

TRANSPORT COSTS AND THE LOCATION
OF INDUSTRIES IN IBADAN - A STUDY
IN INDUSTRIAL GEOGRAPHY

A Thesis presented to the University of
Ibadan in candidacy for the M. A.
Degree in Geography

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ABSTRACT

The significance of transport costs in the location of industries in Ibadan is studied through the application of the comparative cost approach while spatial differential in factor costs is investigated by means of field survey and statistical methods.

The theoretical schema which formalizes the comparative cost approach is substitution of production factors. This considers alternative locations in terms of substitution between transport costs and processing costs and identifies the least cost location.

Industrial concentration in Ibadan is assessed through the adaptation of the multiple criteria technique. The result shows that the magnitude of manufacturing in Ibadan is 30.61% of the total for Western Nigeria.

In Ibadan one universal element of production factors which varies significantly from industry to industry and which is generally subject to persistent spatial variation is transport cost. The role of transport costs in attracting industries into Ibadan is found to be very important in the Fruit Canning and Orange Squash industries but much less so with regards to Soft Drinks and Furniture. These latter have been attracted to Ibadan by the available metropolitan market advantages which form the basis of the present unique spatial monopoly enjoyed by Ibadan in the location of industries.

Results of cost calculations and perhaps most importantly transport costs are generally compatible with similar studies emphasizing the significance of transport costs in the location of specific industries elsewhere. The location of other industries not considered here for lack of data will have to await future investigation.

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CHAPTER IINTRODUCTIONThe subject and its setting

This study attempts to examine the role of transport costs in the location of industries in Ibadan. The role of transportation in the space economy has received much attention from scholars in Economic Geography. In the advanced industrial economies of the world, such as the United States and Great Britain, existing literature recognises the significance of transport costs in the location of industries and labels them as one of the important factors which contribute immensely to regional differentiation.

An examination of the role of transport costs in the location of industries equally involves the assessment of non-transport factors such as the relative wage levels, costs of raw materials, fuel and power and the availability and relative costs of factory sites. This is necessary because the significance of transport costs in the location of industries cannot be explained in isolation. It has to be considered in relation to other important locational factors. Thus, a comparative analytical study of factor costs in so far as this helps to isolate the significance of transport costs in the location of industrial firms in Ibadan falls within the compass of this study.

The classical Weberian model of industrial location regards transport costs as the most fundamental factor determining location¹. Estall and Buchanan also agree that the role of transport costs in the location of industries is an exceedingly complex problem, worth investigating². Transport costs are incurred in the process of raw material collection from their source regions to the factory sites and in the distribution of finished products to markets for consumption. In this regard, Estall observes that "transport, must be regarded as an integral part of the productive process, for a commodity is useless until it has arrived at its point of consumption"³.

The phenomenal proliferation of both Government and private industrial firms in Nigeria since the second half of this century and their concentration in particular areas of the country sufficiently calls for an inquiry into the causes of industrial concentration in such areas. It is observed that almost invariably the industrial firms are located in the main urban centres of the country. Incidentally, these urban centres notably Ikeja, Ibadan, Port Harcourt, Enugu and Kaduna are the transport nodes of the country.

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1. A. Weber: Theory of the location of industries. Translated with an introduction and notes by Carl J. Friedrich, University of Chicago Press, Chicago, 1929.
 2. R.O. Buchanan and R.C. Estall, Industrial activity and Economic Geography, London, 1961, p. 37.
 3. R.O. Buchanan and R.C. Estall, op. cit., p. 37.

This observed concentration at transport nodes and the great emphasis on the role of transport costs in industrial location by previous scholars have inspired this study of the significance of transport costs in locational decisions in Ibadan.

The study covers the manufacturing establishments using modern machines in the productive process. These are generally large-scale and small-scale factory-centered organisations occupying extensive areas of land which are accessible by road. The study does not concern itself with the location of the small-scale traditional craft industries using primitive tools. These craft industries have been on the decline since the beginning of the 20th century. For instance, the blacksmithing industries in Ibadan declined from 70 in 1950 to 20 in 1964⁴. This decline has resulted from the competition of imported but superior substitutes from Birmingham and Sheffield. Table 1 gives an impression of the pattern of decline in other small craft industries in the city.

4. R.A. Adinola, "The Industrial Structure of Ibadan", Nigerian Geographical Journal, Vol. 7, No. 2, December 1964, page 117.

Table 1NUMBER OF INDUSTRIAL UNITS IN IBADAN 1949 AND 1964

Industry Type	1949	1964	% Decrease
1. Weaving	120	30	75%
2. Dyeing	490	43	39.2%
3. Blacksmithies	90	20	77.9%
4. Pottery	9	3	66.7%

Source: Industrial Directory - W. Nigeria, 1950 and 1965 p. 6.

If the present trend continues, it is likely that both the products of local manufacturing industries and foreign importation may completely wipe out the craft industries in due course. Since the importance of these crafts has been challenged in this way and they are gradually being replaced by modern industries it seems that a study based on the expanding modern industries would be of greater value to the regional government in economic planning. It is necessary to point out here that in many cases the owners of the traditional craft industries are illiterate and they keep no records of production factors. In consequence, the location of such craft industries cannot be included in a study which is concerned with the comparative analysis of factor costs.

Review of previous work

There is not now available sufficient information on the distribution of industries in Nigeria, nor is there adequate reporting on the cost components of the factors used in the respective manufacturing establishments. Most of the available information are results of feasibility studies and a sizeable proportion of these concentrated largely on the problems of industrialisation.

Onyemelukwe has discussed the social, political and economic problems of industrialisation which faced the first Republic of Nigeria⁵. This book examines the prospects for industrialisation and points out the existence in Nigeria of a wealth of mineral resources and raw materials sufficient for a programme of rapid industrialisation.

Kilby (1965) carried out a comprehensive survey of the bread industry in Nigeria.⁶ He emphasised the phenomenal rate of growth of this industry since 1946 and the perishable nature of bread and therefore, the need for a market orientation of the industry. Like Onyemelukwe⁷, he elaborated on the problems of industrialisation in

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5. C.C. Onyemelukwe, Problems of industrial planning and management in Nigeria, Longmans, London, 1966.
 6. P. Kilby, An African Enterprise: The Nigerian Bread Industry Stanford University, 1965.
 7. C.C. Onyemelukwe, op. cit.

the country. The extended family in Nigeria according to him is a barrier to the emergence of entrepreneurs because of the multitude of claims and drains usually made on profits.

Sokolaki has also made a survey of the development of infrastructure and the establishment of manufacturing in Nigeria.⁸ He discussed the transport network and the structure of industries in the country. The industries are classified on the basis of major locational orientation to markets and raw material sources.

Some useful literature exists on transportation and locational analysis. Economists and geographers have given some thought to the role of transport costs in locational decisions. These theories largely of German origin treat transportation and other costs as separate factors and emphasize the selection of the least cost location.

Alfred Weber,⁹ based his theory of factory location on transportation costs, labour cost and agglomerating forces. He assumed uniform costs per ton mile and concluded^{indeterminately} that in cases where transfer cost per ton mile is the only important factor, if a non-weight losing material is used in manufacturing, the location can be either raw material or market oriented. If on the other hand, a weight

8. A. Sokolaki, The establishment of manufacturing in Nigeria, Frederick A. Praeger, Publishers, New York, Washington, London 1965.

9. A. Weber, op. cit.

losing material is used, it is raw material oriented. If a ubiquitous material is used, the industry is oriented to markets. He further made a distinction between transport costs and non-transport costs. He recognised that transport costs are not the dictating factor in all location problems and that the optimum location represents the point where computed transport costs and processing costs yield minimum costs.

Despite Weber's simplifying assumption of "uniform costs per ton mile", two important aspects of his contribution have been of much help in the overall orientation of this study. These are his contribution in delineating transport costs and non-transport costs, and his recognition of the site in which an industry could maximise profits. These form the basis for assessing the significance of transport costs in the location of industries in Ibadan and for considering alternative locations in terms of substitution between transport costs and processing costs. The assumption of uniform costs per ton mile by Weber is neither realistic nor applicable in discussing the role of transport costs in the location of industries since in most countries, a complicated freight rate structure exists. Freight rate structure in Nigeria varies from hauler to hauler, from customer to customer for the same consignment, and in relation to the length of haul. Under this condition, a uniform cost per ton

mile cannot be realistically assumed.

Like Weber, Hartshorne, (1927) believed that the optimum location is determined primarily on the basis of costs - that is to say, the costs of translating raw materials in the factory into finished products for consumption¹⁰. The optimum location, according to him is that in which profit is maximised. Stressing the importance of transport costs in locational decisions, he emphasized that the unit transport costs are usually higher on finished goods than on raw materials so that when the manufacturing process involves little or no loss in weight, and the raw material is non-perishable, location with reference to markets is more important than that with reference to raw materials. Hartshorne's conditions for raw material orientation of industries apply in Ibadan where a sizeable proportion of the industries process agricultural raw materials which cannot withstand long distance transportation because of their high degree of perishability. In this respect, the nature of raw materials and of final products of the industries in Ibadan and the unit transport costs on them have been examined with a view to identifying their orientation either to raw material sources or to the market.

10. R. Hartshorne: "Location as a factor in Geography", Annals of the Association of American Geographers, Vol. 17, No. 2, June 1927, page 92.

Various other scholars have made significant contributions to locational theory¹¹. In most of their work, the role of transport costs in industrial location is recognised and well appraised. While accepting Weber's treatise as a basis for further work, these later writers departed in some cases from some of the views held by Weber. ~~Greenhut~~^{Greenhut}, for instance, while recognising the significance of transport costs in locational decisions, is of the opinion that the point of least transport cost is not necessarily the least cost location. A least cost location must permit the firm to undersell its rivals in key markets and place a wider area under its control. He therefore concluded that transport costs cannot be viewed as separate and distinct locational factor as in the Weberian dogma. Similarly, the assumed uniform costs per ton mile by Weber has

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11. Some of these contributions include the work of the following scholars:-
- i. ~~M. Greenhut~~^{Greenhut}, Plant location in theory and practice, Chapel Hill, University of North Carolina Press, 1956.
 - ii. E. Hoover, Location of Economic Activity, 1st Edition New York, 1948.
 - iii. E. ~~Holmes~~^{Holmes}, Plant location, 1st Edition, New York, 1930.
 - iv. A. Lösch, The economics of location, Yale University Press, Yale, 1954.
 - v. M. Chisholm, Geography and Economics, G. Bell & Sons Ltd., London, 1966.
 - vi. W. Isard, Location and Space Economy, John Willey and Sons Inc., New York, 1966.

received much criticism. In fact this has been modified to become the popular "ton-mile approach" which is now in use in many areas of the world for explaining the role of transport costs in industrial location¹². The ton-mile approach, however, becomes inapplicable in developing countries like Nigeria where there is no uniform and clear structure of freight rates.

A wealth of literature exists on transportation geography but only those which are relevant to this study are mentioned here.

Holmes¹³ and later, Hoover¹⁴, discussed the complexities of freight rate structure and ~~tariffs~~^{tariffs} and emphasized the strong locational pull of spatial variations in freight rates. They maintained that rates do not increase proportionately with distance. Hoover, in particular, recognises the influence of heavy terminal costs which are independent of the length of haul and which enables haulers to charge tapering rates with increasing length of haul. Freight rate structure in Nigeria is examined along this line to determine its locational pull on industries. Similarly, Hoover's belief "that transport costs affect the locational preference of a producer unless his supplier and consumer absorb these costs completely"

12. J. Reeves, "Transport costs and the location of industry in Victoria", Economic Record, Vol. 37, 1961, p. 231.

13. E. Holmes, op. cit.

14. E. Hoover, op. cit.

applies in a study of industrial location in Ibadan where most of the industries process imported and agricultural raw materials the sources of which lie at considerable distances from the processing plants.

Bonavia has elaborated on the mechanics of the market for transport¹⁵. According to him, price is commonly based upon the cost of service provided, and the nature of commodity carried. Thus, goods are grouped into classes according to their ability to bear a charge. The charge for an article depends upon comparative costs of carriage, liability to breakage and susceptibility to competitive transport. He therefore concludes that a railway rate book represents a striking example of discrimination monopoly under which transactions are grouped and varying rates charged for what are essentially identical services. It is significant to point out that the Nigerian Railway rate structure conforms with Bonavia's observation since the Nigerian Railway Corporation classifies consignments into various categories for the purpose of charging rates.

In explaining the phenomenon of commodity flow in the U.S., Ullman discusses the concept of complementarity¹⁶. He based material

15. E. Bonavia, The economics of transport, Cambridge University Press, Cambridge, 1936.

16. Ullman E.L. American Commodity flow: a geographical interpretation of rail and water traffic based on the principles of spatial interchange, University of Washington Press, 1957.

circulation on complementarity resulting in an interchange of products between two or more complementary regions. This concept applies in Ibadan since it draws the raw materials for her industries from abroad and from the rural areas and in return, supplies the rural areas with manufactured products. This exchange takes place through transportation, thus emphasising the role of transportation in the space economy.

Hoover and Weber have both emphasised the concept of economic distance. This concept lays more importance on efficient transportation than on geographic proximity. Here efficiency means speed and low cost of transport. Thus Crossman believes that places geographically more distant may be economically nearer because of better transport facility reflected in low freight rates and high speed of haul. Transport efficiency has been investigated along this line to ascertain the degree to which this has been a locational attraction in Ibadan.

Hogg and Roelandts, have worked on the Nigerian Motor Vehicle traffic¹⁷. This work is essentially an estimate of Nigeria's motor vehicle population in 1968. It examines the importance of road transportation as feeders to rail and ocean shipping in the carriage

17. V. Hogg and G. Roelandts: The Nigerian Motor Vehicle Traffic in Ibadan, Nigeria, published for the Nigerian Institute of Social and Economic Research, Oxford University Press, 1962.

of raw materials and finished products of industries. It has data on the volume of traffic handled by road, rail and water transport in Nigeria.

The International Bank for Reconstruction and Development has examined the freight rate structure of the Nigeria railways¹⁸. It estimates that rates range from 5d. to 7d. per ton mile for freight and 1d. per mile per passenger. Similarly, the Nigerian Railway Corporation publishes tariffs which give some information on the freight rate structure of the railways and show the rating of traffic according to type and nature of goods, distance to be covered, weight and measurement. These publications form invaluable source material for the section on the freight rate structure in Nigeria.

No comparable source of statistics exists for road transport. Hawkins has however studied road and rail transportation in Nigeria. In his work, he observes that in the market for transportation, local factors at the road side, and in the lorry parks, are often of overwhelming importance so that no clear pattern of rates emerges for the whole country or even for one region. This view is crucial to the method of approach and the subsequent analysis in the text.

18. Economic Development of Nigeria, Report of a mission organised by IBRD, Federal Government Printer, Lagos, 1954.

Research Methodology

For the appraisal of the role of transport costs in the location of industries in Ibadan, the "comparative cost approach"¹⁹, is here used. The applicability of this method to the study manifests itself through a quantitative measure of the relative pull potential of individual production sites. It also provides a measure of the location in which an industry could achieve the minimum cost for assembling raw materials, processing them, and distributing the finished products to the market.

Attempt was made to apply the "ton mile approach", as used in Australia²⁰, but the complete absence of a uniform freight rate structure in Nigeria made such application impossible. As a result, the required data on transport costs were collected through questionnaires and personal interviews and from the records of the firms involved in the study. The results of this exercise form the basis of the comparative analysis presented in the text.

The application of the comparative cost approach to the study

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19. W. Isard, Methods of regional analysis - an introduction to regional science, M.I.T. Press, Cambridge Massachusetts, 1960, pp. 233 - 245.
 20. J. Reeves, "Transport costs and the location of industry in Victoria", Economic Record Vol. 67, December 1951, p. 231

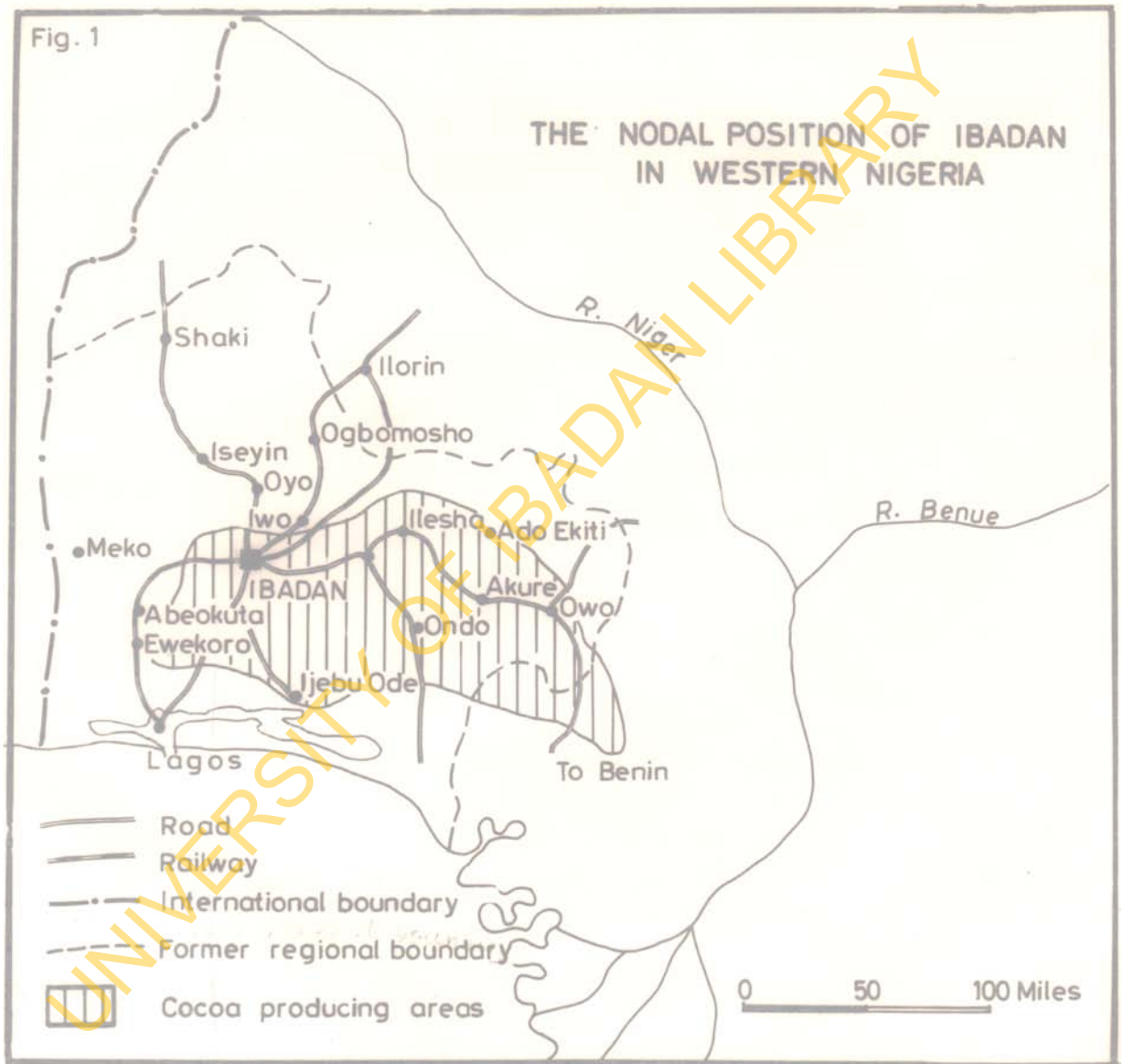
of industrial location, involves the following procedure:

- i. Defining and selecting the area of study, and the areas to be compared in order to measure the transport cost advantage or disadvantage of Ibadan in respect of the industries studied.
- ii. Calculating the total costs of the factors combined for the production of finished goods in each industry.
- iii. Estimating the amount of transport cost differentials in alternative locations to measure the transport cost advantage or disadvantage of Ibadan.
- iv. Offsetting the transport cost advantage or disadvantage of Ibadan against relative differential advantages in processing costs in alternative locations and vice versa, to determine the net transport cost advantage or disadvantage of Ibadan.

The city of Ibadan is a large Yoruba metropolis which lies in the heart of the cocoa producing belt of Western Nigeria, some 600 feet above sea level. It is situated on a railway line running from Lagos to the north of the country and at a cross roads from Lagos, Oyo, Ife, Abeokuta and Ijebu-Ode. Its nodal position in Western Nigeria - Fig. 1 - is a major factor in the rise of the city to industrial eminence. With a population of about one million

Fig. 1

THE NODAL POSITION OF IBADAN IN WESTERN NIGERIA



people²², it is the largest city in Tropical Africa.

The city came under British rule in 1893 and from this time may be dated the beginning of the connections which the city has with the outside world. With the coming of the railways in 1901 and the roads six years later, certain commercial firms such as the United Africa Company, Union Trading Company and G.B. Olivant came to establish in Ibadan. These commercial firms naturally set up their establishments near the railway station at Iddo Gate and at the junctions of the roads from Lagos, Abeokuta, Oyo and Ife. These areas have since become the commercial centre of the city.

For a town of this size, an unusually high percentage of the population is engaged primarily in agricultural production. In 1963, about 25% of the people in the town were still engaged in farming²³. The establishment of manufacturing industries in the city is of recent origin. In 1951, Ibadan became the political capital of Western Nigeria. The Bodija residential estate and the New Reservation Schemes were undertaken subsequently to provide decent accommodation

22. Population Census of Nigeria, 1963, Western Nigeria Statistics Division, Ministry of Economic Planning and Community Development, Ibadan.

23. Population Census of Western Nigeria, op. cit.

for the managerial class. Several other urban amenities such as the provision of electricity and water supply, efficient postal and medical services and the establishment of commercial banks provided the initial infrastructure sufficient to encourage the establishment of industries.

In addition, Ibadan has an extensive area of land for the location of industries. Its large population provides a large market for industrial products. With the provision of these manufacturing facilities, various industries have come to establish themselves in Ibadan at an ever increasing rate since the 1950's.

