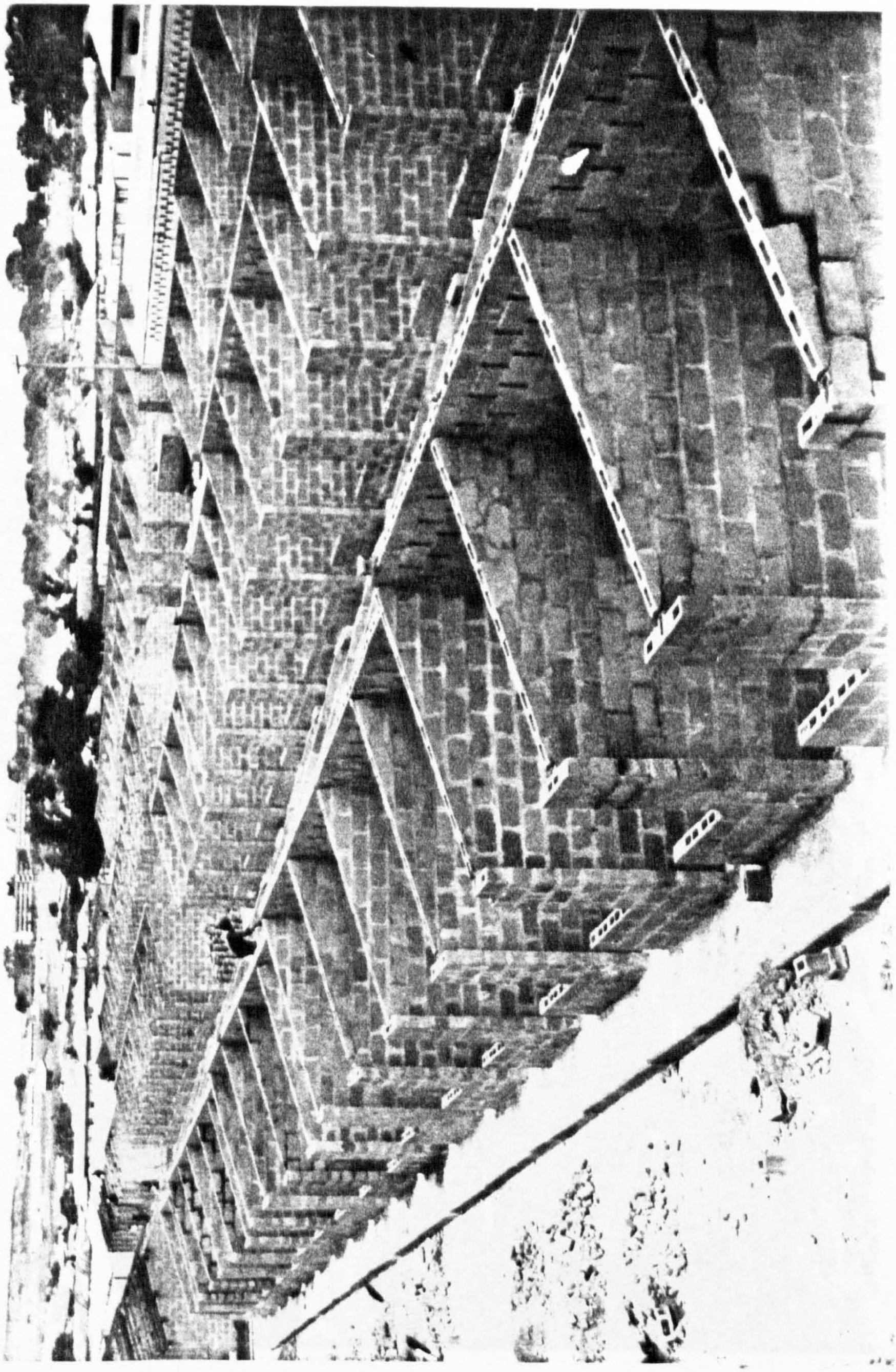


Plate 6.9: Lock-up Stall Blocks Under Construction at the CMP (1975). (Evident Rigidity).

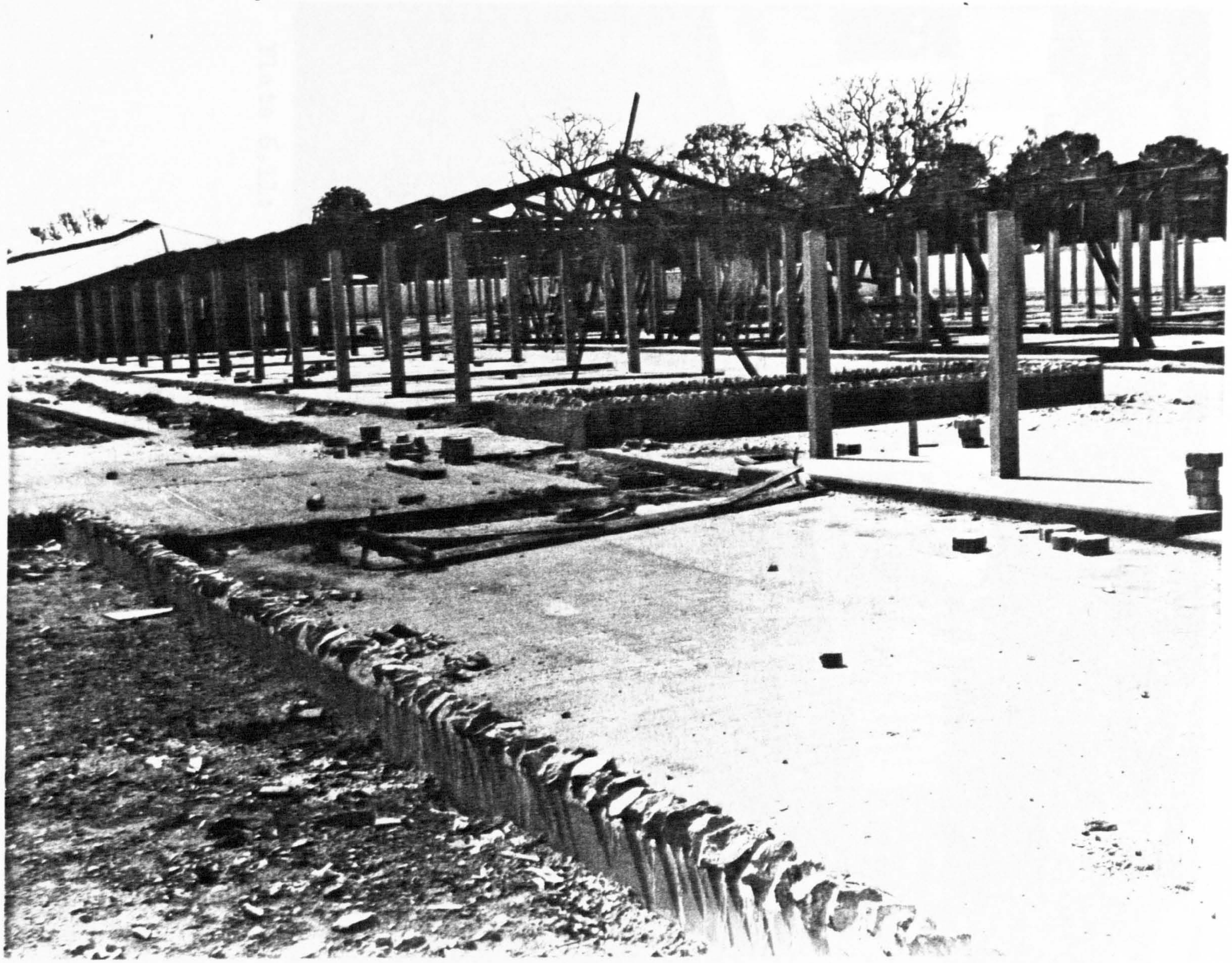


Plate 6.10: Open Stall Blocks Under Construction at the CMP (1975).

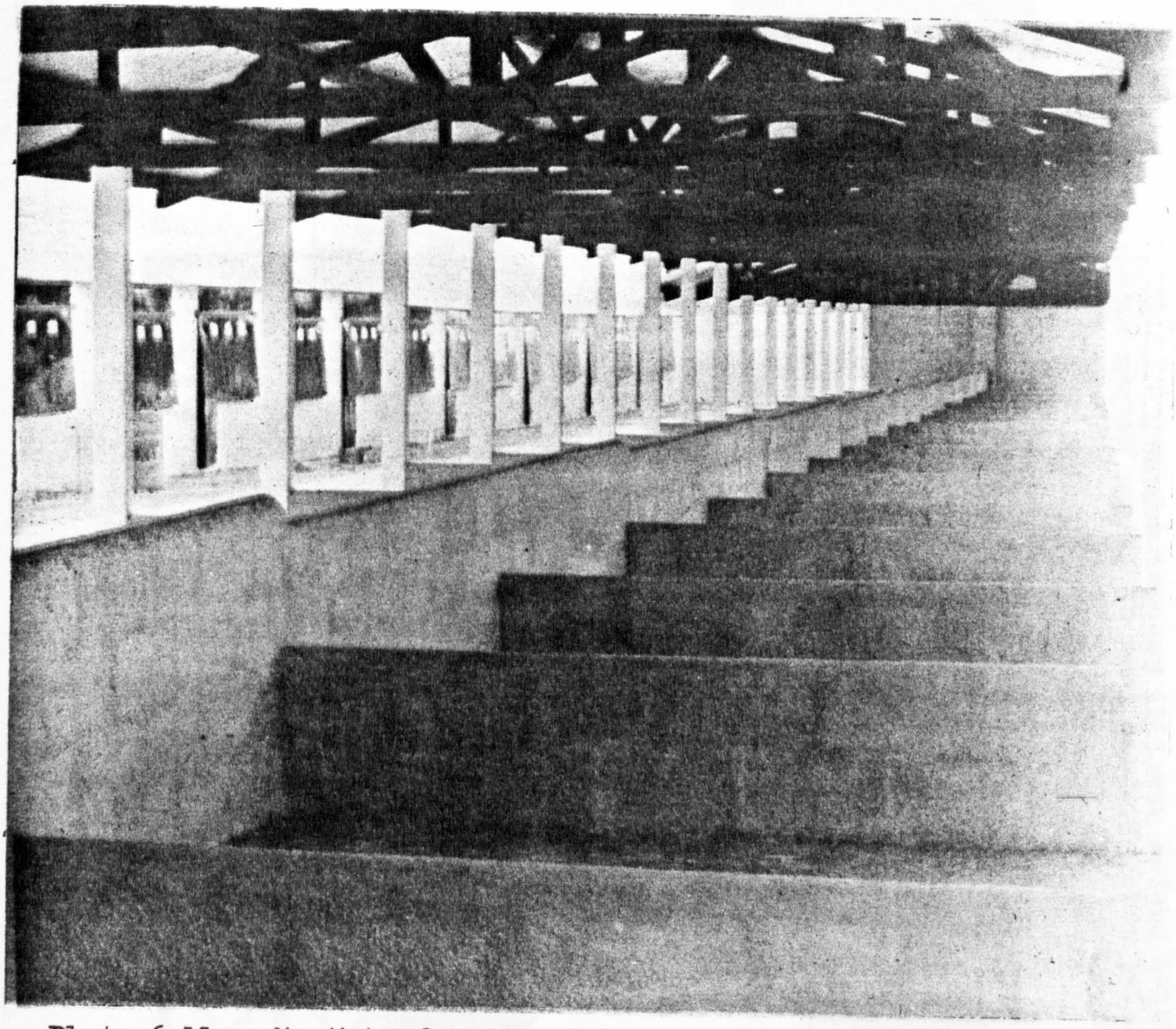


Plate 6.11: New Kaduna Central Market. One Block of Open Stalls. (1975)
(Completed Structure).

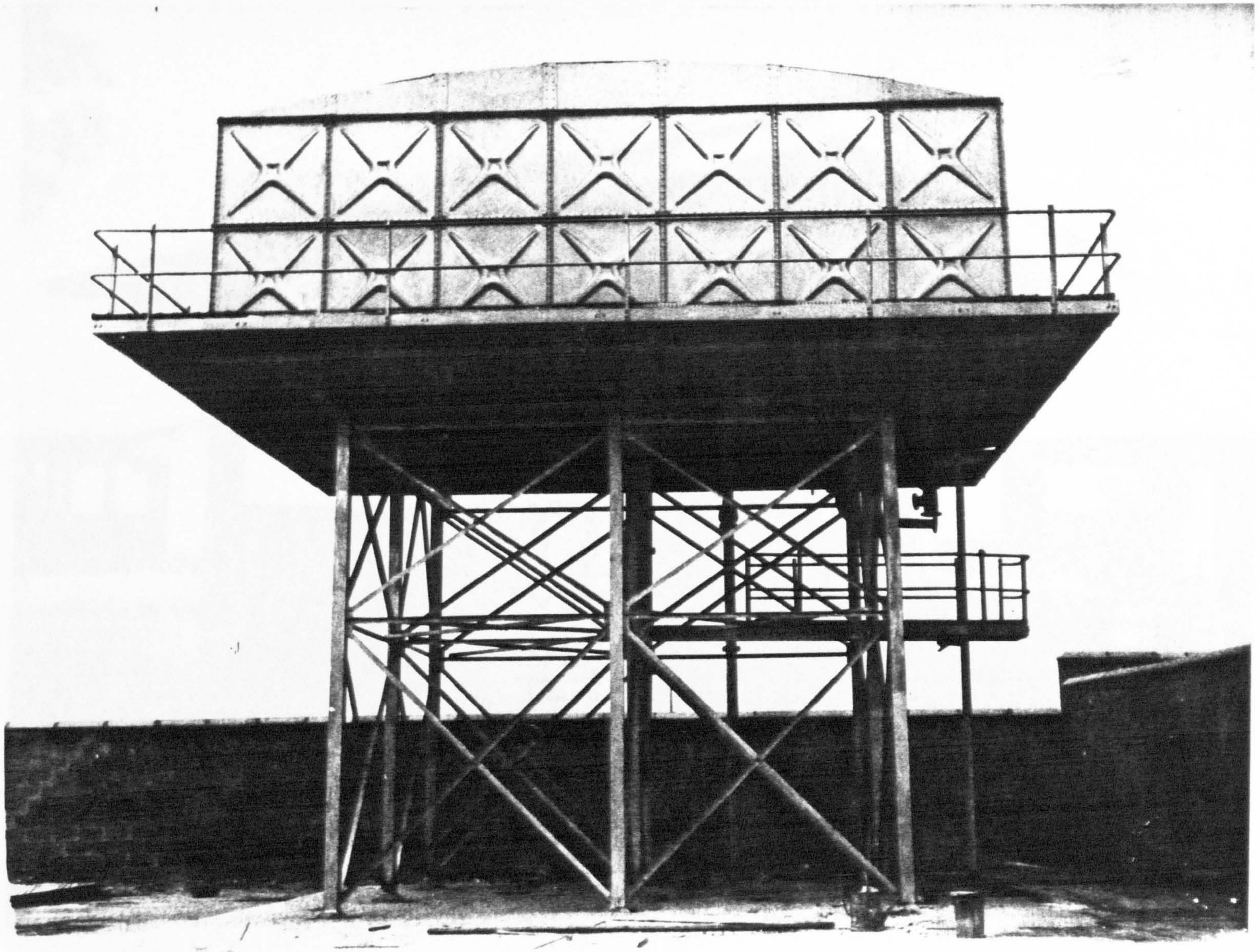


Plate 6.12: Elevated Water Storate Tank of 35,000 gallon capacity at the CMP. (Erected During the 1975 Reconstruction)

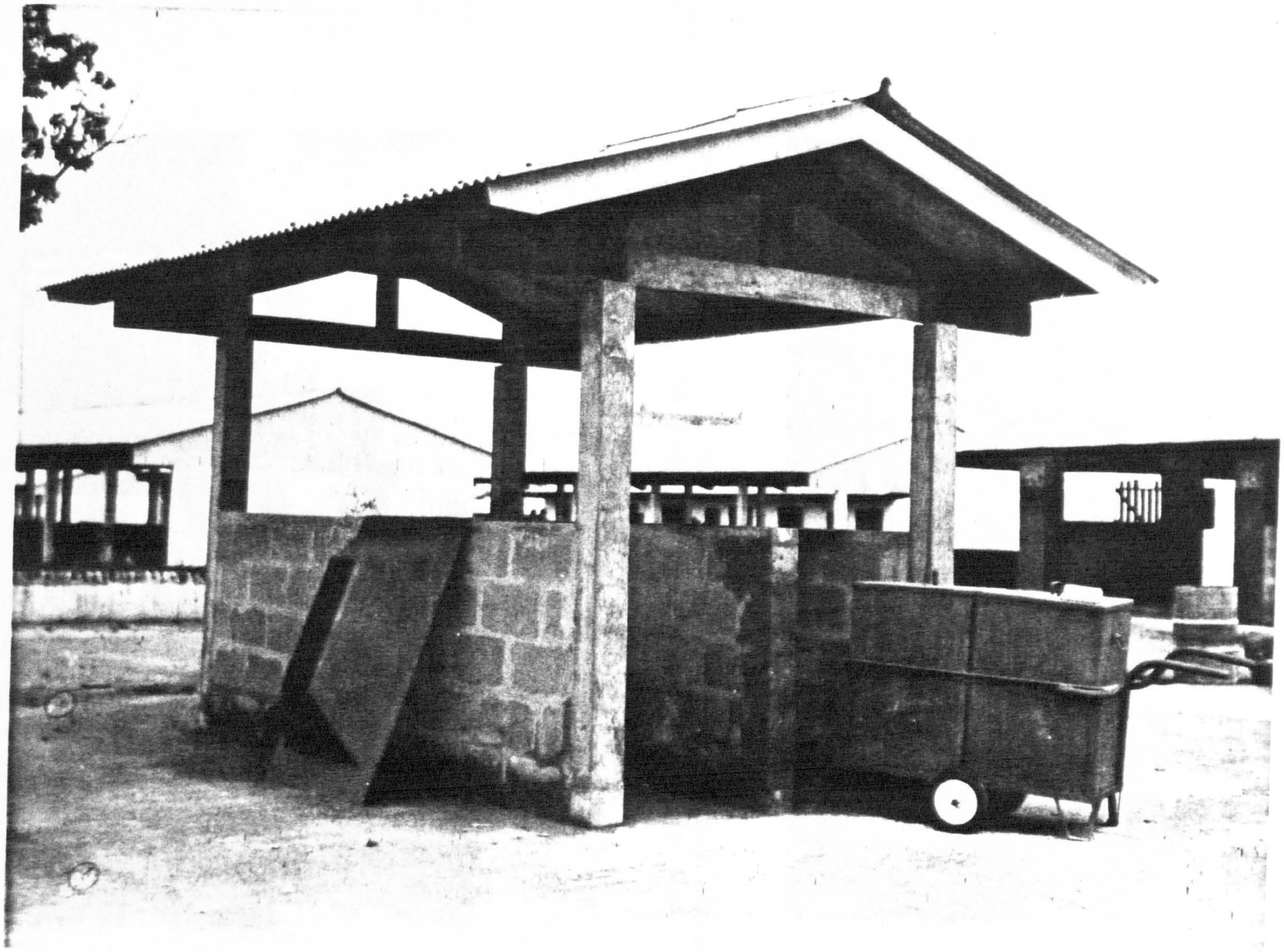


Plate 6.13: A Typical Refuse Receptacle in the CMP (erected during the 1975 reconstruction).

Plate 6.14.1. Chellarams and Leventis Superstores close to the CMP, and along Ahmadu Bello Way.

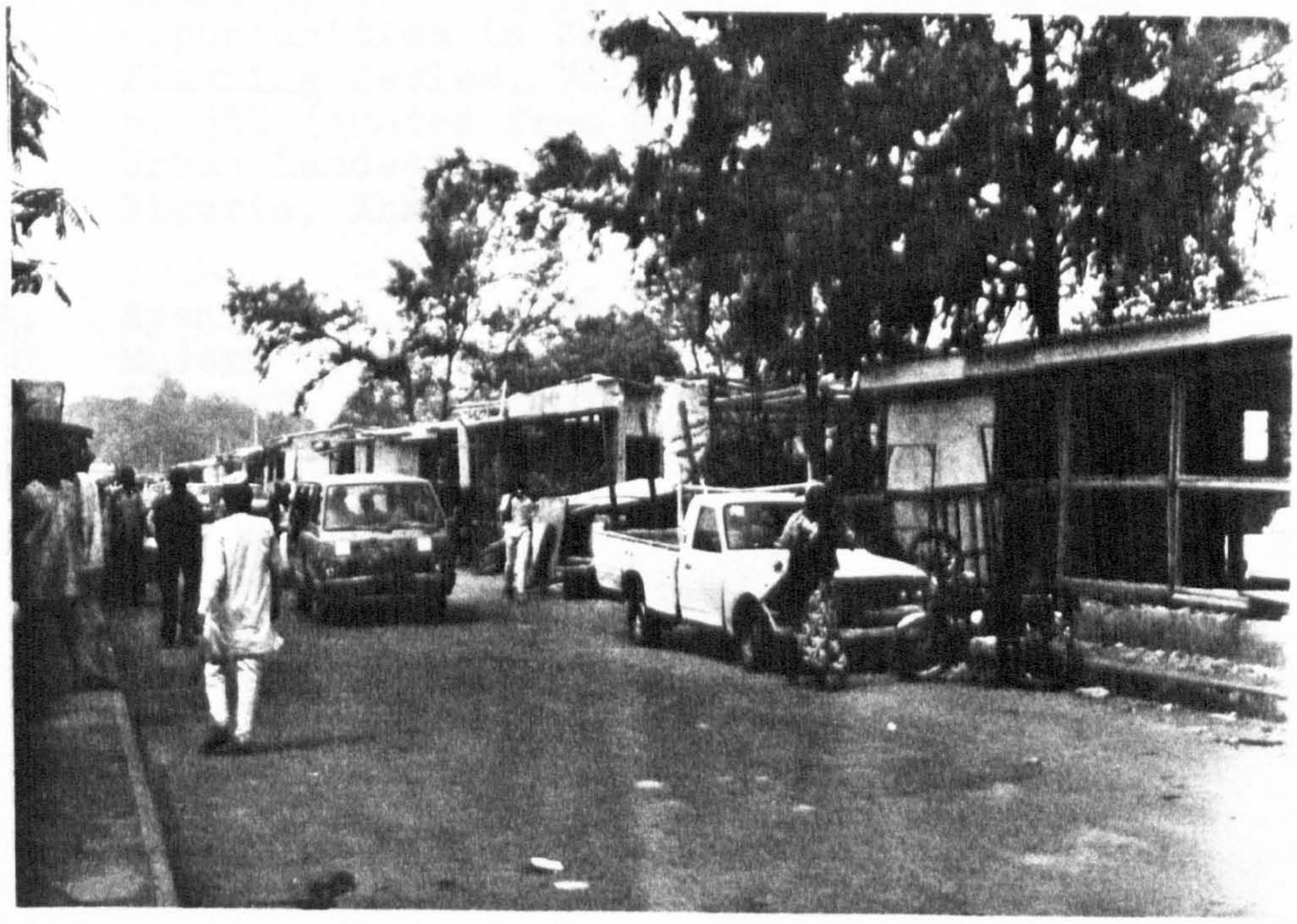


Plate 6.14.2. Stalls under construction on the Island of Lagos Street.

Notes and References: Chapter 6

1. In astronomy the 'apparent magnitude' of any of the class of fixed stars is measured by its brightness as seen from the earth, and the 'absolute magnitude' is measured by its brightness as seen at a standard distance of ten parsecs, giving a measure of 'intrinsic' luminosity. By analogy a locational potential possesses 'apparent magnitude' as its causal influence on the market place depends on its actual size and on its apparent distance from the market place, a structural potential possesses 'absolute magnitude' as its causal influence on the market place depends on its 'intrinsic' constituent of the market place. Therefore a locational potential possesses 'apparent causal influence' whereas a structural potential possesses 'absolute causal influence' on the market place.

2. For full discussion of this type of interview, see Roethlisberger and Dickson (1939) Chapter III.
For a more summarized and perhaps less technical discussion, see Homans (1941).

3. Gihring, T. 'Accessibility Choices and Opportunities in Zaria, Nigeria, in Third World Planning Review, Vol. 4, No. 4, November, 1982, p. 389 (quoted from Urquhart, Alvin; Planned Urban Landscape of Northern Nigeria, Zaria, Nigeria, Ahmadu Bello University, 1977).

4. Ayeni, M.A.O. 'Urban Settlement Types 2: Modern Cities, in Nigeria in Maps, edited by Barbour, K.M. et al., p. 92., 1982.

CHAPTER 7

EMPIRICAL TEST OF THE PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL, USING KADUNA CITY MARKET PLACES; PART 2: DATA ANALYSIS

With reference to section 5.5, page 174, the data analysis is carried out in three stages, namely:

7.1 primary analysis

7.2 secondary analysis

7.3 tertiary analysis

The flow chart in Figure 7.5 , page 345 , is the summary of the primary data analysis. It described the exploration of the survey data and the magnitudes of the specific components of the demand and supply of activity spaces, shown in Figure 7.1 , page 286.

The exploratory analyses are presented in 5 sectors; each sector containing the exploratory analysis of a questionnaire in the field survey. A questionnaire was analysed in two ways. First, the completed forms were read and a summary report written. A form in which the respondent answered less than 95% of the questions was not included in the analyses. The 95% was adopted because the interpretation and prediction were done at 95% confidence level. Second, computer analysis was applied to relevant sections of the questionnaire. The survey questionnaires were all quite different; both in format and contents. In order to obtain an objective and quantitative summary

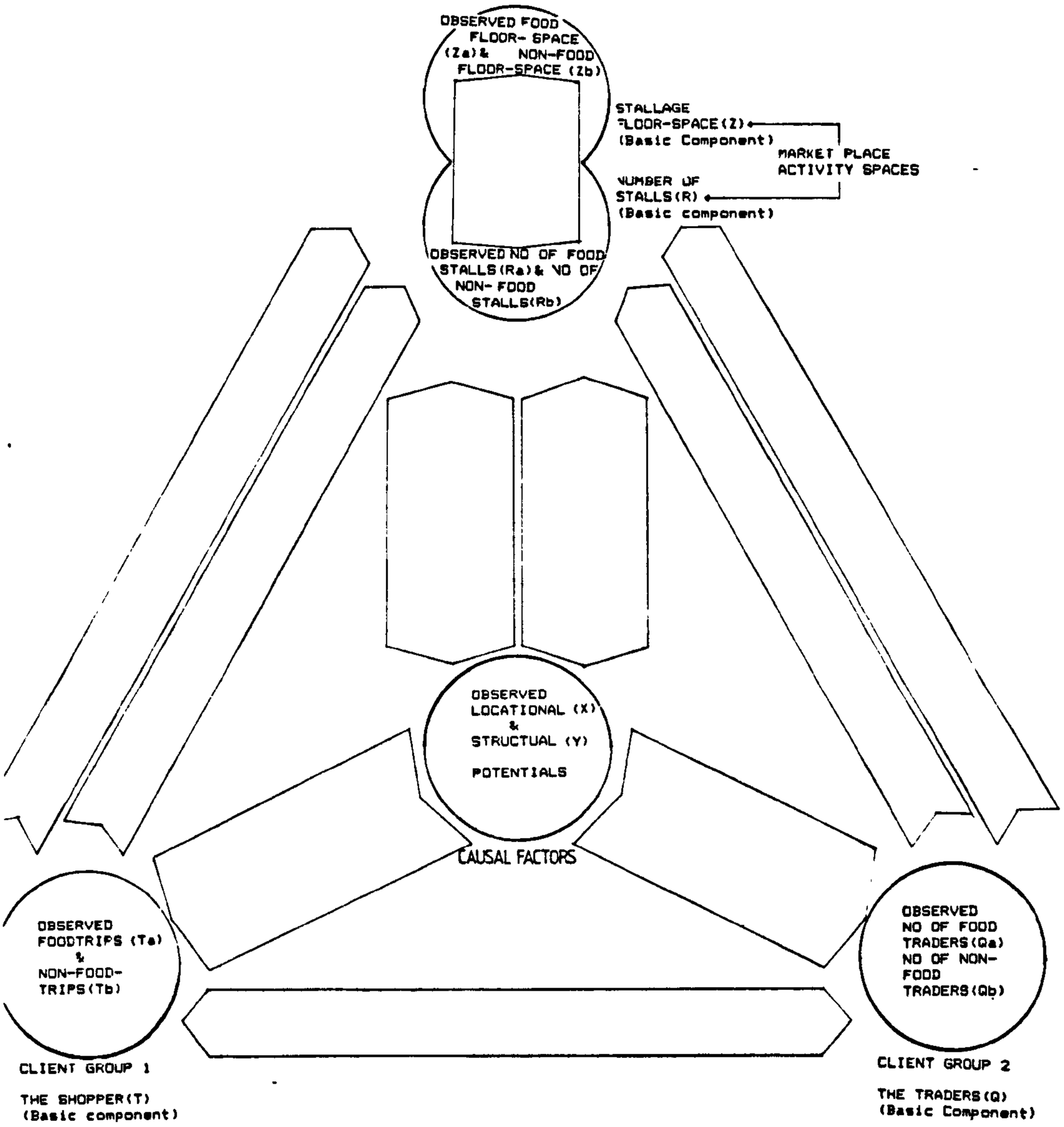


Figure 7.1 :PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL - Stage 1

The Description of the Primary Components of the Model

Note : Arrow indicates direction of Influence

of each survey questionnaire, to which computer analysis could be applied, a coding framework was devised for each survey questionnaire. Each survey questionnaire was coded in a systematic way, complying strictly to the codes, scores and columns stipulated in the questions. The city central market place road vehicle entry and departure census data received some working before coding, while the market place activity space classification data was coded twice in the course of the exploratory analyses. The stages of the exploratory analyses and the facts of the analyses at the various stages are logically presented.