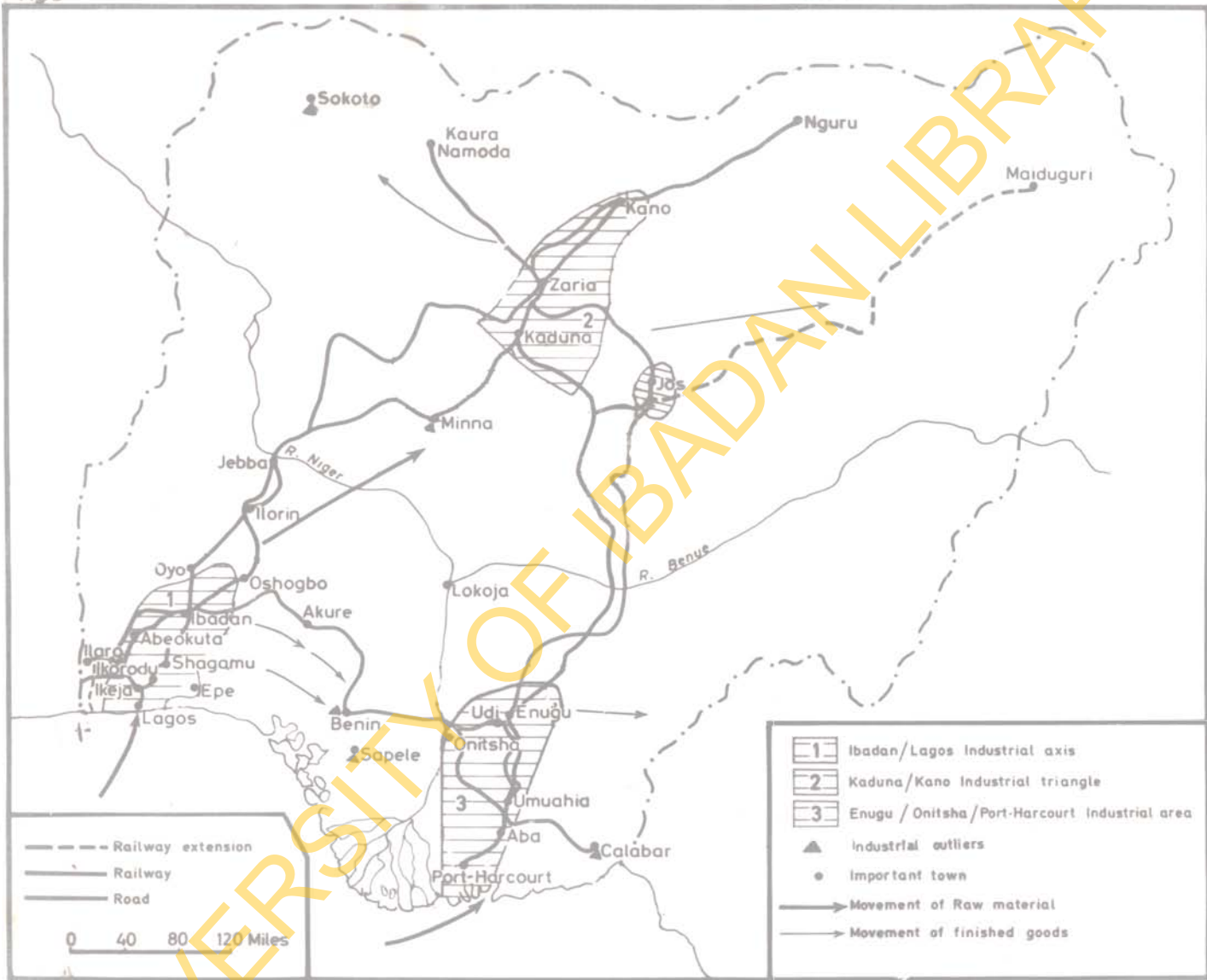
Because of the comparative analysis involved in this study, it was necessary to extend the area of study to other parts of Western Nigeria²⁴. A preliminary study of the industrial map of Nigeria (fig. 2) reveals that the industries in the country are concentrated in three industrial zones. These are the Ibadan/Lagos industrial axis in Western Nigeria, the Onitsha/Port-Harcourt with the Nkalagu industrial area in the east and the Kano, Kaduna and Jos industrial triangle in Northern Nigeria. Outside of these three industrial areas are the industrial outliers of Sapele, Calabar, Benin, ^{Minna} and ~~Enugu~~ Sokoto.

The towns which fall within the Ibadan/Lagos industrial axis (except Lagos) are selected for the comparative analysis of transport cost differentials since all of them lie within the same industrial zone under the same Regional Government.

24. Western Nigeria as used in the study refers to the former Western Region prior to the 1967 division of Nigeria into twelve states, excluding Lagos.

Fig 2

CONCENTRATION OF INDUSTRIES IN NIGERIA



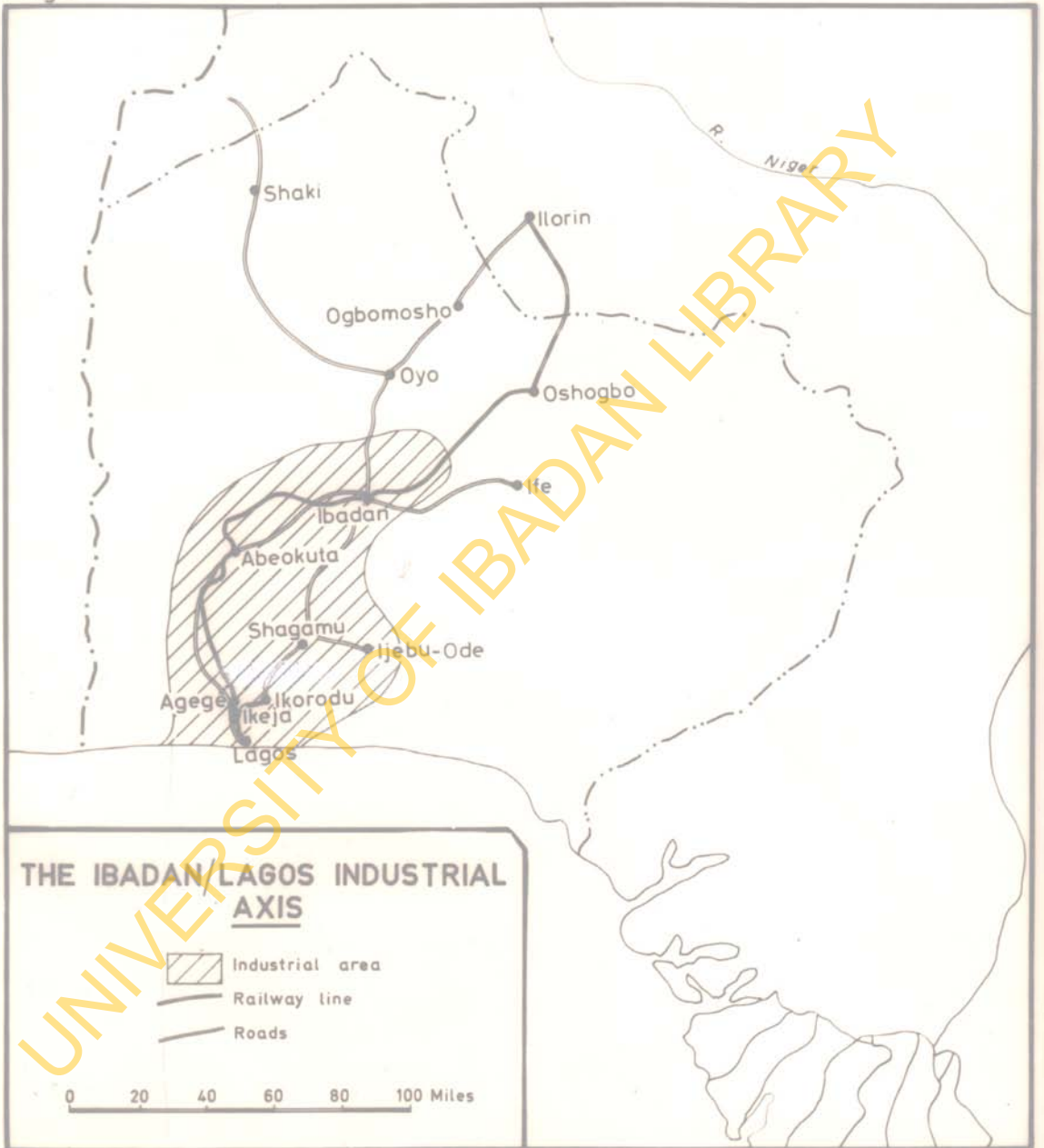
The Ibadan/Lagos industrial axis is that part of Western Nigeria extending from Lagos in the south in a north-east direction for about 90 miles to Ibadan which represents the northern boundary of the area. This area covers a narrow stretch of land in the centre of Western Nigeria and encloses within it, Ikeja, Mushin, Agege and Abeokuta. (Fig. 3) These towns are linked together by both rail and road communication and they coincide with the most densely populated areas of Western Nigeria. The importance of both rail and road communication for the collection of raw materials and the distribution of finished products in this area is obvious. Because of their location on the main lines of communications, the goods from these towns are distributed extensively throughout the country.

The industries participating in the study are those which co-operated by supplying the required data. Such industries must satisfy the condition of having at least ten employees and capital asset of not less than £500 and producing in a factory. The choice of industries located in other towns in Western Nigeria for the purpose of calculating spatial production cost differentials is based on the same criteria. On this basis, four industries have been selected for study.

These are:-

- (1) The Fruit Canning Industry
- (2) The Orange Squash Industry
- (3) The Soft Drinks Industry
- (4) The Furniture Industry

Fig. 3



Attempts at explaining the problems met in this investigation are by the hypothesis approach. In this respect, the working hypotheses, listed below, have been subjected to rules of statistical testing and verification.

1. Transport costs are of great significance in the location, and a major factor in the concentration of industries in Ibadan since the freight rate structure in Nigeria favours the city more than any other town in Ibadan/Lagos industrial axis.
2. Spatial variations in factor costs in Western Nigeria weigh in favour of Ibadan. These enhance its transport cost advantage and make the city the least cost location in Western Nigeria.
3. Processing cost advantage in alternative rival locations is not sufficiently large to outweigh the transport cost advantage of Ibadan.
4. The centrality of Ibadan in Western Nigeria reduces the length of haul to raw material sources and to markets, while its nodality affords maximum accessibility to a larger market area. These combine to reduce haulage costs in Ibadan relative to other towns in Western Nigeria.

Questionnaires were prepared and distributed to both small scale

and large scale factory organizations in the main urban areas within the area of study. A sample of such questionnaires is attached as appendix I (pages. 143-157.....). Because of the comparative analysis involved in the study it was necessary to prepare questionnaires to cover the major traditional factors of location. These are in the main: transport costs, labour, raw material, power, agglomeration and deglomeration factors.

The data collected were rigorously subjected to statistical analysis and inferences drawn from them. Spatial variations in factor costs were tested for significance through regression analysis. The factors which exhibit widest spatial cost differentials were then selected for further investigation since those without spatial variations contribute to no regional advantage or disadvantage. Only those industrial firms which are located in two or more towns were considered because of the comparative nature of the study. The amount of regional differences in factor costs was estimated and this forms the basis for the comparative analysis of each location.

Transport cost differentials were calculated by finding a common base for the respective industries. (See Appendix II page)

The relative cost advantages of each location were set against transport costs to estimate net transport cost advantage or disadvantage and thus the possibility of the substitution of factors of production.

Arrangement of Thesis Ideas

The study is divided into two parts. Part one deals with the structure of industries in Ibadan while part two examines the influence of transport costs on the location of industries in the city.

Chapter One of the work is an introduction primarily concerned with the objective and coverage of the study. It identifies the industries studied and explains the techniques employed in the investigation.

Chapter Two examines the development of industries in Ibadan and discusses the mode of organisation and the evolution of both the traditional craft and modern factory based industries. It also considers the phenomenal rate of industrial development in the city since 1950.

Chapter Three deals with the concentration of industries in Ibadan through the adaptation of the multiple criteria technique proposed by Thompson²⁴. It attempts a classification of the industries on the basis of the nature of the final products and goes further to discuss the location of the different classes of industries in certain parts of the city.

Chapter four discusses the factors of industrial concentration

24. J.H. Thompson, "A new method of measuring manufacturing" Annals of the Association of American Geographers, Vol. 45, 1955, pp. 416 - 436.

in Ibadan. The relative significance of each factor is ranked on the basis of the number of times they were mentioned either as primary or secondary factors in locational decisions. This part of the work also examines the locational advantage of Ibadan in respect of her high market potential, cheap electricity supply and high degree of general accessibility. It examines the spatial variation in factor costs in the Ibadan/Lagos industrial axis and the influence of these on locational decisions in Ibadan. The wide spatial variation in transport and power costs is emphasized and labelled as the most important factors in locational decisions in the area.

Chapter five examines the transport pattern and the freight rate structure of road and rail and the influence of this on the pattern of industrial location in Nigeria. The remaining chapters employ the comparative cost approach in examining the significance of transport costs in the location of some specific industries in Ibadan. Transport cost advantage or disadvantage is calculated for each location and processing costs set against transport costs to determine the net advantage or disadvantage of the latter in locational decisions.

The concluding chapter summarises the results and findings of the study. It examines the effects of the size of samples and the likely effects of a wider selection on the results of the study. It considers the possible impact of improvements in the rate of transport development, as well as in the time factor of transportation with a

general lowering of transport costs and a rise in the level of production efficiency on the present spatial monopoly enjoyed by Ibadan. The future trend of industrial location in Western Nigeria vis-a-vis the present policy of the state Government to disperse industries to other areas is assessed and some suggestions made for the guidance of those responsible for economic planning.

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PART ONE

THE INDUSTRIAL STRUCTURE OF IBADAN

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CHAPTER TWO

INDUSTRIAL DEVELOPMENT IN IBADAN

Based on the mode of organisation, there are two types of industrial enterprises in Ibadan. The first group represents traditional craft industries carried on mostly in the owner's residence in small units, having very little investment of capital and using simple tools in their manufacturing. The second group comprises modern factory based industries. Most of these were established after the Second World War. They had their origin in the post-war economic boom which put more money in the hands of both Government and the private sector of the Nigerian economy. A significant difference between this group and the former is that, unlike the small-scale traditional craft industries, production takes place in factories which may be at considerable distances away from the place of residence of both the proprietor and the workers.

The evolution of Traditional Craft Industries

Traditional craft industries have existed as far back as the founding of the city. The city developed as a war camp around 1821 and functioned as the military base for the Yoruba forces in the tribal wars against the Fulanis in the 19th century. Despite its military function and its involvement in the tribal wars, the city showed evidence of the presence of many craft industries by the mid 19th century. The Missionary, David Hinderer observed in 1851 that a good

number of industry including many weavers, tailors, tanners, carpenters and blacksmiths were carried on in the city¹. Of these, blacksmithing was the most important because of the high demand for war weapons. The smiths manufactured such weapons as swords, guns, cutlasses and axes which were used by the Yoruba forces in prosecuting the war against their enemies.

Throughout the whole of the 19th century, Ibadan remained a war encampment with blacksmithing, weaving, dyeing, tanning and the making of leather goods as the most important industrial undertakings. By 1893, the town came under British protection. Following British effective occupation and the introduction of peaceful administration, an agricultural population quickly emerged from what was originally a camp of warriors. This functional change affected the demand for the products of the craft industries and resulted in a change in the type of products produced. The demand for locally manufactured military weapons was replaced by a higher demand for agricultural implements. The blacksmiths therefore changed the pattern of production to suit the market by concentrating on the production of hoes, cutlasses and knives. In addition, a considerable number of jewel smiths manufacturing a wide range of silver, copper and brass jewels for the

1. D. Hinderer, Journal of the Church Missionary Society, CA2/549, September 1851, p. 4.

people began to establish in the city. The weaving and dyeing industry also developed side by side with the jewellery industry with a considerable number of weavers establishing themselves at Oke Olu-okun. Dyeing pits were also located in close proximity to the weaving centres while several potteries sprang up near streams in the town.

All these traditional craft industries possess some common and distinctive features. In the first place, the system of production in the craft workshops is labour rather than capital intensive. Simple tools which are locally made and are within the limited purchasing power of the entrepreneurs are used. The craft skills are easy to master and are passed from parents to children. Thus it is not unusual to find certain compounds in the city specialising in particular crafts². In most of the industries, the scale of enterprise is considerably small. Most of them are established and organised as a one-man business which may employ some members of the family with five or more paid workers. Because of long experience and considerable acquisition of skill, the finished products from these industries are of fair artistic quality and also of wide variety. The products include mats, pots, cloths, handbags, cane chairs, cutlasses and hoes.

2. Oke Olu-okun for instance, is well known as a weaving centre in the city.

In this study, the present characteristics of the major traditional craft industries are considered. These are blacksmithing, weaving and dyeing and pottery.

The Blacksmithing Industry

This industry produces knives, cutlasses, axes, hoes, arrows, swords and guns. It uses imported motor scrap as raw materials. Charcoal is used as fuel in the forges, and the fire is contained between two low mud walls. The tools produced are still crude and the traditional method of production has not improved over the years.

Smithing was formerly the principal traditional craft of Ibadan people. Today, it has lost its lead to weaving. The decline in blacksmithing results from two major factors. In the first place, the cessation of inter-tribal war following the introduction of peaceful government by the British led to reduced demand for the products of the industry. Secondly, the importation of superior tools from abroad and the resulting price competition led to the displacement of the inferior products of traditional blacksmithing from the market. The few surviving smiths can now be found only in Agbede-Adodo near the centre of the old city and in a few scattered locations. These latter, continue to thrive on their former traditional fame, and on the low demand for cheap and light cutlasses and hoes from many of the peasant farmers.

The Weaving and Dyeing Industry

Weaving and dyeing go hand in hand. Weaving, unlike blacksmithing has continued to thrive in Ibadan. Although, the cloth produced is a heavy, thick and coarse textile, its use in the celebration of important ceremonies, particularly by Yoruba people and the importance attached to wearing it on such occasions have led to increased demand for it. Thus, the industry continues to compete favourably with the machine-produced Manchester textiles. Its product consists of narrow strips of cloth, 4 to 5 inches in width and 15 to 20 yards in length, produced on traditional looms. These strips are usually sewn together to produce the required size.

The dyeing industry utilises indigo leaves for the preparation of dyes. These are then used to make 'Adire' cloth³. Dyeing is essentially an occupation for women. Pieces of white cloth already sewn to the required size are tied to form knots in places according to a design worked in before dyeing. After the dyeing, the design shows as patches of white on a background of dark blue. Another method of preparing Adire has been developed in Abeokuta and Lagos and adopted by the women in Ibadan. This is known as 'Adire eleko'. In this case, designs are made on the plain white cloth by the applica-

3. 'Adire' - is a name derived from the method of dyeing cloth, it means to tie and dye.

tion of starch. When the cloth is dyed, the starched portion is unaffected. When the starch has been washed away, this again shows as patches of white on a dark blue or black background. Up till now, the European made Adire has not succeeded in successfully competing with the locally made ones because the latter is thicker and lasts longer than the former.

Pottery

Pottery industry in Ibadan developed because of the demand for earthen-ware in many households and the abundant deposits of local clay along river beds. The potteries are located along river beds where water is also available. In the past, they supplied most of the cooking pots, plates and storage vessels of the city's inhabitants. Today, the industry has declined following the ^{exhaustion} ~~exhaustion~~ of clay deposits and the competition from imported and Nigeria-made iron and aluminum cooking utensils and plastic products which are more durable than the earthenwares. Another factor making for its decline is that its product - the earthen pots - take a longer time to heat up and cook food than aluminum pots. With the rising cost of fuel (especially firewood) aluminum cooking utensils are preferred. With the continuing rising standard of living, the attendant demand for aluminum products and the rejection of earthen pots, most of those still engaged in this industry may soon have to look for alternative employment.

The example of these three industries emphasises that, with perhaps the exception of the weaving and dyeing industry, the prospect for craft industries in Ibadan is far from bright. Apart from the keen competition from goods of better quality from modern industrial establishments at home and abroad, lack of government encouragement has intensified the rate of decline of the traditional craft industries.

The change to factory centred production

The establishment of factory industries is a very recent feature in Ibadan. This category of industries ^{was} ~~were~~ established after the second world war and their development may be attributed to a number of factors.

The coming of the railways in 1901, and the introduction of motor transport in 1907 widened the market area of Ibadan and encouraged increased ~~and~~ regional specialisation in agricultural production. The post-war economic boom and the sharp rise in the price of cocoa around 1955 put more money in the hands of both public and private sectors of the Nigerian economy. This economic condition ushered in a period of prosperity. It improved the effective demand for manufactured products which could not be met by the numerous small-scale traditional craft industries. Attention was directed to the imports of these manufactured products from abroad. These imported products were of higher quality than the locally produced ones and were there-

fore in greater demand. The continuous importation of these goods, however, soon created an acute balance of payments problem for the country, hence the Government's decision to encourage the establishment of industries. Following on this decision, numerous import substituting industries began to come into existence⁴. These include plastic, food processing, furniture, soft drinks, printing, tobacco and fruit canning industries. From this period dated the beginning of the development of factory industries in Ibadan.

Before 1956, the Nigerian Tobacco Company was the only noticeable factory industry in Ibadan. After this date, there was a remarkable increase in the number of such factory industries. For instance, the 1964, industrial survey of the city showed that there were about 50 industries employing 10 - 999 ^{workers}. Table 2 shows the growth in the number of factory industries and their electricity consumption since 1956. It also emphasizes the phenomenal rate of industrial development which the city has experienced during the period. However, not all the 50 industrial establishments are large-scale and Table 3 shows the pattern of size distribution.

4. It was believed that when such industries begin production, the deficit in the balance of payment would be corrected.

Table 2GROWTH OF MODERN INDUSTRIES AND ELECTRICITY CONSUMPTION 1956 - 1963

Year	No. of Firms	No. of Units of Electricity Consumed	Increase in no. of firms %
1956	1	1,625,000	—
1959	7	6,429,000	85.71
1960	10	11,258,000	90.00
1961	12	13,388,000	91.67
1962	45	15,157,000	97.78
1963	50	17,656,000	98.00

Source: Report of industrial enquiries of Western Nigeria, Ministry of Economic Planning and Social Development, Vol. 2, No. 1, Oct. 1966, page 7 and Western Nigeria Statistical Bulletin, Dec. 1960, page 109 and December 1963, page 2.

Table 3NUMBER OF INDUSTRIES AND NUMBER OF WORKERS EMPLOYED 1965

Range of number of people engaged	Number of establishments reporting
10 - 24	11
25 - 49	20
50 - 99	7
100 - 199	6
200 - 499	2
500 - 999	1
Total	47

Source: Results of field investigation by the writer (1965)

The discrepancy in the total number of industries in this table and table 2 is due to non response. Only 47 of the 50 firms responded and all efforts to collect this particular data were foiled by the managers who regarded such information as highly confidential. They however supplied verbal information on factors of industrial concentration.

The table shows that of the 47 establishments reporting, only 15 employed over 50 workers while only one employed over 500 workers. Within Western Nigeria, the concentration of industries in Ibadan and their selective location in particular areas of the city is the subject matter of the next chapter.

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CHAPTER IIIINDUSTRIAL CONCENTRATION IN IBADAN

The industrial survey of Western Nigeria (1963) shows that of the 166 industrial units operating in the region, 47 (or 28.31% of the total) are located in the Colony Province, 50 units (or 30.12%) in Ibadan and the remaining 69 (representing 41.57%) are shared by four other provinces of the region. Table 4 which shows the break-down of the industries according to provincial locations emphasizes the pre-eminence of Ibadan and the Colony provinces in the industrial scene of Western Nigeria.

Table 4DISTRIBUTION OF INDUSTRIES BY PROVINCE 1963

Province	No. of industries	% of Regional total
Colony	47	28.31
Ibadan	50	30.12
Abeokuta	10	6.03
Ijebu	23	13.86
Ondo	18	10.84
Oyo	18	10.84
Total	166	100%

Source: Report of industrial enquiries of Western Nigeria, Ministry of Economic Planning and Social Development, Statistics Division, Ibadan, Vol. 1, No. 1, October 1966, page 8.

A look at table 5 showing the number of industrial workers

according to six provinces in Western Nigeria further emphasizes the relative significance of Ibadan as a centre of industrial agglomeration in Western Nigeria.