The secondary stage of the data analysis was of confirmatory statistics. Confirmatory statistical analysis, which included simple regression analysis, and scattergram, was employed on the VAX computer, using SPSSX package, in the examination of the proposed hierarchical relationships between the like-pairs of demand and supply of activity spaces. Consequently, the situation in the distribution of demands and supply of activity spaces among Kaduna market places was established.

The tertiary stage of the data analysis was also of confirmatory statistics. Finally, multiple regression analysis was employed to confirm the strength of the causal relationships between the growth rate of any demand or supply of activity space and the locational and structural potentials in the urban market places. Examined here, also, was the relative importance of the locational and structural potentials in causing the observed growth rates of the demand and supply of activity spaces. The data analysis was concluded with explanatory comments and brief summary of the main findings of the research.

7.1 Primary Analysis: Exploration of the Survey Data

The primary analysis consisted of the systematic exploration of the data obtained in the five questionnaires (see Figure 6.1, page 189).

7.1.1 Exploratory Analysis of the Classification of Activity Spaces and Traders in the City Market Places (Sector 1 of Figure 7.5, page 345).

A market place was divided into recognizable zones; the zones being determined by existing design hedges used as elements of space demarcation. The number of zones determined in the market places were as follows:

The Central Market Place	14 Zone(s)
Railway Station Market Place	1 "
Panteka Market Place	1 "
Makera/Kurmin Gwari Market Place	2 "
Tudun Wada Market Place	2 "
Kawo/Talata Market Place	2 "
Ungwan Rimi Market Place	1 "
Barnawa Market Place	1 "
Ungwan Television Market Place	1 "
Badarawa Market Place	1 "
Ungwan Shanu Market Place	1 "
Kabala Gabas Market Place	1 "

The primary survey coding was done for the market place activity space classification using the survey coding frame shown in Appendix 7.1A, page A86 . Thus a data list file called SCCMPA1 was created. For each zone of a market place the following was calculated for each commodity.

(i) number of stall units of 2.00 m^2 floor-space
(one third of a stall of floor space 6.00 m^2)

(ii) number of stall units of 2.25 m^2 floor-space
(one half of a stall of floor-space 4.50 m^2)

(iii) number of stall units of 3.00 m^2 floor-space
(a) (one half of stall of floor-space 6.00 m^2)
(b) (one third of a stall of floor-space 9.00m^2)

(iv) number of stall units of 4.50 m^2 floor-space
(a) (one half of a stall of floor-space 9.00m^2)
(b) (a stall of floor-space 4.50 m^2)

(v) number of stall units of 6.00 m^2 floor-space
(a stall of floor-space 6.00 m^2)

(vi) number of stall units of 9.00 m^2 floor-space
(a stall of floor-space 9.00 m^2)

(vii) number of stall units of 18.00 m^2 floor-space
(a stall of floor-space 18.00 m^2)

(viii) number of squatting units of 1.50 m^2 floor-space
(single squatting space)

(ix) number of squatting units of 3.00 m^2 floor-space
(double swuatting space)

(x) number of squatting units of 6.00 m^2 floor-space
(triple squatting space)

The floor-space of a stall is divided equally among the commodities marketed in the stall, A maximum of three commodities was recorded for each stall. A single squatting space is given by a trader standing or sitting beside his commodity displayed in a basket or a

basin or a 1 x 1 m. mat. Two baskets or two basins or a 2 x 1 m. mat gives a double squatting space. Three baskets or three basins or a 2 x 2 m. mat or 3 x 1 m. mat gives a triple squatting space.

The final coding using the survey coding frame shown in Appendix 7.1B, page A87, and a data list file called SCCMPA was created. From thence the analysis proceeded in four directions with a view to obtaining the following:

7.1.1.1 Distribution of floor-spaces for food and non-food among the competing 12 market places in the city:

The food and non-food floor-space distributions, Z_a and Z_b, are shown in Table 7.1 , page 291 and these constitute the specific components of Cell 'Z' of the model, stage 1, Figure 7.1, page 286.

Secondly, the distribution of floor-spaces for the commodities, viz, the traditional food stuff, factory processed food stuff, durable goods and services goods, and for food and non-food, obtained for each market place in stages 1.4Z, 1.5Z and 1.6Z are shown under each of the 12 urban market places, described in section 6.5.(1-12), pages 216 to 267 .

7.1.1.2 Distribution of stalls for food and non-food among the competing 12 market places in the city:

The food and non-food stalls distribution, R_a and R_b are shown in Table 7.2 , page 291 .

and these constitute the specific components of Cell 'R' of the model, stage 1, Figure 7.1, page 286.

Secondly, the distribution of stalls for the

TABLE 7.1: Stallage Floor-Space in Kaduna City Market Places in 1977 and 1984 (M^2)

Name of Market Place	Sub-Group of Market Places		Stallage Food Floor-Space		Stallage Non-Food Floor-Space		Vacant Floor-Space	Floor-Space under Construction
			1977	1984	1977	1984	1984	1984
CMP	1	CMP	5162	18975.50	17046	32119.50	0	888
RSMP	2	SMPs	2550	3610.00	4855	6975.00	324	0
PMP	2	SMPs	.	1065.00	.	49897.00	528	0
M-KGMP	3	DMPs	4634	6510.00	5334	7497.00	894	0
TWMP	3	DMPs	2602	5049.00	5874	11368.00	726	0
K-TMP	3	DMPs	3459	8961.00	1766	4580.00	216	0
URMP	3	DMPs	1008	1570.00	888	1247.00	1482	0
BMP	4	L/NMPs	1044	1478.00	915	1243.00	450	0
UTMP	4	L/NMPs	1338	1643.00	354	438.00	1080	0
BDMP	4	L/NMPs	407	721.00	244	487.00	972	0
USMP	4	L/NMPs	1643	2140.00	635	785.00	2250	0
KGMP	4	L/NMPs	549	944.00	1004	1477.00	1662	0

TABLE 7.2: Number of Stalls in Kaduna City Market Places in 1977 and 1984

Name of Market Place	Sub-Group of Market Places	Number of Food Stalls		Number of Non-Food Stalls		Vacant Stalls	Stalls under Construction
		1977	1984	1977	1984	1984	1984
CMP	1	977	3691.00	17046	5122.00	0	148
RSMP	2	499	706.00	4855	143.00	54	0
PMP	2	.	.00	.	.00	0	0
M-KGMP	3	1058	1487.00	5334	1549.00	149	0
TWMP	3	438	849.50	5874	1894.50	121	0
K-TMP	3	940	2432.00	1766	1124.00	36	0
URMP	3	172	262.00	888	208.00	247	0
BMP	4	189	246.50	915	207.50	75	0
UTMP	4	299	339.00	354	77.00	180	0
BDMP	4	88	120.00	244	81.00	162	0
USMP	4	191	357.00	635	131.00	375	0
KGMP	4	128	157.00	1004	246.00	277	0

commodities,viz, the traditional food stuff, factory processed food stuff, durable goods and services goods,and for food and non-food obtained for each market place in stages 1.4R, 1.5R and 1.6R are shown under each of the 12 urban market places,described in sections 6.5 (1-12), pages 216 to 267.

7.1.1.3 Distribution of Traders for food and non-food among the competing 12 market places in the city:

The food and non-food traders distribution, Q_a and Q_b are shown in Table 7.3, page 293 , and these constitute the specific components of Cell 'Q' of the model, stage 1, Figure 7.1, page 286.

Secondly, the distribution of traders for the commodities,viz, the traditional food stuff, factory processed food stuff, durable goods and services goods,and for food and non-food obtained for each market place in stages 1.4Q, 1.5Q and 1.6Q are shown under each of the 12 urban market places,described in sections 6.5 (1-12), pages 216 to 267.

7.1.1.4 Distribution of floor-spaces and stalls for food and non-food among the zones of the City Central Market Place:

The food and non-food floor-space distribution, Z_{am} and Z_{bm} are shown in Appendix 7.2 (a-n), p.A88- A96 , and these constitute some specific components of the micro-details of the City Central Market Place, see Figure 7.5, page 345.

Secondly, the distribution of floor-spaces for the commodities, viz, the traditional food stuff, factory processed food stuff, durable goods and services goods obtained in stages 1.4zm, 1.5zm and

TABLE 7.3: Number of Traders in Kaduna City Market Places in 1977 and 1984

Name of Market Place	Sub-Group of Market Places		Number of Food Traders		Number of Non-Food Traders		Squatting Food Traders	Squatting Non-Food Traders	Outstanding Application for Stall
			1977	1984	1977	1984	1984	1984	1984
CMP	1	CMP	977	4066.00	1894	6912.00	375	1790	500
RSMP	2	SMP	499	765.00	125	157.00	59	14	.
PMP	2	SMP	.	.	.	.	.	.	.
M-KQMP	3	DMP	1058	1574.00	992	1707.00	87	158	.
TWMP	3	DMP	438	997.50	979	1952.50	148	58	.
K-TMP	3	DMP	940	2453.00	434	1136.00	21	12	.
URMP	3	DMP	202	280.00	168	220.00	18	12	.
BMP	4	L/NMP	189	252.50	153	211.50	6	4	.
UTMP	4	L/NMP	272	359.00	80	83.00	20	6	.
BDMP	4	L/NMP	87	124.00	88	83.00	4	2	.
USMP	4	L/NMP	275	363.00	127	134.00	6	3	.
KQMP	4	L/NMP	101	163.00	229	250.00	6	4	.

1.6zm respectively as shown in Figure 7.5, page 345 . Also the distribution of equivalent number of stalls for food and non-food among the zones in the CMP are shown in Appendix 7.2 (a-n), pages A88 to A96
The distribution of floor-spaces and stalls for food and non-food in the zones of the CMP is discussed further in section 7.2.2, pages 362 to 365 .

7.1.2 Exploratory Analysis of Consumers' Shopping Behaviour and Attitude (Sector 2, Figure 7.5, page 345).

The structured interview questionnaire, Appendix 6.2.1, page A8 administered to the city residents was coded on computer survey sheets in a systematic manner, complying strictly to the codes, scores, and columns stipulated in the questions. Thus a data list file called 'SCCMPC' was created. The data exploration covered four sections of the questionnaire, viz:

A. City Resident Households' Characteristics
B. City Resident Households' Shopping for Food
C. City Resident Households' Shopping for Non-Food
D. City Resident Households' Shopping at the CMP.

7.1.2.1 Reliability of the Study Week's Shopping Data

In order to ascertain how reliably the study week's shopping data represented the usual week's shopping behaviour pattern in the city, the following comparison was made:

(i) between the households' usual week's choice of shopping centre for major food shopping and the households' study week's choice of shopping centre for major food shopping. The choices are shown in columns 7 and 8 of Table 7.4, page 296 , reference stages: 2.3 UWSB versus 2.3 SWSB.

(ii) between the households' usual week's first, second and third choices of shopping centres for food commodities and the households' study week's first, second and third choices of shopping centres for food commodities. The choices are shown in columns 4 and 5 of Table 7.4, page 296 , reference stages: 2.4 UWSB versus 2.24 SWSB.

(iii) In cases (i) and (ii) above, and for each shopping centre in the Table 7.4, page 296 by dividing the study week's scores by the corresponding usual week's scores the matrices displayed in Table 7.5, page 297 were obtained. The chances that the quotient obtained from the division equals one is the probability that the study week's data reliably represents the usual shopping behaviour pattern in the city, reference stage 2.6B.

A close look at Table 7.5, page 297 shows that the probabilities are very high, staggering around one in most cases. However, there are a few abnormal probabilities which involved zero as numerators and unit as denominator and vice versa. These are negligible because the difference between unit and zero

TABLE 7.4: Comparison of the Study Week's Choices of Shopping Centres with the Usual Week's Choices of Shopping Centres

1 Category of Shopping Institutions	2 Shopping Institution Type	3 NAME OF SHOPPING CENTRE	Choices: 4 Grade	5 Usual Week's Score	6 Study Week's Score	Choice for Major Food Shopping: 7 Usual Week	8 Study Week
MARKET PLACE INSTITUTIONS	(CMP)	CENTRAL MARKET PLACE	1st 2nd 3rd	210 112 23	220 117 25	282	292
	SPECIAL MARKET PLACES (SMP)	RAILWAY STN. MARKET PLACE	1st 2nd 3rd	15 42 27	7 40 36	18	15
		PANTEKA MARKET PLACE	1st 2nd 3rd	1 2 1	1 1 1	1	
	DISTRICT MARKET PLACES (DMP)	MAKERA-KURMIN GWARI MARKET PLACE	1st 2nd 3rd	21 59 36	29 76 10	6	5
		TUDUN WADA MARKET PLACE	1st 2nd 3rd	35 28 11	36 25 12	19	13
		KAWO-TALATA MARKET PLACE	1st 2nd 3rd	32 38 40	32 40 46	36	39
		UNGWAN RIMI MARKET PLACE	1st 2nd 3rd	1 6 11	1 6 12		
	LOCAL/NEIGHBOURHOOD MARKET PLACES (L/NMP)	BARNAWA MARKET PLACE	1st 2nd 3rd	4 2 9	5 1 10	1	
		UNGWAN TELEVISION MARKET PLACE	1st 2nd 3rd	- - -	- 3 4		
		BADARAWA MARKET PLACE	1st 2nd 3rd	3 6 13	3 6 13		
		UNGWAN SHANU MARKET PLACE	1st 2nd 3rd	3 1 13	3 1 12		
		KABALA GABAS MARKET PLACE	1st 2nd 3rd	- 2 4	- 3 4		
OTHER SHOPPING INSTITUTIONS IN THE CITY	(SPS)	SUPERSTORES	1st 2nd 3rd	37 50 64	28 39 69	10	8
	SHOPPING STREETS (SST)	AHMADU BELLO WAY	1st 2nd 3rd	- 2 4	- 1 1		1
		LAGOS STREET	1st 2nd 3rd	- - 3	- - 2		
		IBADAN STREET	1st 2nd 3rd	- 1 1	- 1 2		
		OGBOMOSHO KATSINA JOS ROADS	1st 2nd 3rd	- - 4	- - 1		
		IBRAHIM TAIWO ROAD	1st 2nd 3rd	- - 3	- - 4		
		CONSTITUTION ROAD	1st 2nd 3rd	- - -	- - -		
	(SMBP)	TUDUN WADA BY-PASS ROAD	1st 2nd 3rd	- 2 -	- - 2		
	(CSAH)	CORNER SHOPS AND HAWKERS	1st 2nd 3rd	12 13 66	9 11 57		
	(RSC)	REGIONAL SHOPPING CENTRES	1st 2nd 3rd	- 2 -	- - 2	1	1
COLUMN TOTAL			1st 2nd 3rd	374 368 332	374 374 321	374	374

TABLE 7.5: The Probability that the Study Week's Data Represents the Usual Week's Behaviour Pattern

Category of Shopping Institutions	Shopping Institution Type	NAME OF SHOPPING CENTRE	Choices Score	Choices for Major Food Shopping
MARKET PLACE INSTITUTIONS IN THE CITY		Central Market Place	1.1	1.0
	Special Market Places	Railway Station Market Place	.99	.83
		Panteka Market Place	.75	0/1
	District Market Places	Makera-Kurmin Gwari Market Place	.99	.83
		Tudun Wada Market Place	.99	.68
		Kawo-Talata Market Place	1.1	1.1
		Ungwan Rimi Market Place	1.1	1.0
	Local/Neighbourhood Market Places	Barnawa Market Place	1.1	0/1
		Ungwan Television Market Place	7/0	1.0
		Badarawa Market Place	1.0	1.0
		Ungwan Shanu Market Place	.94	1.0
		Kabala Gabas Market Place	1.2	1.0
OTHER SHOPPING INSTITUTIONS IN THE CITY		Super Stores	0.9	0.8
	Shopping Streets	Ahmadu Bello Way	3.3	1/0
		Lagos Street	.67	1.0
		Ibadan Street	1.5	1.0
		Ogbomosho-Katsina Jos Roads	.25	1.0
		Ibrahim Taiwo Road	1.3	1.0
		Constitution Road	1.0	1.0
		Tudun Wada By-Pass Road	1.0	1.0
		Corner Shops and Hawkers	.85	1.0
		Regional Shopping Centres	1.0	1.0
SUMMARY			.99	1.0

in such a data on human behaviour is negligible. The abnormal probabilities which are significant are those consistent with Ungwan Television Market Place. Here zero is consistently the denominator, which indicates that this market place is no household's usual choice. Therefore, Ungwan Television Market Place may be very unstable or the abnormal probability could be attributed to sampling error. Having allowed for that, and looking closely at the last row of the table, the mean probabilities is 0.995. Therefore the chances that the study week's data differ significantly from usual week's shopping behaviour pattern in the city is 5 in every 1000. The probability that the study week's data do not represent the usual week's shopping behaviour in the city is therefore rejected, and the proposition that the study week's data reliably represent the usual week's shopping behaviour pattern in the city adopted. Having established the reliability of the study week's shopping data, we may now proceed with the exploratory analysis of the study week's shopping data.

A glance at the Table 7.4, page 296 columns 5, 6, 7 and 8 indicates that on the whole the CMP receives a very large portion of the shoppers' trips followed by the DMPs, then the L/NMP, the superstores, the corner-shops, the SMPs, the shopping thoroughfares, and last is the regional shopping centres.

A more detailed look at columns 4, 5 and 6, the entries for 1st, 2nd and 3rd grade choice shopping centres, reveal an interesting pattern. The Central Market Place (CMP) is strongest as a 1st choice and then as 2nd choice. The Local/Neighbourhood Market Places (L/NMPs) are strongest as 3rd choice centres and

oscillate between 2nd and 1st choices. In the District Centre Market Place, Sub-group (DMP), Tudun Wada Market Place, similar to the CMP is strongest as a 1st choice and then as a 2nd choice. This may be attributed to its legacy as the Kaduna central market place during the reconstruction of the CMP (1973-75). Makera-Kurmin Gwari Market Place is strongest as a 2nd choice and then as a 3rd choice. Makera district has three local market places in addition to the DMP. Kawo-Talata and Ungwan Rimi Market Places are strongest as 3rd choice and then as 2nd choice. These are characteristics similar to those of the L/NMPs. The Special Market Places (SMP) are strongest as 2nd choice.

The other shopping establishments in the city seem to receive far fewer trips than the city retail market place hierarchy. The Superstores (SS) receiving considerable size of trips are strongest as 3rd choice and then 2nd. The shopping thoroughfares are predominantly strong as 3rd choice. Tudun Wada By-Pass Road and the Regional Shopping Centres are predominantly strong in the 2nd position. The corner-shops are strongest as 3rd choice and almost equally strong as the 2nd and 3rd choices.

The question that is legitimately posed here is: "What factors are responsible for the observed pattern in the choice of shopping centres for food?".

7.1.2.2 Households Food-trips and Non-Food-trips

The data of the households' study week's shopping for food were isolated for further analysis. The households first, second and third choices of shopping

TABLE 7.6: Crude Study Weeks Food-Trips and Crude Monthly Non-Food Trips

Shopping Establishments	Sub-Group of Market Places		Crude Study Week Food-Trips CWTA	Crude Monthly Non-Food-Trips CMTB	
CMP	1	CMP	658	3170	Market Places
RSMP	2	SMP	121	31	
PMP	2	SMP	2	109	
M-KGMP	3	DMP	145	141	
TWMP	3	DMP	110	289	
K-TMP	3	DMP	244	60	
URMP	3	DMP	22	46	
BMP	4	L/NMP	11	19	
UTMP	4	L/NMP	0	20	
BDMP	4	L/NMP	10	16	
USMP	4	L/NMP	16	0	
KGMP	4	L/NMP	8	1	
SS/DS	5		194	844	Non-Market Places
61	6	ST	1	814	
62	6	ST	1	191	
63	6	ST	2	231	
64	6	ST	1	195	
65	6	ST	4	147	
66	6	ST	0	66	
SMBP	7		0	8	
CSAH	8		50	550	
RSC	9		2	0	

centres for food were multiplied respectively by the corresponding actual time spent at the shopping centre to obtain the "trips" of each choice- stage 2.7B. The trips (man-hours) of the three choices are summed up for each of the 12 competing market places to obtain the crude food-trips consumed in a market place in the study week, the third week of February, 1984. This is termed Crude Week Food-Trips (CWT_a), stage 2.8B, see Table 7.6, page 300 . From the question on the study week's major shopping centre for food, Q16, calculation was done to obtain the percentage of the months shopping for food that is represented by that of the study week, stage 2.9B, and shown in Table 7.7, page 301 , rows 1 and 2.

TABLE 7.7: Rating of the Weeks of the Month for Food Shopping

	First Week	Second Week	Third Week	Fourth Week	No Particular Week	Row Total
Count	156	43	75	38	56	373
Percent	41.8	11.5	20.1	10.2	15.0	100
Adjusted Percent	50.0	13.8	24.0	12.2	-	100

The table shows that 15.0% of the food-trips is consumed in no particular week. This is distributed proportionately among the four week month, based on their initial percentages, to obtain the adjusted percentages shown in row 3. The third week represents 24% of the total

months foodtrips. Therefore the total crude monthly food-trip, 'CMT_a' is given by

$$CMT_a = \frac{CWT_a}{1} \times \frac{100}{24} = CWT_a \times 4.16 \quad \ldots\ldots\ldots \quad (i)$$

From stage 2.2c the households' choices of shopping centres for non-food are summed up and tabulated to obtain the crude monthly non-food-trips consumed in each market place, (CMT_b), stage 2.3c, see Table 7.6, page 300 . From stages 2.5SWB and 2.2c the locational and structural potentials manifested scores are summed up and tabulated for food-trips 2.3BP and non-food trips 2.3CP respectively, and shown in Table 7.8, page 303 , rows 1-5. Thence the locational and structural potentials total manifested frequencies (food and non-food trips) are summed up, and the manifested weights were calculated for the locational and structural potentials as shown in rows 6 and 7 of Table 7.8, page 303 , i.e. stage 2.4P. In that table it could be seen that 23.6% of food and non-food trips are influenced by "combined-trip" variable (Y_8). As stated in Chapter 1, page 16, combined trip is shared equally between food and non-food shopping, i.e. $\frac{23.6}{2} \times \frac{1}{100} = 0.118$ for each, stage 2.5P, and that was called "combined-trip factor". The crude monthly food-trips, (CMT_a), and crude monthly non-food trips, (CMT_b) are adjusted by the combined-trip factor respectively to obtain the adjusted monthly food-trips, (T_a, stage 2.10B) and adjusted monthly non-food-trips, (T_b, stage 2.4C); and these are given by:

$$T_a = CWT_a \times 4.16 \times (1-0.118) = CWT_a \times 4.16 \times 0.882 \quad (ii)$$

$$T_b = CMT_b \times (1 - 0.118) = CMT_b \times 0.882 \ldots\ldots\ldots \quad (iii)$$

TABLE 7.8: Number of Occasions Locational and Structural Potentials Influenced Choice of Shopping Centres (Calculation Scheme of the Weights of Locational and Structural Potential Variables)

A = Food-Trip Choices B = Non-Food-Trip Choices	LOCATIONAL POTENTIALS FREQUENCIES							STRUCTURAL POTENTIALS FREQUENCIES								
	Railway Transport Linkage X_1	Road Transport Linkage X_2	Immediate Surrounding Residential Population X_3	Immediate Surrounding Places of Work X_4	Immediate Surrounding Other Shopping Centres X_5	Immediate Surrounding Wholesale Shops and Warehouses X_6	ROW TOTAL	Architectural Design Factors Y_1	Facilities and Amenities Y_2	Parking and Standing Spaces for Vehicles Y_3	Security of Life and Property Y_4	Environmental Qualities Y_5	Disposition of Commodity Zones Y_6	Preservation of Food Commodity Y_7	Food and Non-Food Floor-Spaces (Scale of Market Place) Y_8	ROW TOTAL
A1 1st Choice	0	132	140	66	156	207	701	79	47	3	4	35	145	159	241	713
A2 2nd Choice	0	155	77	63	121	239	655	49	23	16	4	56	215	191	142	696
A3 3rd Choice	0	90	150	38	67	107	452	32	10	9	2	42	227	109	82	513
B1 1st Choice	0	2204	647	2051	2034	0	6936	1156	105	767	1311	580	1484	399	1125	6927
B2 2nd Choice	0	286	77	49	298	2112	2822	255	183	153	550	2208	2	1448	2139	6938
TOTAL FREQUENCY	0	2867	1091	2267	2676	2665	11566	1571	368	948	1871	2921	2073	2306	3729	15787
WEIGHT	0.0	24.8	9.4	19.6	23.1	23.1	100%	10.0	2.3	6.0	11.9	18.5	13.1	14.6	23.6	100%

TABLE 7.9: Adjusted Food-Trips and Non-Food Trips

Name of Shopping Institutions	Market Place Sub-Groups		Shoppers Food-Trips/hour 1977	Shoppers Food-Trips/hour 1984	Shoppers Non-Food-Trips/hour 1977	Shoppers Non-Food-Trips/hour 1984	
CMP	1	CMP	3393	12471.49	7648	14410.88	Market Places
RSMP	2	SMP	1621	2295.17	109	140.93	
PMP	2		.	36.18	.	495.52	
M-KQMP	3	DMP	1950	2738.82	456	640.99	
TWMP	3		1072	2080.73	679	1313.80	
K-TMP	3		1784	4621.97	105	272.76	
URMP	3		295	423.00	105	209.12	
BMP	4	L/NMP	105	202.12	65	86.37	
UTMP	4		0	.00	54	90.92	
BDMP	4		136	195.68	55	72.74	
USMP	4		240	295.33	0	.00	
KQMP	4		111	148.33	4	4.55	
SS/DS	5		.	3665.52	.	3836.84	Non-Market Places
61	6	ST	.	17.24	.	3700.46	
62	6		.	10.99	.	868.29	
63	6		.	44.14	.	1050.13	
64	6		.	15.15	.	886.47	
65	6		.	71.04	.	668.26	
66	6		.	.00	.	300.04	
SMBP	7		.	.00	.	36.37	
CSAH	8		.	947.35	.	2500.31	
RSC	9		.	37.89	.	.00	

Shoppers trips for food and non-food distribution, T_a and T_b, are shown in Table 7.9, page 304, and these constitute the specific components of the Cell T of the Locational and Structural Potentials Model, Figure 7.1, page 286.

Stage 2.3A: Because of the implication of choice and constraint households are divided into two dichotomous income groups - high and low. These are used as primary demographic sub-groupings for describing the influence of locational and structural potentials on the city residents behaviour pattern in their distribution of food-trips and non-food-trips to the 12 competing urban retail market places. The information thus obtained is shown in Tables 7.10 and 7.11, pages 307 and 308 respectively.

7.1.3 Exploratory Analysis of the Locational and Structural Potentials in the City Retail Market Places (Sector 3, Figure 7.5, page 345)

In the questionnaire on the locational and structural potentials in the city retail market places, each of the 14 locational and structural potential variables (Table 5.2, page 177) was completely knocked down into its component sub-variables. The questionnaire was coded on computer survey sheets in a systematic manner, complying strictly to the codes, scores and columns stipulated in the questions.

The calculation scheme of the locational and structural potential scores of the retail market places is set out in Appendix 6.3.2. page A54 , and its columns are

referred to in the following description. In the calculations one such scheme was devoted to one market place. The "interval levels" of measurement of a sub-variable are shown in column 4 and the sub-variables take on more than one value as shown in the questionnaire. The value called "unit value" is recorded in column 5. The product of the interval level and the unit value gave the crude physical score of the sub-variable in the market place and this is recorded in column 6. The crude physical score of the variable is given in column 7, i.e. the sum of the crude physical scores of its sub-variables. Structural potential variable, Y_8, (food and non-food capacity for combined shopping) obtained from stage 1.6Z of the exploratory analysis of classification of activity spaces in the city market places, is included in column 7, in stage 3.5B. The distribution of the locational and structural potential crude physical scores of the city retail market places, in stage 3.6B, are given in Tables 7.14a and 7.14b, page 311 . At stage 3.7B the crude locational and structural potential scores are standardized by calculating their 'Z' scores in order to normalise them.