Table 5

NUMBER OF INDUSTRIAL WORKERS BY PROVINCE (1963)

Province	Number engaged	% of Total
Colony	6,511	46.1
Ibadan	3,215	23.5
Ondo	1,983	14.5
Abeokuta	936	6.9
Ijebu	587	4.3
Oyo	649	4.7
Total	13,681	100%

Source: Report of industrial enquiries of Western Nigeria, Ministry of Economic Planning and Social Development, Vol. 1, No. 1, October 1966, page 15.

From this table, it can be seen that the industries in Ibadan offer employment to 23.5% of total industrial workers in Western Nigeria. Table 6 further reveals that although the Colony is the most industrialised province of Western Nigeria in terms of the number of industrial workers, Ibadan leads all other provinces in terms of the value of total production. This Province accounts for 48.1% of the regional total compared with 41.35% for the Colony Province the next highest.

Table 6VALUE OF TOTAL INDUSTRIAL PRODUCTS BY PROVINCE (1963)

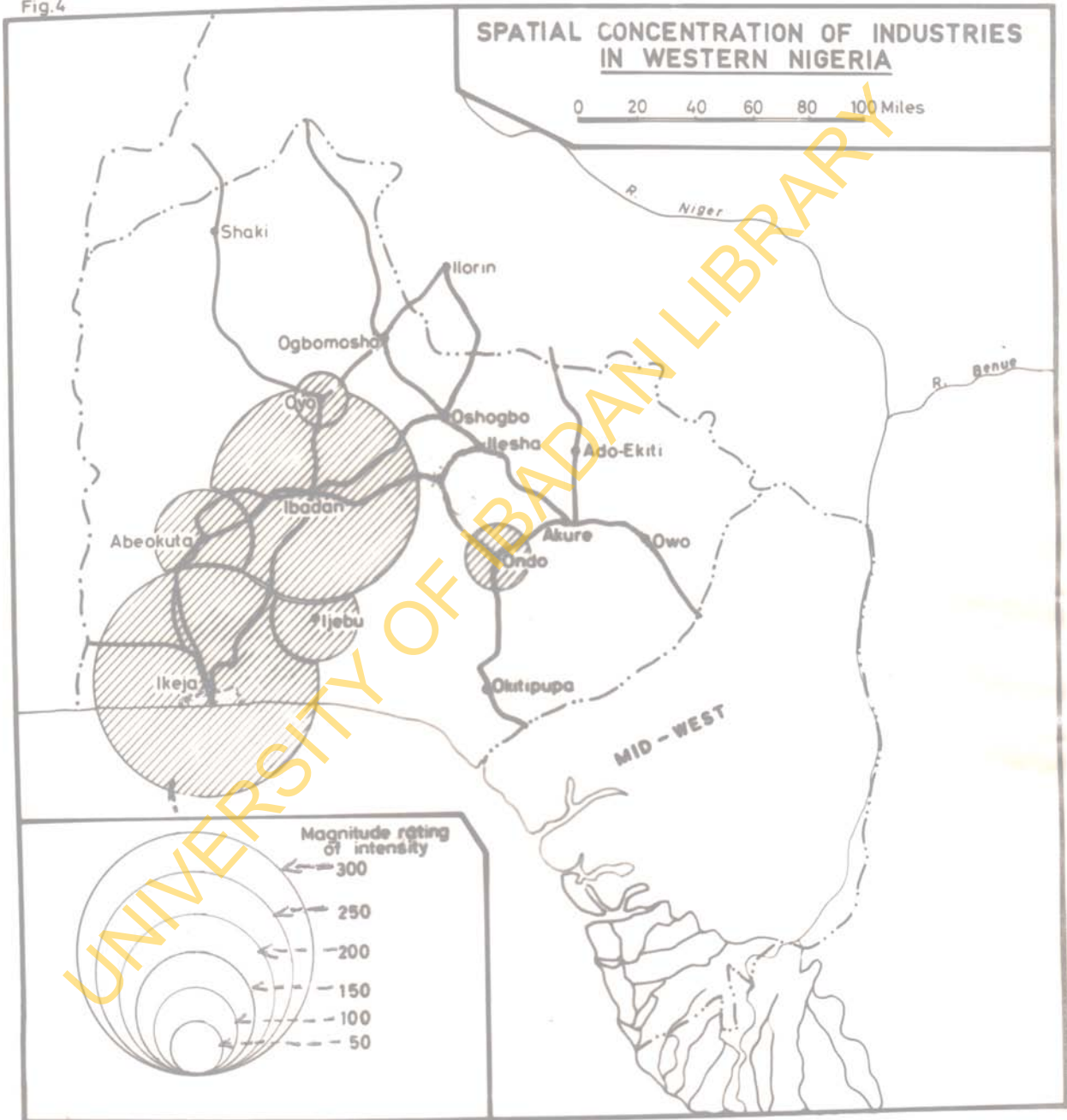
Province	Value in £m.	% of Total
Ibadan	15.5	48.10%
Colony	11.6	41.35%
Abeokuta	1.5	5.25%
Ondo	0.76	2.71%
Ijebu	0.45	1.60%
Oyo	0.25	0.89%
Total	29.06	100%

Source: Report of industrial enquiries of Western Nigeria, op. cit. page 22.

Fig. 4 depicts the uneven pattern of industrial distribution within the region. Instead of showing this through mapping the distribution of the individual variables already discussed, an attempt has been made to adapt the multiple criteria technique proposed by Thompson¹. This technique lays emphasis on the need to measure the degree of industrial concentration rather than simply indicate the magnitude of various variable characteristics of industrial units located in an area. In order to measure the concentration of indus-

1. J.H. Thompson, "A new method of measuring manufacturing" Annals of the Association of American Geographers, Vol. 45, 1955, pages 416 - 436.

Fig.4



tries, Thompson calculated what he called a "multiple criteria rating of magnitude". To compute this for any given region, the number of factory workers, ^{Salaries and wages.} and the value added during manufacture in the region are each divided by the respective "Magnitude Base", i.e. the average of the conditions found in all the industrial units in the region involved. The quotients derived in this way are multiplied by 100, summed and averaged to obtain the multiple criteria rating of magnitude. In other words the formula for the multiple criteria rating of magnitude is of the form:
$$M = \frac{(y/b + a/b_1 + c/b_2)(100)}{r}$$

where M = Multiple criteria rating of magnitude

y = Total number of industrial workers in the area

b = Average regional total of industrial workers

b₁ = Average regional total of salaries and wages paid to industrial workers

a = Total salaries and wages paid to industrial workers

c = Total amount of value added to manufacture

b₂ = Average regional total of value added to manufacture

r = Average rating

The multiple criteria rating of magnitude for Ibadan is as calculated on page 39 (foot note) while those for six provinces are set out in table 7.

The result of this multiple criteria technique gives a much more realistic impression of the uneven concentration of industries in Wes-

tern Nigeria by revealing the exaggerated importance attached to the Colony and Ibadan Provinces by the results of the previous single criteria technique. For instance, by using the number of all industrial workers employed as an index of industrial concentration, the Colony and Ibadan Provinces account for 46.1% and 23.5% of the regional total respectively while that of the total value of industrial products returns 41.3% for the Colony and 48.1% for Ibadan. The multiple criteria index on the other hand puts the magnitude of manufacturing in Ibadan and the Colony Provinces at 30.63% and 51.3% of the regional total respectively. However, this still confirms the dominating position of the two provinces in respect of the degree of industrial

2. The multiple criteria rating of magnitude for Ibadan(1965).

1. Total number of industrial workers in Ibadan = 3,215
2. Average of the total number of industrial workers for 6 Western Nigeria Provinces = 2,840 per province.
3. Total salaries and wages paid to industrial workers in Ibadan = £13,500,000.
4. Average of total salaries and wages for six Western Nigeria Provinces = £4,700,000 per province.
5. Total amount of value added to production = £24,750,000.
6. Average regional total of value added = £6,840,000 per province

$$M = \frac{(y/b + a/b_1 + c/b_2)}{r} (100)$$

$$= \frac{(3,125 + \frac{13,500,000}{4,700,000} + \frac{24,750,000}{6,840,000})}{3} (100)$$

$$= \frac{766}{3}$$

$$M = 255.4$$

concentration since they still account for a high percentage (61.91%) of the total magnitude ratings for the region.

Table 7

MULTIPLE CRITERIA RATING OF MAGNITUDE BY PROVINCE

Province	Magnitude rating	%
Colony	261	61.80
Ibadan	255	60.61
Abeokuta	97	11.65
Ijebu	91	10.82
Ondo	78	9.60
Oyo	51	6.02
Total	435	100%

The unique position of Ibadan as a centre of industrial concentration in Western Nigeria is further emphasized by the fact that the city is the only large urban centre of the Ibadan Province in which industries are located. This contrasts with the Colony Province where industries are located not only in Ikeja but also in other centres such as Epe and Ikorodu.

Before considering the site location of some specific industries in Ibadan, it is necessary to categorise the industries into their different industrial classes. This exercise becomes very important once it is realised that the major industrial categories in Ibadan exhibit significant variations in site location.

The major industrial classes in Ibadan

In Chapter Two, the industries in Ibadan are classified according to their organization into traditional craft and factory industries. In this section, attention is focussed on the factory industries which for the purpose of explaining their concentration in particular areas of Ibadan are here classified into two categories on the basis of size. These are the small scale and the large scale factory industries. The index of size as used in the classification presented here is that of the number of workers employed ~~and the amount of capital invested~~. A small-scale factory industry is one which employs less than ten workers ~~and has a capital investment of not more than 2000~~ while a large-scale³ factory industry employs not less than ten workers ~~and invests at least 2000~~.

A list of the small scale factory industries with the respective number of establishments within each category is shown in table 8.

Table 8

SMALL SCALE MODERN INDUSTRIES IN IBADAN 1963

<u>FOOD PROCESSING</u>	<u>NO. OF ESTABLISHMENTS</u>
Cornmills	155
Bakery	25
Total	180

3. The term 'Large-scale' industry as used here applies to Ibadan only.

Table 8 contd.

<u>LIGHT ENGINEERING</u>	<u>NO. OF ESTABLISHMENTS</u>
Mechanical Workshops	84
Bicycle repairing	70
Goldsmiths	11
Battery Charging	6
Vulcanising	3
Total	<u>174</u>
<u>TEXTILES</u>	
Sewing Institute	64
Tailoring and Dressmaking	10,102
Dry Cleaning	9
Total	<u>10,175</u>
<u>WOOD</u>	
Carpentry	52
Saw Mills	64
Furniture	12
Total	<u>128</u>
<u>LEATHER</u>	
Shoe repairing	28
Tanning	1
Total	<u>29</u>

Table 8 contd.

<u>SERVICE INDUSTRIES</u>	<u>No. OF ESTABLISHMENTS</u>
Barbers	77
Petrol Stations	76
Beer parlours	66
Photo Studio	45
Printing	41
Electrical Services	38
Typing (Public Letter Writers)	25
Radio and T.V. Services	18
Hotel	13
Watch repairing	7
Hair Dressing Saloon	4
	<hr/>
Total	405
	<hr/>

Source: Industrial Survey of Ibadan, by the Town Planning Authority, 1963.

These small-scale industries make use of imported machines and tools in the factory, and, unlike the traditional crafts engage more people most of whom are not necessarily related by blood ties.

The establishment of large-scale industries is a recent feature in the economic geography of the area. Most of these are owned by the regional Government through its statutory corporations - particularly

the Western Nigeria Development Corporation. Such Government or public industries include the Lafia Canning Factory, the Plastics and Pepsi Cola Project. There are a few others owned by private individuals and companies. These are represented by the Nigeria Tobacco Company, the largest tobacco company in West Africa, a factory owned by an Ijebu trader for the retreading of tyres located at Oke-Ado, the steel works and the Tola Foam factories located at Gbagi and Ogumpe respectively.

For the purpose of analysis, a further classification of the large scale industries becomes necessary. Sokolski has classified the industries of Nigeria on the basis of major locational orientation⁴. His methodology is similar to that of Hance who in a review of West African industries, classified the location of modern industries by determining whether they were primarily attracted to the sources of raw material, to the sources of cheap power supply or to specific markets⁵.

The basic system of classification used in this study is based on the nature of final products of the industries. On this criterion, there are eleven industrial groups in Ibadan (Table 9). Each of these is made up of individual factories which manufacture their own products

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4. A. Sokolski, The establishment of manufacturing in Nigeria, New York, 1965. p. 227.
 5. W. Hance, "West African industries - an analysis of locational orientation", Journal of international affairs, Vol. 15, No. 1, 1961, pp. 29 - 41.

independently of the others.

Table 9

CLASSIFICATION OF LARGE SCALE MODERN INDUSTRIES BASED ON THE
NATURE OF FINAL PRODUCTS

A INDUSTRIAL GROUP	B FIRMS WITHIN THE GROUP	C LIST OF PRINCIPAL PRODUCTS	D LOCATION
1. FOOD PROCESSING	Lafia Canning Factory Fan Milk Co. Ltd. Tella Fruit Juice Industry Eleiyele Cashew Processing Factory	Tinned fruits, Orange juice, pineapple and segment Milk Orange Squash Cashew Nuts	Moor Plantation, Ibadan Eleiyele Road, Ibadan Apata Ganga, Ibadan Eleiyele, Ibadan
2. PLASTICS	Nipol Ware Ltd.	Hardwares, polythene films tubes, handbags, trays and toys	Moor Plantation, Ibadan
3. RUBBER	Odeola Tyre Retreading Co. Ltd. Nigerian Foam Rubber Co. Ltd. West African Tyre Retreading Co.	Motor Tyres Cushions, Mattresses Motor Tyres	Oke-Ado, Ibadan Oke-Bola, Ibadan Oke-Bola, Ibadan
4. TOBACCO	N. T. C.	Cigarettes	Oke-Bola, Ib.
5. SOFT DRINKS	Pepsi Cola Project Nigerian Bottling Co. Ltd.	Mirinda, Lemon lime Pepsi Cola, Soda Water Fanta, Sprite, Coca-cola	Moor Plantation, Ibadan Oyo Road, Ibadan

Table 9 contd.

A INDUSTRIAL GROUP	B FIRMS WITHIN THE GROUP	C LIST OF PRINCIPAL PRODUCTS	D LOCATION
6. FOOT-WEAR	Khalil and Halawi Ltd.	Shoes	Ogunpa, Ibadan
7. SAWMILL	Ibadan Sawmills and timber exports Ltd.	Sawn timber	Apata Ganga, Ibadan
	J.A.O. Obadeyi	Sawn timber	Oyo Rd., Ibadan
8. FURNITURE AND JOINERY	Adebayo & Olatunbo- sun (Nig.) Co.	Chairs, Tables, Windows & door frames	Nig. College Road, Ibadan
	B.P. Comazzi	- do -	Adimu, street, Ibadan
	T.A. Ori & Sons	- do -	Queen Eliza- beth II Road, Ibadan
	W.K. Thomas, Western Nig. Trading Co.	- do -	Molete, Ibadan
	Ogunire Furniture Works	- do -	Oke-Bola, Ibadan
	Steel Works Ltd.	- do -	Paradise Club, Ibadan
8. PRINTING	G.E.M. Construction Ltd.	- do -	Molete, Iba- dan
	University Press	Books, Exercise Books, Journals and Periodicals	University of Ibadan
	Onibon Oje Press	Books only	Molete, Ib.
	Abiodun Printing Works	Books, Journals and Periodicals	Molete, Ib.
8. PRINTING	Caxton Press	- do -	Eleiyele, Ibadan

Table 9 contd.

A	B	C	D
INDUSTRIAL GROUP	FIRMS WITHIN THE GROUP	LIST OF PRINCIPAL PRODUCTS	LOCATION
10. PAINTS	Askar of Nig. Ltd.	Paints	Alaiyele, Ibadan
11. CONCRETE & TILES	Nigerian Industrial Products	Cement Blocks and Tiles	Bank Road, Ibadan

Based on this classification and the previous one, one can now distinguish three industrial categories in Ibadan. These are the traditional craft, the small-scale and the large-scale factory industries. It is of interest to note that the factory industries differ very much not only in their form of ownership but also in the pattern of area concentration within Ibadan. Almost invariably, the small scale factories are owned by private persons while the large-scale factories are owned either by the Government, public corporations or by private limited liability companies. Similarly, while the craft industries tend to exhibit a pattern of central location and compete for space in the residential zone of the city, the factories show a peripheral locational pattern along the main transport arteries of the city where there is still much space for expansion. The site location of these three industrial categories is analysed in the following section.

Site location of the Traditional Craft Industries

The traditional craft industries in Ibadan are organised on com-

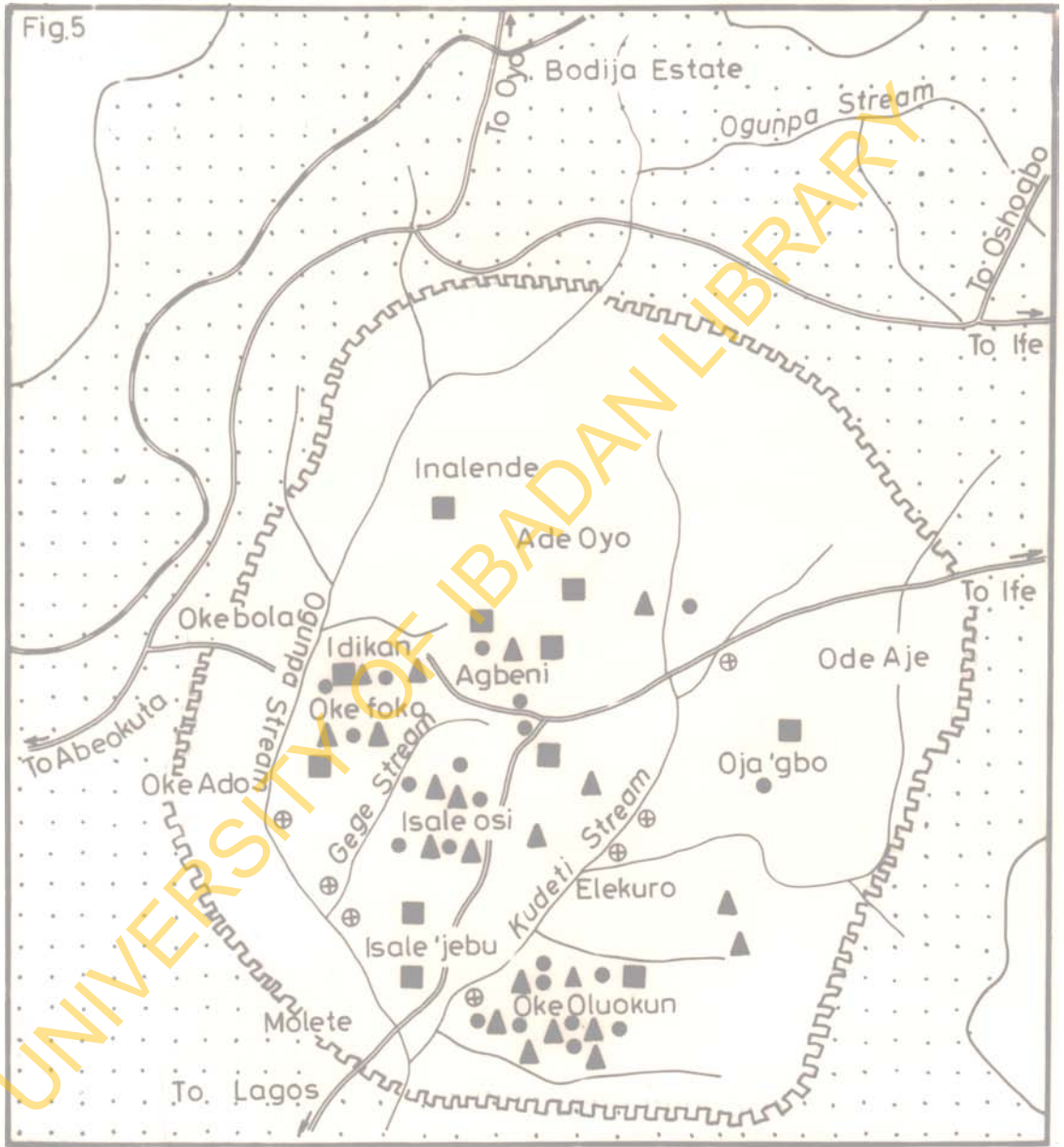
pound basis and in consequence, their location coincides with the place of residence of the respective owners. Thus, one finds a sort of ubiquitous distribution of these industries within the old parts of the city (Fig. 5). In each of the many streets in the centre of the city, there exists a complex intermingling and juxtaposition of craft workshops with the dwelling and market places. These occupy the backyards and verandahs of residences as well as open spaces between them. The only traditional craft industry whose location is somewhat removed from the dwellings of their proprietors is pottery. This particular industry is attracted to the source of its raw materials which are mainly clay and water.

The orientation of the craft industries to dwelling houses has been made possible by their small size and the fact that they do not require large spaces for their operation.