The manifested weights of the locational and structural potentials had been obtained in stage 2.4P (in the data exploratory analysis of the consumers shopping behaviour and attitude, Table 7.8, page 303 , last row) are recorded in column 9 of the calculation scheme. The product of the weight and Z score of the locational and structural potential variable gave its "weighted score", in stage 3.8B, which is shown in column 10. The weighted locational and structural potential scores, which are displayed in Tables 7.15a

	Road Transport Linkages X_2	Immediate Surrounding Residential Population X_3	Immediate Surrounding Places of Work X_4	Immediate Surrounding Other Shopper Centres X_5	Immediate Surrounding Wholesale Shops and Warehouses X_6	
Low Income Households	26.89	8.3	17.6	24.41	22.79	- Row percentage
	63.93	72.45	67.1	63.92	61.1	- Column percentage
	17.32	5.34	11.34	15.72	14.68	- Total percentage
High Income Households	27.45	5.71	15.62	24.93	26.27	- Row percentage
	36.06	27.54	32.89	36.07	38.9	- Column percentage
	9.77	2.03	5.55	8.87	9.34	- Total percentage

TABLE 7.10: Influence of Locational Potentials on Household Income Groups' Choice of Shopping Centre.

	Building Design Factors Y_1	Facilities and Amenities Y_2	Parking and Stationing Spaces for Vehicles Y_3	Security of Life and Property Y_4	Environmental Design Qualities Y_5	Zoning of Market Place by Commodity Y_6	Freshness of Food Commodity Y_7	Food and Non-Food Floor-space (Capacity) Y_8	
Low Income Households	11.33	2.04	7.78	0.00	0.00	15.36	21.41	42.07	- Row percentage
	74.5	86.7	72.8	0.00	0.00	89.41	77.74	86.45	- Column percentage
	7.36	1.32	5.05	0.00	0.00	9.98	13.91	27.35	- Total percentage
High Income Households	7.2	.006	5.4	35.76	24.04	3.37	11.38	12.24	- Row percentage
	25.49	13.29	27.19	100	100	10.59	22.25	13.54	- Column percentage
	2.52	.002	1.9	12.51	8.41	1.18	03.98	4.28	- Total percentage

TABLE 7.11: Influence of Structural Potentials on Household Income Groups' Choice of Shopping Centre.

	2 High Transport Cost by road	3 Too Far From Place of Residence	4 Too Far from Place of Work	6 Cannot Combine Bulk and Stall Purchases	7 Other Shopping Centres are Better	
Low Income Households	46.6	48.9	1.1	0.6	2.2	- Row percentage
	76.1	70.2	33.3	100.0	100.0	- Column percentage
	33.7	35.4	0.8	0.4	1.6	- Total percentage
High Income Households	38.2	54.4	5.9	0.0	0.0	- Row percentage
	23.9	29.8	66.7	0.0	0.0	- Column percentage
	10.6	15.0	1.6	0.0	0.0	- Total percentage

TABLE 7.12: Blockade by Negative Locational Potentials on Household Income Groups' Choice of the Central Market Place.

	1 Rigidity of Stall	2 Lack of facilities	3 Lack of parking space for car	4 Feeling of Insecurity	5 Dirty Environment	6 Dispersed Locations of Commodities	7 Poor Preservation of Food Commodity	
Low Income Households	0.3	0.3	33.6	0.3	2.0	38.8	24.8	- Row percentage
	50.0	100.0	58.9	100.0	66.7	67.2	66.7	- Column percentage
	0.2	0.2	21.5	0.2	1.3	24.8	15.9	- Total percentage
High Income Households	0.6	0.0	41.9	0.0	1.7	33.7	22.1	- Row percentage
	50.0	0.0	41.1	0.0	33.3	32.8	33.3	- Column percentage
	0.2	0.0	15.0	0.0	0.6	12.1	7.9	- Total percentage

TABLE 7.13: Blockade by Negative Structural Potentials on Household Income Groups' Choice of the Central Market Place.

Name of Market Place	Railway Transport Linkages X1	Road Transport Linkages X2	Immediate Surrounding Residential Population X3	Immediate Surrounding Places of Work X4	Immediate Surrounding Other Shopping Centres X5	Immediate Surrounding Wholesale Shops and Warehouses X6
CMP	4	60	350	14	26	15
RSMP	5	37	89	15	12	6
PMP	4	29	242	8	6	17
M-KGMP	3	31	101	4	10	14
TWMP	2	47	174	2	15	0
K-TMP	2	28	90	4	0	6
URMP	1	23	49	4	0	3
BMP	2	22	77	7	0	4
UTMP	4	17	50	0	0	6
BDMP	2	17	48	0	0	0
USMP	4	34	91	0	0	7
KGMP	1	17	64	0	0	3

TABLE 7.14(a): Crude Physical Scores of the Locational Potentials

Name of Market Place	Building Design Factors Y1	Facilities and Amenities Y2	Parking and Stationing Spaces for Vehicles Y3	Security of Life and Property Y4	Environmental Design Qualities Y5	Zoning of Market Place by Commodity Y6	Freshness of Food Commodity Y7	Food and Non-Food Capacity Y8
CMP	40	560	176	80	110	80	11	368
RSMP	20	0	61	25	35	30	9	16
PMP	20	98	0	30	35	60	16	21
M-KGMP	20	0	0	35	55	50	14	130
TWMP	20	222	58	35	65	50	14	100
K-TMP	20	36	49	40	60	60	16	91
URMP	20	36	0	45	60	30	16	25
BMP	20	0	0	25	45	30	14	25
UTMP	20	0	0	15	35	20	12	9
BDMP	20	0	0	15	40	30	14	10
USMP	20	0	0	20	35	20	12	16
KGMP	20	36	0	35	35	30	14	19

TABLE 7.14(b): Crude Physical Scores of the Structural Potentials

	Railway Transport Linkages X1	Road Transport Linkages X2	Immediate Surrounding Residential Population X3	Immediate Surrounding Places of Work X4	Immediate Surrounding Other Shopping Centres X5	Immediate Surrounding Wholesale Shops and Warehouses X6
CMP	.00	56.60	23.53	34.08	55.40	33.58
RBMP	.00	12.96	-3.03	37.80	17.10	-3.05
PMP	.00	-2.21	12.54	11.77	.68	41.72
M-KOMP	.00	1.58	-1.81	-3.10	11.63	29.51
TWMP	.00	31.94	5.62	-10.53	25.31	-27.48
K-TMP	.00	-4.11	-2.93	-3.10	-15.73	-3.05
URMP	.00	-13.60	-7.10	-3.10	-15.73	-15.26
BMP	.00	-15.49	-4.25	8.06	-15.73	-11.19
UTMP	.00	-24.98	-7.00	-17.97	-15.73	-3.05
BDMP	.00	-24.98	-7.20	-17.97	-15.73	-27.48
USMP	.00	7.27	-2.82	-17.97	-15.73	1.02
KOMP	.00	-24.98	-5.57	-17.97	-15.73	-15.26

TABLE 7.15(a): Standardized and Weighted Scores of the Locational Potentials

	Building Design Factors Y1	Facilities and Amenities Y2	Parking and Stationing Space For Vehicles Y3	Security of Life and Property Y4	Environmental Design Qualities Y5	Zoning of Market Place by Commodity Y6	Freshness of Food Commodity Y7	Food and Non-Food Capacity Y8
CMP	31.75	6.71	16.76	31.74	49.91	27.28	-16.95	68.69
RBMP	-2.89	-1.16	3.68	-5.67	-13.36	-7.55	-30.51	-12.22
PMP	-2.89	.22	-3.26	-2.27	-13.36	13.35	16.95	-11.07
M-KOMP	-2.89	-1.16	-3.26	1.13	3.51	6.38	3.39	13.98
TWMP	-2.89	1.96	3.34	1.13	11.95	6.38	3.39	7.09
K-TMP	-2.89	-0.65	2.31	4.53	7.73	13.35	16.95	5.02
URMP	-2.89	-0.65	-3.26	7.94	7.73	-7.55	16.95	-10.15
BMP	-2.89	-1.16	-3.26	-5.67	-4.92	-7.55	3.39	-10.15
UTMP	-2.89	-1.16	-3.26	-12.47	-13.36	-14.51	-10.17	-13.83
BDMP	-2.89	-1.16	-3.26	-12.47	-9.14	-7.55	3.39	-13.60
USMP	-2.89	-1.16	-3.26	-9.07	-13.36	-14.51	-10.17	-12.22
KOMP	-2.89	-0.65	-3.26	1.13	-13.36	-7.55	3.39	-11.53

TABLE 7.15(b): Standardized and Weighted Scores of the Structural Potentials

TABLE 7.16(a) : Transformed, Standardized and Weighted Observed Locational Potential Scores

Name of Market Place	Railway Transport Linkages x_1^2	Road Transport Linkages x_2^2	Immediate Surrounding Residential Population x_3^2	Immediate Surrounding Places of Work x_4^2	Immediate Surrounding Other Shopping Centres x_5^2	Immediate Surrounding Wholesale Shops and Warehouses x_6^2
CMP	.00	64.59	26.54	36.77	68.01	34.38
RSMP	.00	7.71	-3.70	44.01	5.37	-8.96
PMP	.00	-5.75	9.67	3.79	-7.35	49.06
M-KOMP	.00	-2.69	-3.09	-8.20	.19	27.73
TWMP	.00	29.13	2.20	-11.20	14.90	-17.22
K-TMP	.00	-7.21	-3.65	-8.20	-11.59	-8.96
URMP	.00	-13.71	-5.15	-8.20	-11.59	-15.15
BMP	.00	-14.86	-4.22	.04	-11.59	-13.55
UTMP	.00	-19.83	-5.13	-12.20	-11.59	-8.96
BDMP	.00	-19.83	-5.18	-12.20	-11.59	-17.22
USMP	.00	2.28	-3.60	-12.20	-11.59	-5.98
KOMP	.00	-19.83	-4.70	-12.20	-11.59	-15.15
	x_1^3	x_2^3	x_3^3	x_4^3	x_5^3	x_6^3
CMP	.00	70.01	28.22	35.99	71.77	32.50
RSMP	.00	2.86	-3.66	46.58	-1.21	-10.94
PMP	.00	-7.81	6.52	-1.44	-8.18	53.65
M-KOMP	.00	-5.62	-3.42	-8.95	-4.57	23.82
TWMP	.00	24.45	-0.21	-9.89	6.37	-13.91
K-TMP	.00	-8.80	-3.65	-8.95	-9.17	-10.94
URMP	.00	-12.78	-4.11	-8.95	-9.17	-13.54
BMP	.00	-13.39	-3.85	-4.27	-9.17	-13.03
UTMP	.00	-15.72	-4.10	-10.03	-9.17	-10.94
BDMP	.00	-15.72	-4.11	-10.03	-9.17	-13.91
USMP	.00	-1.75	-3.63	-10.03	-9.17	-9.20
KOMP	.00	-15.72	-4.00	-10.03	-9.17	-13.54

TABLE 7.16(b) : Transformed, Standardized and Weighted Observed Structural Potential Scores

Name of Market Place	Building Design Factors Y_1^2	Facilities and Amenities Y_2^2	Parking and Stationing for Vehicles Y_3^2	Security of Life and Property Y_4^2	Environmental Design Qualities Y_5^2	Zoning of Market Place by Commodity Y_6^2	Freshness of Food Commodity Y_7^2	Food and Non-Food Capacity Y_8^2
CMP	31.75	7.21	18.80	35.66	54.68	31.86	-17.21	74.19
RSMP	-2.89	-0.80	.24	-5.46	-10.85	-7.89	-27.72	-8.70
PMP	-2.89	-0.56	-2.30	-3.50	-10.85	11.62	18.26	-8.59
M-KOMP	-2.89	-0.80	-2.30	-1.19	.00	3.67	2.50	1.51
TWMP	-2.89	.46	-0.01	-1.19	7.23	3.67	2.50	-2.73
K-TMP	-2.89	-0.77	-0.66	1.48	3.46	11.62	18.26	-3.78
URMP	-2.89	-0.77	-2.30	4.51	3.46	-7.89	18.26	-8.48
BMP	-2.89	-0.80	-2.30	-5.46	-6.03	-7.89	2.50	-8.48
UTMP	-2.89	-0.80	-2.30	-8.31	-10.85	-11.50	-11.16	-8.81
BDMP	-2.89	-0.80	-2.30	-8.31	-8.59	-7.89	-2.50	-8.80
USMP	-2.89	-0.80	-2.30	-7.06	-10.85	-11.50	-11.16	-8.70
KOMP	-2.89	-0.77	-2.30	-1.19	-10.85	-7.89	2.50	-8.64
	Y_1^3	Y_2^3	Y_3^3	Y_4^3	Y_5^3	Y_6^3	Y_7^3	Y_8^3
CMP	31.75	7.29	19.03	37.12	57.14	35.49	-17.12	74.86
RSMP	-2.89	-0.71	-1.05	-4.79	-8.78	-7.55	-25.07	-7.40
PMP	-2.89	-0.67	-1.92	-3.83	-8.78	9.22	19.40	-7.39
M-KOMP	-2.89	-0.71	-1.92	-2.49	-2.46	1.15	1.55	-3.78
TWMP	-2.89	-0.21	-1.17	-2.49	3.08	1.15	1.55	-5.76
K-TMP	-2.89	-0.71	-1.47	-0.71	.08	9.22	19.40	-6.16
URMP	-2.89	-0.71	-1.92	1.38	.08	-7.55	19.40	-7.38
BMP	-2.89	-0.71	-1.92	-4.79	-6.31	-7.55	1.55	-7.38
UTMP	-2.89	-0.71	-1.92	-5.83	-8.78	-9.24	-11.87	-7.41
BDMP	-2.89	-0.71	-1.92	-5.83	-7.70	-7.55	1.55	-7.41
USMP	-2.89	-0.71	-1.92	-5.44	-8.78	-9.24	-11.87	-7.40
KOMP	-2.89	-0.71	-1.92	-2.49	-8.78	-7.55	1.55	-7.40

and 7.15b, page 312 , constitute the specific components of Cell (X & Y) of the Locational and Structural Potential Model , Figure 7.1, page 286.

It was observed that the manifested frequency of locational potential X_1 (railway transport linkage) was zero. This made its weight zero and consequently its weighted score was zero. The railway is not used for intracity transport. Therefore railway transport linkage had no causal influence on the consumers' shopping behaviour and attitude.

7.1.3.1 Locational and Structural Potential in the Description of Kaduna City Retail Market Places

Section A of the questionnaire on the locational and structural potentials in the city retail market places was designed to elicit information on the historical development of the retail market places in the city. The records contained in this section of the questionnaire were extracted and summarized for each market place, in stage 3.1A. The summary was augmented by descriptive comments on the locational and structural potentials which have been measured statistically in Section B of the questionnaire, in stage 3.2A.
The historical development cum descriptive comments on the locational and structural potentials of the retail market places in Kaduna city constituted the contents of section 6.5 of the thesis.

7.1.4 Exploratory Analysis of CMP Road Vehicle Entry and Departure Census (Sector 4, Figure 7.5, page 345)

In stage 4.1, the records contained in the completed CMP road vehicle entry and departure census survey sheets, Appendix 6 4 1 page A63 , are carefully counted and then entered into the survey working sheets, Appendix 6 4 2 page A 64 . One such working sheet was devoted to the census records of each of the seven days of the study week - Tuesday (28/2/84) through Monday (5/3/84). The classes of road vehicles recorded in the census survey were:

(i) private car/van
(ii) motor cycle
(iii) minibus/taxi cab
(iv) motor truck
(v) hand cart

Omnibus was not noticed in the CMP during the road vehicle census survey. Omnibus was privately owned and used only in intercity journeys and their stations were in private premises and not the CMP. Secondly, the omnibuses used by the Kaduna State Transport Authority in intracity public transport have not been plying the Kaduna city streets for a long time, and are therefore not noticed in the CMP.

The entries in the 7 survey working sheets were coded on computer survey sheets in a systematic manner complying strictly to the codes, scores and columns stipulated in the CMP road vehicle entry and departure census survey coding frame shown in Appendix 7.3, page A 97 . A data list file called SCMPD, was thus created, in stage 4.2.

The CMP road vehicle entry and departure census survey was carried out in the 4th week of the month of February. The factors for adjusting for the effects of the week and month of the survey, derived from stage 2.2D of exploratory analysis of consumers shopping behaviour and attitude, (Sector 2 in Figure 7.5, page 345), are calculated in stage 4.3; see Tables 7.17 and 7.18, pages 317 and 318 In stage 4.4 the survey data are adjusted to normalize the effects of the week and month of the survey on the survey data. From this point the analysis became two pronged, aimed at obtaining:

A. the road vehicle traffic in the CMP
B. the road vehicle accumulation in the CMP

7.1.4.1 The Road Vehicle Traffic in the CMP

Practice in Europe generally has been to follow the US Highway Capacity Manual for traffic flow standards and for the 'level of service' concept, hour flows being expressed in passenger car units, (p.c.u.'s). Most traffic studies in Nigeria are also expressed in p.c.u.'s. But in Great Britain the Transport and Road Research Laboratory work has shown that the use of p.c.u. factors does not adequately reflect the effect of traffic composition on average traffic speed. In the city central areas of Great Britain there is segregation of auto vehicles and pedestrians, while cyclists and hand-drawn carts are virtually absent. In the Kaduna CMP situation, auto vehicles, pedestrians, cyclists and hand-drawn carts mingle in the entry and exit routes; the use of p.c.u. factors would be worse in reflecting the effect of traffic composition.
The road vehicle traffic in the CMP is expressed in

TABLE 7.17: Adjusting Factor for Week of Survey of CMP Road Vehicle Entry and Departure Census

	First Week	Second Week	Third Week	Fourth Week	No Particular Week	Row Total
Count	170	206	166	240	113	895
Percent	19.00	23.02	18.55	26.81	12.62	100
Adjusted Percent	21.74	26.34	21.24	30.68	-	100

Weekly Mean = $\frac{100}{4}$ = 25%

The CMP road vehicle entry and departure census survey was done in the 4th week.

∴ The adjusting factor for week of survey of CMP road vehicle entry and departure census is given by

$$\frac{25.00}{30.68} = 0.85$$

TABLE 7.18: Adjusting Factor for Month of Survey of CMP Road Vehicle Entry and Departure Census

	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	MAXIMUM COUNT
Count	361	362	367	367	362	363	364	367	368	364	367	368	374
Percent	96.52	96.79	98.12	98.12	96.79	97.05	97.32	98.12	98.39	97.32	98.12	98.39	100

Mean percent January through December = 97.59

The CMP road vehicle entry and departure census survey was done in the month of February.

∴ The adjusting factor for month of survey of CMP road vehicles entry and departure census is given by $\frac{97.59}{96.79} = 1.01$

vehicles (with up to 15 per cent of heavy vehicles) instead of p.c.u.'s.

In stage 4.5A the road vehicle traffic, vehicle/hour/ both directions, is tabulated for the 12 CMP entry and exit routes; this information is necessary for the design project of the CMP. In stage 4.6A the vehicle/hour/both directions tabulated for the 12 CMP entry and exit routes is collapsed to obtain vehicle/hour/both directions in the CMP and this is shown in Table 7.19, page 320. In order to facilitate vivid and easy citing, the data in Table 7.19 are presented in graphs in Figure 7.2, page 321. All the 12 CMP entry and exit routes are single carriageway roads. To obtain the average vehicle/ hour/both directions in each carriageway road, the figures in Table 7.19, page 320, are divided by 12 and are shown in Table 7.20, page 322. That was stage 4.7AM which constitutes a specific component of the Micro-Details of the CMP in Figure 7.5, page 345 . The metal portion of the CMP entry and exit routes are anything between 10.0 - 3.5 m. wide.

7.1.4.2 The Road Vehicle Accumulation in the CMP

In stage 4.5B1 the vehicle net accumulation in the CMP is tabulated for the 12 CMP entry and exit routes; this information is necessary for the design project of the CMP. In stage 4.5B2 the vehicle net accumulation, tabulated for the 12 CMP entry and exit routes, is collapsed to obtain summary vehicle net accumulation in the CMP, and this is shown in Table 7.21, page 324. By applying the definition of vehicle accumulation at the hour given in section 1.2.1.3, page 16.

TABLE 7.19: Mean Road Traffic at the CMP

ROAD VEHICLE		Traffic										
		7-8am	8-9am	9-10am	10-11am	11-12am	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm
Private Vehicles	Private car/van	999	1444	1464	1565	1637	1629	1421	1111	1206	1368	1510
	Motor Cycle	807	994	1214	1173	1197	1137	1041	930	1018	1164	1341
Commercial Vehicles	Minibus/ taxicab	2122	2831	2853	2697	2628	2305	2216	2161	2286	2260	2540
	Motor truck	42	56	47	45	56	46	40	43	52	61	77
	Ommibus	-	-	-	-	-	-	-	-	-	-	-
Hand cart		112	116	118	127	130	118	77	111	113	107	119
Total (hand-cart excluded) auto		3970	5325	5408	5480	5518	5071	4738	4245	4562	4853	5468
Total (hand-cart included)		4082	5441	5526	5607	5648	5189	4815	4356	4675	4960	5587
Private Vehicles		1806	2438	2678	2738	2834	2766	2462	2041	2224	2532	2851
Commercial Vehicles		2164	2887	2900	2742	2684	2351	2256	2204	2338	2321	2617

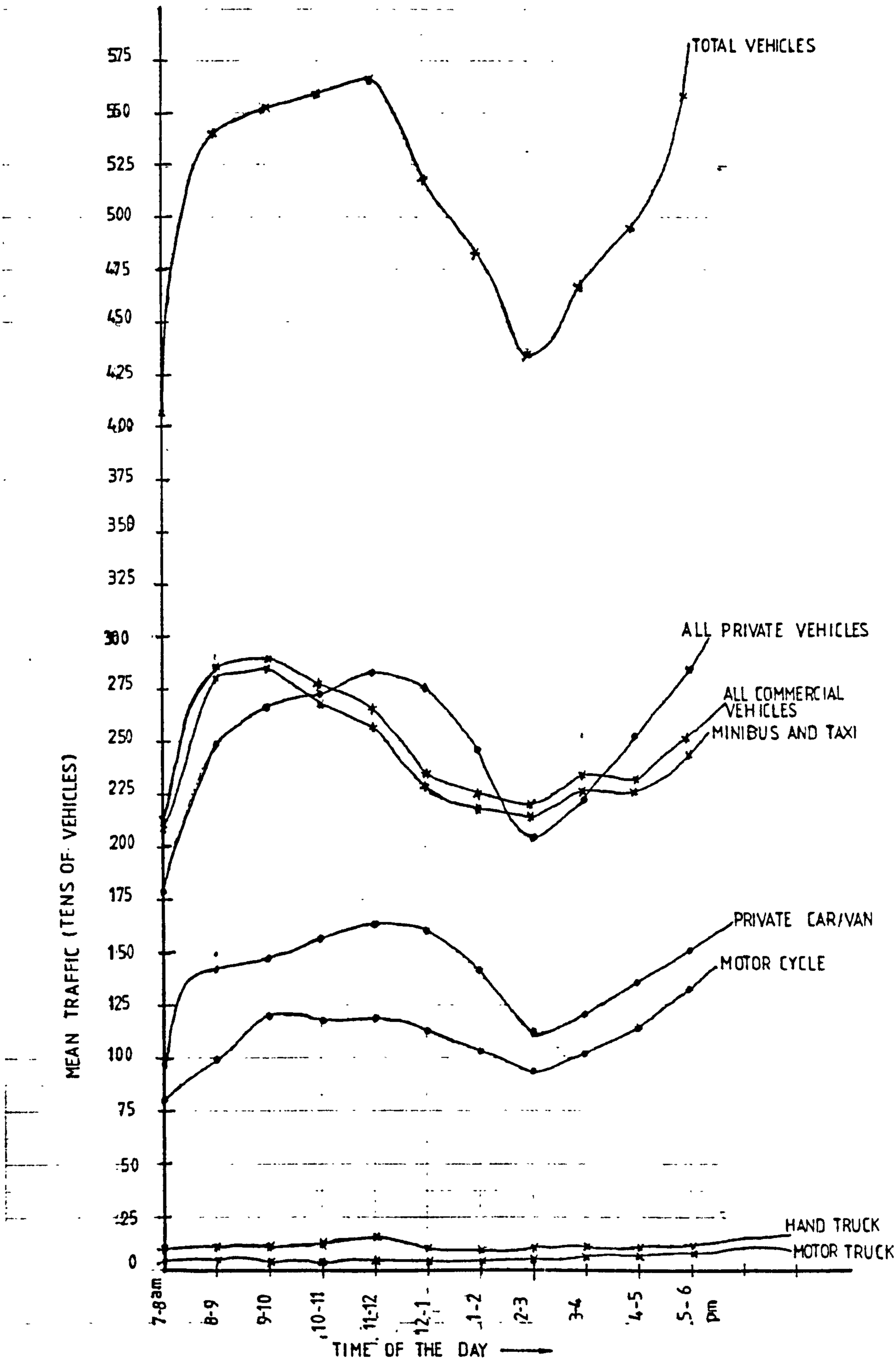


Figure 7.2: Plots of Mean Traffic in Kaduna City Central Market Place 1984

TABLE 7.20: Mean Road Traffic in Each CMP Entry and Exit Carriageway

ROAD VEHICLE		Traffic										
		7-8am	8-9am	9-10am	10-11am	11-12am	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm
Private Vehicles	Private car/van	84	121	122	131	137	136	119	93	101	114	126
	Motor cycle	68	83	102	98	100	95	87	78	85	97	112
Commercial Vehicles	Minibus/ taxicab	177	136	238	225	219	192	185	181	191	189	212
	Motor truck	4	5	4	4	5	4	4	4	4	5	6
	Omnibus	-	-	-	-	-	-	-	-	-	-	-
Hand-cart		10	10	10	11	11	10	7	10	10	10	10
Total (hand-cart excluded) auto		331	444	451	457	460	423	395	354	381	405	456
Total (hand-cart included)		341	454	461	468	471	433	402	363	390	414	466
Private vehicles		151	204	224	229	237	231	206	171	185	211	238
Commercial vehicles		181	241	242	242	224	196	188	184	195	195	219

on Table 7.21, the mean road vehicle accumulation at the CMP is obtained and shown in Table 7.22, page 326. To facilitate vivid and easy citing, the data in Table 7.22 are presented in graphs in Figure 7.3 page 325. The accumulated vehicles seek parking and stationing spaces in the private vehicle parking lots and commercial vehicle stations provided in many sites scattered round the CMP. The CMP had a gross private vehicle designed and used parking space capacity of 800 m^2 and commercial vehicle designed and used stationing space capacity of 5400 m^2. To obtain vehicle accumulation-space ratios in the CMP, (1) the gross private vehicle parking space capacity is divided by the total private vehicles demanding parking opportunity, and (2) the gross commercial vehicle stationing space capacity is divided by the total commercial vehicles demanding stationing opportunity. These ratios are shown in Table 7.23, page 327 , which constitute the specific component 4.7BM of the Micro-Detail of the CMP in Figure 7.5, page 345 . With reference to Neufert Architect's Data, second (international) English edition (1980), p. 21-22:

"Basic layout of vehicle parking spaces in parking bay ranges from 1.800 x 4.600 M to 2.400 x 6.000 M. Larger bay dimensions are usually adopted for open air parking, or where high proportion of larger cars and vans are likely used. While 90^{o} parking is more economical in space requirement (20-22 m^2/car), 45^{o} parking (23-26 m^2/car) is more convenient". See Appendix 7.4 page A99

Large vehicles approximate dimensions (exact sizes may vary) are given in Table 7.24, page 328.