Central location of the small-scale industries

The small-scale industries in Ibadan are found in the centre of the city. But unlike the small-scale traditional craft industries, their location does not coincide with the place of residence of their owners. Rather, the factories are housed in separate buildings specifically designed to meet the requirements of the particular industry. Since most of these small-scale factories are largely service industries such as light engineering, mechanical works, watch repairing, tailoring and dressmaking, furniture and leather works, printing and

LOCATION OF TRADITIONAL CRAFT INDUSTRIES IN IBADAN



- ▲ Weaving
- Dyeing
- Black Smithing
- ⊕ Pottery
- ~~~~~ Old town wall
- The newer parts of the City



photography, they have to be located close to their customers. This is necessary in order to meet customers' specifications and maintain close contact with as large a number of customers as possible. Since the firms within each industrial category provide identical services and they are many in number, there is a cut throat competition between them. A distant location away from the centre of population is therefore a grave disadvantage to any of these industrial firms. This explains why this ^{class} ~~class~~ of industries tend to be located right in the centre of the city where population density is highest and where they can therefore attract the attention of many customers.

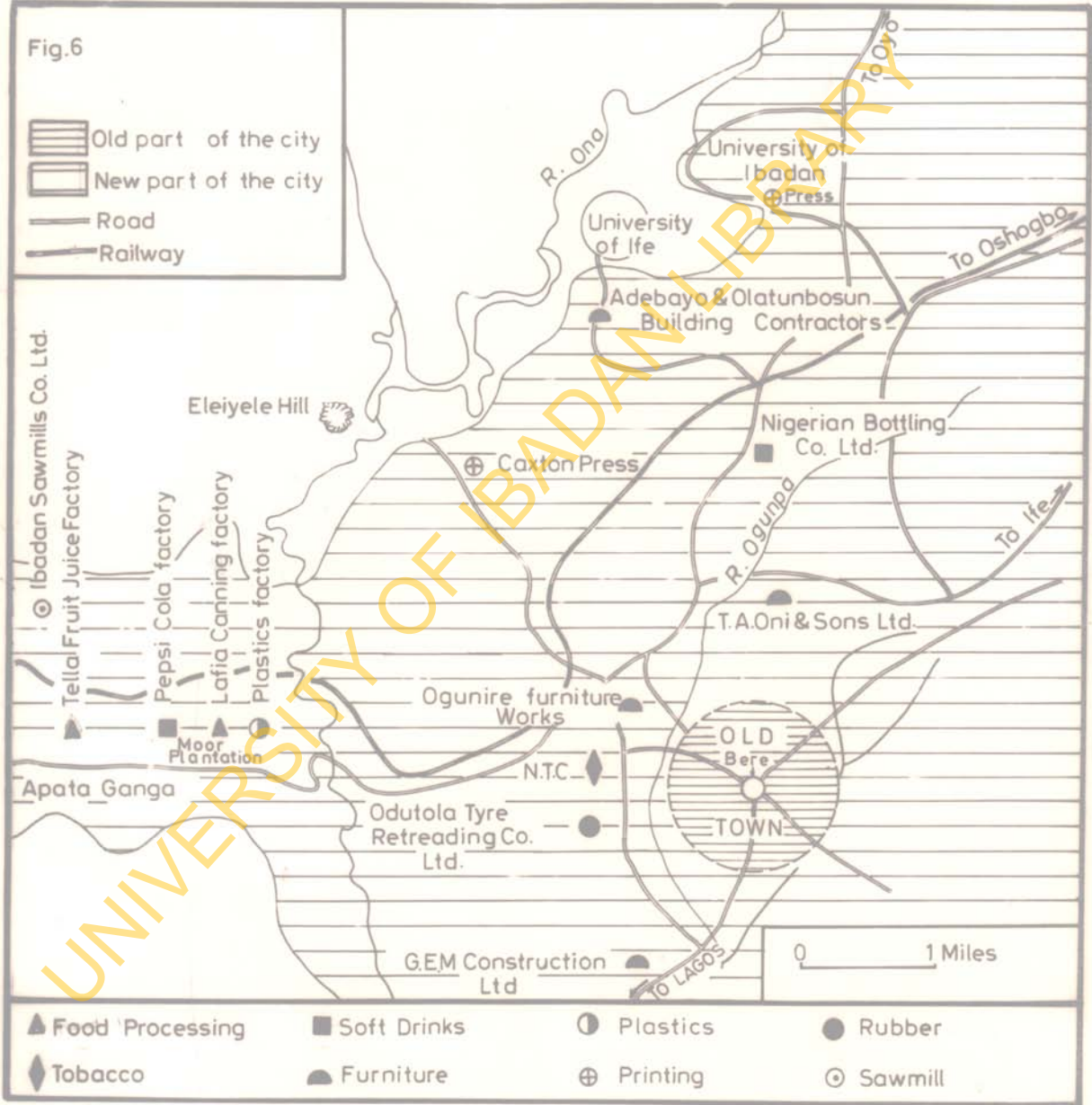
The Peripheral location of the large-scale factory industries

A look at fig. 6 showing the distribution of large-scale factory industries in Ibadan shows that these tend to avoid the centre of the city. Most of them are found in the peripheral zones of the city. One reason for this is the availability of cheap and extensive land in this part of the city.

The actual site location of these large scale factory industries is shown in column 'D' of table 9. This table reveals that this industrial class is concentrated along Moor Plantation/Apata Ganga area on the Ibadan/Abeokuta road, around Eleiyele road, the Oke-Ado and Oke-Bola area and along the Oyo/Ibadan road.

From the foregoing analysis, it is clear that Ibadan has become a centre of industrial agglomeration in Western Nigeria. While we can

LOCATION OF LARGE SCALE FACTORY INDUSTRIES IN IBADAN



accept the presence of an industrial tradition in Ibadan, the original craft industries are now waning in importance. Modern factory industries are surging up and are rapidly replacing the traditional crafts. The proliferation of factory industries and their established concentration in Ibadan poses another important question. Why are these industries concentrated in Ibadan as against any other urban centre in Western Nigeria? The answer to this question is discussed in the next chapter.

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CHAPTER IV

FACTORS OF INDUSTRIAL CONCENTRATION IN IBADAN

This assessment of the relative importance of the factors of industrial concentration in Ibadan is based upon the results of a field survey conducted by the writer between April and October 1966. Preliminary to the field work, the industrial directory of the region was consulted to gather information relating to the number and site location of all industrial establishments in Ibadan which employ not less than ten paid workers¹. The result of this exercise shows that there were in 1965 fifty such establishments in Ibadan. Copies of a questionnaire were prepared and delivered in person to the production managers of each firm. A copy of this is attached as the Appendix I (pages^{146 - 149}.....).

While preparing the questionnaire, attention was focussed on the influence of nearness to raw materials, and markets for final products, availability of cheap labour, fuel and power supply, Government incentives and institutional factors. ~~These factors were expected to be among the most relevant factors for locating industries in Ibadan.~~ Questions relating to the availability of efficient transport facility were also included in the questionnaire. This was prompted

1. Industrial Directory, Federal Ministry of Commerce and Industry, Lagos, 1964, pages 1-35.

by the concentration of transport ^{facilities} ~~facility~~ around Ibadan which is dealt with in Chapter V of this work.

Numerous problems were encountered in the collection of the data. These include non-response by three of the firms and frequent personal confrontations with managers of various establishments for the release of the information required. Information relating to the number of workers employed, amount of capital invested and annual profits made by firms were regarded as highly confidential and were therefore evaded by some respondents. Fortunately, however, all the fifty firms co-operated in supplying the required information on the reasons for locating in Ibadan.

The nine major factors mentioned by the fifty industrial firms participating in the study are ranked in table 10. The rank is based on the number of times they were mentioned whether as the only factor, the principal factor or as tertiary factor. For each of the nine factors, the number of firms mentioning it as first in importance to them is also given.

This table shows that four of the major nine factors were mentioned by more than 40% of the fifty firms interviewed, while the remaining five factors were mentioned by less than 30% of the total (see column D). The four factors ranked high by the firms are - market, influence of power supply, labour and institutional factors. (Institutional factors mean the availability of financial houses, pos-

tal services, residential facilities, commercial facilities, taxation, tariffs and research institution). Of these factors, market influence, power supply and labour were mentioned frequently as factors which influence locational decisions.

Table 10

RANK OF NINE MAJOR FACTORS FOR INDUSTRIAL CONCENTRATION IN IBADAN²

A Location Factor	B Total No. of firms mentioning factor	C Total mentioning factor as first	D % of 50 firms mentioning factor	
			mentioning factor	mentioning factor as first
1. Market influence	54	26	68	52
2. Power Supply	27	9	54	18
3. Labour	22	5	44	10
4. Institutional factors	21	-	42	-
5. Transport facility	13	2	26	4
6. Raw material influence	9	8	18	16
7. Political influence	4	-	8	-
8. Plant linkage	3	-	6	-
9. Social consideration	1	-	2	-

2. Based on the results of field work conducted by the writer between April and October 1966.

Market Influence

A relatively large number of industrialists considered that the presence of a large market influenced their decision to locate in Ibadan. 34 industrial units out of a total of 50 units reporting mentioned this factor. This figure represents 68% of industrial establishments. 26 of the 50 firms (52%) mentioned the existence of a large market as the first in importance in making their decisions to locate in Ibadan. These results would seem to show that manufacturers in Ibadan are quite alert to the significance of ~~market accessibility~~ ^{the market} in the choice of their location. The firms which are very much involved in the high ranking of market influence happen to be those within the food canning, bakery, soft drinks and furniture industries.

The presence of a large market for the consumption of finished products is becoming increasingly important in locational decisions all over the world. A large market per se is essential for those industries in which the cost of transporting the finished products to the consumers forms a high percentage of total production costs. If the products of an industry increase in weight, fragility or bulk, it often becomes necessary for such an industry to ^{be} market-oriented. A market location is also desirable when the manufactured products are highly perishable and therefore have to be consumed fresh. The first group of market-oriented industries in Ibadan is the Soft Drinks

Industry which adds water to its products and becomes heavier than its raw materials. The second group is represented by the bakery and ice cream industries the products of which do not store well for long.

Apart from market orientation ^{of industries} due to the nature of final pro-

ducts and a consideration of transport costs, Ibadan, the largest town in West Africa with its large market area in Western Nigeria, has much to offer to manufacturers. One of such offers is its higher comparative advantage in market potential. The size of population, level of income, retail sales and consumption patterns have been variously used as index for determining the size of markets in any given region. Harris, for instance, used this criterion in determining the market potential in the United States.⁵

In determining the intensity of accessibility, he introduced the concept of market potential. Harris formula for assessing market potential is of the form:

$$P = \frac{M}{D}$$

where P = Market potential

M = Summation of markets accessible to a point

D = Distance to markets (Measured in terms of the cost of transporting the final products to markets accessible to a given point.

He used this formula to calculate the market potential for

5. C.D. Harris, "The market as a factor in the localisation of industries in the U.S.", Annals of the Association of American Geographers, Vol. XLIV, 1954, p. 515.

several cities and concluded that the quantity of goods sold in the United States declines progressively with increasing distance from a central market to others far away from the centre.

Harris believes that population is one measure of the size of market but he also emphasizes that the level of income and retail sales provide more efficient indices. Mere population is not a sufficient criterion for assessing a region's market potential. A small population can have a larger market potential than a large population depending upon their respective levels of income and their consumption pattern for particular products.

Because of lack of adequate data, it was not possible to employ Harris formula in the assessment of the market potential for Ibadan. Instead, the size of income and number of people earning £300 and above in the main towns of Western Nigeria have been used as the criteria for determining the size of markets⁴. The writer considers these indices as useful because a town which has the largest number of people within the income group of £300 and above will also have the highest disposable income, part of which could be spent on buying manufactured goods.

Table 11 showing the distribution of people within the income

4. It is assumed that people within the income group of £300 and above are likely to consume industrial products.

group of £300 and above and their total income by eight towns in Western Nigeria points out the dominating position of Ibadan as the largest market centre among these towns. The reason for this is not far to seek. About 30% of the population in Western Nigeria is concentrated in Ibadan Province⁵. Within the city itself a sizeable proportion of its population is engaged in non-agricultural production. These belong to the class of wage earners employed in trades, crafts, administrative, professional and technical and other occupations. Since this class of people is not directly engaged in food production, they have to depend upon purchases in the market for their basic needs. Of the 254 people earning more than £2,000 in seven Western Nigerian cities in 1965, 179 were in Ibadan alone, 31 in Ikeja, 21 in Akure, 7 each in Abeokuta and Ifesha, 5 in Ijebu-Ode and 4 in Oyo⁶. This large proportion of the high income group in Ibadan results from its being the seat of the regional government as well as the centre of several institutions of higher learning and large commercial and financial houses which employ this class of workers.

5. 1965 Census Reports, Ministry of Economic Planning and Social Development, Statistics Division, Ibadan, 1965. See also, Western Nigeria Statistical Bulletin, Ministry of Economic Planning and Social Development, Statistics Division, Nos. 1 and 2, Vol. 8, June and December 1966, p. 6.

6. Western Nigeria Statistical Bulletin, op. cit., p. 56.

Table 11NUMBER AND INCOME OF PEOPLE EARNING £300+ IN EIGHT WESTERNNIGERIA TOWNS 1965⁷

Towns	No. of people earning £300+	% of total	Total income of people earning £300+ in £	% of total
Ibadan	148,738	21.4	8,559,755	20.0
Abeokuta	117,613	16.3	6,545,506	14.3
Alure	104,727	14.0	7,208,904	17.2
Oshogbo	100,344	12.3	5,587,694	12.0
Oyo	96,180	12.0	5,069,991	11.3
Ilesha	92,857	12.0	5,223,245	11.0
Ijebu-Ode	54,556	7.0	3,709,309	8.0
Ikeja	40,826	5.0	2,837,613	6.2

Source: Records of the Regional Tax Boards of Western Nigeria.

Cheap electricity supply

Cheap electricity supply is the second most frequently mentioned factor. 27 out of 50 industrial firms mentioned this factor. It was noted as the primary factor by only 9 of the firms. This is just 33% of those which mentioned the factor as important in their locational decisions and 18% of all the industrial firms reporting. This result is considered significant enough to justify a conclusion that the

7. The figures for this table were collected from the records of the local councils with Rating authority and the regional Tax Boards in the towns involved.

availability of cheap electricity supply is an important locational factor in Ibadan. Most of the industries involved here are saw mills, food processing, rubber, cigarettes and light engineering.

In Nigeria, electricity is the main source of energy for industrial firms. The direct use of electricity by industries implies a location at a point to which this source of power can be brought economically. Inadequate supply of electricity is a general feature of the infrastructure of the Nigerian economy. There are very few areas with cheap and adequate electricity supply. The main power station in the country before the commissioning of the Kainji Scheme is at Ijora in Lagos. This station has an installed capacity of 1000 M.V. Ibadan, Ughelli, Afam, Oshogbo, Owo and Akure had unconnected stations which operated independently of Ijora in the past. These stations have now been connected into one system known as "Inter connected stations" so as to reduce generation cost. The Ijora power station acts as the control house. It is responsible for the generation, transmission and distribution of electricity to these areas. In the event of a fault or too much heavy load on any of these stations, the Ijora Power Station is contacted for re-inforcement. Conversely, if there is any breakdown in the Ijora station, supply to the sub-stations is reduced or cut off completely. The sub-station then supplies its own electricity over an area the extent of which is determined by the installed capacity of the station.

Now that the Kainji Dam has been opened the pattern of electricity supply will change gradually. At present, only three of the twelve Kainji generators are in use since these can meet present public power demand. When the public demand for power increases, more Kainji generators will be used, then the unit cost of power will be reduced.

Distance differentials from the source of electricity and the volume of consumption have had certain important consequences on power cost and on the location of industrial activity in Western Nigeria. The influence of the former is reflected in the greater concentration of industries in areas close to the power station and is well borne out by the negative correlation of -0.65 between ^{distance from} power station and the number of industries in the urban centres of Western Nigeria. This correlation is statistically significant at .05% level of significance. The co-efficient of determination ($r^2 = .42$) which is also re-assuringly high shows that 42% of the variance in the degree of industrial concentration is accounted for by nearness to the source of electricity. This, however, still leaves 58% of the variance unexplained. The reason for the higher degree of industrial concentration in areas close to the source of electricity supply is due to the rise in the unit cost of electricity as distance increases from the power station. The unit cost of electricity is least in areas close to the power station such

as Ikeja and highest in areas like Ondo far away from the generating station (Table 12).

Table 12

AREAL VARIATION IN THE UNIT COST OF ELECTRICITY IN WESTERN NIGERIA

Towns	Distance from Power Station in miles	Cost of Electricity per unit	Number of industries
Ikeja	12	2d.	47
Ijebu Ode	62	5d.	23
Abeokuta	65	5d.	10
Ibadan	89	5d.	50
Oyo	122	4d.	18
Oshogbo	159	5d.	2
Ondo	162	5d.	18
Ilesha	165	5d.	3
Ogbomoso	162	5d.	2
Ado Ekiti	214	5d.	1
Owo	248	5d.	1

Source: Records of the Electricity Corporation of Nigeria, Ibadan, 1964 and Report of industrial enquiries of Western Nigeria, 1966, page 8.

The only exception to this is the case of Ibadan which is farther away from the power station than Ijebu Ode and Abeokuta but has more industries than either of these towns. Table 12 explains w this anomaly and shows that Ibadan, Ijebu Ode and Abeokuta fall within the same electricity price zone. This would seem to suggest that the distance differentials among these towns from the power station are not

sufficiently great to affect the unit cost of electricity. In addition the low unit cost of 3d. for Ibadan results from the larger number of consumers in the city which makes possible the spreading of the overhead charges on a larger number of consumers. Thus, compared with other urban centres in Western Nigeria, such as Ondo, Owo and Ilesha, where a unit costs 5d., Ibadan is favourably placed as regards the cost of electricity. If an industry is located at Ibadan, there is a savings of 2d. per unit of electricity (or 40% of cost) consumed as against an alternative location in either Ondo or Ilesha. This saving becomes significant when one considers that in 1964, industrial firms in Ibadan consumed a total of 12,500,655 units of electricity⁸. Therefore, for industrial concerns which have to be power-oriented a location in Ibadan or Ikeja is preferred to a location in any of the other towns where the unit cost of electricity is relatively high.

Skilled Labour

Skilled labour is ranked third as a factor of industrial concentration in Ibadan. 22 of the industrial firms mentioned it while 5 considered it as the main factor in their decision to locate here. This means that 44% of the fifty firms mentioned the supply of skilled labour while 10% regarded it as a factor of first importance. Obviously this result would seem to prove that labour has an important influence in location decisions in Ibadan without necessarily being the primary influence.

8. Western Nigeria Statistical Bulletin, op. cit.

Labour supply is overwhelmingly significant in the food processing and the tobacco industries. Nearly all the firms within these industries ranked labour supply very highly. This shows the increasing importance of labour availability in industries which, because of the many stages in the production process, have to be labour intensive.

Institutional Factors

Institutional factors were ranked fourth among the locational attractions of Ibadan. 21 of the 50 firms or 42% of the total mentioned it as a factor. The high percentage of those mentioning it reflects the uneven economic development of the major towns of Western Nigeria and the concentration of most of the modern facilitative industries such as banks, post offices, employment exchanges and insurance houses in Ibadan. Because of the availability of these services in Ibadan, the city enjoys a unique position in the region. Their almost complete absence in other centres in Western Nigeria constitutes a major locational disadvantage.

The Influence of Raw Materials

Of the 50 firms, 18% acknowledged that raw material influenced their locational decisions. 16% rated this factor as being of first importance in this respect. Compare this with skilled labour mentioned by 44% of the firms but considered as the most important factor by only 10%. The industries which ranked raw material low are mainly the bakery, printing and soft drinks industries which use

very little local raw materials. However, although raw material is ranked low as a locational factor by these firms, it nonetheless constitutes a significant component in their cost structure (Table 13).

Table 13

COST STRUCTURE IN FIVE INDUSTRIAL FIRMS IN IBADAN (1965)

	1	2	3	4	5	6
Firms	Transport Cost in £'00	Raw Material cost in £'00	Labour cost in £'00	Power Cost £'00	Others £'00	Total Cost in £'00
W.N.D.C. Pepsi Cola Factory	2	41	27	6	15	98
Obitola Tyre Retreading Co.	10	52	45	8	5	120
Steel Works Ltd.	16	35	28	5	4	88
Nipol Ware Ltd.	15	34	19	4	6	78
Caxton Press Ltd.	2	12	10	2	7	33

Source: Records of production of each factory.

A comparison of column 2 of this table with the other columns reveals that raw material stands higher than all other factors in the cost structure of the industrial firms. The high cost of raw materials is due to the additional costs of both import duties and sea and land transportation. The price of these imported raw materials rises and falls in accordance with the Government's fiscal policy. For instance, the duty payable on one gallon of concentrates for the manufacture of mirinda was only 6d. in 1964, but this rose phenomenally to 2s. 6d. in

1968 following the Government's "tough budget" policy of that year which was designed to strengthen the external value of the country's currency and reduce the deficit in the balance of payments. Thus, the manufacturers using such materials have to incur higher costs, the burden of which they eventually pass to the consumers.

The foregoing analysis shows the relative significance of the various factors of industrial concentration in Ibadan. However, in order to fully explain the concentration of industries in the city, it is necessary to consider spatial variations in the cost of these factors. This will reveal how factor costs vary from one location to the other and the effect of ^{these} variations on locational selection. This exercise is the subject matter of the next section.

Spatial cost differentials

For the appraisal of the spatial cost differentials in Western Nigeria, the industrial directory of the region was consulted to get a list of towns in which one or more similar factories were located. The result of this exercise shows that it is only the Furniture and Joinery industry that has factories which are located in each of the urban centres. The other industrial groups are concentrated chiefly in Ibadan and Mushin, the Canning industry has one factory and it is located in Ibadan while there are only three factories in the Orange Squash industry and they are located in Ibadan, Abeokuta and Ijebu Ode respectively. In order to cover as many towns as possible, the Furni-

ture and Joinery industry was selected for illustrating the spatial variations in factor costs. The two most important raw materials of this industry are imported steel and local timber. Since steel has to be imported, the distance in miles among towns was calculated from Lagos which is the collecting and distributing port for these towns. It is believed that Lagos must have a transport cost advantage in the collection of imported steel over the other towns which are considerably distant from the port.

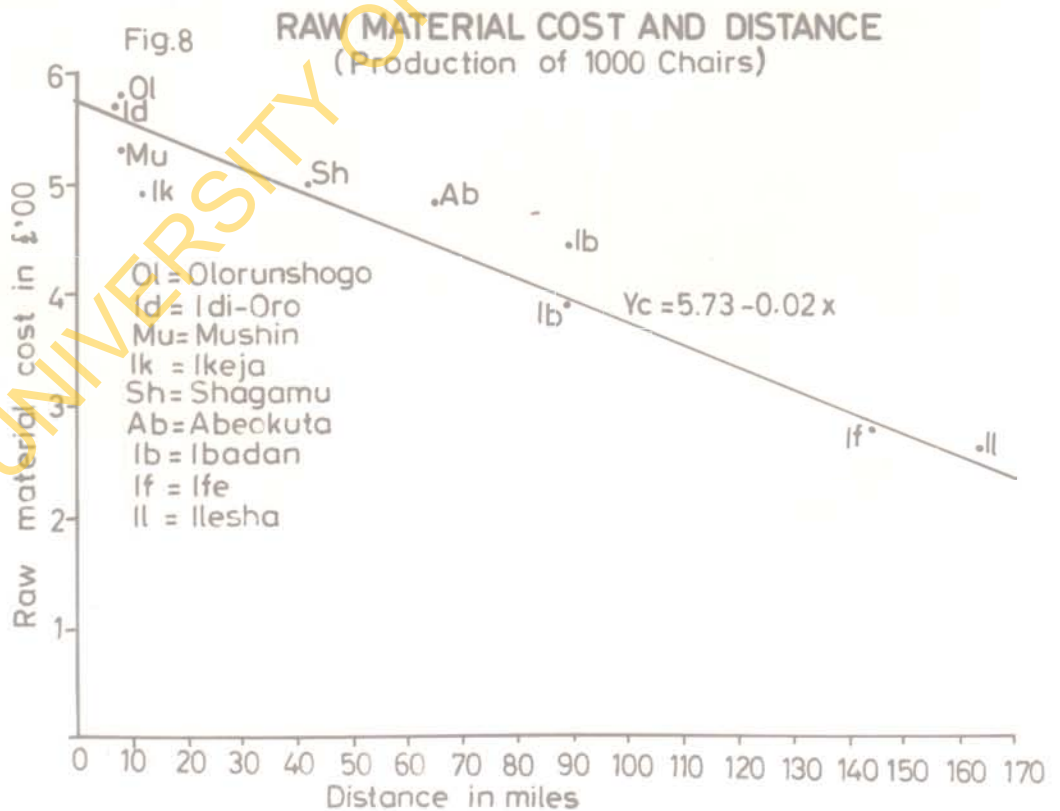
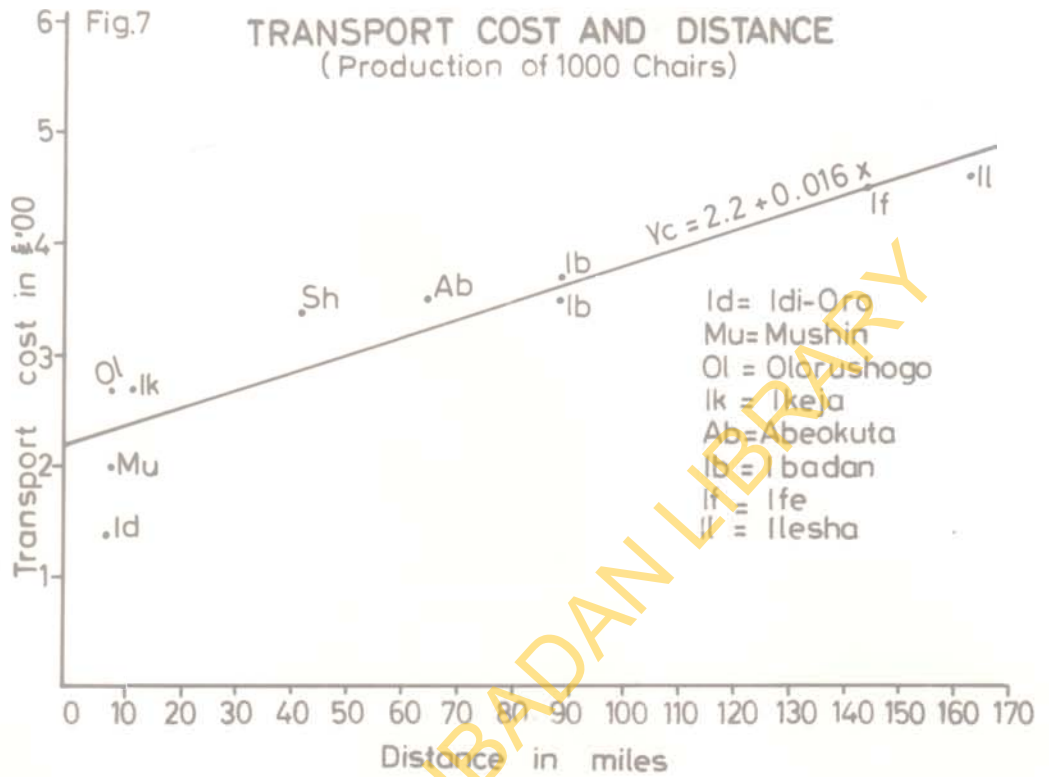
Factories which are of the same size in terms of the value of total production were then selected for the analysis in order to eliminate the influence of size on costs. Table 14^a shows the names, location and factor costs of the selected factories. Finally, it was necessary to carry out a ~~regression~~^{correlation} analysis of distance against each of the cost items shown in this table to illustrate the relationship between distance and the costs of the factors of production.