TABLE 7.21: Mean Road Vehicle Net Accumulation in the CMP

ROAD VEHICLE		NET ACCUMULATION											
		7.00am	8.00am	9.00am	10.00am	11.00am	12.00 noon	1.00pm	2.00pm	3.00pm	4.00pm	5.00pm	6.00pm
Private vehicles	Private car/van	54	136	268	173	203	173	177	51	-6	-10	-19	-78
	Motor cycle	70	161	156	124	12	37	3	-5	-4	- 6	- 8	-211
Commercial vehicles	Minibus/ taxicab	129	31	36	31	51	43	39	17	-2	- 9	-28	- 18
	Motor truck	23	6	10	6	10	25	10	8	7	4	15	45
	Omnibus	-	-	-	-	-	-	-	-	-	-	-	-
	Hand-cart	?	5	7	-4	9	-11	-5	7	-7	-1	2	-13
Total vehicles (minus hand-carts)		276	334	470	334	276	278	229	71	-5	-21	-40	-262

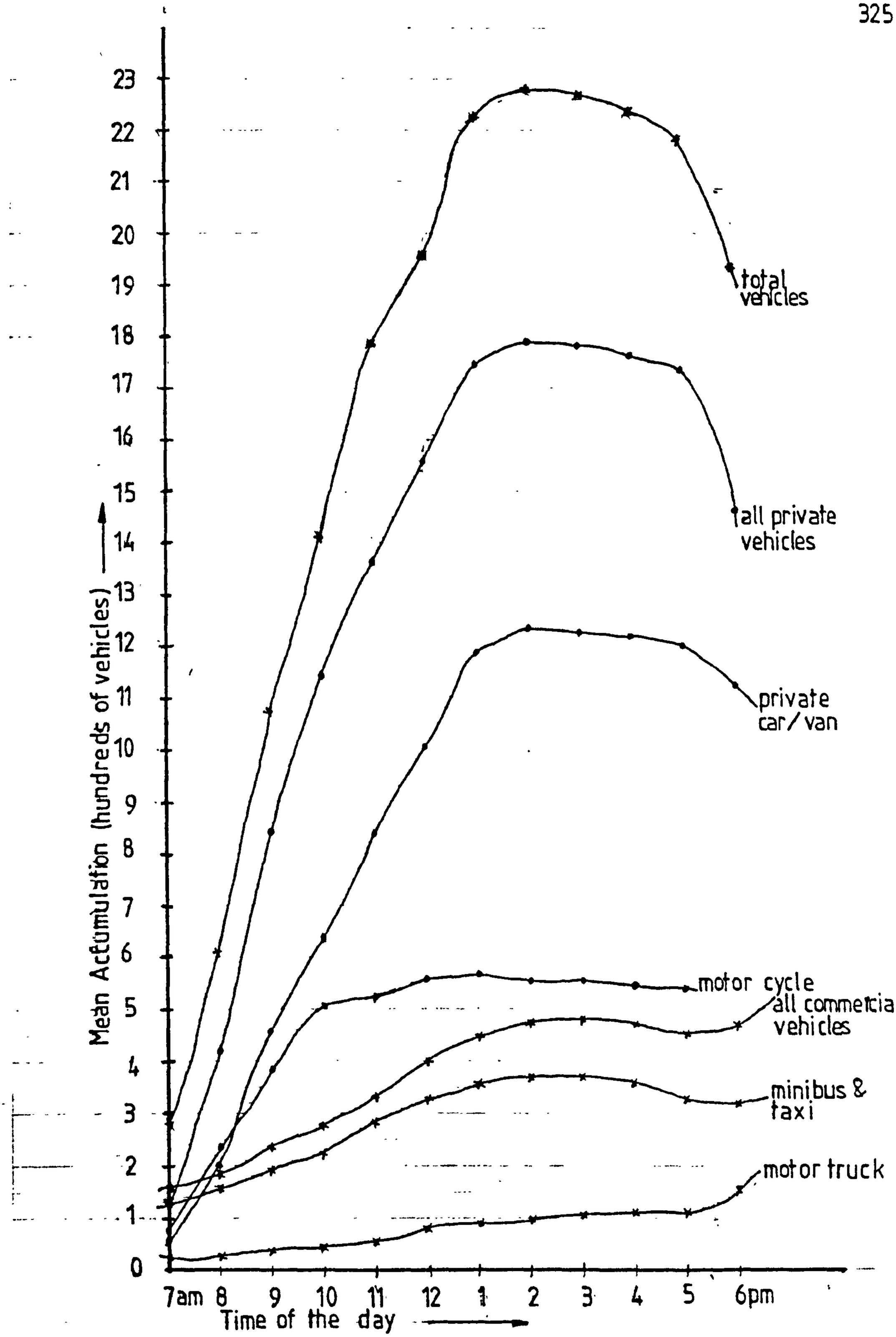


Figure 7.3 Plots of Mean Road Vehicle Accumulation in Kaduna City Central Market Place, 1984

TABLE 7.22: Mean Road Vehicle Accumulation in the CMP

ROAD VEHICLE		ACCUMULATION											
		7.00am	8.00am	9.00am	10.00am	11.00am	12.00 noon	1.00pm	2.00pm	3.00pm	4.00pm	5.00pm	6.00pm
Private Vehicles	Private car/van	54	190	458	631	834	1007	1184	1235	1229	1219	1200	1122
	Motor cycle	70	231	387	511	523	560	563	558	552	548	540	329
Commercial Vehicles	Minibus/ taxicab	129	160	196	227	278	321	360	377	375	366	338	320
	Motor truck	23	20	39	45	55	80	90	98	105	109	113	158
	Omnibus	-	-	-	-	-	-	-	-	-	-	-	-
Handcart		?	?	?	?	?	?	?	?	?	?	?	?
Total vehicles (minus hand-carts)		276	610	1080	1414	1790	1968	2167	2268	2261	2242	2191	1929
Total private vehicles		124	421	845	1142	1357	1567	1747	1793	1781	1767	1740	1451
Total commercial vehicles		152	189	235	272	333	401	450	475	480	475	451	478

TABLE 7.23: Road vehicle accumulation space ratios (m^2/veh.)

ROAD VEHICLE	Parking/Stationing Space Per Vehicle m^2/veh.											
	7.00am	8.00am	9.00am	10.00am	11.00am	12 noon	1.00pm	2.00pm	3.00pm	4.00pm	5.00pm	6.00pm
Private vehicles	6.45	1.90	0.95	0.70	0.59	0.51	0.46	0.45	0.45	0.45	0.46	0.55
Commercial vehicles	35.52	28.57	22.98	19.85	16.22	13.47	12.00	11.37	11.25	11.37	11.98	11.30

"Vehicle parking spaces for disabled persons should be wider. For semi-ambulant persons, bay widths should be increased to 2700 or better, 2800 m; for wheelchair users, 3000-3100 m."

TABLE 7.24: Large vehicle approximate dimensions: (exact sizes may vary)

Vehicle	Length metre	Width metre	Overhang rear (OR)
Intercity bus	13.7	2.7	3.1
City bus	12.2	2.6	2.0
School bus	12.04	2.4	3.9
Ambulance	6.5	2.1	1.6
Paramedic van	5.5	2.0	1.5
Hearse	6.5	2.1	1.6
Airport limousine	6.9	1.9	0.9
Trash truck	8.6	2.4	1.8
UPS truck	7.1	2.3	2.5
Fire truck	9.6	2.5	3.0

After a comparison of the ratios in Table 7.23, page 327 , to the ratios (20-22 m^2/car for 90^o parking and 23-26 m^2/car for 45^o parking) recommended by Neufert Architect's data (1980), there was no hesitation in declaring that the parking and stationing of road vehicles situation in the CMP was very appalling.

TABLE 7.25: Road Vehicles (auto) registered in Kaduna State (1974-83) - ten years preceding year of study, 1984

Road Vehicles (Auto)		New Registration										
		1974	1975	1976	1977	1978	1979	1980	1981	1982	1983 estimate	total 1974-1983
Private Vehicles	Private car/van	2390	5444	1200	13095	11484	6248	4082	30292	33819	37757	145811
	Motor cycle	5345	9400	2413	26548	11845	14403	8262	26775	34265	43850	183106
Commercial Vehicles	Commercial vehicles	637	1802	590	8814	18457	2057	2538	25637	33670	44220	138422
	Taxi and Omnibus 1974-76 or Taxi 1977-83	461	664	316	704	829	395	391	8589	3874	1747	17970
	Omnibus only 1974-76 or Bus 1977-83	200	448	192	460	1499	402	941	13448	9691	6984	34265
Total (all auto vehicles)		9033	17758	4711	49621	44114	23505	16214	104741	115319	134558	519574

Total private vehicles	7735	14844	3613	39643	23329	20651	12344	57067	68084	81607	328917
Total commercial vehicles	1298	2914	1098	9978	20785	2854	3870	47674	47235	52951	190657

TABLE 7.26: Road vehicle traffic at the CMP for every 10,000 private or commercial vehicles registered in Kaduna State, Nigeria (1974-83)

Road Vehicles	Traffic										
	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm
Private vehicles	55	74	82	83	86	84	75	62	68	77	87
Commercial vehicles	114	152	152	144	141	123	119	116	123	122	138

TABLE 7.26(b): Hand cart traffic expressed as percentage of commercial vehicle traffic

	Traffic										
	7-8am	8-9am	9-10am	10-11am	11-12pm	12-1pm	1-2pm	2-3pm	3-4pm	4-5pm	5-6pm
Hand Cart	5.18	4.02	4.07	4.63	4.84	5.02	3.41	5.04	4.83	4.61	4.55

TABLE 7.27: Road vehicle accumulation at the CMP for every 10,000 private or commercial vehicles registered in Kaduna State, Nigeria (1974-83)

Road Vehicles	Accumulation											
	7.00am	8.00am	9.00am	10.00am	11.00am	12 noon	1.00pm	2.00pm	3.00pm	4.00pm	5.00pm	6.00pm
Private vehicles	4	13	26	35	41	48	53	55	54	53	52	44
Commercial vehicles	8	10	12	14	18	21	24	25	26	25	24	25
Hand carts	?	?	?	?	?	?	?	?	?	?	?	?

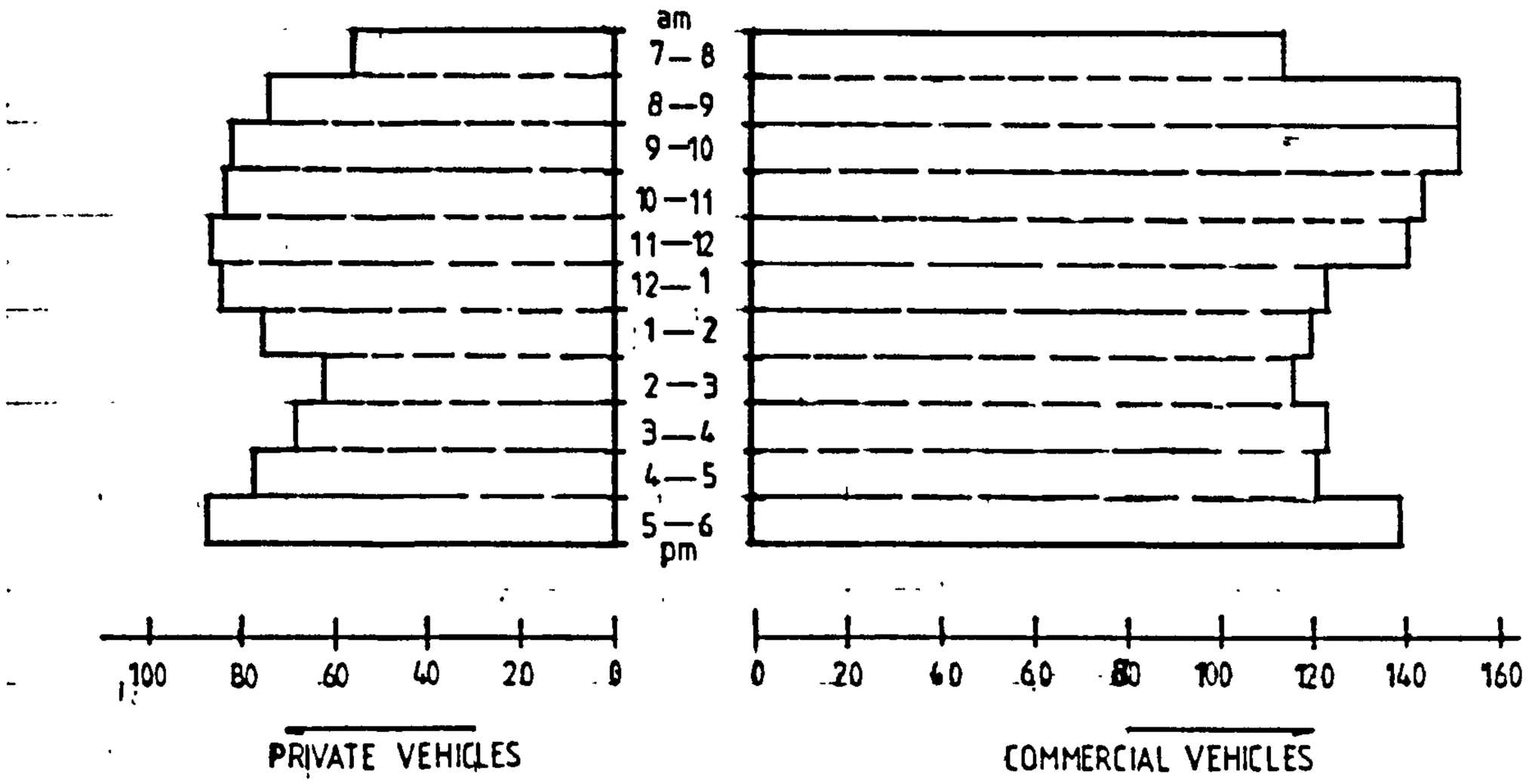


Figure 7.4.1: Mean Road Vehicle Traffic in Kaduna City CMP (1984) per 1000 Private or Commercial Vehicles Registered in Kaduna State; (1974- 1983)

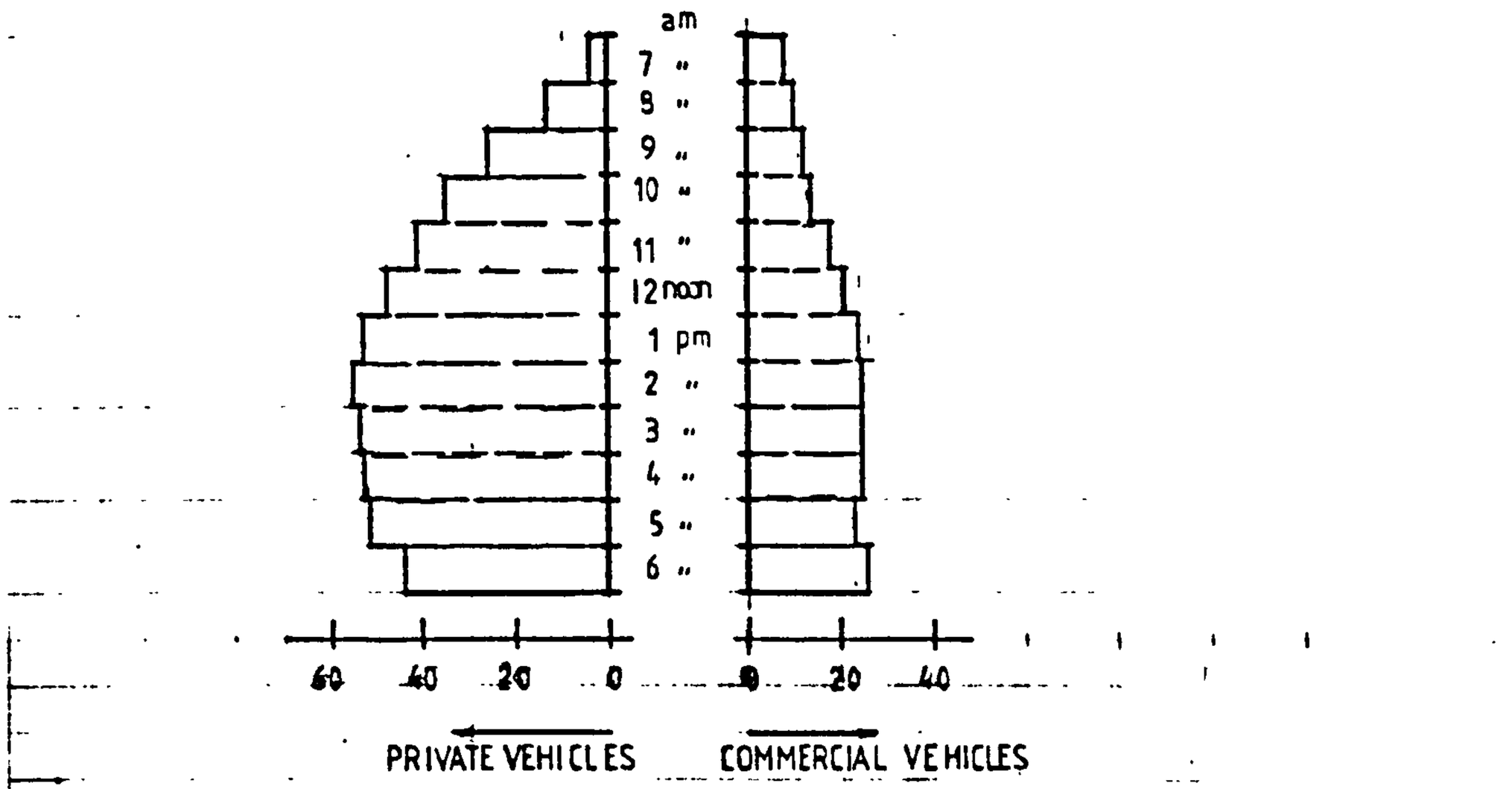


Figure 7.4.2: Mean Road Vehicle Accummulation in Kaduna City CMP (1984) per 1000 Private or Commercial Vehicles Registered in Kaduna State; (1974-1983)

7.1.4.3 Road Vehicle Traffic and Accumulation in the CMP as Products of Road Vehicle (auto) Registered in Kaduna State (1974-1984)

In stage 4.7 the data on road vehicles (auto) registered in Kaduna State (1974-1983) - ten years preceding the year of study, 1984, shown in Table 7.25, page 329 , are obtained from Kaduna State road vehicle registry, reference Appendices 7.5A and 7.5B, pages A100 and A101 . In stage 4.8 the road vehicle traffic and accumulation in the CMP are expressed in number of vehicles per 10,000, private or commercial vehicles registered in Kaduna State (1974-1983) and are shown in Tables 7.26 and 7.27, pages 330 and 331 . To facilitate vivid and easy citing, a stem-a-leaf of road vehicle traffic generated in the CMP for every 10,000 private or commercial vehicle registered in Kaduna State (1974-1983) is shown in Figure 7.4.1 page 332 . Similarly, a stem-a-leaf of road vehicle accumulation generated in the CMP for 10,000 private or commercial vehicles registered in Kaduna State (1974-1983) is shown in Figure 7.4.2, page 332.

7.1.5 Exploratory Analysis of the CMP Traders Marketing Behaviour and Attitude (Sector 5, Figure 7.5, page 345).

The structured interview questionnaire, Appendix 6.5.1, page A66 , administered to the CMP traders was coded on computer survey sheets in a systematic way, complying strictly to the codes, scores and columns specified in the questions. A data list file called 'SCCMPB' was thus created. The data exploration covered the two sections of the questionnaire, viz:

1. Stallage in the CMP - (5.2AB)
2. Marketing Activity in the CMP - (5.2CD)

From stage 5.2AB, the data on the size of stall floor-space that was required by a trader were isolated for analysis. The cases where the trader stipulated the required additional floor-space but expressed unwillingness to pay for the additional floor-space were ignored and not admitted into the analysis, because demand must include the ability and willingness to pay for the demanded goods, Wonnacott and Wonnacott, 1979.

In stage 5.3A, the mean size of stall floor-space demanded for the commodity classes are calculated and shown in column 2 of Table 7.28(a), page 335.
In stage 5.4A, the mean size of stall floor-space demanded for food and non-food are calculated and shown in column 3 of Table 7.28(a). In stage 5.5Am the mean size of stall floor-space demanded for food and non-food are expressed as percentage of observed stall floor space obtained in stage 1.6ZM, shown in column 4 of Table 7.28(a), and the percentages are shown in column 5 of the same table.

From stage 5.2AB, the data on the micro-details of stallage in the CMP were isolated for analysis.
The issues covered are specified in Table 7.28(b), page 336 . These issues are expressed by number of food and non-food traders, in stage 5.3B. In stage 5.4BM the number of food and non-food traders involved in these issues are expressed as percent of total number of food and non-food traders in the CMP, and these percentages are shown in Table 7.28(b).

From stage 5.2CD, the data on marketing activity are isolated as (i) marketing activity as characteristic

TABLE 7.28(a): Comparison of demanded stallage floor-space with the observed stallage floor-space in the CMP

MEAN DEMANDED STALLAGE FLOOR-SPACE 1	2	3	Observed Floor-space m^2 4	Demanded as percentage of observed floor-space 5	
01 Tubers	5.0				FOOD
02 Grains	5.3				
03 Flours	3.5				
04 Cooking oil	3.0				
05 Livestock	2.5				
06 Fresh meat	6				
07 Fresh fish	5.3				
08 Dried meat and fish	2.3				
09 Vegetables, fruits and nuts	3.2	5.2	5.3	0.98	
10 Spices	5.0				
11 Provisions (tinned foods)	5.3				
12 Snacks and mineral drinks	5.3				
13 Alcoholic drinks	5.2				
14 Tobacco	3.0				
15 Men's clothing	4.5				NON-FOOD
16 Women's clothing	5.0				
17 Children's clothing	4.0				
18 Shoes	4.0				
19 Furniture	4.3				
20 Electronics and electrical	5.2				
21 Plastics, dishes and glasses	5.0				
22 Leather goods	4.4				
23 Cooking utensils and tools	6.0				
24 Prams and cycles	5.2				
25 Cosmetics	3.5				
26 Chemists and drugs	5.3				
27 Toys and jewellery	6.5				
28 Books and stationery	6.0				
29 Building and construction materials	6.0	4.6	6.3	0.73	
30 Auto spare parts	5.2				
31 Bicycle spare parts	4.3				
32 Restaurants	3.0				
33 Hairdressing	5.2				
34 Pools betting	5.2				
35 Tailors and weavers workshops	5.0				
36 Laundry services	5.2				
37 Watch/shoe/bicycle repairs	3.0				
38 Electronics and electrical workshop	5.2				

TABLE 7.28(b): CMP Traders' desire to maintain their locations at the CMP

	Percent of Food Traders	Percent of Non-Food Traders
Traders who chose their location in the CMP	75.6	58.9
Traders who want to continue to remain in the CMP	97.8	93.2
Traders who accepted to locate on the first floor of a 3 storey market place	60.0	68.5
Traders who accepted to locate on the second floor of a 3 storey market place	42.2	54.8

FIGURE 7.4.3 ; Layout Plan of Kaduna City Central Market Place (CMP) in 1984

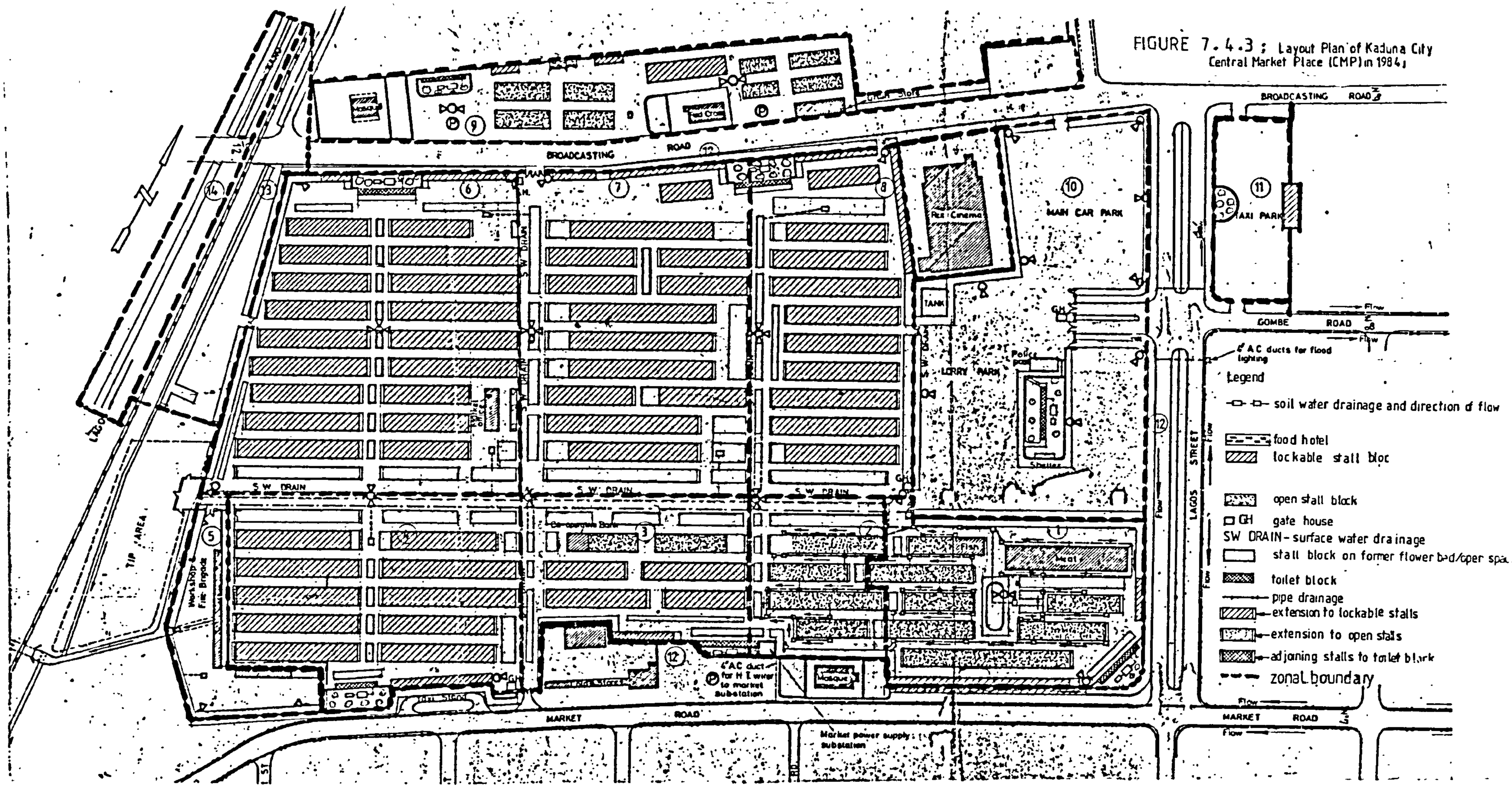


TABLE 7.29(a): Micro-Details of Trading Activity in the CMP.

TRADING ACTIVITY IN THE CMP	Percent of Food Traders	Percent of Non-Food Traders
1. Wares from locations inside the CMP	16.3	8.2
2. Wares from locations in Kaduna Capital Territory	29.6	10.5
3. Wares from locations in Kaduna State	14.0	1.0
4. Wares from locations in the other 9 Northern States	20.7	23.3
5. Wares from 4 Eastern States	7.4	26.5
6. Wares from Bendel and 4 Western States	11.9	26.0
7. Wares arriving at the CMP station by train	-	-
8. Wares arriving at the CMP station by motor trucks	31.6	37.0
9. Wares arriving at the CMP station by vans	49.4	39.0
10. Wares arriving at the CMP station by hand-truck	5.1	10.6
11. Wares arriving at the CMP station by motor cycle	2.5	-
12. Wares arriving at the CMP station by head loader	3.8	-
13. Wares arriving at the CMP station by wheelbarrow	6.3	4.9
14. Wares transported in Motor-truck to the stall	-	1.4
15. Wares transported in Motor-van to the stall	2.0	-
16. Wares transported on bicycle to the stall	3.0	-
17. Wares transported in hand trucks from the CMP station to the stall	30.7	27.7
18. Wares transported in wheelbarrow from the CMP station to the stall	31.1	31.8
19. Wares transported by head-loaders from the CMP station to the stall	28.1	31.4
20. Traders whose customers carry away their purchases in hand truck	4.4	0.6
21. Traders whose customers carry away their purchases in wheelbarrow	4.4	6.2
22. Traders whose customers carry away their purchases by head-loaders	45.5	8.9
23. Traders whose customers carry away their purchases as hand luggage	45.5	79.5
24. Traders who maintain 2 No. stalls in the CMP	4.4	6.8
25. Traders who maintain 3 No. stalls in the CMP	2.2	2.7
26. Traders who maintain 4 or more stalls in the CMP	-	1.4
27. Traders who have outlets outside the CMP	4.4	4.1
28. Traders who have assistants who squat inside the CMP	28.9	13.8
29. Traders who have assistants who squat outside the CMP	-	15.1
30. Traders who accept to put exact price tag on displayed commodity	35.6	28.8
31. Traders who take part in rotating capital contribution in the CMP	15.6	19.2

TABLE 7.29(b): Traders' Mode of Travel to the CMP

	Walk	Bicycle	Motor Cycle	Car-Van	Minibus	
Food Traders	13.3 28.6 5.1	6.7 75.0 2.5	17.8 50.0 6.8	6.7 21.4 2.5	55.6 39.7 21.2	- Row percentage - Column percentage - Total percentage
Non-Food Traders	20.5 71.4 12.7	1.4 25.0 .8	11.0 50.0 6.8	15.1 78.6 9.3	52.1 60.3 32.2	- Row percentage - Column percentage - Total percentage

TABLE 7.29(c): Times of Movement of Commodities into the Stalls in the CMP

	Before 7am	7am-12 noon	12-4pm	4-6.30pm	After 6.30pm	Any time 7am-6.30pm	ROW TOTAL
Food Traders	10.0	64.4	6.6	4.4	3.3	11.1	100.00
Non-Food Traders	4.8	50.7	15.6	4.1	1.4	37.8	100.00

TABLE 7.29(d): Number of Regular assistants in the Stall in the CMP

	Number of Regular Assistants							ROW TOTAL PERCENTAGE
	0	1	2	3	4	5	6	
Food Traders	53.3	22.2	13.3	4.4	4.4	2.2		100%
Non-Food Traders	20.5	43.8	27.4	4.1	1.4	1.4	1.4	100%

TABLE 7.29(e): Observed Level of Congestion of the Stall in the CMP

	Very Congested	Congested	Fairly Congested	Not Congested	Almost Empty	Not Sure	ROW TOTAL PERCENTAGE
Food Traders	15.6	42.2	28.9	4.4	6.7	2.2	100%
Non-Food Traders	12.3	37.0	35.6	6.8	5.5	2.7	100%

TABLE 7.29(f): Previous Locations of CMP Traders

	Central Market Place	Tudun Wada Market Place	Makera Kurmin Gwari Market Place	Barnawa Market Place	Panteka Market Place	Kawo Talata Market Place	Ungwan Rimi Market Place	Ahmadu Bello Way	Lagos Street	Ibadan Street	Ibrahim Taiwo Road	Ungwan Shanu Market Place	Outside Kaduna City	ROW TOTAL PERCENTAGES
Food Traders	51.1	13.3			6.7	2.2	4.4					4.4	17.8	100%
Non-food Traders	35.6	19.2	1.4	2.7	1.4		2.7	1.4	1.4	2.7	2.7		28.8	100%

TABLE 7.29(a): Floor-Levels (of a three level market place structure) on which commodities are preferred by the shoppers

FLOOR-LEVEL OF THE THREE STOREY MARKET PLACE STRUCTURE	Tubers	Grains	Flours	Cooking oil	Livestock	Fresh meat	Fresh fish	Dried meat and fish	Vegetables fruits and nuts	Spices	Provisions (tinned foods)	Snacks and mineral drinks	Alcoholic drinks	Tobacco	Men's clothing	Women's clothing	Children's clothing	Shoes	Furniture	Electronics and Electrical	Plastics, dishes and glasses	Leather goods	Cooking utensils and tools	Press, cycles	Cosmetics	Chemists and drugs	Toys and jewellery	Books and stationery	Building and construction materials	Auto spare-parts	Bicycle spart-parts	Restaurants	Hairdressing	Pools betting	Tailors and weavers workshops	Laundry services	Watch/shoe/ bicycle repairs	Electronics and electrical repairs	ROY TOTAL PERCENTAGE
GROUND % of Respon-ses	13.6	13.4	9.1	13.4	8.8	11.8	7.0	6.7	11.5	1.1	2.4	.5	-	-	-	.0	-	-	.0	.0	-	-	.4	.0	-	.0	-	-	-	-	-	.0	.0	-	-	-	-	-	100%
FIRST % of Respon-ses	.1	.0	.2	.1	.0	.1	.3	.6	.5	1.9	8.5	6.4	4.1	3.9	4.9	5.2	4.8	4.6	.6	3.0	4.5	6.4	7.3	5.1	9.0	7.5	2.8	4.3	.5	.4	.1	.1	.3	.0	.4	.1	.5	.5	100%
SECOND % of Respon-ses	-	-	-	-	-	-	-	-	-	.1	.1	.9	.7	1.4	11.2	11.3	11.2	11.2	.4	8.5	2.1	3.1	2.5	1.9	4.6	5.8	5.9	4.9	.9	.8	.4	.7	.7	.1	1.7	.4	2.6	2.2	100%

SECTOR 1

CLASSIFICATION OF ACTIVITY SPACES AND OF THE TRADERS IN CITY MARKET PLACES

SECTOR 5

CITY CENTRAL MARKET PLACE TRADERS MARKETING BEHAVIOUR AND ATTITUDE

SECTOR 4

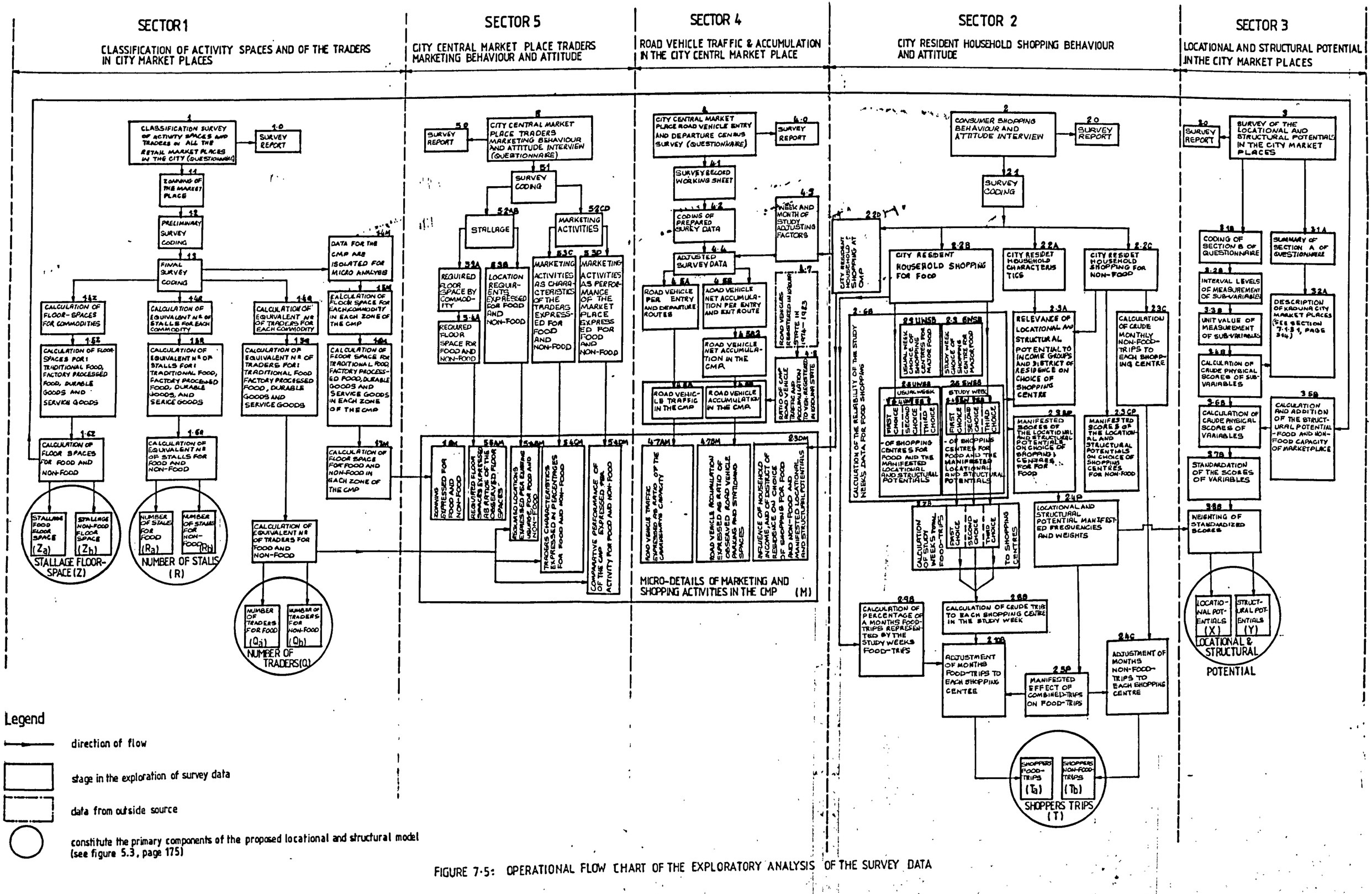
ROAD VEHICLE TRAFFIC & ACCUMULATION IN THE CITY CENTRL MARKET PLACE

SECTOR 2

CITY RESIDENT HOUSEHOLD SHOPPING BEHAVIOUR AND ATTITUDE

SECTOR 3

LOCATIONAL AND STRUCTURAL POTENTIAL IN THE CITY MARKET PLACES



Legend

- direction of flow
- stage in the exploration of survey data
- data from outside source
- constitute the primary components of the proposed locational and structural model (see figure 5.3, page 175)

FIGURE 7·5: OPERATIONAL FLOW CHART OF THE EXPLORATORY ANALYSIS OF THE SURVEY DATA

of the traders, stage 5.3C, and (ii) marketing activity as performance of the market place, stage 5.3D. The issues covered in stage 5.3C are specified in Table 7.29(a) page 338 , and the issues covered in stage 5.3D are specified in Table 7.29(b-g), pages 339 to 344. These issues are expressed by the number of food and non-food traders involved. In stages 5.4CM and 5.4DM, these numbers of food and non-food traders involved in those issues are expressed as percentages of total number of food and non-food traders in the CMP. The % increases of the issues covered in marketing activity as performance of the market place are discussed in section 7.2.2, pages 361-362.

7.2 Examination of the Hierarchical Relationships Between any Pairs of the Specific Demands and Supplies of Activity Spaces

In the preceding section, the magnitudes of the following specific demands and supplies of activity spaces in Kaduna city market places were described; (see Figure 7.1 , page 286)

1. The shoppers food-trips (T_a), and non-food-trips (T_b)
2. The stallage food floor-space (Z_a), and non-food floor-space (Z_b)
3. The numbers of food stalls (R_a), and non-food stalls (R_b)
4. The numbers of food traders (Q_a), and non-food traders (Q_b)

The 1984 data obtained for the above 8 specific demands and supply of activity spaces in Kaduna city market places are shown in Tables 7.9, 7.1, 7.2, 7.3, pages 304, 291, 291, 293, respectively.

This section is devoted to the examination of the form of the hierarchical continuum in, and the strength of the relationship between any pair of the specific demand and supply of activity spaces in respect of food shopping. Also examined is the form of the hierarchical continuum in, and the strength of, the relationship between any pair of the specific demand and supply of activity spaces in respect of non-food shopping. These relationships constitute the 6 pairs of hierarchical relationships of the proposed Locational and Structural Potential Model; (see Figure 7.6, page 348). The 6 pairs of hierarchical relationships to be examined had been listed in Table 5.3, page 179 .

These hierarchical relationships were expressed in section 5.4.1, page 160 , in the following generic equations.

$$D_{a_1} = \alpha D_{a_2} + C_a \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1a)$$

$$D_{b_1} = \beta D_{b_2} + C_b \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1b)$$

where 'a' and 'b' are notations to indicate:

(1a) 'a' for food shopping

(1b) 'b' for non-food shopping

'a' and 'b' are treated as parts of the letters preceding them, that is:

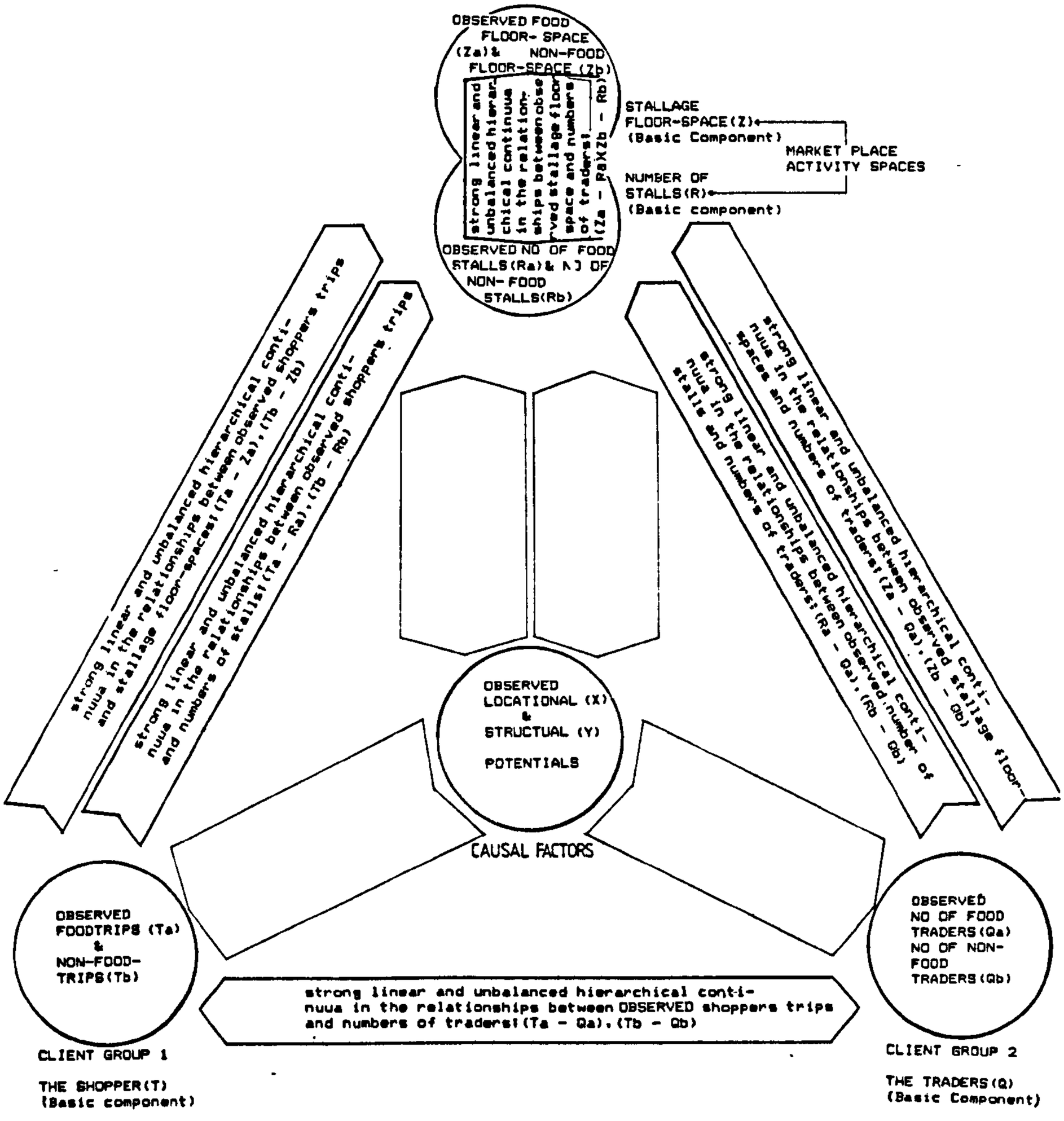


Figure 7.6 :PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL:-Stage 2

1a. There is strong linear and unbalanced hierarchical continuum in the relationship between any observed pair of demand and supply of activity spaces, for food shopping.

1b. There is strong linear and unbalanced hierarchical continuum in the relationship between any observed pair of demand and supply of activity spaces, for non-food shopping.

Note : Arrow indicates direction of Influence.

D_{a_1} and D_{a_2} are a pair of demand and supply of activity spaces for food shopping and are called 'food like-pair'

D_{b_1} and D_{b_2} are a paid of demand and supply of activity spaces for non-food shopping and are called 'non-food like-pair'

D_{a_1} and D_{a_2} may be substituted with any pair of these, (T_a, Z_a, R_a and Q_a) to give 6 independent equations.

D_{b_1} and D_{b_2} may be substituted with any pair of these (T_b, Z_b, R_b and Q_b) to give 6 independent equations.

The rest of this section is devoted to the calibration of those 12 hierarchical equations and to the interpretation of their scatter-plots.

To confirm the above hierarchical relationships between the like-pairs of the specific components of the Locational and Structural Potential Model, for Kaduna city, STATISTICAL PACKAGE FOR SOCIAL SCIENCES (X version), SPSS-X, was employed on the VAX computer to run SIMPLE REGRESSION ANALYSES and SCATTERGRAMS of the pairs of corresponding variables as enunciated in the 6 pairs of hierarchical relationships, (see Figure 7.6, page 348). The computer outputs and the interpretation are described in the succeeding pages.

7.2.1 Simple Regression Analyses of Specific Components of the Four Basic Cells of the Model

Simple regression analyses of pairs of the like variables in Table 5.3, page 179 , the specific components of the four basic cells of the model, produced the correlation matrix shown in Table 7.30, page 351 . A close examination of the correlation matrix reveals a high inter-correlation among food-trips, non-food-trips, stallage food floor-space, stallage non-food floor-space, number of food stalls, number of non-food stalls, number of food-traders, and number of non-food traders. The only exception was stallage non-food floor-space (Z_b) which was poorly correlated with every other variable. This was due to the extraordinary nature of non-food floor-space in the special market places - the Railway Station and the Panteka Market Places. When the non-food floor-spaces of these two market places were removed from the regression analysis, it was found that non-food floor-space correlated with other variables very strongly.

The strong inter-correlation among the specific food and non-food components of the model suggest linearity and homogeneity of variance among these specific components. This implies the existence of some sort of scale or hierarchy among the city retail market places. The linearity and homogeneity of variance among the specific components of the model's basic cells is confirmed by judging how well the scatter-plots in Figures 7.7 (1, 1a and 1b), pages 353-354, and also in the figures in Appendices A.7.2.(1-5), pages A102 - A120 fit straight lines. The exact nature of the implied scale or hierarchy in the city's market

Correlation:

		KTAA	KTBB	KZAA	KZBB	KRAA	KRBB	KQAA	KQBB
THE SHOPPERS FOODTRIPS	- KTAA	1.000							
THE SHOPPERS NON-FOOD-TRIPS	- KTBB	.923	1.000						
THE STALLAGE FOOD FLOOR-SPACE	- KZAA	.991	.889	1.000					
THE STALLAGE NON-FOOD FLOOR-SPACE	- KZBB	.386	.483	.363	1.000				
THE NUMBER OF FOOD STALLS	- KRAA	.960	.798	.982	.272	1.000			
THE NUMBER OF NON- FOOD STALLS	- KRBB	.947	.929	.953	.394	.892	1.000		
THE NUMBER OF FOOD TRADERS	- KQAA	.971	.823	.990	.289	.999	.913	1.000	
THE NUMBER OF NON-FOOD TRADERS	- KQBB	.955	.961	.951	.415	.883	.995	.905	1.000

TABLE 7.30: Correlation Matrix of the Specific Components of Demand and Supply of Activity Spaces.

place system was examined in detail in the scattergrams of like-pairs specific components of the model. The hierarchical relationship examined are the 12 listed in Table 5.3, page 179. The detailed examination of the hierarchical relationships between the shoppers trips and the stallage floor-spaces are given in the next section 7.2.1.1 below.

7.2.1.1 Hierarchical Relationships Between Shoppers' Trips and Stallage Floor-Spaces $(T_a - Z_a, T_b - Z_b)$;

The computer output T_a-Z_a in Figure 7.7.1 , page 353 indicates the predictable strong relationship between trips for food and food floor-space. The interesting thing shown by the scatterplot is where one case, the CMP, has far greater values on both variables than all the others. Since its values are far removed from the others, the majority of cases appear bunched together in order to permit the atypical case to appear on the same plot. Though this case has such atypically high values, it is not an outlier as shown by the standardized scatterplots in Figure 7.7.1a , page 354. This indicates that although the atypical case is estranged, it belongs to the same family of data. From Figure 7.7.1 , there appears to be a positive association between shoppers food-trips and food floor-space. That is, as the amount of food floor-space increases, so does the food-trips, with correlation coefficient 'r' of 0.99 and 'r^2' of 0.98. The relationship between food floor-space and food-trips may also be termed linear, since the observed points cluster more or less around a straight line of slope = 0.1304 and of intercept on the Y axis = -159.67. The overall relationship is said to be significant as shown by the significance statistics of 0.0000.

HIERARCHICAL RELATIONSHIPS BETWEEN SHOPPING TRIP AND STALLAGE FLOOR SPACE

SHOPPING TRIP

16000 12000 8000 4000 0

0 5000 10000 15000 20000 25000 30000 35000 40000 45000 50000

STALLAGE FLOOR SPACE (M^2)

□ FOOD SHOPPING
+ NON-FOOD SHOPPING

PMP

Fig. 7.7.1

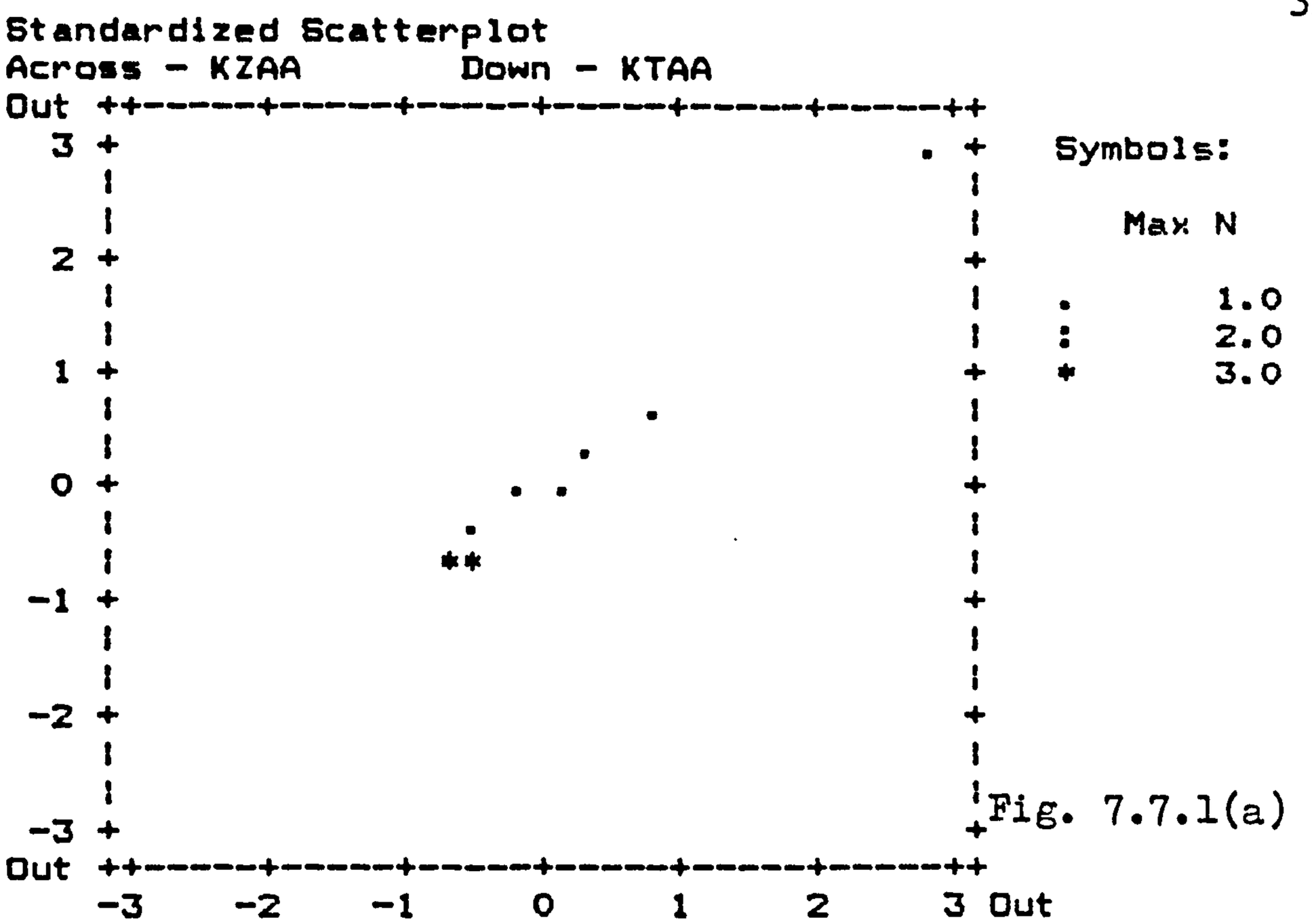


Fig. 7.7.1(a)

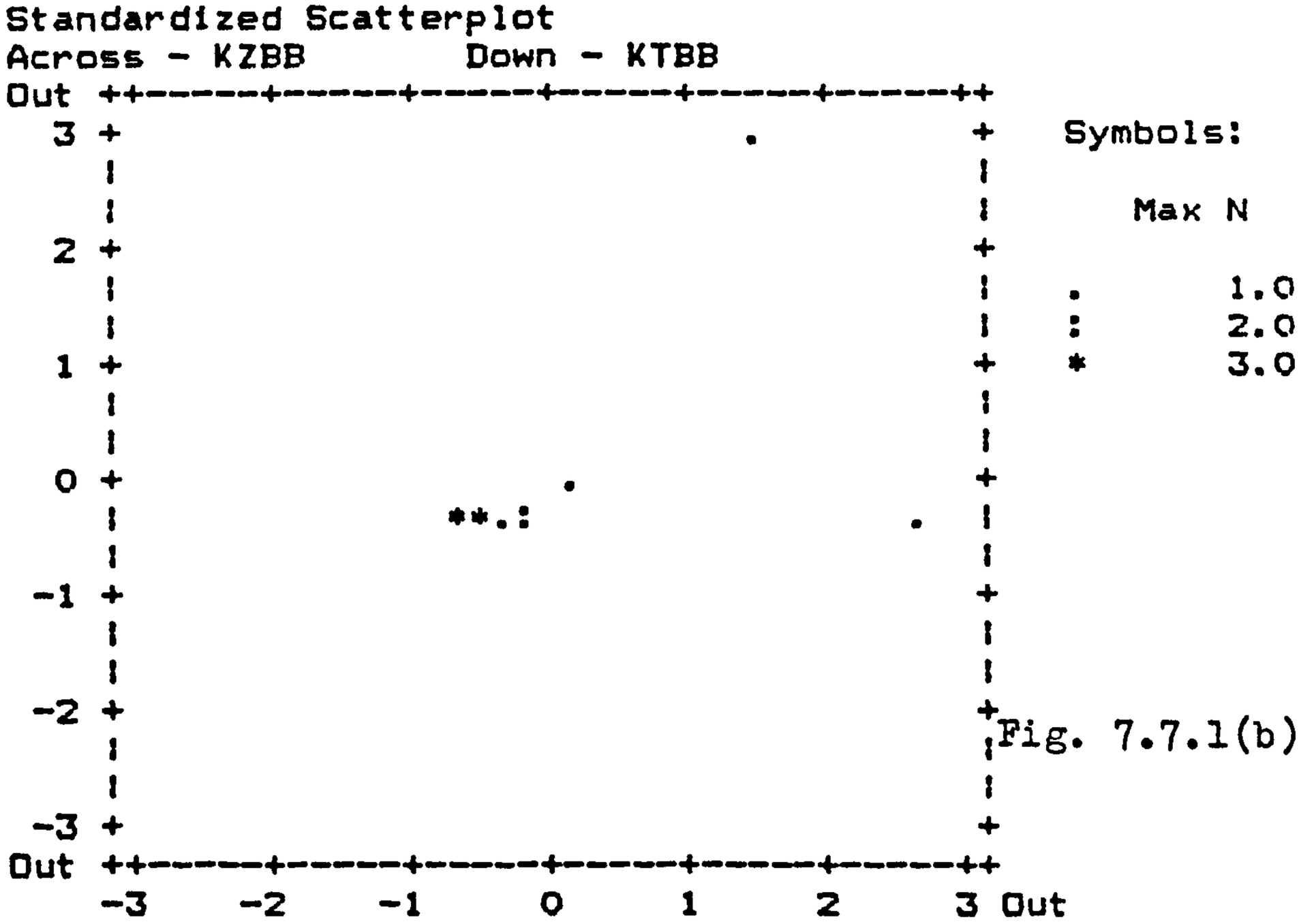


Fig. 7.7.1(b)

Legend:

KTAA - THE SHOPPERS FOODTRIPS
KTBB - THE SHOPPERS NON-FOOD-TRIPS
KZAA - THE STALLAGE FOOD FLOOR-SPACE
KZBB - THE STALLAGE NON-FOOD FLOOR-SPACE

The computer print-out T_b-Z_b in Figure 7.7.1, page 353, indicates the expected strong relationship between trips for non-food and non-food floor-spaces. Again, an interesting thing is shown by the scatter-plot where one case CMP has far greater values on both variables than all the others, and another one case has far greater value on non-food floor-space with corresponding little value on non-food-trips. The latter case is the Panteka Market Place which is an abnormal retail market place, being a specialized market place for building and construction materials, second hand auto spare parts and technical workshops. Therefore, this market place does not open its doors to the majority of the residents. However, the consequence of the atypical cases is that majority of cases appear bunched together in order to permit them to appear on the same plot. For example, the 2 in Figure 7.7.1a represents two market places, each having the same values on either axis. However, Tables 7.1 and 7.9, pages 291 and 304 do not show any two market places having the same values. The standardized scatterplot in Figure 7.7.1b, page 354 indicates, however, that these two atypical cases are not outliers, but belong to data family. From Figure 7.7.1 there appears to be a weak positive association between shoppers non-food trips and non-food floor-spaces with correlation coefficient 'r' of 0.48 and 'r^2' of 0.23. The relationships appear weak because of the Panteka Market Place having abnormally high value of non-food floor-space and very few non-food-trips. With Panteka Market Place removed from the regression analysis, the scatterplots show that, for the other market places, there is a strong positive relationship between the shoppers' non-food-trips and the stallage non-food floor-space.

The summary statistics are entered in Tables 7.31(a & b), pages 356 and 357; and the other hierarchical relationships are examined in a similar manner in the succeeding pages.