Results show a strong relationship between increases in transport cost incurred as distance increases (Fig. 7). The cost of transport incurred by the factories increases progressively with increasing distance from the coastal location. Idi-Oro, which is some seven miles away from the coast incurs the least transport cost while Ilesha situated in the interior at a distance of 163 miles away from the port of Lagos incurs the highest transport cost on the production of 1000

Table 14a

SPATIAL COST DIFFERENTIALS IN THE PRODUCTION OF 1000 CHAIRS IN WESTERN NIGERIA

Name of Factory	Location	Distance from Lagos in miles	Transport Cost on collection of raw materials and distribution of finished products in £'00	Labour Cost in £'00	Raw material Cost in £'00	Power Cost in £'00	Other Costs in £'00	Total Cost
Owoseni Furniture Works	Idi-Oro	7	1.4	6.1	5.7	.3	.02	13.52
Complete Home Enterprise	Mushin	8	2.0	6.4	5.3	.6	.04	14.34
Friendly Furniture Co. Ltd.	Olorunsogo	8	2.7	5.6	5.8	.5	.01	14.61
Minaco Ltd.	Ikeja	12	2.7	4.3	4.9	.7	.04	12.64
Adebayo Furniture Works	Shagamu	42	3.4	4.0	5.0	1.1	.01	13.51
Adeoye Furniture Works	Abeokuta	65	3.5	3.3	4.8	.9	.02	12.52
Ogunire Modern Furniture	Ibadan	89	3.5	3.6	4.5	.8	.03	12.43
Steel Works Ltd.	Ibadan	89	3.7	3.5	3.9	1.2	.01	12.31
Modern Furniture Service	Ife	144	4.5	3.4	2.8	1.8	.02	12.62
Olorunredo Joinery Factory	Ilesha	163	4.6	3.2	2.1	2.0	.01	12.51
Correlation Co-Efficient	-	-	+0.91	-0.01	-0.96	+0.71	-	-0.67



chairs. This spatial cost differential is probably due to the fact that a sizeable proportion of the raw materials used in manufacturing are imported, and coastal locations would therefore be at an advantage while the interior locations would have to incur additional transport cost for conveying imported steel from the coast to the factory site.

In the case of raw materials, one finds an inverse relationship between cost and distance. With a high negative correlation co-efficient of -0.96 , one can with confidence admit a progressive decrease in the cost of raw materials, especially timber as one moves away from the port of Lagos to inland locations (Fig. 8). The higher cost of raw material for this industry in the Lagos area is a consequence of the scarcity of timber, the second important raw material for the manufacture of chairs. The bulk of timber supply in Western Nigeria comes from Ondo and Ijebu Provinces which are closer to the interior locations. The only available supply in the Lagos area comes from Mushin and Shagamu districts and much of this has been exploited almost to exhaustion stage.

Although, labour cost shows a negative correlation with distance as one moves away from the coast inland, this decrease is, however, not well marked as shown by the rather small correlation co-efficient of -0.01 which is not statistically significant at $.05\%$ level of significance. The co-efficient of determination ($r^2 = 0.001$) shows that only $.01\%$ of the variance in labour cost is due to distance differential.

The total cost of production shows a tendency to decrease with distance away from the port of Lagos. This view is supported by the high negative correlation co-efficient of -0.67 . This trend is however distorted by Ibadan which qualifies as the least cost location when all factor costs are considered, even though it is 89 miles away from Lagos while Ife and Ilesha, situated 144 and 168 miles away from Lagos respectively incur relatively higher total costs. The reasons for this locational advantage of Ibadan over all other towns is explained in Chapter IX.

A consideration of factor costs in the Soft Drinks Industry shows that both labour and raw material costs are very high in the cost structure. Table 14^b shows costs of inputs expressed as percentage of total production cost in two Soft Drinks factories. However, although both labour and raw material costs are very high, there seems to be no significant spatial difference in their incidence. These two factors are therefore not likely to have any significant effect on locational selection. Thus, as Rawstron suggests, a factor which accounts for a large proportion of total costs of a firm may not have influence on location if there is no regional difference in its cost¹⁰.

10. E.M. Rawstron, "Three principles of industrial location", Transactions and papers of the Institute of British Geographers, 1958, page 55.

Table 14^bCOSTS OF SELECTED INPUTS AS % OF TOTAL COSTS IN IBADAN AND MUSHINSOFT DRINKS FACTORIES ~~Operating~~ FOR THE YEAR 1963

1	2	3	4	5	6
Location	Transport Cost	Labour Cost	Raw Material cost	Power Cost	Other Costs
Ibadan, Pepsi Cola Project	5.1	38.7	45.1	6.1	5.0
Mushin, Pepsi Cola Project	2.6	39.5	45.6	4.6	5.9
Advantage/Disadvantage of Ibadan	-2.5	+0.6	+0.5	-1.5	+2.9

- = Disadvantage

+ = Advantage

Unlike raw material and labour, transport and power costs reveal a remarkable spatial difference (columns 2 and 5). The difference is also sufficiently significant to influence a manufacturer's decision as to where to locate between Ibadan and Mushin.

In the case of the Orange Squash industry, apart from the cost of assembling raw materials and distributing finished products, there is no spatial variation in both processing costs and total costs of production. While the Abeokuta-based Blaize Memorial Institute incurred a total of £375 in 1965 as processing costs and £17.8 on raw material assembly and distribution of 4000 bottles of Orange Squash,

the Tella Fruit Juice Industry at Ibadan incurred £377 as processing costs and £9.9 on transport for the same number of bottles. This difference in transport cost is considered significant enough to have a strong locational pull on this industry from Abeokuta to Ibadan. Whether Ibadan is the least cost location for this industry is the subject matter of Chapter VII.

The results of this analysis point out that industries are concentrated in Ibadan because of her comparative advantage of a high market potential, high degree of general accessibility to markets and raw materials, and cheap electricity supply. The analysis of factor costs shows some statistically significant variations in space. It is significant to note that the factor which exhibits widest spatial variations from industry to industry is transport cost. The main problem which emerges from this is whether Ibadan has any locational advantage arising from this spatial transport cost differential in the location of industries in the city, and whether such an advantage is sufficiently large to make Ibadan the least cost location in Western Nigeria. This problem is resolved in the second part of this study.

PART TWO

TRANSPORT COSTS AND THE LOCATION
OF SPECIFIC INDUSTRIES IN IBADAN

UNIVERSITY OF IBADAN LIBRARY

CHAPTER VTRANSPORTATIONAL FACTORS AFFECTING LOCATIONAL DECISIONSIN NIGERIAThe Transport Network

Intending manufacturers in the more advanced industrial countries of the world such as the United States and Great Britain give only a minimum consideration to the adequacy of rail and road routes when deciding on where to locate. This very important factor is taken for granted since every part of these areas is adequately covered by rail and highway network such that no place suffers from inefficient transport system. In the underdeveloped areas of the world such as Nigeria, the absence or lack of efficient transport system in some parts of the country contributes immensely to regional differences in locational attractions. Thus in Nigeria, the provision of adequate and efficient transport system plays an important role in the decision on plant location.

The construction of road and rail ^{networks} is capital-intensive and therefore, no industrial concern without such financial backing can undertake the provision of these facilities. In consequence, factory industries in Nigeria with relatively small capital have to await the development of transport before establishing themselves.

Transport development in Nigeria is concentrated largely on the urban areas of the country while some of the rural areas still remain

inaccessible except through winding and narrow untarred roads which are open to traffic only during the dry season. As a result of this concentration of transport facility on the large towns, the initial infrastructural development for industrial establishment in them has progressed to a high degree by African standard. The attraction offered to manufacturers by the availability of efficient transport system is enhanced by the necessity to assemble raw materials at the factory and distribute the finished products to the markets for consumption. This collection and distribution activity takes place through the rail, road and water transport. The airway is at present engaged only in passenger traffic especially where speed is essential and it is therefore of less importance in attracting industries to specific areas.

In 1962, Nigeria had 45,498 miles of roads¹. This gave the country a density of almost one mile of road per eight square miles. This is relatively high by African standards. Of this length of roads, only about 7,706 or 17% were surfaced with bituminous asphalt.

From 1908 to 1940, the progress in road construction in Nigeria was slowed down by several difficulties. These include the ~~case~~ *great* ~~natural~~ barrier of the Benue and Niger rivers, the large expanse of

1. Digest of statistics, Vol. 12, No. 4, Federal Office of Statistics, October 1963, page 63.

tsctas-infested and sparsely populated Middle Belt, the fear of competition with the railroad and the effect of the First World War. As recently as 1937, the only tarred road in the country outside townships was the one from Lagos to Abeokuta. After 1940, the construction of all season roads started and rapid progress was made after the Second World War. Today, trunk roads now form a grid network. There are two trunk A roads from north to south of the country, and four running from east to west. These are constructed and maintained by the Federal Government and they link the Federal and regional capitals with the largest cities and neighbouring countries. The trunk B roads are constructed by the Regional Governments and maintained by their respective Ministries of Works. This class of roads links the divisional headquarters of the country with each other. They also serve as feeders to both the rail road, the Trunk A roads, and the ports. In addition to these two classes of roads, there are Trunk C roads, which are constructed and maintained by local authorities and in some cases, by communal efforts. The Trunk C roads are feeders to the Trunk B roads. Farm products from the rural areas get to the major roads through this class of roads while industrial products also find their way to the rural areas through them. The roads are unevenly distributed between the regions.

Table 15

ROADS BY CATEGORY AND REGION (MILES) 1960

Region	Trunk A	Of Which Tarred	Trunk B	Tarred	Local	Tarred	Total	Total Tarred
N. Region	4,057	1,350	2,184	452	13,856	200	20,097	2,002
W. Region	819	672	1,007	985	10,070	361	11,896	2,018
E. Region	688	495	1,473	500	11,865	63	14,026	1,058
Lagos	-	-	-	-	-	-	196	166
Total	5,564	2,517	4,664	1,937	35,791	624	46,215	5,244

Source: Stanford Research Institute, The economic Co-ordination of transport in Nigeria, ^{development} Menlo Park, S.R.I., 1961, page 137.

In 1959, 62% of the freight traffic and more than 90% of the passengers of the country were carried by road transport². For the transport of exports, the roads serve mainly as feeders to railways and waterways, where these exist. For short hauls however, the road system is used in preference to the railways. This is the case with Western Nigeria cocoa which is hauled to Apapa on roads. Similarly for other items, notably valuable consignments that call for quicker than rail delivery, and the east to west traffic where no railway exists, road transport is used. The imports intended for near desti-

2. Stanford Research Institute, The economic co-ordination of transport development in Nigeria, Menlo Park, S.R.I., 1961.

nations usually travel by road. The road system was not meant to carry imports to the far north. It was only for strategic reasons during the 1939 - 1945 war that the all-season road linking Jebba and the north was constructed in order to evacuate the ground-nut pyramids ^{which} ~~that was~~ accumulated at Kano owing to shortages of rolling stock.

The greatest contribution made by the road system to industrial development is the creation of transport facilities where none existed before and the lowering of transport costs through competition. However, Nigeria is still faced with series of highway problems. These include the acute shortage of indigenous trained personnel for road construction and the shortage of capital. In addition, the numerous single lane bridges cause delay while weight limitations on some of the bridges and the presence of many unsurfaced stretches on the trunk road network constitute the ultimate limitations to the speed of movement on the roads. Finally, the intrusion of political consideration into the construction and maintenance of roads in Nigeria has led to lack of economic co-ordination in road transport development.

The first railway in Nigeria started from Lagos in 1893 and reached Ibadan in 1901. By 1921, it was extended to Kano. In the east, the Port Harcourt line got to Enugu in 1916 and to Kaduna in 1932 following the construction of the Makurdi bridge across the

Berne River. The Jos mines led to the extension of a rail line from Zaria to Jos. By 1939 due to the outbreak of the Second World War, railway development in the country suffered a series of setbacks. It could no longer pay its way neither was it able to meet the inelastic capital charges on the funds originally invested in its construction. Owing to pre-war financial problems, funds were not available for investment in ~~the industry~~ ^{railway development}. Normal replacements were not carried out and by the end of the war, the railway was in no position to meet the demands of the traffic that came with the post-war economic boom. This condition persisted until 1954. The International Bank for Re-construction and Development in its report that year noted that the railway was still unable to move all the traffic offered to it. This was evidenced by the groundnut pyramid in Kano.

In 1956, the railways became a public corporation. It handled most of the freight traffic involving long hauls while passengers constitute only a small amount of its traffic. In fact, by that date, it had lost much of its passenger traffic to the roads. The number of passengers carried fell from 6.7 millions in 1938 to 5.5 millions in 1954³.

In response to the persistent financial instability of the rail-

3. E. Hawkins, Road transport in Nigeria, A study in African enterprise, London, Oxford University Press, 1958.

ways, the Government in 1960 appointed the Elias Commission to investigate the causes of frequent losses. The Commission in its report, recommended the Nigerianisation of the Corporation and the running of the Corporation as a commercial concern⁴. Although this recommendation was accepted and implemented, the Corporation still runs a deficit⁵. This is due to labour problems, insufficient stock, poor maintenance, bad management and corruption on the part of some of the highly placed officials of the Corporation. Another Commission of Inquiry set up by the Federal Military Government (1968) to probe the assets of the Corporation officials, and to investigate the management and finances of the Corporation found several of the senior officials guilty of corruption, and recommended their dismissal from office and the prevention of the Corporation Manager from holding any public office in future. Despite these problems the railroad is still the main backbone of the transport system in Nigeria for the haulage of bulky consignments over long distances.

River transport in Nigeria is operated almost entirely by private enterprise under very arduous conditions. The two main rivers in the country, the Niger and the Benue, do not serve the major population

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4. Report of the Elias Commission of Inquiry into the administrative economic and industrial relations of the N.R.C., Lagos, Federal Government, Printer, 1960, pp. 62 - 65.
 5. N.R.C., Reports and accounts for the year ended 31st March, 1960 - 1965, Ebute-Metta, Railway Printer, 1961 - 1965, page 5.

centres. Periods of high and low water level alternate, and restrict the use of the rivers for all-year navigation. The construction of the multi-purpose dam on the Niger, it is hoped, will considerably improve river navigation in the country. Inland river ports are maintained at Baro, the up-river terminal port on the Niger and at Garua in the Cameroons on the Benue river. The handling facilities at Baro and Garua deal with over 100 and 1,600 tons of cargo a day respectively.

The operation of the ocean ports is the responsibility of the Nigerian Ports Authority. These ports, with Lagos and Port Harcourt as the most important, handle the exports and imports of the country. Their hinterlands have been greatly extended by the rail and road network. The Government of the country has invested much capital in keeping the ports in good and efficient condition. Dredging has improved the depth of the harbour and vessels drawing 27 feet at high water and 24 feet at low water can now cross. This has increased the volume of traffic handled by the ports. In the case of the Lagos port, the Government has initiated a scheme for the extension of the Apapa Wharf to alleviate the problem of congestion.

With this continuous expansion and modernisation of the ports, the building and re-surfacing of roads, and the extension of the railways, the volume of Nigeria's surface traffic has shown a marked increase. Table 16 shows that the total tonnage handled by rail, road and river transport increased from 1615 million tons in 1953 to 3235

million tons in 1960.

Table 16

NIGERIA SURFACE FREIGHT TRAFFIC MILLION TON-MILES 1953 - 1960

Year	Rail	Road	Rivers	Total
1953	687	840	88	1,615
1954	775	1,020	95	1,890
1955	937	1,200	99	2,236
1956	1,002	1,580	101	2,483
1957	1,099	1,500	110	2,709
1958	1,065	1,710	100	2,875
1959	1,214	1,850	120	3,164
1960	1,105	2,010	120	3,235

Source: Stanford Research Institute, The Economic Co-ordination of transport Development in Nigeria, Menlo Park, S.R.I., 1961, p. 65.

At present, Nigeria seems to have a comparatively well developed transport system for the haulage of raw materials and industrial products. This notwithstanding, the remarkably uneven distribution of the available transport system creates locational advantages for certain areas such as Ibadan, Enugu, Lagos, Kaduna, and Kano which have both rail and road connections as well as freight rate advantages.

Freight rate structure is an important element of the many considerations influencing the location of manufacturing industries. The wide spatial variations in the structure of freight rates in Nigeria give rise to differential locational advantages through its influence

on the relative economies of production. As a result of this, all manufacturers are acutely interested in freight rate analysis in order to determine the location which minimises aggregate transport costs in the process of assembling raw materials and distributing the finished products to markets.

In general, transport charges in Nigeria are based on the general principle of charging what the traffic will bear. However, these charges vary with several other transportation factors such as the following:-

- (a) The form of available transport media
- (b) The distance to be covered
- (c) The nature and density of route ways
- (d) The quantity and nature of commodity carried
- (e) Variation from customer to customer.

The form of available transport media

Freight rate in Nigeria varies with the three types of media (rail, road and water) available for assembling and distributing industrial products in the country. The differences in rates charged by each of these media result from the varying costs incurred.

As many studies have demonstrated⁷, terminal and line-haul costs

7. R. Albion, Foreign trade in the era of wooden ships, in the growth of American economy, Harold P. Williamson, New York, page 169.

vary from one form of transport to another. For example, terminal costs are higher for water carriers than they are for rail carriers. The road hauler on the other hand incurs very low terminal costs. While water and rail carriers have to maintain a large number of workers such as engineers, signal officers and clerks at the ports and the various stations, the road hauler pays a uniform rate of only two shillings per day for the use of the motor park, and employs only a motor driver and perhaps one or two other apprentices.

The terminal costs do not vary with distance, they are the same whatever the length of haul. The line haul costs however vary with the form of transport media. For long hauls, water and rail transport ^{are} ~~is~~ cheaper than road transport because the running costs of the former are much less than the ^A terminal costs ~~of the latter~~. As a result of this situation, both water and rail transport can afford to reduce rates with increasing distance for the terminal charges are then spread over greater distances. Roads, on the other hand, incur a higher running cost and correspondingly higher rates are charged. Thus, for long distances, water and rail transport is preferable to road while for short hauls, road transport is better.

The distance to be covered

Freight rates also vary with distance. The structure of rates generally falls off per ton-mile with increasing distance although not

in uniform steps⁸. In practice, the rates charged move upwards in a series of steps which get lower and longer as distance increases. This economy of long distance haulage may be reduced to a large extent by the necessity, where it occurs, to break bulk, and transfer the load to another form of transport. This has the tendency of raising transport costs greatly. Before the construction of the Asaba/Oritsha bridge (now damaged as a result of the civil war) the river Niger constituted a break of bulk between Asaba and Oritsha as road transport has to change to river transport to cross both ways. Thus, transport costs become higher than it would have been if there were no break of bulk.

The transport of cocoa from Ikole Ekiti to Apapa by road illustrates that rates do not increase proportionately with distance. While it costs a cocoa buying agent stationed at Ikole Ekiti £5 to transport a ton of cocoa to Apapa (a distance of 280 miles) via Ibadan/Abeokuta road, it costs another agent in Ibadan £2.1 to transport the same quantity over a distance of 103 miles via the same route to Apapa⁹. If rate fixing follows the principle of strict proportionality to distance, the Ikole agent should pay £5.72 where the Ibadan agent pays £2.1. Transport charges for some stations in Western Nigeria for the evacuation of

8. R.C. Estall and R.O. Buchanan, Industrial activity and economic Geography, Hutchinson University Library, London, 1961, p. 38.

9. Results of field investigation by the author. This does not apply to the whole region, for transport charges vary from customer to customer.

cocoa to Apapa are set out in table 17 which shows the falling off per ton mile of freight charges as distance increases.

Table 17

FREIGHT RATE STRUCTURE ON THE HAULAGE OF COCOA

Origin Station	Destination Station	Distance from Apapa in miles	Transport Cost per ton in £	Transport Cost per ton mile in £
Ota	Apapa	28	.7	.025
Ifo	"	52	.8	.025
Abalabi	"	51	1.25	.023
Wagind	"	53	1.32	.023
Abeokuta	"	69	1.67	.023
Abanla	"	80	1.8	.023
Ibadan	"	103	2.1	.021
Iwo	"	118	2.5	.021
Ago-Owu	"	131	2.62	.020
Oshogbo	"	161	2.64	.016

Source: Western Nigeria Marketing Board, Cocoa Marketing Scheme Transport Differentials, 1965/66 circular letter to registered buying agents.

The nature and density of route ways