7.2.1.2 The Other 5 Pairs of Hierarchical Relationships Between the Specific Components of the Four Basic Cells of the Model

The general idea adopted in the examination of the above hierarchical relationships between the shoppers trips and the stallage floor-space is systematically applied in the examination of the other 5 pairs of hierarchical relationships between the specific components of demand and supply of activity spaces in the urban market places. The examinations are detailed in the Appendices as follows:

Appendix	Hierarchical Relationship Between
A.7.2.1	Shoppers Trips and Number of Stalls ($T_a - R_a$, $T_b - R_b$); pages A102 to A105
A.7.2.2	Stallage Floor-Space and the Number of Stalls ($Z_a - R_a$, $Z_b - R_b$); pages A105 to A109
A.7.2.3	Stallage Floor-Space and the Number of Stalls ($Z_a - Q_a$, $Z_b - Q_b$); pages A109 to A113
A.7.2.4	Number of Stalls and Number of Traders ($Q_a - R_a$, $Q_b - R_b$); pages A113 to A116
A.7.2.5	Shoppers' Trips and Number of Traders ($T_a - Q_a$, $T_b - Q_b$); pages A117 to A120

The findings from the examination of the 6 hierarchical relationships are summarized in the next section, 7.2.2; the situation in the distribution of demand and supply of activity spaces among Kaduna city market places, page 359.

TABLE 7.31(a): Summary Statistics of the Relationships Between Like-Pairs of Demand and Supply of Activity Spaces for Food Shopping

Statistic	T_a-Z_a	T_a-R_a	Z_a-R_a	Z_a-Q_a	Q_a-R_a	T_a-Q_a
	1.1a	1.2a	1.3a	1.4a	1.5a	1.6a
	Hierarchical Relationship Between Shoppers Food-Trips and the Food Floor-Space	Hierarchical Relationship Between Shoppers Food-Trips and the Number of Food-Stalls	Hierarchical Relationship Between Food Floor-Space and the Number of Food-Stalls	Hierarchical Relationship Between Food Floor-Space and the Number of Food-Traders	Hierarchical Relationship Between Number of Food Traders and the Number of Food Stalls	Hierarchical Relationship Between Shoppers Food-Trips and the Number of Food-Traders
r	.9905	.9598	.9817	.9897	.9951	.9706
r^2	.9811	.9212	.9637	.9795	.9902	.9421
Sign F	.0000	.0000	.0000	.0000	.0000	.0000
SE. of EST.	100	204	1052	790	203	175
C_a	-160	-112	317	317	-116	-113
α	.1304	.5906	4.589	4.288	1.320	.5534

TABLE 7.31(b): Summary Statistics of the Relationships Between Like-Pairs of Demand and Supply of Activity Spaces for Non-Food Shopping

Statistic	T_b-Z_b	T_b-R_b	Z_b-R_b	Z_b-Q_b	Q_b-R_b	T_b-Q_b
	1.1b	1.2b	1.3b	1.4b	1.5b	1.6b
	Hierarchical Relationship Between Shoppers Non-Food-Trips and the Non-Food Floor-Space	Hierarchical Relationship Between Shoppers Non-Food-Trips and the Number of Non-Food-Stalls	Hierarchical Relationship Between Non-Food Floor-Space and the Number of Non-Food-Stalls	Hierarchical Relationship Between Non-Food Floor-Space and the Number of Non-Food Traders	Hierarchical Relationship Between Number of Non-Food Traders and the Number of Non-Food Stalls	Hierarchical Relationship Between Shoppers Non-Food-Trips and the Number of Non-Food Traders
	3	5	7	9	10	13
r	:4831 .9484*	.9295	.3938 .9731*	.4146 .9781*	.9987	.9605
r^2	.2334 .8995*	.8639	.1551 .9470*	.1719 .9566*	.9973	.9226
Sign F	.0558 .0000*	.0000	.1027 .0000*	.0901 .0000*	.0000	.0000
SE. of EST	729 1430*	307	14879 2263*	14730 2049*	66	232
C_b	42 -1129*	-162	6145 349*	6348 940*	-6	-129
β	:0248 .4349*	.4993	4.115 5.9704*	3.265 4.505*	1.078	.3889

* Summary Statistics of the Relationship when Panteka Market Place (PMP) was omitted in the simple regression analysis.

7.2.2 The Situation in the Distribution of Demand and Supply of Activity Spaces among Kaduna City Market Places

From the description cum explanation in sections 7.2.1. above, some important facts have emerged and can be distilled for future use in the development of the argument. The Tables 7.31(a & b), page showed the summary statistics obtained in the examination of the six pairs of the hierarchical relationships of the proposed locational and structural potential model, stage 2, shown in Figure 7.6, page 348 . After allowing for the aberrations in the non-food floor-spaces, caused by the building and construction material depots at the Railway Station and Panteka Market Places, it could be seen that the summary statistics overwhelmingly confirm that:

There is a strong linear relationship between any of these like-pairs of demand and supply of activity spaces, viz:

1.1a the shoppers food-trips and the stallage food floor-space, $(T_a - Z_a)$

1.1b the shoppers non-food-trips and the stallage non-food floor-space, $(T_b - Z_b)$

1.2a the shoppers food-trips and the number of food stalls, $(T_a - R_a)$

1.2b the shoppers non-food trips and the number of non-food stalls, $(T_b - R_b)$

1.3a the stallage food floor-space and the number of food stalls, $(Z_a - R_a)$

1.3b the stallage food floor-space and the number of non-food stalls, $(Z_b - R_b)$

1.4a the stallage food floor-space and the number of food traders, $(Z_a - Q_a)$

1.4b the stallage non-food floor-space and the number of food-traders, $(Z_b - Q_b)$

1.5a the number of food stalls and the number of food traders $(R_a - Q_a)$

1.5b the number of non-food stalls and the number of non-food traders, $(R_b - Q_b)$

1.6a the shoppers food-trips and the number of food-traders $(T_a - Q_a)$

1.6b the shoppers non-food-trips and the number of non-food traders, $(T_b - Q_b)$

The examination of the standardized scatterplots and scattergrams of the above 6 pairs of the specific demand for and supply of activity spaces strongly and also unanimously revealed that, although the CMP has atypically far greater values on both variables than all the other city retail market places, it is not an outlier and not statistically different. But since its values are far removed from the others, the majority of the cases appear bunched together in order to permit the atypical CMP to appear on the same plot. These plots, 24 in number, unequivocally revealed a big gap between the CMP at the upper extreme and the other market places at the lower extreme. The fact that the plots of the market places consistently fell into two main discrete groups, instead of forming expected hierarchical continuua, was a sign of 'imbalance' in the distribution of demand and supply of activity spaces among the market places. Since the CMP is not

an outlier and not statistically different from the other market places, the imbalance must be due only to high concentration, in the CMP, of the like-pairs of the demand and supply of activity, in the proportions similar to those found in the other market places.

The phenomenal impact of the concentration of those specific components is revealed in the comparison of the stallage floor-spaces, the number of stalls and the number of traders in the CMP in 1984 and 1977, see Table 6.4, page 224 . (1977 was selected because it was the year the 1975 reconstructed CMP stalls were fully allocated). In the 7 year period the stallage floor-spaces for food and non-food increased by 256.8% and 88.4% respectively, the number of stalls for food and non-food increased by 277.7% and 170.4% respectively, and the number of traders for food and non-food increased by 316.2% and 264.9% respectively. Those percentages show that the demand for food shopping at the CMP has increased at a rate much faster than for non-food. With reference to page 131 para. 2 of this thesis, this situation is contrary to "central place theory". According to central place theory, the CMP being at the apex of the city's retail trade, should provide for non-food shopping than for food shopping, and the rate of growth of demand for food shopping ought to be less than that for non-food. The implication of the above contradiction is that the lower market places in the hierarchy have failed in their duty to provide a great portion of the city's demand for food shopping.

The above increase percentages are alarming in themselves. The city decision takers recognized the problem and the need to provide additional activity spaces to accommodate

the increased demand for activity spaces in the CMP. But not aware of the complex interrelationships between the demand for activity spaces and the locational and structural potentials in the city retail market place system, reactionary and spontaneous measures were adopted to achieve additional stallage floor-spaces and number of stalls in the CMP. Those reactionary and spontaneous measures were:

1. squeezing in temporary stalls in any available open space;
2. construction of temporary stalls on designed flower beds and on storm water drainage channels;
3. construction of temporary stalls on some portions of designed shoppers access and circulation pathways;
4. adjoining temporary stalls to lavatory blocks;
5. erection of temporary stalls too close to the railway;
6. traders usurption of shoppers access and circulation pathways by organized squatting;
7. parking of private vehicles and stationing of commercial vehicles on thoroughfares in the CMP vicinity.
8. extension of existing stall blocks into the shopping malls.

All those measures were taken within the 1975 designed boundary of the CMP. The effect of the above reactionary and spontaneous measures is that additional stallage floor-spaces and number of stalls were achieved at the expense of the subservient stallage and accessibility floor-spaces which have diminished by

28,331 square metres, i.e. the amount by which the stallage food and non-food floor-spaces have increased; see Appendix 6.1.2 page A6 and Table 6.4, page 224 . The increased number of traders and shoppers trips coupled by the diminished sizes of the subservient stallage and accessibility floor-spaces have caused overcrowding of people and activities in the subservient stallage and accessibility floor-spaces. The unbalanced demand and supply for activity spaces in the market places are manifested in the pressures of demand and supply shown in Table 7.32, page 364

The ratios in columns 10 and 11 do not reflect any significant differences, implying that for the used parts of the market places the trader/stall ratios are the same for all the market places. However, these ratios do not include vacant stalls and stalls under construction. The stall vacancy ratios are shown in columns 16 and 17. These ratios are in reverse order of the economic performance of the market places - with the highest for the L/NMP and the lowest for the CMP. Again the stalls under construction ratios in columns 18 and 19 indicate nil for the other market places except the CMP where some new stalls are under construction, see Plate 6.14.2, page 283.

In columns 12 and 13 of the same table, the high figures for Makera-Kurmin Gwari and Kawo-Talata market places are due to the periodic aspects of these market places. The periodic aspects are open space market place where many of the traders have only to stand or sit down beside one or two baskets of food stuffs he or she brought for sale in the periodic market place. This tends to push up the trader/floor-space ratios

TABLE 7.12: Proportions Between Like-Pairs of the Specific Components of Demand and Supply of Activity Space

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Code of Market Place	Name of Market Place	Market Place Sub-Group	Ratio of the Shoppers' Food-Trip To No. of Food Traders (Persons Per Hour	Ratio of the Shoppers' Non-Food-Trip To No. of Non-Food Traders (Persons Per Hour)	Ratio of the Shoppers' Food-Trips To Stallage Food Floor-Space (Person Per m^2)	Ratio of the Shoppers' Non-Food-Trip To Stallage Non-Food Floor-Space (Persons Per m^2)	Ratio of the Shoppers' Food-Trip To No. of Food-Stalls (Persons Per Stall Per Hour)	Ratio of the Shoppers' Non-Food-Trip To No. of Non-Food-Stalls (Persons Per Stall Per Hour)	Ratio of Food-Traders To Food-Stalls (Persons Per Stall)	Ratio of Non-Food-Traders To Non-Food-Stalls (Persons Per Stall)	Ratio of Food-Traders To Stallage Food Floor-Space (Persons Per m^2)	Ratio of Non-Food Traders To Stallage Non-Food Floor-Space (Persons Per m^2)	Ratio of Stallage Food Floor-Space To No. of Food-Stalls (m^2 Per Stall)	Ratio of Stallage Non-Food Floor-Space To No. of Non-Food Stalls (m^2 Per Stall)	Ratio of Vacant Number of Stalls To the Total Number of Stalls	Ratio of Vacant Stallage Floor-Space To the Total Stallage Floor-Space	Ratio of the Number of New Stalls Under Construction to the Total Number of Stalls	Ratio of Stallage New Floor-Space Under Construction to the Total Stallage Floor-Space	Ratio of the Number of Squatting Food Traders To the Number of Food Traders Occupying Stalls	Ratio of the Number of Squatting Non-Food Traders To the Number of Non-Food Traders Occupying Stalls
11	CMP	CMP	3.07	2.08	.66	.45	3.38	2.81	1.10	1.35	.21	.22	5.14	6.27	.00	.00	.00	.00	.09	.26
21	RBMP	PMP	3.00	.90	.64	.02	3.25	.94	1.08	1.10	.21	.02	5.11	48.78	.06	.00	.00	.00	.08	.09
22	PMP	SMPs	.	.	.03	.01	.	.	.	.	.	.	.	.	.	.	.	.	.	.
31	M-KOMP		1.74	.38	.42	.09	1.84	.41	1.06	1.10	.24	.17	4.38	4.84	.05	.06	.00	.00	.09	.09
32	TMMP		2.09	.67	.41	.12	2.45	.69	1.17	1.03	.20	.17	5.94	6.00	.04	.04	.00	.00	.15	.06
33	K-TMP	DMPs	1.88	.24	.52	.04	1.90	.24	1.01	1.01	.27	.25	3.68	4.07	.01	.02	.00	.00	.01	.03
34	URMP		1.51	.93	.27	.17	1.91	1.01	1.07	1.06	.18	.18	5.94	6.00	.53	.53	.00	.00	.06	.01
41	BMP		.80	.41	.14	.07	.82	.42	1.02	1.02	.17	.17	6.00	6.00	.17	.17	.00	.00	.02	.02
42	UTMP		.00	1.10	.00	.21	.00	1.18	1.06	1.08	.22	.19	4.85	5.99	.43	.52	.00	.00	.02	.02
43	BDMP	L/MMPs	1.58	.88	.27	.00	1.83	.90	1.03	1.02	.17	.17	6.01	6.01	.81	.80	.00	.00	.02	.07
44	USMP		.81	.00	.14	.00	.00	.00	1.02	1.02	.17	.17	5.99	5.99	.77	.77	.00	.00	.02	.02
45	KGMP		.91	.02	.16	.00	.94	.02	1.04	1.02	.17	.17	6.01	6.00	.99	.99	.00	.00	.04	.02

for these two market places, and push down their floor-space/stall ratios.

The implication of the ratios in columns 10 - 15 inclusive is that the reactionary and spontaneous measures adopted to achieve additional demanded stallage has been able to maintain in the CMP the same ratios between stallage floor-space, number of stalls, and number of traders as is the case in the rest of Kaduna market places.

Based on the assumption that the amount of time consumed in actual shopping is directly proportional to the amount of money spent, the ratios in columns 4 to 9 inclusive represent the relative economic performances of Kaduna city market places. The zero performance on food shopping for Ungwan Television Market Place could be due to sampling error. Also data was not obtained on the numbers of stalls and traders in Panteka Market Place because its physical structure did not permit that.

In this section it has been confirmed that there are strong linear relationships between the like-pairs of the specific demand and supply of activity spaces in Kaduna market places. Confirmed also is that there are unbalanced hierarchical continuua in those relationships. In the next section, 7.3, are examined the causal influences which brought about the unbalanced distribution of the demand and supply of activities to create the above state of affairs.

7.3 Examination of the Causal Relationships Between Rates of the Demand or Supply of Activity Spaces, and the Locational and Structural Potential in the Market Places

The purpose of this tertiary analysis is to calibrate the equations, that arise from the proposed causal relationships between the growth rates of the demand or supply of activity spaces, and the locational and structural potential in Kaduna city market places. See Figure 7.7, page 367 , (proposed locational and structural potential model - stage 3). These causal relationships had been stipulated in Table 5.4, page 180 . The 1977 and 1984 data for the specific demand and supply of activity spaces are shown in Tables 7.9, 7.1 , 7. 2 , 7.3, pages 304, 291, 291, 293 , respectively. From those data the growth rates of the specific demand and supply of activity spaces may be calculated for the period 1977-1984. The locational and structural potentials are listed in Table 5.2, page 177, and their data for Kaduna city market places are shown in Tables 7.16(a) and 7.16(b), page 313.
In Kaduna city market places the locational potentials (X) were found to be 6 in number, and the structural potentials (Y) 8 in number; (i.e. n = 6, and m = 8). With reference to section 5.4.2, page 171 , the generic predictive equation (2) may be written for Kaduna city market places as follows:

$$\delta D_o = \left[L_1X_1^i + L_2X_2^i + \ldots + L_5X_5^i + L_6X_6^i\right] + \left[S_1Y_1^i + S_2Y_2^i + \ldots + S_7Y_7^i + S_8Y_8^i\right] + K + E \quad (2)$$

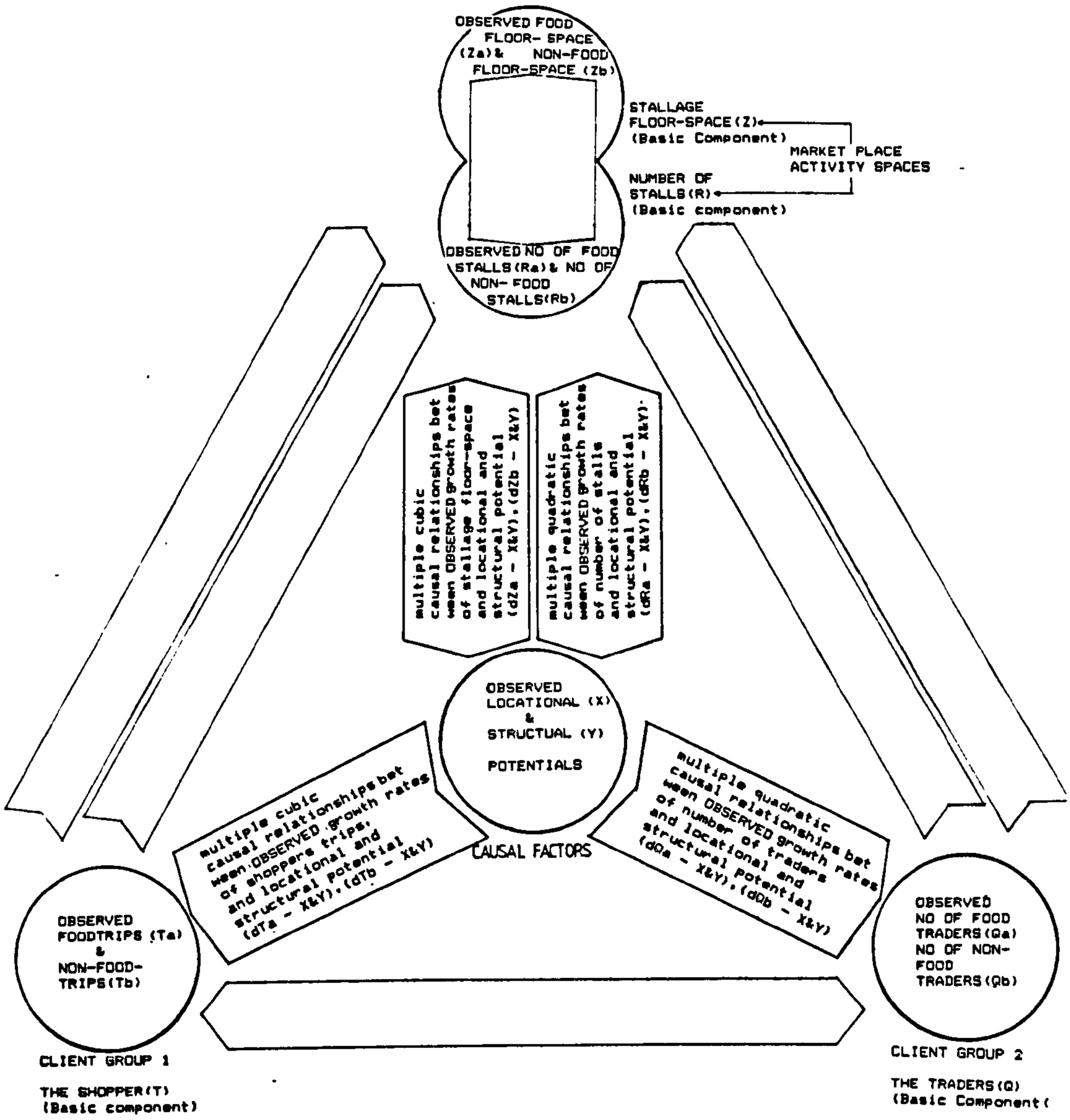


Figure 7.7 :PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL:-Stage 3

2. There is strong non-linear multiple causal relationship between the growth rate of any demand or supply of activity space, the locational and structural potentials.

Note : Arrow indicates direction of Influence.

where dD_o is the growth rate of any specific demand or supply of activity space. dD_o may be substituted with dT_a, dT_b, dQ_a, dQ_b, dZ_a, dZ_b, dR_a and dR_b respectively to obtain the 8 predictive equations (4 for food shopping and 4 for non-food shopping)

X_1, X_2, ... X_5, and X_6 are the locational potentials

Y_1, Y_2, ... Y_7, and Y_8 are the structural potentials

L_1, L_2 ..... L_5 and L_6 are the coefficients of the locational potential variables

S_1, S_2 ..... S_7 and S_8 are the coefficients of the structural potential variables

K is a constant and E is the error term

i is an exponent to be estimated

The succeeding pages are devoted to the calibration of those 8 predictive equations, and to the interpretation of the relative importance of the locational and structural potential variables in Kaduna city retail behaviour.

To confirm the above proposed strong relationships and causal influence between the growth rates of the demand or supply of activity spaces, and the locational and structural potentials in Kaduna city market places. STATISTICAL PACKAGE FOR SOCIAL SCIENCES (X version) SPSS-X, was employed on the computer to run MULTIPLE REGRESSION of each of the 8 proposed causal relationships between the specific demands or supplies and the

locational and structural potential variables. Among these multiple regression procedures are Forward Selection, Backward Elimination and Stepwise Regression. None of this variable selection procedure is 'best' in any absolute sense; they merely identify subsets of variables that, for the sample, are good predictors of the dependent variable. Initial runs were repeated on the above three multiple regression procedures with data set. It was discovered that Backward Elimination produced best fits with combination of variables that were least difficult to interpret. Backward Elimination procedure was, therefore, employed to produce computer outputs and their interpretation is presented in the following section, 7.3.(1 - 13).

7.3.1 Multiple Regression Output Interpretation Guidelines

The following statistics provide the essential information necessary for the interpretation of the computer outputs for the multiple regression analysis.

7.3.1.1 Backward Elimination

While Forward Selection starts with no independent variables in the equation and sequentially enters them, Backward Elimination starts with maximum number of variables in the equation and sequentially removes them. Instead of entry, removal criteria are specified.

Two removal criteria are available in SPSS-X. The first is the minimum F value (FOUT), that a variable must have in order to remain in the equation.

Variables with F values less than this F-to-remove are eligible for removal. The second criterion available is the maximum probability of F (keyword POUT) a variable can have. The default FOUT value is 2.71 and the default POUT value is 0.10. The default criterion is POUT.

In the second step the variable with the smallest Partial Correlation Coefficient is removed. The equation is recalculated (without the eliminated variable) and on the third step another variable now with the smallest Partial Correlation Coefficient is removed. The process of recalculation and elimination is continued until a variable, with its significance less or equal to 0.10 criterion is reached and the backward elimination stops. The equation produced at this stage gives the best fit for the data set. The default criteria were used in the exercise because the independent variables had been weighted and standardized as described in section 7.1.3, page 305. Therefore default runs allowed them to exert their weights fully.

7.3.1.2 F statistic

In regression, one often has to make a trade-off between the strength of the relationship, as indicated by the value of R and the statistical validity of this relationship, as indicated by the F statistic.

One can have a very high R value which is statistically invalid and similarly, a statistical valid relation with a low R value. Ideally, one wants a high value of R and something which is statistically valid. In interpretation the first statistic to be considered

needs to be the F statistic which indicates statistical validity.

SPSS-X calculates the F statistic for you and then indicates the exact level of significance. It is up to you to select the level you feel to be appropriate. Consideration is given to the use of either the 1% or 5% level, that is, there is a 1 in 100 or a 5 in 100 chance of any result having arisen by chance, rather than indicating a true relationship.

These are the generally-used levels of significance. Clearly, the 1% is a more stringent statistical test. Thus on the print-out one wants the "Signif F" = value to be 0.01 (1%) or 0.05 (5%). Any values greater than these are statistically invalid. Since the data was collected under strict supervision and several steps have been adopted in the data adjustment, the 1% stringent statistical test is not considered essential. Therefore the 5% level is adopted.

If we consider the print-out (dT_a - X & Y), Appendix A7.3.1 page A121 , all the information under the "Analysis of Variance" heading is used to calculate the F statistic. All the statistic is, is the ratio between explained and unexplained variance in the dependent variable, that is the deviation between the original values of the dependent variable and those predicted by the regression equation. The F statistics is simply the ratio between the two Mean Squares values on the print-out. Thus on print-out (dT_a - X & Y) F = 1045.82, which is simply 3.52201/.00337. Either of the two Mean Squares (Regression or Residual) is given by dividing the Sum of Squares by the Degree of Freedom (DF).

7.3.1.3 R statistic

Having selected the level of significance, one then wants to examine the R values. They vary between 0 and 1, with value of 1 indicating a perfect relationship, and 0 no relationship at all. The traditional cut-off point, however, is usually 0.5, i.e. a value of R between 0.5 and 1 indicates strong relationship. The % of variance in the dependent variable explained by the independent variables is given by R^2. Adjusted R^2 is a more conservative measure which makes allowance for equations with few cases. As there are only 12 cases Adjusted R^2 is used. Again, Adjusted R^2 varies between 0 and 1; the higher the better.
The Standard Error is the standard deviation of the residual, that is, the difference between the predicted and the real data values. This indicates the typical "error" if the equation is used to predict the dependent variable; the smaller the value the better.

7.3.1.4 R^2 Change statistic

As backward elimination is employed in the computer runs, the multiple regression started with entering the maximum number of independent variables in the equation and sequentially removes them, one in each step, and stops when the default criterion POUT = .100 limit is reached. This step gives the equation of best fit. In each step a change in the R value occurs which produces R^2 change, and F change. In any step if the variable removed had a peculiar effect on the goodness of fit of the equation the Signif F change will be significant, i.e. less than 0.05 value.

7.3.1.5 Var - Covar Matrix of Regression Coefficients (B)

The next block of statistics contain information relating to the correlation coefficient and covariance among the independent variables in the equation. High correlation among the independent variables in the equation introduces the problems of 'multi-collinearity". This may result in a regression equation with significant R^2, although virtually none of the coefficients is significantly different from 0. If any independent variable is a perfect linear combination of other independent variables, the correlation matrix is "singular" and a unique, unbiased, least-squares solution does not exist. Similarly, variables that are almost linear combination of other independent variables produce "near-singularities". Variances, called covariance, of the estimators increase when independent variables are interrelated. The absence of multi-collinearity in a data set produces unmasked relationship, i.e. the statistics computed by the regression equation are truly reliable. It also produces little covariance of the independent variables. For example on the output (dT_a - X & Y), page 780, the variance of the independent variables is placed on the diagonal. The correlation coefficients of the independents are placed above the diagonal, whilst covariance is placed below the diagonal. For example, the covariance between X_2^3 and Y_4^3 is - 5.141E-07 and this may be compared with the values of the variables. The interpretation of the correlation coefficients between the independent variables is similar to that of R discussed above. It could be seen that the data transformation eliminated the multi-collinearity which existed in the raw data set.

7.3.1.6 B statistic

Then comes a mass of information relating to the variables in the equation. The B values are regular or unnormalized regression coefficients, which can be inserted into the regression equations and used to calculate values of the dependent variable for given values of the independent variables. Thus on print-out (dT_a - X & Y), Appendix A.7.3.1, page A121.

$$dT_a = 0.0115\ X_2^3 - 0.1575\ X_3^3 \text{ etc.}$$

This being so, it means that the absolute size of the B values are indicative simply of the magnitude and distribution of the data set for each variable. The Standard Error of B (SE B) gives an indication of the distribution of the variable. Its' main use is to give an idea of the likely accuracy of any prediction derived from the regression equation. If the SE is large in relation to B , then one would be wary of any predicted results. For example, in print-out (dT_a - X & Y), X_2^3 has a B value of - 0.0115 , with an SE B of 0.001703; which imply a standard error of 4.7%, which is reasonable. 95% Confdnce Intervl B for X_2 are 0.007287 and 0.015623, of which 0.011455 is the mean. This means that at 95% Confid Level the independent X_2 in the equation has a prediction interval 0.011455 $\pm$ 0.00416, i.e. the X has prediction error term of $\pm$ 0.00416.

7.3.1.7 Beta statistic

The Beta coefficients, however, are normalized regression coefficients whose size is a direct reflection of the importance of each variable in the equation. In simple regression, Beta will equal the regression coefficient R . Examination of the size of these coefficients will enable one to see which variable will be removed in the next step of backward regression. Thus, on print-out (dT_a - X & Y), X_4 has the smallest Beta coefficient, i.e. it is of least importance, it would have been removed in the next step if the regression were to proceed further. The sign is not relevant in terms of a variable's importance. It is relevant, however, in prediction. For instance, on print-out (dT_a - X & Y), the variable X_3 with Beta value = -1.1694 is the most important variable, but the negative sign indicates that an increase in its value will result in a decrease in the value of the dependent variable dT_a.