When different forms of route ways are available such as tarred and untarred roads, different rates are bound to be charged by transporters. In fixing transport cost differentials, the road haulers charge higher rates for hauls on laterite roads than for tarmac roads. The recognised freight rates at present ruling for the transport of

cocoa in Nigeria are as follows:-

Tarmac Roads	-	6½d. per ton mile ¹⁰
Laterite Roads	-	7½d. per ton mile

The main reason for this difference in rates is that the rate of depreciation of vehicles resulting from wear and tear is greater on laterite than on tarmac roads. Transporters therefore charge higher rates to compensate for the greater depreciation of their vehicles.

Rates also vary with the density of route ways. A high density of route ways generates competition which in turn leads to reduction in rates by transporters to attract more customers, while a low density of route ways encourages monopolistic practices by transporters which leads to higher transport charges. Road density in Western Nigeria (Table 18) shows a concentration around Ibadan and the Colony Provinces. In parts of Ondo Province where road density is low, freight rates vary between 8d. and 9d. per ton mile on tarred roads, whereas in Ibadan Province where road density is comparatively high, rates stand at 6d. per ton mile for the same type of consignment and on the same type of road. Compared with other provinces in Western Nigeria one can see that the density of route ways favour Ibadan. This results in a higher degree of accessibility for Ibadan. Accessibility is a neces-

10. Western Nigeria Marketing Board, Cocoa Marketing Scheme. Transport Differentials, 1965/66 circular letter to registered buying agents.

sary requirement for any successful manufacturing. Raw materials have to be assembled, finished products have to be taken to markets and labour has to be attracted.

Table 18

DENSITY OF ROUTE WAYS BY PROVINCE IN WESTERN NIGERIA 1964

(TARRED ROADS ONLY)

Province	Trunk A & B Roads miles	Provincial Roads miles	District Roads miles	Total Mileage	Area in Sq. Miles	% Density	Transport Cost per Ton Mile
Ibadan	390	144	180	714	4,521	15.79	6d.
Colony	157	28	43	208	1,354	15.36	6d.
Ijebu	130	38	169	337	2,496	13.72	7d.
Abeokuta	188	158	233	579	4,206	13.57	7d.
Ondo	342	184	238	764	3,162	9.36	9d.
Oyo	243	225	116	582	9,695	6.00	10d.

Source: Ministry of Works and Transport, Western Nigeria, 1964.

The quantity and the nature of commodity

A large volume of traffic has the tendency of inducing transport agencies to offer special rates. When a large quantity of consignments is offered for haulage, the overhead transport charges could be reduced to allow freight rate reductions by transporters. This usually has adverse effects on smaller firms in their competition with large ones since the growth of the former may be restricted by having to pay higher rates than their larger competitors who qualify for freight

rate reductions.

The possibility of a return cargo also has significance, for if vehicles or wagons have to return empty, freight charges must be high enough to pay the cost of their return journey. One of the major financial problems facing the Nigeria Railway Corporation today is the absence of sufficient cargo for the north-bound trip. Similarly, vehicles plying the Ado Ekiti to Ibadan road in the Western State of Nigeria do not enjoy the advantages of back haul economy in their return journey to Ibadan for lack of sufficient cargo for this part of their trip. Thus passengers from Ado Ekiti to Ibadan pay as much as two shillings per head above their counterparts from Ibadan to Ado Ekiti.

The nature of the commodity carried also affects transport charges. Extra costs are incurred if for example, special containers are required (for liquids) or if special care for loading and reloading is essential - (for fragile items) or if special speed of movement is necessary as in the case of perishable goods.

Transport charges are lower for low valued products than for high valued products. For example, freight rates on raw materials and semi-finished products are generally lower than freight rates on finished products. One reason for this differential is that those who are responsible for fixing freight rates assume that the demand for transport on the part of the owners of low-value products is quite

sensitive to the cost of transport¹³. Raw materials like cotton, groundnuts and fruits are rated less than cocoa (which is much more valuable) by the road haulers. Similarly, bulky goods like cement, other building materials and manufactured products pay higher rates than any other consignment. The Nigeria Railway Corporation, for instance, employs the code system of charging rates. It uses certain alphabets to stand for various categories of goods e.g.

O. F. means Offensive goods

D. E. means Explosives and dangerous goods.

These classes of goods bear heavier charges than ordinary goods. For the fixing of rates, goods are divided into classes based on the nature of the consignment involved as regards weight, measurement, liability to breakage, value, whether dangerous or offensive. After this classification, freight is then charged according to the length of haul between stations. For this purpose the minimum distance for freight charge is 10 miles. The railway freight charges for three categories of consignments for 1964 are shown in table 19 where the tapering of rates ^{per unit weight} with increasing distance can also be seen. Class I goods are the agricultural products while Classes II and III are fragile and dangerous goods respectively.

13. B. Chinitz: Freight and the Metropolis, Harvard University Press, Cambridge, Massachusetts, 1960, page 119.

Table 19RAILWAY FREIGHT CHARGES FOR DIFFERENT CLASSES OF GOODS (1964) in pence per cu

Miles	Class I	Class II	Class III
10	6	6	6
20	6	6	6
30	6	7	7
40	8	9	15
50	12	13	16
60	14	15	19
70	16	17	23
80	18	21	26
90	20	23	28
100	23	25	31

Source: The Nigerian Railway Tariff, Ebute-Metta, Railway Printers, 1964, page 46.

Variation from customer to customer and from season to season

The charge a customer pays is often a function of his familiarity with the road hauler, his status and bargaining power. A customer with a strong bargaining power pays less than a weak bargainer, while a highly placed man in the society is often made to pay higher than other customers. Rates also vary from season to season.

During the Christmas and the New Year period, when the volume of traffic and flow of people increases, road haulers increase the freight rates. Between March and October of every year, a passenger without a load travelling from Ibadan to Ijesha-Ishu in Ekiti Division pays ten shillings for a distance of 150 miles. This works out at $\frac{4}{5}$ d.

(four fifths of a penny) per mile per passenger. But between November and February of every year, the same passenger pays as much as £1. 5/- for the same journey. This shows an increase of more than 100%. Thus in the motor traffic industry, no clear pattern of freight rate exists. Conditions at the motor parks, at the road sides and the temperament of both hauler and customer affect the cost of transport. This weakens the ton-mile approach as a method for examining the role of transport costs in the location of industries in Ibadan. As a result, the comparative cost approach is applied in the subsequent chapters to show the significance of transport costs in locational decisions in the city.

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CHAPTER VI

THE FRUIT CANNING INDUSTRY

The analysis of the role of transport costs in the location of the Fruit Canning Industry in Ibadan refers to the Lafia Canning Factory. This factory is located near Moor Plantation on the Ibadan/Abeokuta road where it occupies a two acre piece of land lying between the Pepsi Cola Factory and the Nipol Ware Ltd. Factory on the one hand and between the railway line and the Trunk A road from Abeokuta to Ibadan on the other.

No elaborate attempt is made here to trace the origin and early development of this factory. Rather, attention is focused on a description of the principal raw materials, the finished products and the freight charges incurred in the process of raw material assembly and the distribution of final products to markets.

Fruit canning industry in Ibadan concentrates on the processing of raw fruits into finished products for consumption. Lafia Canning Factory, a Government sponsored project, came into being following a growing awareness of the bright prospects for industrial processing of raw fruits in Western Nigeria and the envisaged substantial contribution which this will make to both agricultural and industrial development of the region¹. Having established the factory, the Western

1. Arthur D. Little Inc., "An evaluation of the Tropical fruit production and processing potential in Western Nigeria and a suggested prerequisite programme", Project Analysis No. 12, Government Printer, Ibadan, 1962, page 1.

Nigeria Government delegated the day-to-day management of the factory to the Western Nigeria Development Corporation. This decision is basically sound because in practical operation, the factory has a chance of fulfilling its theoretical feasibility by coming under the direct control of a corporation which also owns a number of citrus plantations. These plantations, located at Apoje, Adipiti and Eruwa, now supply a sizeable proportion of the raw materials for the industry.

The Lafia Canning Factory began to operate in 1954 with a fixed investment of £579,000 provided by the Western Nigeria Development Corporation. It has capacity for producing 200,000 tons of canned fruits per annum, but production has never exceeded 10% of plant capacity since it started production 15 years ago. This low level of production results from irregular and insufficient supply of raw materials and the small size of home market which could not absorb more than 5% of plant capacity. The firm finds it difficult to compete in the international markets with other large scale producers of canned fruit such as U.S.A., Australia, South Africa and Israel. Apart from the fact that these large world producers have the ability to reduce prices in order to capture even its home markets, the Lafia Canning Factory suffers from the disadvantage of an underdeveloped economy by having no complementary industries from which it could derive linkage advantages. Cans have to be imported from abroad and consequently, to export any finished products of the firm, means paying freight twice

and this places the factory at a serious disadvantage in its competition in the international market.

Transport costs on raw materials

The principal raw materials of the fruit canning industry in Ibadan are oranges, lemon juice, pine apples, tomatoes and grape fruits. In Western Nigeria, the introduction of citrus cultivation was haphazard and its propagation and improvement has been largely neglected because of the greater profit from cocoa cultivation. The majority of citrus today comes from natural ungrafted trees either isolated or in small patches mixed with high bush and other types of trees. However, there has been considerable natural selection based on fruit quality characteristics and the degree to which individual trees are resistant to disease. Undoubtedly, there has been much cross pollination such that great variations are found in the type, quality and characteristics of grape-fruit and oranges and in the productivity and health of trees. So far, two types of citrus fruits have been developed. These are the "Marsh Seedless" grape fruit from imported bud wood and the Nigerian Sweet Orange. The latter is often referred to by areas as "Agege 1", 'Etinau', or 'Umudike'. Some organised work is being done to propagate and improve these two varieties although difficulties are still encountered in producing the true strains and in nursing these to maturity free from attacks of viruses.

More plantations have been proposed for citrus production to

ensure regular supply of raw materials. Fortunately, only about half of these projects lie beyond a 50-mile radius of the Lafia Canning Factory. Because of this short distance, hauling costs, quality control, and the high degree of perishability of the fruits constitute minor transportation problems. In addition to the plantations, raw fruits are also supplied from peasant farms all over Western Nigeria. Some of these farms are considerably distant from Ibadan. In many of them, production of fruits is fragmented, primitive and disorganised and is tied in with subsistence agriculture, petty trading and the practice of bush fallowing of cultivated land.

Marketing is as much fragmented as production and it is extremely difficult to put values on production costs or on returns received for fruit. Supply of raw fruits from this type of unorganised farms cannot therefore be expected to be regular. However, the Lafia Canning Factory depends on peasant farms only for supplementary supplies. To facilitate collection from so many supplies, a number of collecting points accessible to motor truck pick-up have been organised in the rural areas. These include: Aba Alamu, Ijimoba via Ejigbo, Ajagasi in Oshun Division, Isundinrin in Igbajo, Ipero village via Abeokuta. This arrangement has helped not only to minimise total transport expenses but also to reduce spoilage resulting from long hauls of this type of perishable raw materials.

For the appraisal of the significance of transport costs incurred

in the collection of these materials in the cost structure of the Lafia Canning Factory, attention is directed to Table 20. This table shows that out of a total of £15,570 direct charges incurred by the factory during 1962/63 only £446 was for fruit procurement.

Table 20

PRODUCTION COST - LAFIA CANNERY²

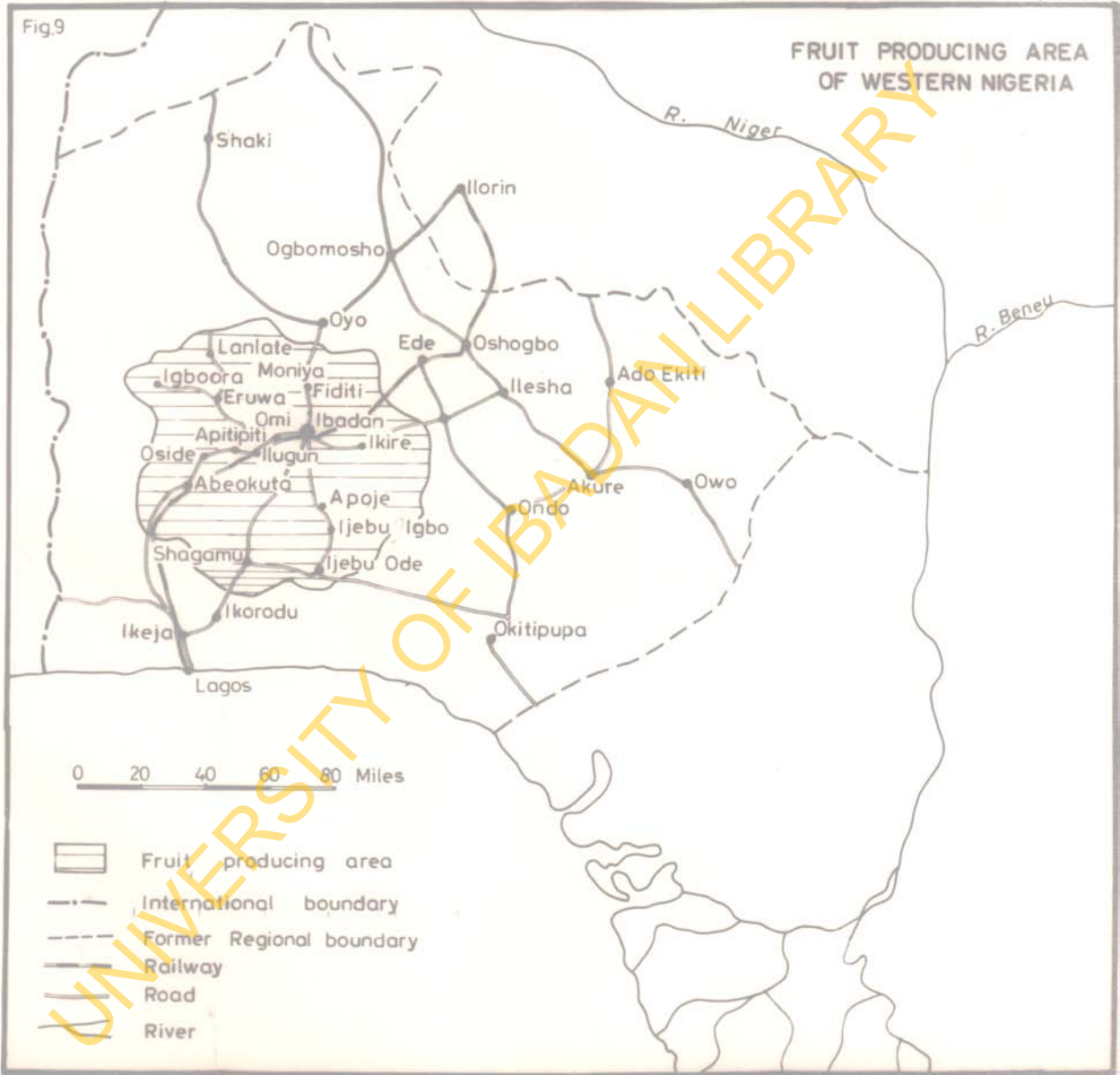
	<u>1962/63</u>	<u>1963/64</u>
Raw Fruit	£3,308	£3,077
Labour	1,381	1,482
Sugar	593	664
Cartons, Cans, Labels (Imported)	7,597	7,477
Supervision	914	1,383
Steam (Fuel)	916	924
Fruit procurement	446	298
	<u>£15,570</u>	<u>£15,305</u>

The explanation for the low costs incurred in the procurement of raw materials is due partly to the usual practice of transporters charging less on raw materials than on finished products and partly to the fact that Ibadan lies in the centre of the fruit producing region. (Fig. 9) This reduces to a considerable extent the high costs arising from long distance haulage of raw materials. Although parts of the fruit producing region lie nearer to Ijebu Ode and Abeokuta,

2. Source: Comparative Balance Sheet, Lafia Cannery 1964, From the records of the W. N. D. C., Ibadan, 1962 - 1964.

Fig.9

FRUIT PRODUCING AREA OF WESTERN NIGERIA



Ibadan remains the most central location in terms of the overall distance covered.

Furthermore, it costs more to buy fruits as distances increase away from the factory site. For instance, the delivered price of a ton of pineapples at the Lafia Canning Factory for distances not exceeding ten miles is £6. 15/- from eleven to thirty-five miles £7 and £7. 10/- for distances of thirty-six to seventy miles³. The increase in the price of pineapple with increasing distance from the factory site is due to the additional cost incurred in the process of assembling the fruits. Since freight rates increase in this manner, the least transport cost location for the collection of raw materials is the nearest market to the raw material sources and this happens to be Ibadan. Table 21 shows that the total number of miles from all raw material sources to Ibadan is 15 per cent less than that to Ijebu-Ode and 35 per cent less than to Abeokuta.

In addition to those raw materials which are locally available, a few others such as Cans, Cartons, labels, sugar and concentrates are imported. These, unlike the fruits can withstand long distance transportation. Data relating to the cost of transporting these imported intermediate raw materials was not available in isolation from those of local raw materials. As a result, it is not possible to assess the

3. Extracts from information leaflet distributed to farmers in Western Nigeria by Mr. T.A. Adebayo, Manager, Lafia Canning Factory, August 1967.

relative transport cost advantages of each of the competing centres from the Lagos port. However, the assembly cost of this type of imported raw materials is not likely to be sufficiently great to give rise to any differential transport cost advantage. But, because of the proximity of Ibadan to the source of local raw materials resulting in lower freight rates, one can reasonably conclude that a consideration of transport cost advantage in raw material assembly has been a major factor in the location of the Lafia Canning Factory in Ibadan.

Table 21

DISTANCES FROM RAW MATERIAL SOURCES TO THREE POSSIBLE LOCATIONS
FOR CANNING FACTORY IN MILES⁴

Raw Material Source	Distance to Ibadan	Distance to Ijebu Ode	Distance to Abeokuta
1. Eruwa	44	87	41
2. Apitipiti	28	71	20
3. Apoje	54	21	62
4. Ond	9	52	39
5. Ilugan	22	67	28
6. Igbo Ora	54	108	58
7. Idire	25	68	68
8. Ijebu Igbo	34	12	71
9. Egbeda	15	56	61
Total	332	382	446

4. This table is based on the records contained in the Western Nigeria Road Mileage Chart, 1960, Ministry of Information, Ibadan 1960.

Transport cost on the distribution of finished products

The principal finished products of the Lafia Canning Factory are canned grape ^{fruit} segments, canned pineapples, orange and lemon juice concentrates and squashes. Unlike the raw materials used to manufacture these products, they are less bulky since the raw materials lose weight in the process of manufacture. The finished products become much more valuable in relation to bulk and they acquire a higher degree of storability which makes them capable of withstanding long distance transportation.

The general principle governing the manufacturer's locational selection is that his factory will tend to be located where the estimated aggregate costs are the least⁵. In order to isolate the influence on location of transport rates on finished products, it is convenient to assume initially that transport cost is the only factor in the location of the Lafia Canning Factory in Ibadan. Under this assumption, the least cost production site is the location with the minimum transport cost. We shall assume further that the Western Nigeria Development Corporation which operates the factory has a choice to locate in any of the main population centres in Western Nigeria which incidentally are also the main markets for the products of the factory. Then the amount of products produced can be assumed to be

J. Reeves

5. [^] "Transport costs and the location of industry in Victoria", Economic Record, 1947, page 240.

sold equally according to population size in each centre. Haulage costs of finished products will also be weighted in like manner.

In the fiscal year 1962/63, Lafia produced 600 tons of canned fruits and sold this for £30,527⁶. The distribution cost for this tonnage of canned products was £240.

The problem to be solved here is whether an alternative location would have reduced transport costs on the distribution of finished products.

Table 22 shows the main population centres in Western Nigeria, their population at the 1963 population census, the percentage of any given total of canned fruits that would be sold in each centre if canned fruits are produced in Ijebu Ode and distributed evenly on population basis, distance to be covered if production takes place in alternative locations and the cost of transporting the proportion of canned products sold in the respective towns.

In this table, the transport costs to the various markets on their proportion of canned fruits if production were to be carried on at Ijebu Ode is shown in column 5 where total transport cost amounts to £591. 6^s. Thus, Abeokuta would take 65 tons, and to transport this quantity from Ijebu Ode, the producing centre to Abeokuta a distance of 59 miles would cost £38.05. Since production takes place at

6. Arthur D. Little Inc., Project analysis and Technical Assistance Dept. of the Premier's Office, Ibadan, No. 12, 1964, page 4.

Ijebu Ode, it pays no transport cost on the 38 tons of canned fruits consumed there.

Table 22

COST OF CONVEYANCE FROM IJEBU ODE TO OTHER TOWNS⁷

1	2	3	4	5	6
Population Centre	Total Population in '000	Proportion of canned fruit out of 600 tons	Distance from Ijebu Ode in miles	Estimated transport cost in £	Transport Cost per ton-mile in pence
Ijebu Ode	69	38	-	-	-
Abeokuta	187	63	59	38.05	2.5
Ibadan	627	359	43	160.80	2.3
Oyo	112	64	77	51.50	2.5
Ondo	74	43	140	62.70	2.4
Owo	90	35	200	68.75	2.5
Total	1,159	600	519	381.60	-

The estimated transport cost in column 5 is based upon the assumption that production takes place at Ijebu Ode. The average cost per ton mile for canned products is 2.5d. by road. Abeokuta with a population of 187,000 is assumed to consume 63 tons which will cost any factory at Ijebu Ode £38.05 to transport to Abeokuta over a distance of 59 miles. Similarly, Ijebu Ode will have to incur a transport cost of £160.8 on the haulage of 359 tons of canned fruits to the consumers at

7. The population figures are taken from Western Nigeria Population Census 1963.

Ibadan over a distance of 45 miles. The sum of £381.60 represents the estimated total transport cost incurred by Ijebu Ode for distributing the proportion of canned fruits consumed at each centre.

A similar series of costs like the one in table 22 is worked out for production taking place at each of the remaining market centres. The results of these are outlined in table 23.

Table 23

TRANSPORT COSTS ON THE DISTRIBUTION OF 600 TONS OF CANNED
FRUITS IN ALTERNATIVE CENTRES

Manufacturing Centre	Transport Cost in £
Ibadan	138.05
Oyo	360.75
Abeokuta	367.50
Ondo	374.35
Ijebu Ode	381.60
Owo	592.05

From this table, it becomes clear that the best location which minimises transport costs on the distribution of finished products is Ibadan. It has a transport cost of only £138.05. Compare this figure with Oyo the next highest with £360.75. The transport cost advantage of Ibadan is a consequence of its large size which makes it the largest market centre among the alternative locations. By virtue of its large market, it consumes the greatest proportion of canned fruits

(Table 22). The population centre in which production takes place incurs no transport cost on the fraction of total production which is consumed there. Ibadan takes 359 tons out of 600 tons of canned fruits produced. Therefore by locating in Ibadan, the Iafia Cannery avoids transport cost on the distribution of 359 tons of canned fruits.

The influence of other factors

Although, Ibadan has a transport cost advantage over alternative locations both in the collection of raw materials and in the distribution of finished products, it does not necessarily follow that Ibadan will be the least cost location with reference to other costs of production. However, an assessment of the cost of non-transport factors such as labour, site and electricity which were initially assumed uniform does not make a serious reduction in the locational advantage of Ibadan.

The cost of labour, for instance, does not show any marked difference among the alternative locations. The quality of labour can however, affect the choice of site by manufacturers. Here again, Ibadan is at a great advantage over any of the other competing alternative locations because of its being a reservoir of skilled labour. This is supported by table 24 showing the occupational structure of Western Nigeria.

This table shows that out of a total of 42,889 people in the administrative, professional and technical occupational class in Western

Nigeria in 1962, 17,652 or 41.1% are found in Ibadan province alone while the remaining 58.9% are shared by the other provinces. It can be concluded therefore that Ibadan has an advantage over the other provinces in the concentration of skilled labour and that this represents a strong locational attraction to intending manufacturers who wish to establish industries in Western Nigeria.

Table 24

POPULATION OF WESTERN NIGERIA BY OCCUPATION - 1962 FIGURES

A	B	C D E F G				
		O C C U P A T I O N S				
Province	Total Population	Agriculture and Fishing	Crafts	Trade & Clerical	Administrative Professional Technical	Others
Abeokuta	629,850	268,719	10,427	66,455	4,749	8,146
Colony	237,929	84,874	7,204	29,590	5,876	12,879
Ibadan	1,649,929	576,116	46,157	183,593	17,652	31,239
Ijebu	458,851	249,616	9,623	39,866	2,438	6,413
Ondo	1,347,637	656,062	16,813	82,192	6,560	17,250
Oyo	1,029,640	555,023	15,997	82,891	5,614	12,619
Total	5,248,292	1,376,415	106,223	484,587	42,889	88,546

Source: Western Nigeria Statistical Bulletin, Ministry of Economic Planning and Social Development, Statistics Division, Ibadan, June and December 1966, page 11.

As regards the relative cost of sites, it is true that land sites are cheaper and readily available in larger quantities in the other

centres than in Ibadan. This is because of the low demand for land for residential and industrial purposes in these places. In Ibadan the high demand for land for various competing uses has led to a continuous increase in land value over the last two decades. Thus, the relatively low cost of land in the other centres represent a locational advantage but this is not likely to be sufficiently large to outweigh the transport cost advantage of the city of Ibadan.

Electricity cost has already been shown to be relatively cheaper in Ibadan where one unit costs only 3d., compared with other places such as Owo or Ondo where one unit costs 5d. Electricity is an important factor in the infrastructural development of Nigeria. Without it industrialisation is virtually impossible since no other source of power is locally available. The absence of electricity supply in many other towns has greatly reduced their locational advantage despite any overwhelming advantage for industrial use which they may have.

Having regard to the main ideas expressed in this chapter, one can admit to a great extent that the location of the Lafia Canning Factory in Ibadan represents a device for minimising transport costs. The centrality of the city within the fruit producing areas makes it the least cost location for raw material procurement. The large size of its market reduces distribution costs since a sizeable proportion of canned fruits on which distribution cost is avoided is consumed in the city. Similarly, an assessment of non-transport costs shows that

the locational advantage of other centres in respect of cheaper land sites fails to overshadow the metropolitan advantages of Ibadan. Thus, in terms of aggregate production costs, the city remains the least cost location for the fruit canning industry.

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CHAPTER VIITHE ORANGE SQUASH INDUSTRY

The Orange Squash Industry in Ibadan is represented by the Tella Fruit Juice Factory. This factory is housed in one large building at Apata Ganga some twenty yards away from the Apata market on the main road which links Abeokuta with Ibadan. The Tella Fruit Juice Factory is a one-man business and it operates on a relatively small scale. It has a capital investment of approximately ₦5,000 and 13 employees on regular pay.¹

In assessing the significance of transport costs in the location of this factory, the 'Comparative cost approach was also used². This approach provides a quantitative measure of the pull potential of locational factors towards alternative locations. A satisfactory basis for this approach is provided by the Blaize Memorial Institute located at Abeokuta. This Institute devotes a section of its factory to the production of Orange Squash and another section to the training of young men in carpentry. The Orange Squash producing section of the factory has been selected for the comparative analysis that follows. The spatial differential in transport costs and processing costs in

-
1. Compare with the Corporation owned Lafia Canning Factory with initial capital investment of ₦579,000 and 25 employees.
 2. W. Isard, Methods of regional analysis, an introduction to regional Science, M.I.T. Press, Cambridge Massachusetts, 1960 pp. 240 - 245.

both factories are assessed to identify the location with minimum aggregate costs. Since both factories are not of the same size, the possible effects of scale economies on production costs are eliminated by a mathematical calculation of what costs would be if both produced on the same scale and under the same level of managerial efficiency.

In the analysis which follows, transport cost is at first assumed to be the only factor in the location of this factory in Ibadan. This assumption is later relaxed and the substitution effects of other production factors in the alternative location is examined to determine the net transport cost advantage of the Ibadan-based Tella Fruit Juice Factory.

Transport costs on raw materials

The main item of raw materials used by the Tella Fruit Juice factory includes oranges, grape fruits, lemon juices, sugar and concentrates. With the exception of the concentrates and bottles which are imported from the United States of America and Western Germany respectively, all other raw materials are produced locally within Western Nigeria. Unlike the Lafia Canning Factory which collects the greater proportion of its raw fruits from the Western Nigeria Development Corporation's citrus plantations, the main sources of supply of raw materials for the Tella Fruit Juice Factory are the local farms around the Ibadan/Abeokuta region. The raw fruits are brought in baskets from the farms to some established collecting centres along the

Ibadan/Abeokuta road chiefly by the wives of the farmers. Such collecting centres include Omi Adio, Olobo, Orile Ilugun, Osiele and Apitipiti. In addition, there are some road side markets for the sale of oranges and grape fruits. Such road side markets are organised under shade-providing trees along the main road. The fruits are exhibited for sale on palm leaves spread on the ground. From here, they are collected by factory owned motor lorries to the factory site for processing. In some cases, orange and grape fruits are brought from the surrounding farms to Ibadan markets for the urban population. The Tella factory then collects them in bulk from these markets lying at short distances from the factory site. For example, this factory has an important orange fruit market in Apata which has now become a depot for agricultural products originating from Omi/Ilugun/Ibadan road.

Because of the absence of any form of organised fruit production and marketing the supply of raw fruits to this factory is not regular. This constitutes a great handicap for the factory as production is sometimes held up for months whenever fruits are not forthcoming. However, the factory has the advantage of nearness to the main sources of its raw materials and in consequence, the perishability and spoilage of the fruits resulting from long distance transportation is easily avoided. Similarly, the assembly cost incurred on raw materials is not as high as it would otherwise be if long dis-

tances are involved. In 1965, this amounted only to £4.3 out of a total production cost of £104.4 incurred on the production of 1,000 bottles of Orange Squash, the former representing about 4.1% of the latter.

Distribution cost of finished products

The Tella Fruit Juice Factory concentrates on the production of Orange Squash. In 1965, this factory incurred £5.6 on the distribution of 1,000 bottles of orange squash to markets. This amount represents 5.4% of the total cost of production but is higher than the cost incurred on the collection of raw materials. One important reason for this apart from the usual one that finished products are rated higher than raw material is that the finished product in this case is more fragile and requires special handling while in transit in order to prevent damages to the bottles. It is therefore usual for transporters to charge higher freights on such commodities². Thus, in order to reduce transport costs, the Orange Squash industry has to be market oriented.

From what has been said so far on the nature of both raw material and finished products, one can conclude that the orange squash industry illustrates the case of industries whose raw materials and finished products cannot stand long distance transportation, and hence their

2. B. Chinitz, Freight and the Metropolis, Harvard University Press, Cambridge Massachusetts, 1960, page 119.

markets are spatially restricted.

Transport cost advantage of Ibadan

The transport cost differentials for the production of 1,000 bottles of Orange Squash each in Ibadan and Abeokuta factories are tabulated in table 25.

Table 25

TRANSPORT COSTS ON THE PRODUCTION OF 1000 BOTTLES OF ORANGE SQUASH IN £

Location	Transport Costs on		Total	Transport cost advantage of Ibadan
	Raw material	Finished products		
Ibadan, Tella Fruit Juice Factory	4.3	5.6	9.9	7.9
Abeokuta, Blaize Memorial Institute	8.2	9.6	17.8	-

Transport cost advantage of the Ibadan factory amounted to £7.9. This difference is highly significant to attract the industry to Ibadan. The significance of transport cost in the location of this factory becomes greater when one considers that not less than 76,000 bottles of orange squash were produced in the Tella Fruit Juice Factory in 1965. However, it will be misleading to conclude that Ibadan is the least cost location because of this transport cost advantage without considering the possibility of substitution of other factors of production which incidentally are cheaper in this alternative loca-

tion for the industry. Table 26 shows the processing cost differentials between Ibadan and Abeokuta.

Table 26

PROCESSING COST DIFFERENTIALS ON THE PRODUCTION OF 1000 BOTTLES
OF ORANGE SQUASH IN IBADAN AND ABEOKUTA IN £.

Location	Processing Costs In £					Cost Advantage of Abeokuta
	Labour	Raw material	Power	Others	Total	
Ibadan, Tella Fruit Juice Factory	50	31	6	18.5	94.5	3.5
Abeokuta, Blaize Memorial Institute	41	27	7	16	91	

Processing cost advantage of Abeokuta location is £3.5 but Ibadan already has a transport cost advantage of £7.9 over Abeokuta. Therefore the net transport cost advantage of Ibadan is £4.4 on the production of 1,000 bottles of orange squash. This shows that the processing cost advantage of the Abeokuta Blaize Memorial Institute is not sufficiently great to offset the larger transport cost advantage of the Ibadan-based Tella Fruit Juice Factory.

The transport cost differential between Ibadan and Abeokuta results from the location of these two towns in relation to raw material sources and markets for the consumption of finished products. The Abeokuta factory collects its raw materials from farms which are

considerably distant from the factory site. This adds to the cost of transporting these materials to the factory. Ibadan on the other hand, lies in the centre of the source regions of the raw materials. In most cases, a sizeable proportion of oranges required by the Tella Factory are collected from Dugbe, Ayeye, Orita-merin and Apata markets. These are the important orange fruit markets in the city and all of them lie close to the Tella Fruit Juice Factory.

As for the distribution of finished products the Abeokuta factory incurs extra transport costs because more than half of its finished products are hauled to the Kingway Stores and the A.G. Leventis in Ibadan, a distance of 44 miles. This becomes necessary since the Abeokuta market unlike the Ibadan market, is not sufficiently large to consume all the products of the Blaize Memorial Institute.

The comparative analysis shows Ibadan as a more economic location for the orange squash industry. But inspite of the cost disadvantage of the Abeokuta based Blaize Memorial Institute, it still sells with profit in Ibadan. This is made possible by the failure of the Tella Fruit Juice Factory to supply all the orange squash requirements of Ibadan. Thus, if the Tella Fruit Juice Factory decides to expand in order to increase production to meet all the demand of Ibadan market and cut down its price in future, and if consumers' tastes or preference for the products ^{of} Blaize Memorial Institute and demand in general remain static, it would become virtually ~~impossible~~ ^{impossible} for the

Blaise Memorial Institute to sell with profit in Ibadan.

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CHAPTER VIIITHE SOFT DRINKS INDUSTRY

There are two large soft drinks factories in Ibadan. These are the Western Nigeria Development Corporation Pepsi Cola Factory and the A.G. Leventis Bottling Company Ltd. Both produce widely advertised brands which are marketed throughout Western Nigeria. These comprise various carbonated drinks, Pepsi Cola, Mirinda Lemon, Lemon Lime, Mirinda Orange and Coca-cola. The products of the two factories compete vigorously in the market, each trying to capture the market from the other by means of rigorous, often expensive advertisements and price competition. The A.G. Leventis Bottling Company Ltd., for instance, tries to undersell the W.N.D.C. Pepsi Cola by cutting down its market price to the disadvantage of the latter.

While the Western Nigeria Development Corporation Pepsi Cola Factory is located at Moor Plantation on the Abeokuta/Ibadan road three miles away from the city centre, the A.G. Leventis Bottling Company Ltd. is located at Mokola, near the Bodiya Estate on the Oyo/Ibadan road some two miles away from the centre of the town. The peripheral location of these factories illustrates the recency of their establishment, the full potential of transport availability and of extensive sites on the location of modern industrial establishments. These two

factories were established in mid-1950's at a time when land was no longer available within the centre of the city for the siting of industries. They therefore found suitable sites on the outskirts of the city. Here, land is not only available in large units, but are relatively cheaper when compared with land values in the city centre. A plot of land 50 x 100 feet within the centre of the city costs as much as £150, while similar plots in the city periphery costs only £80.

The analysis of transport costs in the location of the soft drinks industry in Ibadan refers to the Western Nigeria Development Corporation Pepsi Cola factory. In order to isolate the influence of transport costs in the location of this factory, the significance of transport cost in the cost structure, and spatial variations in transport costs incurred by this factory and the ^{W.N.D.C.} ~~W.N.D.C.~~ Pepsi Cola factory located at Musini are assessed. Then the processing costs in both factories are set against the transport cost differentials to determine the net transport cost advantage/disadvantage in each location.

Raw material assembly cost

This factory makes use of imported raw materials such as sugar and concentrates of various grades from New York, chemicals and carbon-dioxide from the Imperial Chemical Industries in Western Germany and kolanuts from the West Indies¹. A sizeable proportion of the bottles

1. A. Sokolaki, The establishment of manufacturing in Nigeria, Frederick A. Praeger, Publishers, New York, Washington, London, 1965, page 430.

*W.N.D.C. means Western Nigeria Development Corporation.

used in the factory is also imported from Western Germany while a small percentage of local sugar for the factory comes from the Bacita Sugar Factory. With increasing level of sugar production in Bacita, the dependence on foreign sugar is being reduced.

In the year 1982, the Ibadan-based Pepsi Cola Factory incurred a total production cost of £9,920 out of which transport cost on the collection and assemblage of raw materials amounted to £570. This represents about 5.8% of the total costs of production. The small percentage of raw material assembly to total production cost results from two important factors:

(a) The nature of the raw materials: The raw materials used in the soft drinks manufacturing industries are less bulky in relation to value. They are conveniently packed in containers and do not require any special handling since they are neither fragile nor highly perishable and can therefore withstand long distance transportation. It is the practice of those furnishing transportation to charge favourable rates on raw materials of this nature.

(b) ^{Concessional} Freight rates: The suppliers of the raw materials used by the Pepsi Cola factory in Ibadan absorb the cost of transporting these materials from the source regions to the Lagos Port. This means that the Pepsi Cola Factory is responsible for only the cost of transporting these materials from Lagos to Ibadan. It ^{should} ~~not~~ be ~~noted~~ ^{noted} that the Pepsi Cola factory in Ibadan took its franchise from

the I.C.I. in New York. As an infant industry, the absorption of the cost of transport by ~~the~~^{these} large-scale producers of concentrates has enabled the Pepsi Cola Factory to survive competition from other firms producing identical soft drinks.

Although transport cost on the collection of raw materials for this factory is low in Ibadan, one wonders whether this would not have been lower still in a coastal location since such a location would avoid all main line haulage costs of raw materials and pay only the local delivery costs. Average transport cost per ton mile of the various concentrates is 2.2d. Spatial transport cost differential for the haulage of carbon concentrates in Western Nigeria favours the coastal location more than the interior locations such as Ibadan. Lagos is unquestionably the least cost location in the collection of these raw materials. This analysis shows that a consideration of factors other than raw material assembly cost has influenced the location of the pepsi cola factory in Ibadan. The problem to be solved is how far away can a Pepsi Cola Factory located in Lagos be the supply point to markets in Western Nigeria and this is dealt with later.

Distribution cost of finished products

In 1962, the Western Nigeria Pepsi Cola Factory produced about 500,000 bottles of Pepsi Cola. This factory incurred a total transport cost of £620 or ~~4%~~^{4.1%} of the value of total products for the distribution of this number of bottles of Pepsi Cola valued at approximately £150,000. The transport cost on the distribution of the finished

products of this firm is higher than the cost of assembling the raw materials at the factory. The attraction of a market centre for all industrial concerns in this category are overwhelmingly important in locational selection for, as Schumer has observed, "if the total cost of transporting a specific quantity of raw materials is less than that of transporting the finished products therefrom, the processing facilities will be located at or near the market²", by locating at the main market for the finished products of the industry, transport cost will be greatly reduced and the margin of profit will rise.

The high cost incurred on the transport of the finished products results from the nature of these products themselves. Bottling plants add liquid ^{weight} ~~weight~~ to fragile containers. The products of the factory have a relatively low degree of storability and they therefore fall within the group of those products requiring quick delivery to consumers. These conditions make the transporters impose higher freight rates on the transfer of the finished products. From this discussion so far, it would seem that the most advantageous location for the soft drinks industry would ^{be} _^ at the point of minimum total movement of finished products. So far as this is true, Lagos and Ibadan are ideally placed in Western Nigeria. Mushin, Abeokuta and Ijebu Ode would also seem to have relative advantages over small centres of population. This is so

2. L. Schumer, The elements of transport, Butterworth & Co., (Australia) Ltd., Sydney, 1954, page 162.

because a centre with a high population pays no transport cost on the distribution of the proportion of Pepsi Cola produced and consumed there while a centre with low population incurs a relatively higher distribution cost since only a small fraction of total production is consumed locally.

In order to identify the location with the minimum transport costs, the Western Nigeria Development Corporation Pepsi Cola factory in Mushin near Lagos, is compared with the Pepsi Cola factory in Ibadan³. Transport cost differentials for both factories are tabulated in table 27⁴.

Transport cost on both raw material and finished products are cheaper in Mushin than in Ibadan. The transport cost advantage of the Mushin location is as high as £500. Thus the feasibility of a Mushin location for Pepsi Cola is very high in respect of transport costs.

The overwhelming advantage of Mushin in respect of the cost for collecting raw materials is due to its greater proximity to the port of Lagos which is the collecting and distributing port for the imported raw materials used in the manufacture of Pepsi Cola. While the

3. The W.N.D.C. Pepsi Cola Factory in Mushin closed down in 1965 because of what the management called problems of over capitalisation. The plant at Ibadan is said to be the largest Pepsi Cola plant in the whole of West Africa and could supply Pepsi Cola to the whole of Western Nigeria. To cut down total production cost, it was decided to close down the smaller factory and produce to plant capacity at the Ibadan-based factory.

4. The 1962 figures are used for both factories.

Mushin factory pays only the cost of transport from the Lagos port to the factory site, the Ibadan factory which is situated far in the interior has to pay additional delivery cost related to the distance from Lagos port. However, with increasing level of sugar production in the Bacita factory, this position is likely to alter slightly. Mushin will probably incur a relatively higher transport cost on the collection of sugar since Bacita is nearer to Ibadan than Mushin.

Table 27

TRANSPORT COSTS ON THE PRODUCTION OF 500,000 BOTTLES OF PEPSI-COLA IN £: (IBADAN AND MUSHIN)

	L O C A T I O N A T	
	Ibadan	Mushin ⁵
Transport cost on raw material	570	340
Transport cost on finished products	620	480
TOTAL	1,190	820

Transport cost advantage of Mushin = (£1,190 - £820) £370

It is realised that the length of haul is only one element in the movement of goods. The structure of freight rates and other concessional rates operating in this country are not sufficiently dissimilar to cancel the short haul advantage of Mushin. The Mushin cost

5. The figures for Mushin were computed from the original production costs on 950,000 bottles of Pepsi Cola produced by this factory in 1962.

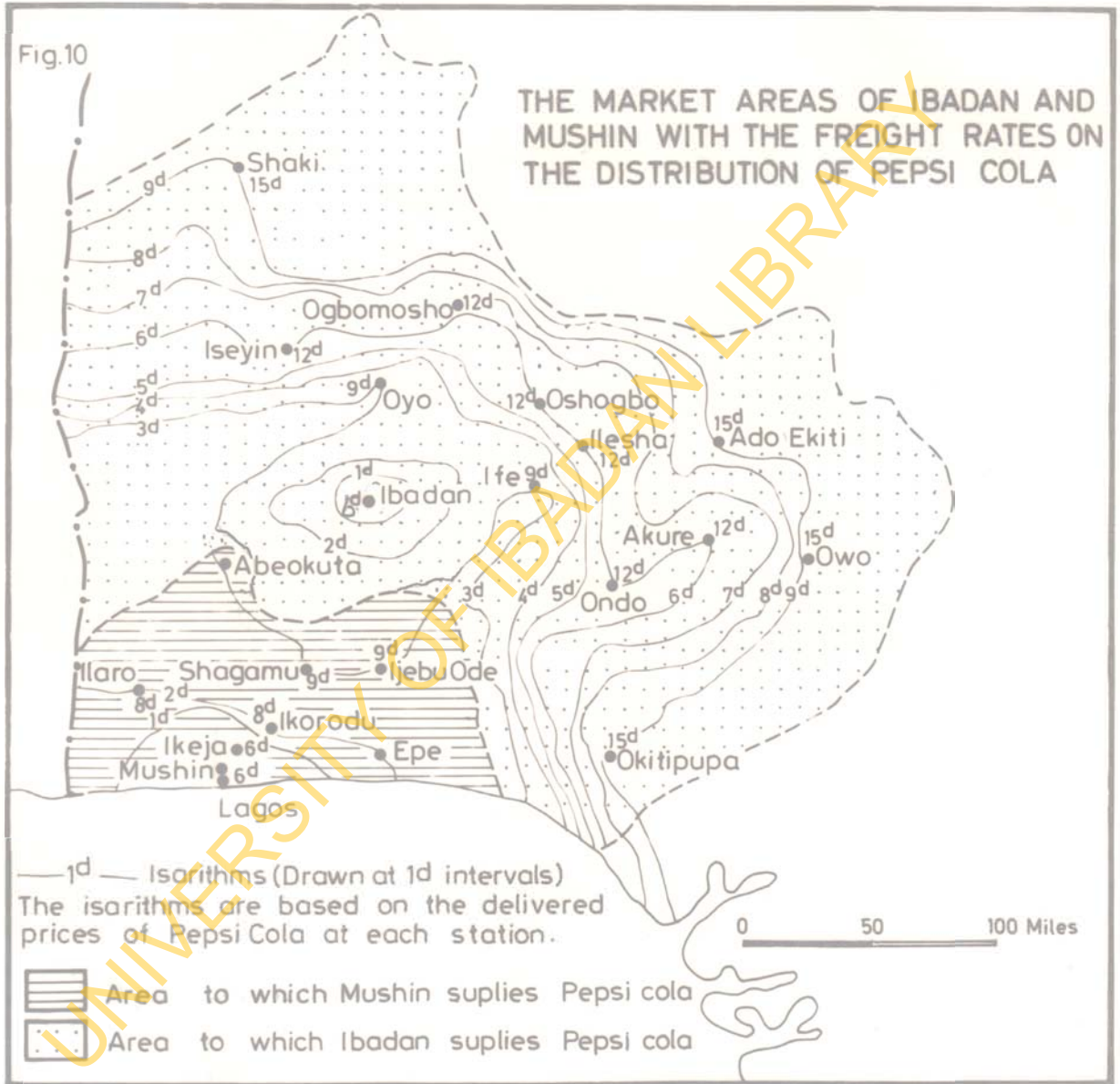
advantage as regards the distribution of finished products could be explained in terms of the size of the market areas for ^{the} two locations. Fig 10 shows the size of the market areas of Ibadan and Mushin with the freight rates ruling on the distribution of Pepsi Cola. Ibadan serves a remarkably larger market area than Mushin. The market area of Ibadan extends as far as Ilesha, Akure, Ado-Ekiti and Oshogbo which have higher freight rates and are considerably distant from one another to the extent that the cost of distributing Pepsi Cola to such areas is bound to be high. Mushin on the other hand has a smaller but concentrated market area which does not extend for more than a radius of 60 miles⁶. Part of this belongs to the high income-density market area of Lagos. It also includes important centres such as Abeokuta, Shagamu, Ibeju and Ikorodu. Because of this relatively smaller area over which finished products are distributed, Mushin incurs a correspondingly small transport cost on the distribution of Pepsi Cola to the consumers.

These results indicate that the centres of high population in Western Nigeria are competitive for the location of Pepsi Cola because of the apparent element of spatial monopoly in the market for the product. Costs of distribution increase with distance away from the producing centre up to a point at which it becomes desirable to set up another factory in order to avoid increasing costs of production. Thus,