7.3.1.8 Correlation (Correl) statistic

The statistic Correl is the regular or unnormalized regression coefficient of each isolated independent variable, were it alone in the regression equation. For example on print-out (dT_a - X & Y), X_2 has a Correl = 0.8835. What this means is that were Y_8 alone in the regression equation, both R and B would have the same value of 0.8835. As usual R will vary between 0 and 1, the higher the better. The use of the statistic, Correl value, is to determine which of the independent variables is the best predictor of the dependent variable. The higher the absolute value of Correl, the better the prediction.

7.3.1.9 Part Correlation Coefficient (Part Cor) statistic

When a variable is removed from the regression equation, a large change in R^2 indicates that the variable provides unique information about the dependent variable that is not available from the other independent variables in the equation. The signed square root of this change is called the Part Correlation Coefficient (Part Cor). It is the correlation between the dependent variable, say T_a, and an independent variable, say Y_8^3, when the linear effect of all the other independent variables have been removed from Y_8^3. For example, the output (T_a - X & Y) shows that the removal of the variable X_6^3 (immediate surrounding wholesale shops and warehouses) from a regression equation that contains the other five independent variables, results in a change in R^2 of - 0.0001 (0.01^2). This means that on step number 8 (not shown on the output) of the backward regress, the Part Cor of X_6^3 with T_a was -0.01. As R^2 change-value of - 0.0001 is very small, it implies that X_6^3 did not provide unique information about T_a, and that accounts for why it was removed from the final regression equation. However, the R^2 change-value of 0.0001 for X_6^3 does not indicate what proportion of the unexplained variation ($1 - R^2$) in T_a this change constitutes.

7.3.1.10 Partial Correlation Coefficient (Partial) statistic

A coefficient that measures the proportional reduction in variation is the 'Partial Correlation Clefficient' (Partial). The statistic Partial can be interpreted as the correlation between any independent variable and

the dependent variable when the linear effects of the other independent variables have been removed from both the dependent and that particular variable. For example, on the output (dT_a - X & Y), the statistic Partial-value of 0.9396 for X_2^3 is the correlation between X_2^3 and dT_a when the linear effect of the other 4 independent variables has been removed from both dT_a and X_2^3. Any one statistic Partial-value must be less than R-value, because it is this one statistic Partial-value that has been improved by the others in the equation to produce R-value. Also for a particular independent variable, the Part Correlation Coefficient is never larger in absolute value than the Partial Correlation Coefficient.

7.3.1.11 Individual Variable F statistic

The F statistic is calculated for each independent variable in the equation and its significance level indicated. It is generally most desirable to adopt the equation showing strong relationship, as indicated by the value of R and the statistical validity of this relationship as indicated by the overall F statistic and by the F statistics of the individual variables in the equation.

7.3.1.12 Variables Not in the Equation

The section headed "Variables not in the equation" indicates the values that each variable would have if it were in the equation. Thus Beta is the normalized regression coefficient that each variable would have if it were in the equation. The partial is the

correlation between the variable and the dependent controlling for the influence of the independents already in the equation. Minimum tolerance is a criterion used to determine admission to the equation. On the output (dT_a - X & Y) when the default POUT = 0.100 limits was reached, the variables not in the equation have F-values less than the default FOUT value - 2.71. Also none of these variables is significant, as indicated by Sig F statistic.

7.3.1.13 Goodness of Fit and Prediction

The Normal Probability (P-P) Plot, Standardized Residual, is used to indicate the goodness of fit, particularly for the observed versus expected values. One would expect the plot to be on or near the diagonal, if the equation was a good predictor. For example, on the output (dT_a - X & Y), Figure 7.9, page 389 , by observing how points scatter about the diagonal (the expected straight line), comparison can be made between the two distributions (observed distribution of residuals, expected distribution of residuals). Again, if the equation is a good predictor, the plots on Figure 7.10 , page 392, reads the same values on both axes (predicted, and observed) of the dependent variable.

7.3.1.14 Violation of Assumptions

All the above discussed statistics have been calculated on the assumption that the variables in the equations possess the properties of normal distribution, i.e. linearity and equality of variance. To detect

violation of these assumptions, the following two plots are examined:

1. Standardized residuals against standardized predicted values, i.e. ZRESID versus ZPRED

2. Studentized residuals against standardized predicted values, i.e. SRESID versus ZPRED

Systematic patterns between the predicted values and the residuals suggest possible violation of the linearity assumption. If the linearity assumption was met, the residuals would be randomly distributed in a band about the horizontal straight line through 0 , as shown in Figures 7.8 (a & b), page 387 . If the spread of the residuals increases or decreases with values of the independent variables or with predicted values, one should question the assumption of constant variance of the dependent variable for all values of the independent variable.

7.3.2 Correlation Matrix of the Raw Data and the Exploration of the Multiple Regression Analysis

One does not usually know in advance the appropriateness of a model such as linear regression. As a starting point, linear relationship in the raw data set is assumed.

One of the first steps in calculating an equation with several independent variables is to calculate a correlation matrix for all the variables. The matrix shown in Table 7.33, page 380 , is the correlation between the variables in the regression analyses (both the dependents and independents).

Table 7·33: Correlation Matrix of Dependent and Independent Variables Before Data Transformation

LEGEND

dTa = RCHTA
dTb = RCHTB
dZa = RCHZA
dZb = RCHZB
dRa = RCHRA
dRb = RCHRB
dQa = RCHQA
dQb = RCHQB

Correlation:		RCHTA	RCHTB	RCHZA	RCHZB	RCHRA	RCHRB	RCHQA	RCHQB	X2	X3	X4	X5	X6	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
GROWTH RATE OF THE SHOPPERS FOODTRIPS	-	RCHTA	1.000																			
GROWTH RATE OF THE SHOPPERS NON-FOOD-TRIPS	-	RCHTB	.547	1.000																		
GROWTH RATE OF THE STALLAGE FOOD FLOOR-SPACE	-	RCHZA	.952	.549	1.000																	
GROWTH RATE OF THE STALLAGE N-FOOD FLOOR-SPACE	-	RCHZB	.611	.709	.663	1.000																
GROWTH RATE OF THE NUMBER OF FOOD STALLS	-	RCHRA	.930	.517	.938	.536	1.000															
GROWTH RATE OF THE NUMBER OF NON- FOOD STALLS	-	RCHRB	.925	.712	.940	.841	.883	1.000														
GROWTH RATE OF THE NUMBER OF FOOD TRADERS	-	RCHQA	.948	.533	.976	.582	.934	.917	1.000													
GROWTH RATE OF THE NUMBER OF NON-FOOD TRADERS	-	RCHQB	.955	.628	.925	.588	.936	.925	.959	1.000												
ROAD TRANSPORT LINKAGES	-	X2	.707	.240	.660	.241	.792	.607	.780	.769	1.000											
IMMEDIATE SURROUNDING RESIDENTIAL POPULATION	-	X3	.850	.261	.836	.286	.877	.720	.915	.870	.911	1.000										
IMMEDIATE SURROUNDING PLACES OF WORK	-	X4	.566	.119	.450	.057	.478	.365	.508	.533	.615	.567	1.000									
IMMEDIATE SURROUNDING OTHER SHOPPING CENTRS	-	X5	.656	.166	.640	.174	.669	.550	.756	.727	.916	.901	.682	1.000								
IMMEDIATE SUROUNDING WHOLESALE SHOPS/WAREHOUSES	-	X6	.442	.035	.404	-0.108	.521	.301	.480	.573	.499	.567	.486	.543	1.000							
BUILDING DESIGN FACTORS	-	Y1	.825	.202	.849	.199	.847	.649	.875	.799	.719	.915	.578	.759	.622	1.000						
FACILITIES AND AMENITIES	-	Y2	.843	.333	.868	.317	.860	.729	.923	.843	.830	.969	.486	.841	.435	.926	1.000					
PARKING AND STATIONING OF VEHICLES	-	Y3	.874	.392	.878	.423	.888	.785	.937	.877	.870	.930	.719	.872	.487	.881	.912	1.000				
SECURITY OF LIFE AND PROPERTY	-	Y4	.841	.469	.854	.326	.834	.738	.868	.873	.695	.827	.541	.700	.555	.840	.857	.804	1.000			
ENVIRNMENTAL DESIGN QUALITIES	-	Y5	.895	.556	.880	.433	.881	.811	.906	.926	.768	.891	.490	.762	.515	.835	.912	.837	.928	1.000		
ZONNING OF MARKET PLACE BY COMMODITY	-	Y6	.904	.596	.894	.647	.859	.921	.915	.965	.727	.824	.479	.742	.545	.726	.793	.815	.843	.901	1.000	
PRESERVATION OF FOOD STUFFS	-	Y7	-0.026	.454	-0.020	.370	-0.120	.145	-0.139	-0.024	-0.426	-0.346	-0.566	-0.495	-0.354	-0.359	-0.246	-0.423	.011	.028	.058	1.000	
FOOD NON-FOOD CAPACITY OF MARKET PLACE	-	Y8	.872	.366	.871	.348	.881	.772	.920	.924	.807	.947	.532	.841	.705	.917	.917	.874	.889	.940	.911	-0.185	1.000

The first point to make is that Y variables are generally more highly correlated with the dependents than the X variables. For example, the highest correlation between the independents and the Y variables is 0.965, the highest correlation between the independents and the X variables is 0.915. Thus the structural potentials seem to give better relationships with the demands for activity spaces.

Two variables also appear to be rather anomalous, X_6 and Y_7, having r = 0.442 and r = - 0.026, respectively, with dT_a. Y_7 is not correlated with any other variable, while X_6 is only correlated with Z_b. Of the other 20 variables dZ_b is only correlated with 5, the best correlation being with dR_b and Y_6, with coefficients, .841 and .647 respectively. As discussed in page 350, the poor correlation of Z_b with the rest of the variables was due to Panteka and Railway Station Market Places. Again when Panteka and Railway Station Market Places were dropped, Zb was found to correlate strongly with the rest of the other variables. Another variable that showed poor correlation with others was X_4. It is correlated with only 14 other variables, the highest coefficients being .719 and .681 with Y_3 and X_5 respectively. However, it must be noted that the 6 other remaining coefficients are between .057 and 0.500, and of these 3 are associated with Y_6, and dZ_b. The other variables have correlation coefficients of over 0.5 with one another, except those associated with X_6, X_4 and dZ_b.

In their present form, it could be said that Y_7, X_6 and X_4 are anomalous. Having said that, it seems that X and Y variables are:

(i) closely related to each other

(ii) closely related to the dependent variables

This, in fact, means that the independent variables are

(iii) not mutually statistically independent, but closely associated

(iv) not measuring unique dimensions in the independent/dependent variable relationship, but reinforcing one another.

This means that the data set, in its raw form, exhibits the characteristics of 'multi-collinearity'.

Trial multiple regression runs were done with the raw data set and the outputs examined. The Normal Probability (P-P) Plot, Standardized Residuals - observed against predicted values, for example on the output (dT_a - X & Y trial run) shown in Appendix A.7.3.1(x), page A122, gave cause for concern. If the hypothesis of there being a linear relationship between the dependent and independent variables held, then one would expect the plot to show the cases on or near the diagonal; that is the observed values being close to the expected, as calculated by the equation. This did not seem to be the case. What seems to have happened is that cases with low observed values were overpredicted by the equation; those with high values were underpredicted. This could be due to:-

(i) multi-collinearity in the raw data set, or

(ii) the fact that the linear hypothesis of the raw data set was faulty and the relationship is not 'linear' but 'curvilinear'.

If the former is the case, the implication is that it would not be possible to identify the separate influence of each of the independent variables. This is not critical since the main essence of the thesis is the predictive quality of the model. If the latter, it may be necessary to subject the raw data to some transformation. As such, some of the data transformations suggested by Tukey (1970), Table 7.34, page 384, were judiciously explored. It was found that expressing the independent variables as exponentials gave the right data transformation which:

(i) produced the best fit

(ii) produced the optimal predictions posing minimum interpretation difficulty

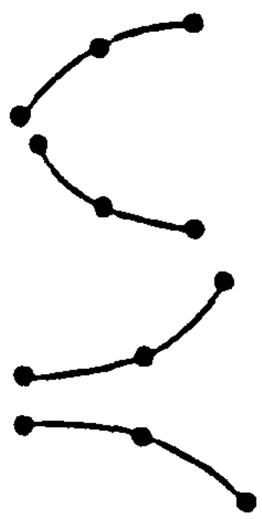
(iii) confirmed the curvilinearity in the raw data set

(iv) estimated the values of the parameters i in the generic predictive equation (2) shown on page 366; i is the exponential parameter;to which the locational (X) and structural (Y) potential may be raised to obtain the best fit for the equations that predict the values of the growth rate, dD_o, of demand or supply of activity spaces.

The data transformation, in order to produce equations of best fit and prediction, estimated the exponential parameters i = 3 in the predictive equations for the shoppers trips and the stallage floor-space, and i = 2

TABLE 7.34: Appropriate Transformation for Various Curves

Appropriate Transforms for Various Curves

Curve	Verbal Description	*X* Transform	*Y* Transform
	both positive	log x, $-1/x$, etc.	y^2, y^3, etc
	both negative	log x, etc	log y, etc
	both positive	x^2, x^3, etc.	log y, etc.
	both negative	x^2, etc.	y^3, etc.

Source: Tukey (1970). Adapted from p. 9-4b

Note: Culled from Understanding Data, by Erickson, B.H. and Nosenchuk, T.A.; Open University Press, 1977.

in the predictive equations for the number of stalls and the number of traders, Where i = 3 the relationship is known as "multiple cubic relationship", and "multiple quadratic relationship", where i = 2.
The transformed,standardised and weighted locational and structural potentials are shown in table 7.16(a & b), page 313.

In a multiple quadratic relationship, an increase in the location and structural potentials produces an exponential increase, "to the power of 2", in the number of food stalls, non-food-stalls, food-traders, non-food-traders. The exponential increase, to the second power, results in "steeply changing slope of curvilinear relationship" between the locational and structural potential and each of the following; food-stalls, non-food-stalls, food-traders and non-food-traders. The curves for food-stalls and non-food-stalls are not identical with the respective curves for food-traders and non-food-traders because of the incidence of squatting traders, who do not occupy stalls, in the retail market places.

In a multiple cubic relationship, an increase in the locational and structural potentials produces an exponential increase, "to the power of 3", such as, in shoppers food-trips, shoppers non-food-trips, stallage food floor-space and stallage non-food floor-space. The exponential increases, to the third power, result in "more steeply changing slope" of curvilinear relationship" between the locational and structural potential , and each of the following, shoppers food-trips, shoppers non-food trips, stallage food floor-space and stallage non-food floor-space.

Although in a city retail market place there are 1, 2 or 3 uniform sizes of stalls floor-space, the sizes differed in the market places. These differences, in addition to the sizes of the stalls floor-spaces

measured in square metres, accounted for the differences in changing slopes of the curves for number of food-stalls, non-food-stalls, and those of the stallage food floor-space, stallage non-food floor-space, respectively.

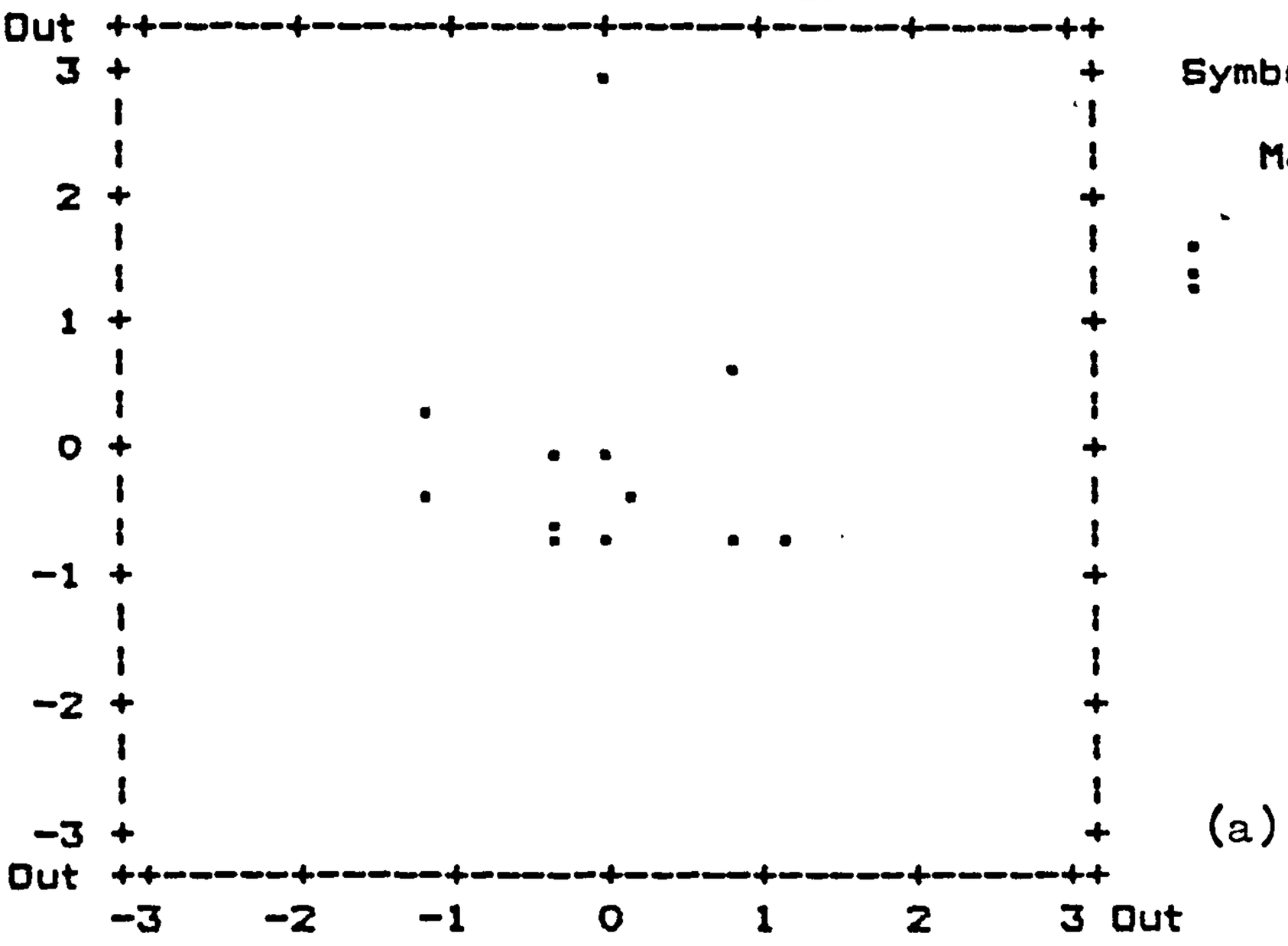
7.3.3 Causal Relationship Between the Growth Rate of the Shoppers Food-trips, and the Locational and Structural Potential in the Market Place; (2.1a)

All the essential statistics necessary for the examination of the strength and form of the causal relationship between the growth rate of the shoppers food-trips and the locational and structural potential in the market place are contained in the computer output shown in Appendix A.7.3.1, page A121 . The process of the examination is recorded as follows:

The computer output shown in Appendix A.7.3.1, page A121 is step 9 of the backward regression of the growth rate of the shoppers food-trips on the locational and structural potentials in a market place. It is adopted as the best predictive equation.

It indicated an R-value of 0.9994 and Adjusted R^2-value of 0.9988. The statistical validity of the relationship is also indicated by the Signif F-value of 0.0000. The Sig F of the independent variables in the equation, X_2^3, X_3^3, X_4^3, Y_6^3, and Y_8^3 are 0.0005, 0.0000, 0.0001, 0.0000 and 0.0000 respectively. Also the significance of the constant term is 0.0000.

Plots of the Standardized Residuals (ZRESID) and the Studentized Residuals (SRESID) against the Standardized Predicted Values (ZPRED) are shown in Figures 7.8 (a & b) page 387 , respectively. The residuals are



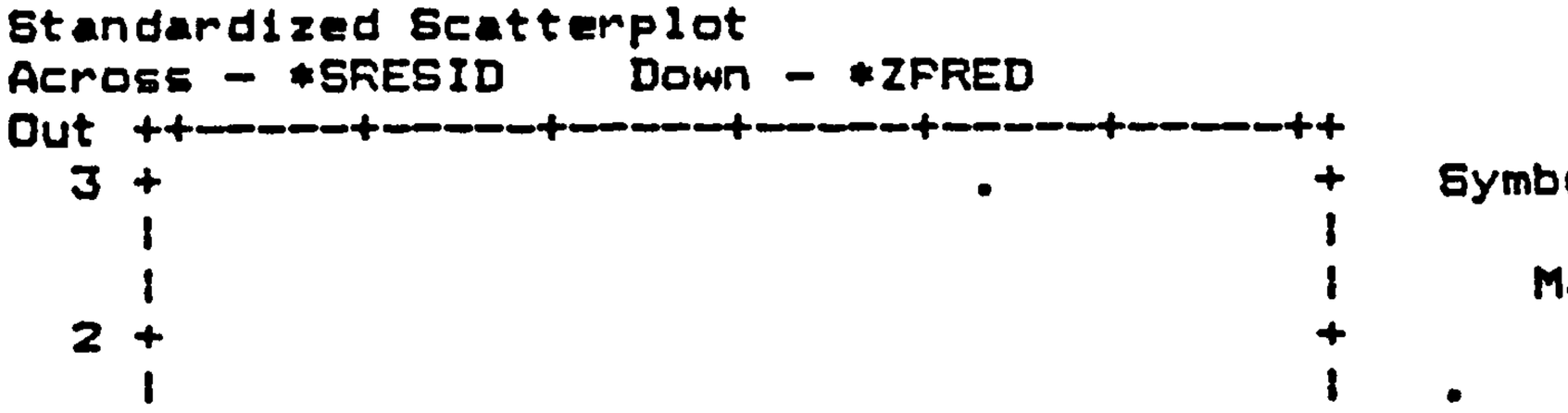


Fig. 7.8(a & b): Scatterplots of Standardized Predicted Values (ZRESID)with (a) Standardized Residuals (ZRESID)
(b) Studentized Residuals (SRESID)
For the Prediction Equation of the Growth Rate of the Shoppers Food-Trips.

randomly distributed in a band about the horizontal straight line through O, and this indicates linearity in the transformed data set. Since the spread of the plots does not increase or decrease with the predicted values, the assumption of constant variance of the dependent variable for all values of the independent variables is confirmed.

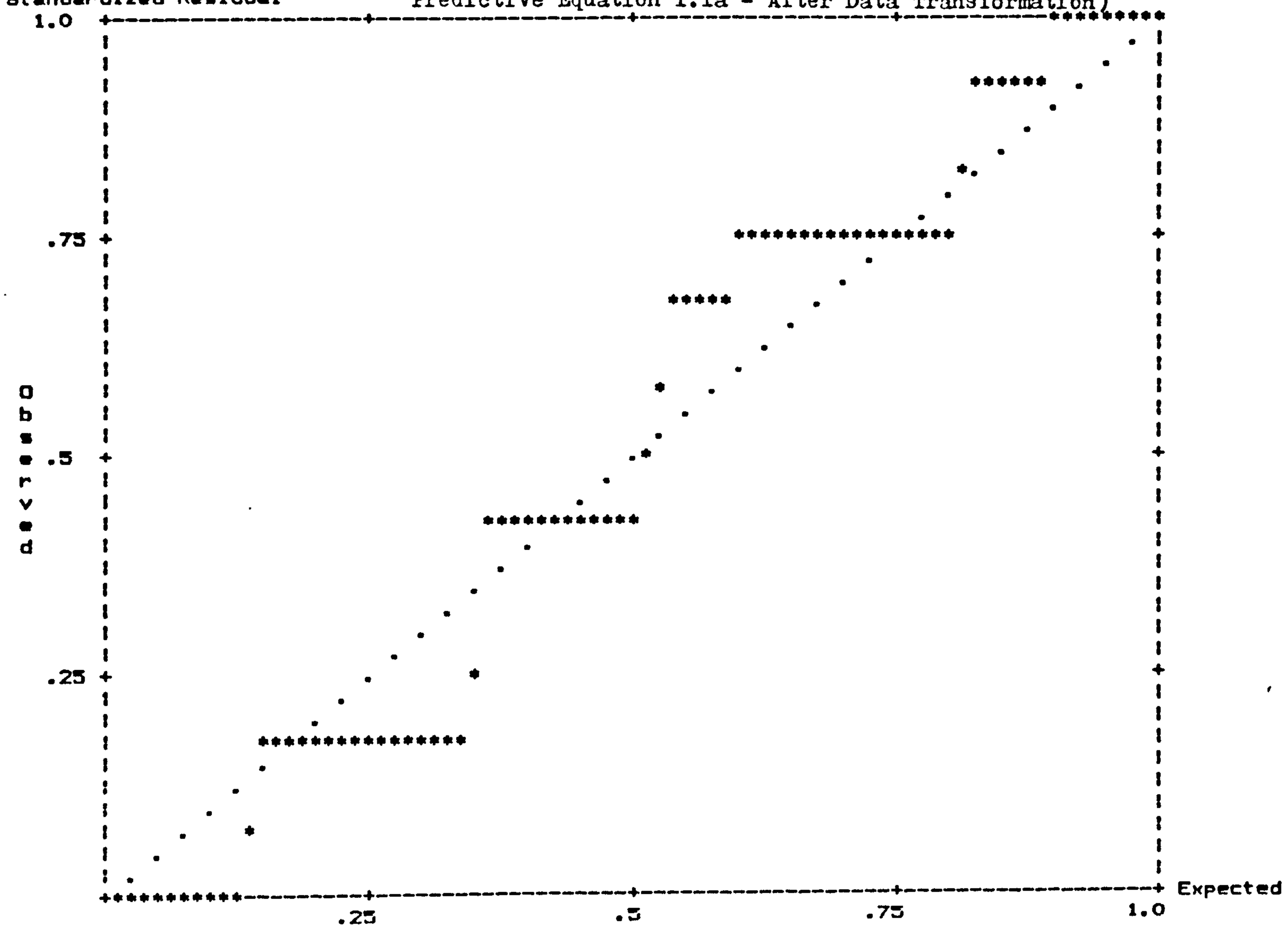
The SEB-values at 95% Confidence Level are small compared with B-values for the independent variables. So the result of the predicted values of the dependent variable may be accepted with confidence. Also the Normal Probability (P-P) Plot, Standardized Residuals, shown in Figure 7.9, page 389 , lie on the diagonal. This indicates the goodness of fit of the prediction line.

From an examination of the above statistical analysis R $>$ Adjusted R^2 $>$ 0.5, and Signif F $<$ 0.05 and Signif F (for each of the independent variables in the equation) $<$ 0.05. Therefore the null proposition that there is no causal relationship between the growth rate of the shoppers' food-trips and the locational and structural potential in Kaduna retail market places is rejected and the alternative that there is strong multiple cubic relationship between the growth rate of the shoppers' food-trips and the locational and structural potential in Kaduna city market places is accepted.

Using the calculated B-values and the data transformation parameter i-value of 3, the locational and structural potentials retail equation (2.1a) for the prediction of the shoppers' food-trips distribution is written as:

$$dT_a = 0.0115X_2^3 - 0.1575X_3^3 + 0.0102X_4^3 + 0.0844Y_6^3 + 0.0527Y_8^3 + 0.2652 \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2.1a)$$

Figure 7.9:
Normal Probability (P-P) Plot (Predictive Equation for Growth Rate of Shoppers Food-Trips - Optimal Standardized Residual Predictive Equation 1.1a - After Data Transformation)



At 95% Confidence Level the B-values for the independent variables in the equation X_2^3, X_3^3, X_4^3, Y_6^3, Y_8^3 and the constant term K have error terms of $\pm$ 0.0042, $\mp$ 0.0180, $\pm$ 0.0028, $\pm$ 0085, $\pm$ 0.0064 and $\pm$ 0.0409, respectively. As indicated by the Beta statistic in Appendix A.7.3.1, page A121 growth rate of food-trips seem dependent upon the magnitude of the locational and structural potential variables in the equation in this descending order:

	Beta statistic
X_3^3 - immediate surrounding residential population	1.1694
Y_8^3 - food and non-food capacity of the market place	0.9830
Y_6^3 - zoning of the market place by commodity	0.8737
X_2^3 - road transport linkages	0.2243
X_4^3 - immediate surrounding places of work	0.1574

As indicated by the Correl statistic, the locational and structural potential variables in the equation are Best Single Predictor Variable of growth rate of Food-trips in this descending order:

	Correl statistic
Y_8^3 - food and non-food capacity	0.9240
Y_6^3 - zoning of the market place by commodity	0.9015
Y_2^3 - road transport linkages	0.8835
X_3^3 - immediate surrounding residential population	0.8458
X_4^3 - immediate surrounding places of work	0.5954

The predictive ability of the equation is confirmed by the plot of the predicted values against the observed growth rate of shoppers' food-trips shown in Figure 7.10. , page 392 . A table of the predicted values, observed values and percentage accuracy of the prediction is shown in the following Table 7.35. , page 393 . The percentage accuracy of the prediction is shown for each market place and the maximum, minimum and mean percentages are 118.66, 84,34 and 101.5, respectively; i.e. ($\pm$ 17.16).

Figure 7.10 . , page 392 , showed the atypically high predicted and observed growth rate of shoppers' food-trips to the CMP far removed from the other city retail market places. The majority of the other market places are bunched together in order to permit the CMP to appear on the same plot. A big gap existed between the CMP and the others. A small gap existed between the subgroup of the 4 DMPs and the subgroup of the 5 L/NMPs. The 2 SMPs found their places somewhere between the DMPs and the L/NMPs. Since there is strong multiple cubic causal relationship between the growth of the shoppers' food-trips and the locational and structural potential in the city market places, the observed unbalanced distribution of the growth rate of shoppers must be dependent on the disproportionate locational and structural potentials possessed by Kaduna city market places.

The summary statistics for the equation 2.1a, page 388, and the significance of F for the independent variables in the equation, discussed in paragraph one of this section, are shown in Table 7.36, page 394,

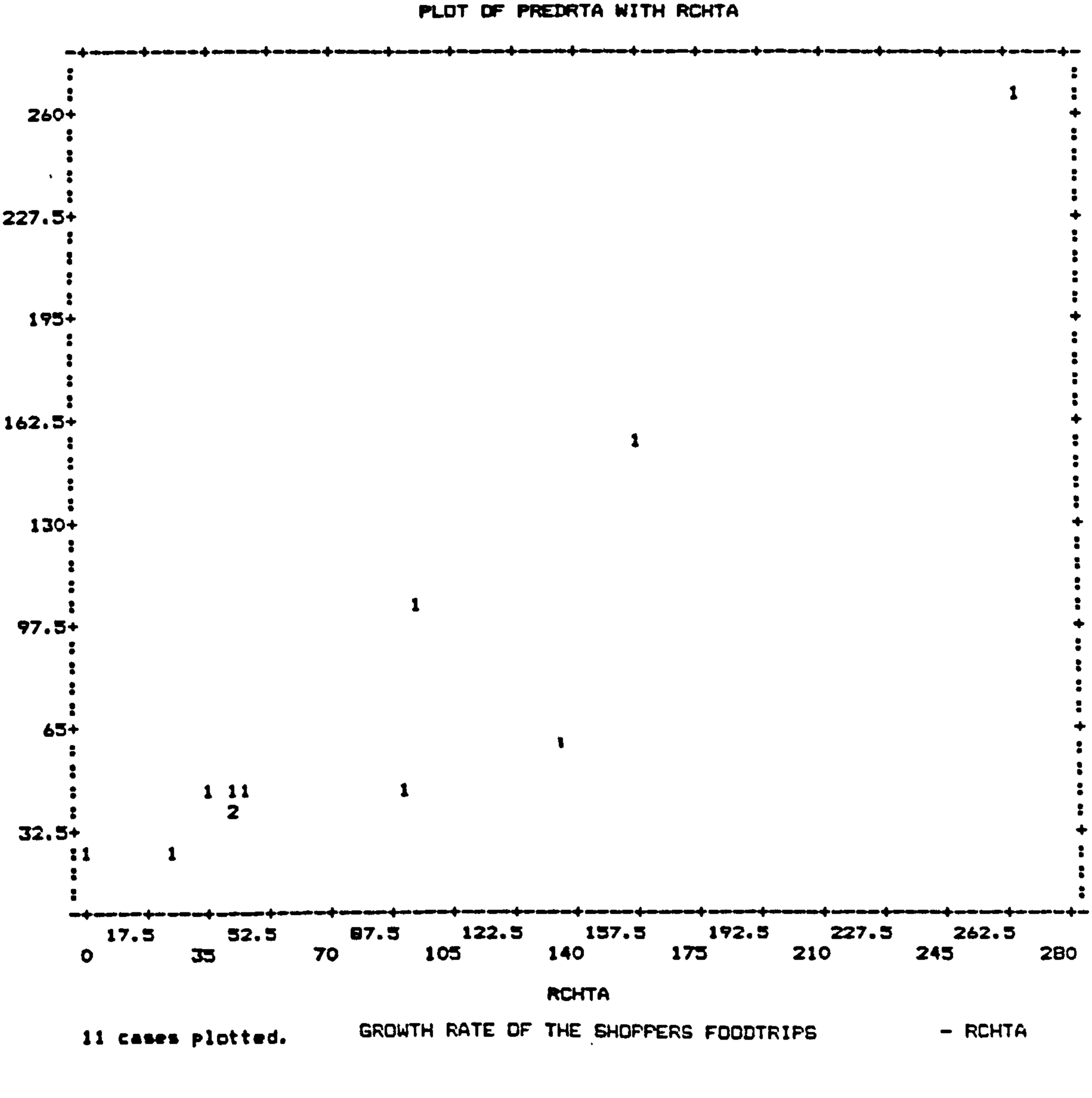


Fig. 7.10: Plot of Observed and Predicted Growth Rates of the Shoppers Food-Trips.

TABLE 7.35: Observed and Predicted Trend Growth Rate of Shoppers' Food-Trips

Name of Market Place	The Shoppers Food-trips in 1977	The Shoppers Food-trips in 1984	Observed Growth rate of the Shopper-trips	Predicted Trend Growth rate of the Shoppers Food-trips	Percentage accuracy of the prediction
CMP	3393	12471.49	267.57	266.88671	99.75
RSMP	1621	2295.17	41.59	39.61382	95.25
PMP	.	36.18	.	45.02129	.
M-KGMP	1950	2738.82	40.45	40.19791	99.37
TWMP	1072	2080.73	94.10	106.03448	112.69
K-TMP	1784	4621.97	159.08	157.71604	99.14
URMP	295	423.00	43.39	44.14849	101.75
BMP	105	202.12	92.50	43.26075	46.77
UTMP	0	.00	.00	27.74111	.
BDMP	136	195.68	43.89	44.79629	102.08
USMP	240	295.33	23.05	24.69401	107.12
KGMP	111	148.33	33.63	44.14849	131.29

column 2.1a The significance of F is the same as the significance of t in this case.

7.3.4 Notes on the Examination of the Causal Relationships 2.1b, 2.2a, 2.2b, 2.3a, 2.3b, 2.4a and 2.4b;

All the essential statistics necessary for the examination of the strength and forms of the causal relationships between the locational and the structural potentials in the market place, and the following growth rates of demand or supply of activity spaces:

2.1b	Growth rate of the shoppers' non-food-trips	dT_b
2.2a	Growth rate of the number of food traders	dQ_a
2.2b	Growth rate of the number of non-food traders	dQ_b
2.3a	Growth rate of the stallage food floor-space	dZ_a
2.3b	Growth rate of the stallage non-food floor-space	dZ_b
2.4a	Growth rate of the number of food stalls	dR_a
2.4b	Growth rate of the number of non-food stalls	dR_b

are given in the computer outputs shown in Appendices A.7.3.2, A.7.3.3, A.7.3.4, A.7.3.5, A.7.3.6, A.7.3.7, A.7.3.8, pages A124, A129, A134, A139, A144, A149, A154 respectively.

Since the predictive equations; for the causal relationships are given in generic form, the general principles of examination of the causal relationship between the growth rate of the shoppers food-trips and the locational and structural potential in the market place, given in section 7.3.4, pages 386 to 395 , are applied to the examination of the causal relationships 2.1b, 2.2a, 2.2b, 2.3a, 2.3b, 2.4a and 2.4b in a systematic manner. Since the examination, to a great extent, is repetitive, each is abridged to give only the calibrated predictive equation, its ability to predict, and the problem definition. The examinations are detailed in the Appendices as follows:

Appendix	Causal Relationship Between
A.7.3.2	the Growth Rate of the Shoppers' Non-Food-Trips, and the Locational and Structural Potential in the Market Place; (2.1b), page A123
A.7.3.3	the Growth Rate of the Number of Food Traders, and the Locational and Structural Potential in the Market Place; (2.2a), page A128
A.7.3.4	the Growth Rate of the Number of Non-Food Traders, and the Locational and Structural Potential in the Market Place; (2.2b, page A133
A.7.3.5	the Growth Rate of the Stallage Food Floor-Space, and the Locational and Structural Potential in the Market Place; (2.3a), page A138
A.7.3.6	the Growth Rate of the Stallage Non-Food Floor-Space, and the Locational and Structural Potential in the Market Place; (2.3b), page A143

Appendix	Causal Relationship Between
A.7.3.7	the Growth Rate of the Number of Food Traders, and the Locational and Structural Potential in the Market Place; (2.4a), page A 148
A.7.3.8	the Growth Rate of the Number of Non-Food Traders, and the Locational and Structural Potential in the Market Place; (2.4b), page A 153

The 8 predictive equations are assembled in Table 7.37 , page 398. The summary statistics for the equations and the significance of F for the independent variables in the equations are entered in Table 7.36, page 394; for comments on the significance of the locational and structural potential in Kaduna city market place system.

7.3.5 Comments on the Significance of the Locational and Structural Potentials in Kaduna City Market Place System

The set of eight predictive equations of the effect-causal relationships between the demand and supply of activity spaces, and the locational (X), and structural (Y) potentials in Kaduna city market place, included the locational and structural potential variables to varying extents. The significance level of any independent variable in each of these original set of 8 equations is written in Table 7.36, page 394. The number of times each independent variable appeared in all the eight equations is shown in column 2 of Table 7.38, page 399. Structural potential, Y_8, (food and non-food capacity of the market place) and Locational potential, X_3, (immediate surrounding residential population) appeared in seven and six equations respectively.

The present food and non-food capacity, which is only a measure of the physical size of the market, may be assumed to reflect the cumulative effect of some other

TABLE 7.37 The predictive equations calibrated from the generic equation (2) page (for the causal relationships between the growth rates of demand or supply of activity spaces, and the locational and structural potential in the market place).

$$dT_a = 0.0115X_2^3 - 0.1575X_3^3 + 0.0102X_4^3 + 0.0844Y_6^3 + 0.0527Y_8^3 + 0.2652 \quad \text{(2.1a)}$$

$$dT_b = 0.0059X_2^3 + 0.0124X_3^3 + 0.0454Y_8^3 + 0.0137 \quad \text{(2.1b)}$$

$$dQ_a = -0.0187X_5^2 + 0.102\,Y_6^2 - 0.0203Y_7^2 + 0.0866 \quad \text{(2.2a)}$$

$$dQ_b = -0.0069X_4^2 + 0.0204X_5^2 + 0.0035X_6^2 + 0.0207Y_6^2 + 0.0123Y_8^2 + 0.0118 \quad \text{(2.2b)}$$

$$dZ_a = 0.0113X_2^3 - 0.1445X_3^3 + 0.0882Y_6^3 - 0.0079Y_7^3 + 0.0373Y_8^3 + 0.00 \quad \text{(2.3a)}$$

$$dZ_b = 0.1928X_3^3 + 0.0072X_4^3 + 0.0129X_6^3 + 0.0098Y_6^3 + 0.0036Y_7^3 - 0.0663Y_8^3 + 0.00 \quad \text{(2.3b)}$$

$$dR_a = 0.0197X_2^2 - 0.1279X_3^2 - 0.0324X_5^2 + 0.0915Y_6^2 - 0.017\,Y_7^2 + 0.0484Y_8^2 + 0.00 \quad \text{(2.4a)}$$

$$dR_b = -0.0522X_3^2 - 0.0117X_4^2 + 0.0381X_5^2 + 0.0311Y_6^2 + 0.0148Y_8^2 + 0.00 \quad \text{(2.4b)}$$

TABLE 7.38: The Number of Times the Independent Variables Appeared out of 8 in each of the 3 Repeat Sets of Equations

1 Locational and Structural Potential Variables	2 Original set of 8 equations No independent variable dropped	3 Repeat 1 set of 8 equations Y_8 omitted	4 Repeat 2 set of 8 equations both Y_8 and X_3 omitted
X_1 - Railway Transport Linkages			
X_2 - Road Transport Linkages	4	2	1
X_3 - Immediate Surrounding Residential Population	6	5	-
X_4 - Immediate Surrounding Places of Work	4	5	3
X_5 - Immediate Surrounding Other Shopping Centres	4	3	2
X_6 - Immediate Surrounding Wholesale Shops and Warehouses	2	2	4
Y_1 - Design Factors			3
Y_2 - Facilities and Amenities			4
Y_3 - Parking and Stationing Spaces for Road Vehicles			
Y_4 - Security of Life and Property		6	3
Y_5 - Environmental Qualities		3	4
Y_6 - Zoning of Market Place by Commodity	7	6	6
Y_7 - Freshness of Food Commodities	4	6	7
Y_8 - Food and Non-Food Capacity	7	-	-
Total Number of Locational and Structural Potentials included	38	38	37

locational and structural potentials acting over a period of time. To test this assumption, the backward elimination procedures were repeated, excluding structural potential, Y_8. The number of times each independent variable appeared in the "repeat 1 set" of the eight equations is shown in column 3 of Table 7.38, page 399 . The independent variables involved in the repeat 1 set are indicated with an '*', asterisk in Table 7.36, page 394.

In the repeat 1 set of predictive equations the same number, 38, of the independent variables, were included, as was in the original set of equations. The most significant differences were noticed in X_2, Y_4, Y_5 and Y_7. Whereas the number of X_2 decreased, Y_4, Y_5 and Y_7 increased. This seems to imply that X_2 works better with Y_8, while the presence of Y_8 in an equation tends to exclude Y_4, Y_5 and Y_7.

When Y_8 was omitted, X_2 was excluded from the equations for food-trips and non-food trips. This is explained by the fact that the means of public transport are not a social service but are strongly rooted in entrepreneurial economics. The taxi cabs and minibuses are owned and operated by private individuals who prefer to channel their movement to destinations with promises of full passenger loads. Therefore the larger the size of a market place, the greater are the chances of its attraction on taxi cabs and minibuses. And since transport fares are basically priced per 'drop', the low income households, who use the public transport means, endeavour to reduce the time spent on waiting for unprogrammed public transport by going to market places where the majority of the taxi cabs and minibus operators are willing to visit. This is in

addition to the fact that a large market place promises more prospect of combined shopping opportunities.

Y_4 and Y_5, (security of life and property, and environmental qualities, respectively), which were not included at all in the original set of eight equations, appeared very significant in the absence of the effect of Y_8. This implies that for a group of market places, where all the other causal factors are the same, but the magnitudes of Y_4 and Y_5 varying, the trader would prefer to locate in the one with high Y_4 and Y_5 values. The traders would attract shoppers and this would mean more demand for food and non-food commodities. More traders would take up more stalls in order to provide the demanded food and non-foods. The resulting changing demand and supply schedules would be continuous and spiral, giving rise to a large scale market place. When this happens, the economy of scale would set in and the causal influence of Y_4 and Y_5 would be masked in the large momentum of Y_8.

The removal of the causal influence of scale enhances the causal influence of freshness of food commodity, Y_7. The full implication of this was exemplified in the origin and development history of the Railway Station Market Place (RSMP), and of the two periodic markets associated with Makera and Kawo district centre market places; refer to sections 6.5.2, 6.5.4, 6.5.6, pages 233, 240, 249 , respectively. The Railway Station Market Place started with train passenger traders halting at Kaduna railway junction to sell off some of their food stuffs. The eventual growth of the retailing of these food stuffs brought in non-food

traders from the city; and a full-time market place began to grow. The periodic market places began with leprosy patients bringing their fresh food produce to sell when they attended clinics which had weekly periodicity. Their requirements to purchase non-food goods with the proceeds from the sale of their food produce attracted non-food traders.

When the full weight of the scale of the market place was brought into play, zoning of the market place by commodity, Y_6, was very significant in 7 out of the 8 equations in the original set. This was no surprise because during the field survey, the shoppers, the traders and the market place administrators expressed serious concern about the breaking down of the zoning of the market place by commodity. When Y_8 was omitted the inclusion of Y_6 in the equations fell from 7 to 6. This implies that even though zoning is very helpful in general in all of the cases, it becomes essential with increase in the magnitude of Y_8. This is further confirmed by the fact that in the 7 equations in which Y_6 was included, its relative importance was second in 3 equations, third in 2 equations, fourth and fifth in one equation, respectively. With reference to Appendices (OUTPUTS) A.7.3 (1-8), pages A121 - A154, the Var-Covar Matrices of Regression Coefficients (B) of the independent variables in the equations show that Y_8 and Y_6 were poorly correlated, with the highest value of -0.4 and the other 5 coefficients were -0.2 and below. Out of those 7 Regression coefficients, 6 were negative. The implication of this statistical evidence is that Y_6 is an important independent variable and provides unique information about the dependent variables which Y_8 could not provide. Also the negative coefficients imply that the magnitude of

Y_6 varies inversely with Y_8. That is, with increase in the size of the urban retail market place the zoning of the market place by commodity becomes a less simple matter.

The omission of Y_8 from the original set of equations reduced the degree of importance of X_5 slightly. In the original set, X_5 was strongly associated with the number of stalls and the number of traders. Where as trader's strategy in choosing his location is to take advantage of customers overflowing from a neighbouring shopping centre, he would,to all intents and purposes, prefer a location with higher neighbouring shopping centres; as this would mean more overflow to him. Going by Reilly's gravity model, (see page 132), if his own retail market place increases in size, the traffic between his own centre and the neighbouring one would increase,and this would mean a greater competitive opportunity at his disposal.

The omission of Y_8 from the equations, showed that X_4 was a stronger locational potential than it appeared to be in the original set of 8 equations. Again, assuming other potentials, but X_4, remained the same for a group of market places, the market place with higher magnitude of X_4 would receive more custom from places of work and socio-culture surrounding the market place. More traders would be attracted. This situation would call for more traders. The increased number of traders, other things being equal, would make prices more competitive, thereby increasing the attractiveness of the market place. When the size of the market place became large by this process, the economy of scale would tend to overshadow the initial factors that generated the growth. This accounts for why Y_8 tended to mask the influence of X_4.

In the original set of equations X_3 was included in 6 of the eight equations. This is understandable, as population is sine qua non for the existence and survival of a market place. But it is interesting to note that with the dropping of Y_8, X_3 was excluded from the equation for prediction of non-food-traders. The implication of this is that a non-food-trader does not necessarily lay emphasis on locating in his local centre market place, but rather, in the part of the city, where the other locational and structural potentials would guarantee him at least the minimum number of customers to keep him in business. The implication of this is that a non-food-trader has a greater chance of success in a large market place than in a small one. Subsequently, many of the non-food-traders at the CMP live far away from it and have to come to the market place in auto vehicles, see Table 7.29(b), page 339.

In the equation for dT_a, dT_b, dQ_a, dQ_b, dZ_a, dZ_b, dR_a and dR_b the correlation coefficients of X_3 with Y_8 are -0.61, -0.74, -0.12, -0.15, -0.58, -0.77, -0.12 and -0.15, respectively. It could be seen that for dT_a, dT_b, dZ_a and dZ_b, X_3 and Y_8 are highly correlated. One implication of this is that in the equations for dT_a, dT_b, dZ_a, dZ_b, X_3 and Y_8 are reinforcing each other. Therefore, a large retail market place encourages concentration of residual population around itself, while a high residential population gives rise to a large retail market place. The existence of this situation is further confirmed by the comparison of Part Cor statistic of X_3, with and without the effect of Y_8. The comparison is presented in the following Table 7.39, page 405.

TABLE 7.39: Comparison of Part Cor statistic of X_3 in equation sets with and without Y_8

	dT_a	dT_b	dQ_a	dQ_b	dZ_a	dZ_b	dR_a	dR_b
Original set of 8 equations with Y_8	.30	.03	.40	.12	.35	.36	.42	.17
Repeat-1 set of 8 equations without Y_8	.27	.12	.23	-	-.33	-.25	.16	.16

It could be seen that the Part Cor statistic of X_3 was generally higher in the original set of eight equations with Y_8, than in the repeat-1 set of 8 equations with Y_8 dropped. Similarly, comparison of Part Cor statistic of Y_8 with and with X_3 dropped, showed that Part Cor statistic of Y_8 was generally higher in the original set of 8 equations with X_3 than in a set of 8 equations with X_3 dropped. This implied that R^2 Change statistic of X_3 was higher in equations with Y_8 than in equations without Y_8; a bigger R^2 Change-value meant that the independent variable played a greater role in the equation. Secondly, the negative correlation of X_3 to Y_8 accounted for the negative signs of B statistic of X_3 in the majority of the equations, where X_3 and Y_8 occurred together.

One independent variable, X_6, was included once in the original set of equations, and in this equation it occurred together with X_3 and Y_8 with whom it was highly correlated; with correlation coefficients of 0.62 and 0.63 respectively. The correlation matrix,

Table 7.33, page 380 , showed that even in the raw data, before the data transformation, X_6 was poorly correlated with the dependent variables, whilst it was highly correlated with X_3 and Y_8. After the data transformation, X_6 became highly correlated with the dependent variables, and it was seen later that its significance as a causal factor was stronger in the absence of both X_3 and Y_8.

A Repeat-2 set of the 8 equations was obtained by repeating the backward elimination regression analysis with both X_3 and Y_8 dropped. The number of times each independent variable was included in the repeat-2 set of equations is shown in column 4 of Table 7.38, page 399. The independent variables included in the repeat-2 set of equations are indicated with '+' cross sign, Table 7.36, page 394 .

It could be seen that the omission of both X_3 and Y_8 from the equations unmasked X_6, Y_1 and Y_2 (immediate surrounding wholesale shops and warehouses, design factors, and facilities and amenities, respectively) as they became included 4, 3, 4 times respectively and with the total number of independent variables in the 8 equations decreasing from 38 to 37. The implication of this is that these three variables have negligible significance with majority of the city's residents, but are very strongly significant for the minority who give their consideration when deciding where to shop for food or non-food commodities;

- since $37 < 38$, "the fewer the greater share of honour" adage is exemplified.

It was interesting to note that although Y_3 was highly correlated with dependent variables, it was not included even once out of the 119 times the independent

variables were included in 24 equations. With further drops of more independent variables, Y_3 would be included in some equations. But this was not done, because of time constraint; the analysis has to stop somewhere. But the very low significance of Y_3 is explained by the fact that the ratio of private auto vehicle ownership in Kaduna city, and Nigeria as a whole, is quite small. Even though parking situation for private cars/vans was very appalling, see Plate 3.7(b) page 90 , parking problems affected only a very small fraction of the city's residents. For the commercial vehicle operators, very poor stationing spaces for their vehicles could not deter them from their bid for stationing spaces in a place like CMP, which promises lucrative adventure in the traffic jammed motor stations.

As explained in the exploratory analysis, section 7.1.3 page 314 , the train is not used in intracity mass transportation of people or goods. Therefore X_1 is not significant in influencing shopping pattern, but however, the Railway Station Market Place is largely sustained by food produce brought from the south and middle belt of the country by long distance train services.

7.4 Brief Summary of the Data Analysis

To summarise the proceedings of the above analytical debate, the author is strongly convinced that in the system of urban market places in Kaduna city:

Firstly, there is

(i) strong hierarchical relationship; and

(ii) unbalanced hierarchical continuum in the relationship between:
   (a) any of the pairs of demand and supply of activity spaces, for food shopping;
   (b) any of the pairs of demand and supply of activity spaces, for non-food shopping

Secondly, there is strong multiple causal relationship between the growth rate of any demand or supply of activity space, and the locational and structural potentials in the market place.

The above two findings are summarised in the diagram shown in Figure 7.11, page 409; as stage 4 of the proposed locational and structural potential model.

Thirdly, the intuitive and reactionary measures adopted by the decision-takers to solve the problem of unbalanced demand and supply of the activity spaces have led to further imbalance, cumulating in more congestion of people and vehicles in the central market place, and in the under-utilization of the potential available in the other market places.

It is hoped that the analysis has helped to bring the complex interrelationships between the demand and supply of activity space, and the locational and

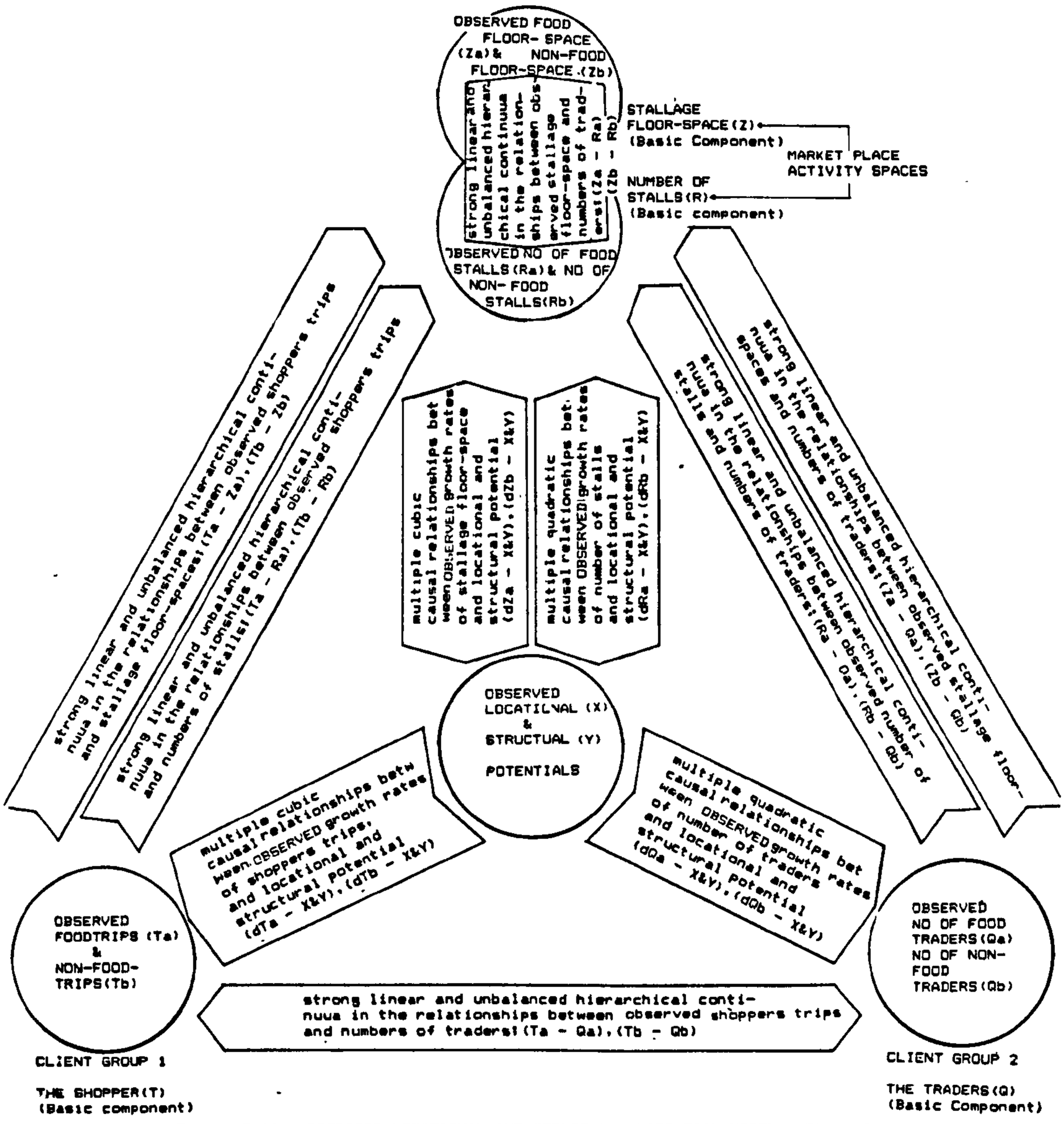


Figure 7.11 :PROPOSED LOCATIONAL AND STRUCTURAL POTENTIAL MODEL:- Stage 4

1a There is stronge linear and unbalanced hierarchical continuum in the relationship detween any observed pair of demand and supply of activity spaces.for food shopping.

1b There is stronge linear and unbalanced hierarchical continuum in the relationship detween any observed pair of demand and supply of activity spaces.for non-food shopping.

2. There is strong non-linear multiple causal relationship between the growth rate of any demand or supply of activity space.the locational and structural potentials.
(The calibrated predictive equations are shown in table 7.37. page 407.)

Notes : Arrow indicates direction of Influence

structural potential in the market places to the consciousness of those who take decisions in respect of urban and regional development plans.

Further, in order to suggest appropriate solutions to the above findings, the next chapters are devoted to the generation and evaluation of alternative development planning strategies. The alternative strategies consist of packages of proposals in search of a better 'future' and thence working backwards those proposals required to achieve balanced demand and supply of activity spaces, with the view to optimising the locational and structural potential in the market places.

But first, what are the current approaches to plan evaluation, and in what ways is the proposed locational and structural potential model associated with them?