6. The term 'smaller market area' refers to distance to be covered in the distribution exercise and not to the density of market for Pepsi Cola.

Fig.10

THE MARKET AREAS OF IBADAN AND MUSHIN WITH THE FREIGHT RATES ON THE DISTRIBUTION OF PEPSI COLA



although, the Pepsi Cola Factory at Ibadan has capacity to produce Pepsi Cola for the whole of Western Nigeria, the rise in distribution costs as distance from factory increases sets a limit to its market area and makes the establishment of another factory necessary. For instance, if the Ibadan factory were to supply Pepsi Cola to Mushin, a bottle of Pepsi Cola would cost 11d. instead of the normal 6d. per bottle. Conversely, if Mushin were to supply Ibadan, one bottle would equally cost 11d. instead of the factory price of 6d. Thus, Ibadan would be blanketed by the 4d. isarithm instead of the 1d. isarithm, and in consequence Mushin would fail to sell with profit within the Ibadan market areas.

Net transport cost disadvantage of Ibadan

The foregoing analysis indicates that a Mushin location for Pepsi Cola has a transport cost advantage over an Ibadan location. It is pertinent to investigate the influence which other factors such as processing costs have on the location at Mushin. This is necessary because assembly and distribution costs are only one element in the final costs of Pepsi Cola produced. With processing costs, Ibadan has an advantage due to scale economies but even this is inadequate to reverse the overall cost advantage of Mushin. Table 28 emphasizes that on the production and distribution of 500,000 bottles of Pepsi Cola, Mushin has an overall cost advantage of £290.

Table 28

PROCESSING COST DIFFERENTIAL ON 500,000 BOTTLES OF PEPSI COLA
IN IBADAN AND MUSHIN IN £:

	L O C A T I O N	
	Ibadan	Mushin
Processing costs	8,730	8,830
Processing cost advantage of Ibadan = £8,830 - £8,730 =	100	nil
Total transport costs	1,190	810
Transport cost advantage of Mushin = £1,190 - £810	nil	380
Net transport cost advantage of Mushin = (£380 - £100) = £100	nil	280 380

In the location of this factory in Ibadan, one can see clearly the rationale for market orientation for the minimisation of transport costs. The Pepsi Cola factory is located in Ibadan which has a large market in order to minimise the cost of transporting finished products from Mushin which is the least cost location for the factory to Ibadan. The decision to split the industry into two separate factories and the location in two towns by the Western Nigeria Development Corporation enables the industry to avoid the high cost of distribution of the finished products to consumers from a centralised production area. The gains which accrue to the Corporation if it integrates the Ibadan factory with that at Mushin in a single large scale unit, and distributes the finished products to Ibadan market area will be less than

having a separate plant in Ibadan. Since transport cost on the finished products is higher than that for raw materials, the high distribution cost with increasing distance from the producing centre will dissipate any profit arising from the low cost advantage of Ibadan.

The location of the Pepsi Cola factory in Ibadan as analysed in this chapter shows a striking example of industries whose location is spatially restricted to the main markets for the final products and whose size is limited by the extent of the market areas that could be served conveniently without the danger of rapidly increasing costs of distribution with consequent diminishing returns to scale. This means that in a region like Western Nigeria where several urban markets exist, it becomes much more profitable to establish another Pepsi Cola factory as soon as the stage of constant returns to factors of production is reached.

It is also shown that since the finished products of this industry are fragile and bulkier than the raw materials the point of minimum aggregate transport costs is the main market for these products. Thus, although a coastal location for Pepsi Cola production reduces raw material assembly costs, Ibadan, which lies in the interior becomes the least cost location because of the existence of a large market.

CHAPTER IX
THE FURNITURE INDUSTRY

The furniture industry in Ibadan is represented by many important factories which make different kinds of furniture products ranging from cushion and metal chairs, tables ~~of all descriptions~~ and containers, to trays, lockers, cupboards, and shelves. Some of these factories include the Adebayo and Olatunbosun Nigeria Co. Ltd. located at the old Nigerian College Road, H.P. Cosmazzi Furniture Works located at Amiru Street, T.A. Oni and Sons Ltd. on Queen Elizabeth II Road, the Steel Works Ltd. located behind the Paradise Club and lying adjacent to the Baptist Bookstore, and the G.E.M. Construction Ltd. at Molets. These factories make use of both imported and locally produced raw materials such as iron rods, scrap iron, plywood and mahogany in the making of furniture products which are widely sold in the local markets. One significant characteristic of these factories is that they are owned by private individuals who formed themselves into limited liability companies. The establishment of these factories and many others which are not considered here because they fail to qualify by virtue of their small size, results from the increasing need for constructional materials and comfortable seating materials consequent on the rise in the level of income and the post-war economic boom. With the rise in the price of cocoa and the resulting increase in the rate of building dwelling houses came the

need for furniture of different kinds. Apart from the demand for well furnished private dwellings, an increasing amount of furniture products such as chairs, cupboards, desks and bookshelves were required for public houses as well as primary and secondary schools.

In this chapter, the role of transport costs in the location of these factories in Ibadan will be restricted to the Steel Works Ltd. In this respect, the Complete Home Enterprise, in Mushin is selected for the comparative analysis of spatial transport cost differentials. It is believed that spatial variations in transport costs in the two different locations will reveal the least transport cost location.

Transport costs on the collection of raw materials

In order to assess the influence of transport costs on the location of the furniture industry in Ibadan, we shall again assume initially that as between different areas, there are no advantages in comparative costs arising from locational factors other than transport costs on raw materials and finished products. Under this assumption, the least cost location for the Furniture Industry will be the site where total transport costs are the least.

In table 29 are shown the total transport costs incurred on the production of 1,000 metal/wood chairs each by two factories located in different towns. Although these factories produce other furniture products, the production of chairs account for the greatest activity in each of them. Chairs have been chosen because it is found that the

two factories use the same raw materials namely - imported steel, plywood and mahogany. The bulk of plywood used comes from Sapele. Ekiti Division of Ondo Province is the main source of mahogany. Scrap iron and rods are imported from abroad.

In 1965, the Steel Works Ltd incurred a total amount of £280 on the collection of raw materials for the making of 1,000 steel/wood chairs. This is 24.4% of the total cost of producing this number of chairs. This percentage of transport cost to total costs of production is among the highest in the cost structure of all the industries studied in this work. This is significant when one takes account of the cost structure in the Iron and Steel Industries of the more advanced industrial areas of the world in which the average percentage of transport cost to total cost of production usually stands between 2.8% and 3%.

The high cost incurred in the process of raw material procurement in this factory is attributable to the nature of the raw materials. The imported iron scrap and rods are bulky and they need to be conveyed in special vehicles specifically built for this purpose. In most cases the scrap iron and rods cannot be packed in convenient forms for haulage. They are often too long and heavy for the common type of vehicles on Nigerian roads such that the haulage of this item is monopolised by a few 7-ton lorries plying the major roads and competing vigorously with the railways of the country. Thus, the transporters

charge higher rates on the haulage of the materials. Similarly, plywood and mahogany need trucks specially designed for the conveyance of sawn timber. However, much of the weight of timber is reduced at source in the process of sawing which gets rid of all the waste products before the timber is transported to the factory site. The high cost in the collection of sawn timber therefore is not due simply to bulk and weight but also to haulage over long distances and the need for specially designed vehicles for the transportation from the forest to the factory sites. The scarcity of such vehicles and the weight limitation on some of the roads in the country has the tendency of increasing freight charges on sawn timber.

Transport costs on the distribution of finished products

The finished products of the furniture industry belong to the class of commodities which becomes progressively bulkier in the process of manufacture. The products, apart from adding on more weight after manufacture, become fragile, more difficult to pack for conveyance, and occupy more space. Any industry in this category has to be market-oriented in order to minimise total transport costs. In addition, the need for customers' specification further enhances the necessity for such orientation.

In the year 1965, the Steel Works Ltd., Ibadan incurred a transport cost of £90 for the distribution of 1,000 steel/wood chairs to consumers. Most of these were institutions of higher learning

within Ibadan. This amount is very small when compared with the sum of £280 incurred for raw material assembly. The factory spends less on the distribution of finished products because Ibadan consumes nearly all the products of the factory such that only local delivery costs are incurred.

Comparison with other factories located outside Ibadan shows that Ibadan has a transport cost disadvantage in the location of this factory.

Table 29

TOTAL TRANSPORT COSTS ON THE PRODUCTION OF 1,000 CHAIRS IN TWO

TONNES IN £: (1965 - 1966)

	LOCATION AT	
	Mushin	Ibadan
Transport cost on raw materials	216	280
Transport cost on finished products	52	90
TOTAL =	268	370

Aggregate transport cost is less in Mushin and higher in Ibadan.

Ibadan therefore has a comparative transport cost disadvantage in the location of the Furniture Industry. Transport cost on the collection of raw materials is also higher in Ibadan than in Mushin. This is due to the extra cost incurred in transporting imported iron scrap and rods from the Lagos port to Ibadan over a distance of 89 miles.

Mushin does not incur as much extra cost because it lies only 8 miles away from the port. Fig. 11 showing the freight rates on the haulage of iron rods in Western Nigeria emphasizes the transport cost advantage of Mushin over Ibadan. In this map, it is shown that in general, freight rates on the haulage of iron rods increase from the Lagos port to the north of the region.

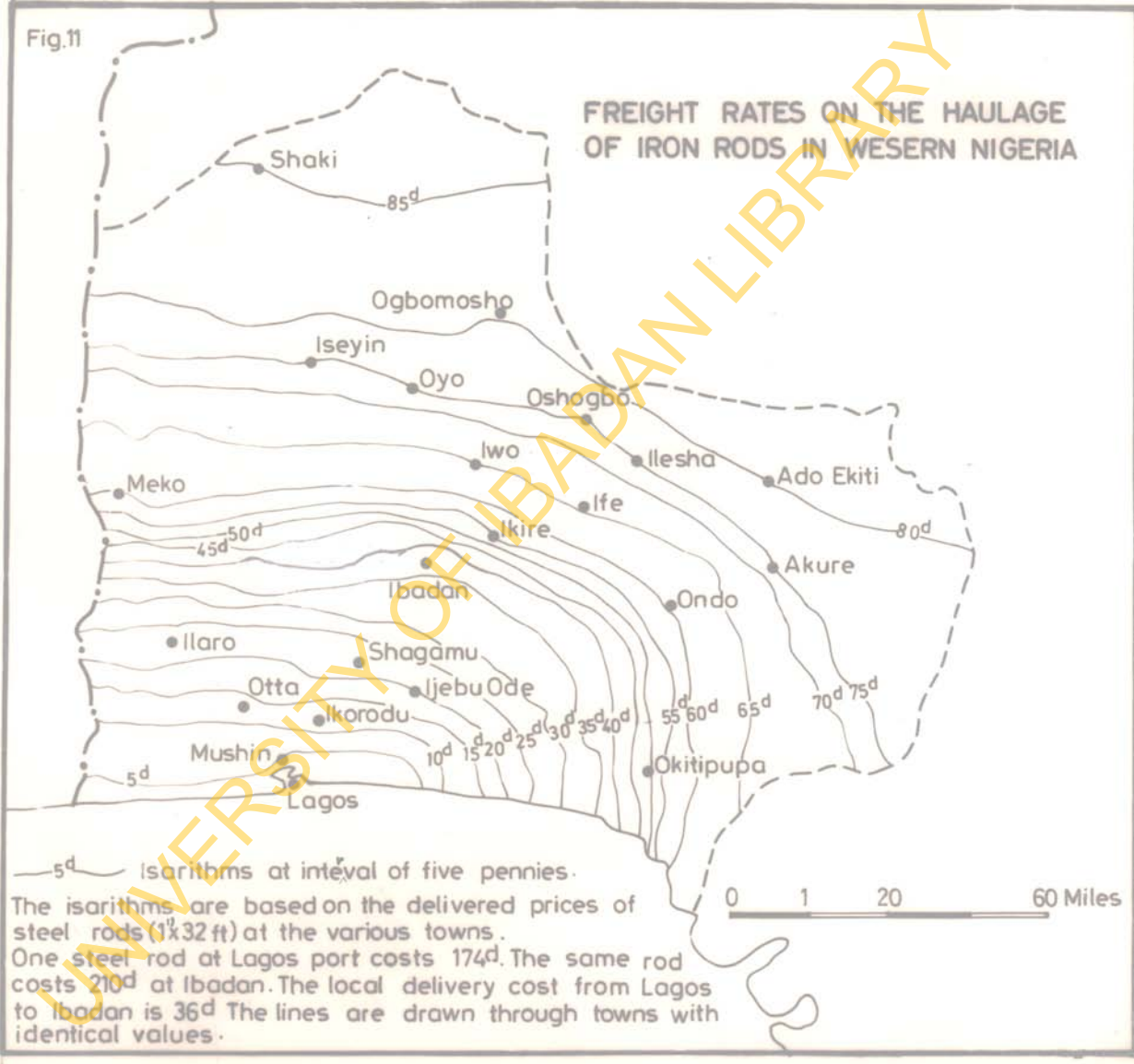
Apart from having to pay higher rates on the assemblage of iron rods, Ibadan also incurs a higher local delivery cost on the finished products. While Mushin sells to local consumers who absorb costs of delivery, the bulk of the sales of the Ibadan factory goes to large consumers like the Kingsway Stores and institutions of higher learning which qualify for home delivery of products. The transport cost disadvantage of Ibadan, when compared with Mushin is £102 on each 1,000 chairs produced. Thus in the siting of the Steel Works Ltd. in Ibadan, transport cost could not have been the major attraction since transport cost is higher than in other areas.

Other factors of production

A consideration of non-transport factors shows that Ibadan is the least cost location for the furniture industry because of its cost advantage in respect of other factors. These are processing costs and the cost of timber. While the Steel Works Ltd. in Ibadan incurred a total of £420 as processing costs in the production of 1,000 chairs between 1965 and 1966, processing cost in the Complete Home Enterprise

Fig.11

FREIGHT RATES ON THE HAULAGE OF IRON RODS IN WESTERN NIGERIA



in Mushin was £612 for the same period. This means that processing cost is relatively lower in Ibadan than in Mushin. In the case of the cost of timber, Ibadan has the advantage of nearness to the sources of timber in Western Nigeria, particularly Sapele and Ondo Province. Timber is used along with imported steel in the manufacture of these chairs. Because of Ibadan's closer proximity to an abundant supply of timber, the Ibadan factory pays less for this raw material than its Mushin counterpart. This is the reverse of what happens in the case of the transport of imported iron scrap and iron rods in which Ibadan stands at a disadvantage because of greater length of haul. Processing costs for the two locations are set against transport cost differentials in table 30.

Table 30

PROCESSING AND RAW MATERIAL COST ADVANTAGE OF IBADAN

	LOCATION AT	
	Ibadan	Mushin
Total transport costs	370	268
Transport cost advantage	nil	102
Total processing and raw material costs	945	1,255
Processing and raw material cost advantage	£10	nil

Net advantage of Ibadan = £310 - £102 = £208

Thus although, the Mushin location has transport cost advantage over an Ibadan location for the furniture industry, this advantage is not

sufficiently large to overshadow the processing and raw material cost advantage of Ibadan. This means that the furniture factory could afford to stay in Ibadan and incur high transport costs and still maximize profits rather than locate elsewhere. This conclusion agrees with Greenhut's assertion that the least cost location is not necessarily the point of least transport cost since lower processing costs and other locational advantages in alternative locations can offset the transport cost advantage of any location¹.

In the light of the findings of this chapter, it is necessary to re-emphasize the increasing importance of the market in the location of industries whose final products become bulkier and more difficult to carry than the raw materials. Because of the presence in Ibadan of a large market for furniture products and because of her relative processing cost advantages, the city becomes the least cost location for the furniture industry despite its comparative disadvantage in transport costs.

1. M. Greenhut, Plant location in theory and practice, Chapel Hill, University of North Carolina, 1956, page 385.

CHAPTER X
CONCLUSION

Summary of results

It has been the purpose of this study to set out the role of transport costs in the location of industries in Ibadan. Some aspects of non-transport factors which are relevant to isolating the significance of transport costs in locational decisions have been assessed through analysis of spatial cost differentials and substitution of production factors in alternative locations. If this work has succeeded in achieving these objectives, the author will be satisfied.

The industries considered are fruit canning, orange squash, soft drinks and furniture, making use of agricultural, forest and imported semi-finished raw materials in their manufacturing processes. The Products of the Orange Squash and Pepsi Cola industries add liquid weight to fragile containers while those of the Furniture industry become bulkier and cumbersome to transport. This peculiar characteristic explains their orientation towards the largest market for their final products. The Fruit Canning industry on the other hand is raw material oriented because, while the raw materials lose weight in the process of manufacture, its finished products become much more valuable and less perishable. A wider selection of industrial types would give additional information related to the indivi-

dual industrial class concerned but would not affect the results of this study. The differences in the nature of raw materials and finished products of these other industries are bound to give rise to varying degrees in the level of significance of transport costs in the decision to locate them in Ibadan. With available data, this constitutes an interesting area of study for future investigation.

Having subjected the working hypotheses listed in the introduction to the rules of verification and of falsification, the following results are presented.

Industrial agglomeration in Ibadan is a product of the existence of a large market potential for manufactured products, a high degree of general accessibility and geographic differences in the prices of the factors of production. The measurement of market potential in Western Nigeria places Ibadan above others with 23.2% of total disposable income of all employees in the income group of £300 and above. This high market potential in Ibadan is emphasized by the relatively low market potential in other urban centres. Abeokuta, the next highest market centre after Ibadan accounts for only 16.3% of the total disposable income. Thus, the presence in Ibadan, of a large population possessing a high purchasing power, has been a major locational attraction to the city. The per capita income in Ibadan is likely to grow faster than that of the other urban areas of Western Nigeria especially with the increasing number of industries being

established in the city. As Miller has observed in a recent study of the Geography of manufacturing, the per capita income is usually higher in manufacturing areas than in areas where income is derived from other sources¹. This condition is likely to enhance further the locational advantages of Ibadan in respect of comparative market potential.

Spatial cost differentials and comparative general accessibility favour Ibadan more than any other alternative locations in Western Nigeria. Spatial variation in the unit cost of electricity places Ibadan only next to Ikeja in terms of cheapness, while the degree of general accessibility shows a concentration around Ibadan. As a locational factor in manufacturing, electricity supply varies in importance from industry to industry. With the complete absence of heavy industries in Ibadan, there is no power oriented industry in the city. The influence of power as a locational attraction lies in the comparative low cost advantage enjoyed by industries locating in the city. With regards to general accessibility, a considerable proportion of manufacturing is usually concentrated in areas having "maximum accessibility to regional and national markets"². Accessibility advantage in Ibadan is therefore a factor in the concentration of industries in the city.

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- ^{Williard}
 1. E. A. Miller, A geography of manufacturing, Prentice - Hall, Inc. Englewood Cliffs, N.J., 1962 page 6.
- ^{Williard}
 2. E. A. Miller, op. cit. page 5.

A remarkable spatial variation exists in the structure of factor costs of the industries studied. It is significant to emphasize that transport and raw material costs show the widest spatial variation and these have therefore been labelled as the principal factor to be considered when making location/decisions. This conclusion is in keeping with Chisholm's assertion that if any factor of production exhibits a wide spatial variation in costs, it will influence manufacturers in the decision on where to locate³.

It is also shown that labour costs account for the highest percentage of total production costs but that the degree of spatial variation in these costs from one town to another is relatively low when compared with those of other factors such as power, raw material and transport. The effect of this is that the pull potential of labour costs on industries locating in Ibadan is not as great as that of other factors with wider differences in spatial costs. This is so because such factors do not contribute immensely to regional advantage or disadvantage. And it is well known that "if the price of the major item of cost does not vary with location, it will have no effect upon the decision where to locate"⁴. Sokolski also made the point that no industry has been attracted to Nigeria specifically because of the factor of labour⁵.

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3. M. Chisholm, Geography and Economics, G. Bell & Sons Ltd., London 1966, page 36.
 4. M. Chisholm, Geography and Economics, *op. cit.*, page 56.
 5. A. Sokolski, op. cit., page 230.

The significance of transport costs in the location of industries in Ibadan varies from industry to industry. It has been very high in the location of the Soft Drinks Industry in Ibadan. The products of this industry become progressively more fragile, more cumbersome to pack and handle, more valuable in relation to bulk and are differentiated into more types and sizes after manufacture. The market orientation of the industry is a device for minimising transport costs on the distribution of the finished products since the location of the plant outside its major market will lead to rapidly rising transport costs. Thus, according to Chinitz, as transport costs rise relative to other costs, producers seek ways of avoiding transport costs by locating closer to the market⁶.

That the least cost location is not necessarily the least transport cost location is supported by the findings in the furniture industry. Results of cost calculations in this industry show that while Ibadan is not the least transport cost location, it is nevertheless, the least cost location for the industry. For all industries using imported raw materials in their manufacturing process, a coastal location is better than an interior location with regards to transport cost because of the extra cost incurred in transporting the raw materials to interior locations. But, in cases where the industry pro-

6. B. Chinitz, Freight and the Metropolis, Harvard University Press, Cambridge Massachusetts, 1960, page 118.

duces products, the weight of which exceeds total weight of the imported raw materials⁷, an orientation to the main market for such products gives the manufacturer the opportunity to reduce distribution costs⁸. The transport cost advantage of Mushin, the alternative location for the furniture industry is not sufficiently large to overshadow the processing and raw material cost advantage of Ibadan. Thus, Ibadan which suffers transport cost disadvantage qualifies as the least cost location for the furniture industry when processing and raw material cost advantage is substituted for its transport cost disadvantage.

Transport cost is significant in the location of the fruit processing industry in Ibadan. The location of the Tella Fruit Juice Factory and the Lafia Canning Factory in Ibadan upholds ^{the} hypothesis that transport cost advantage constitutes an important factor in the location of this factory. The Tella Fruit Juice Factory had a transport cost advantage of ₦169.1 over its Abeokuta counterpart between 1965 and 1966. When the substitution of production factors was considered, it was found that Ibadan still had a net transport cost advantage over this alternative location. Thus Ibadan is the least transport cost location as well as the least aggregate cost location for the fruit canning industry. This advantage of Ibadan is not far to seek. The population centre in which production takes place incurs less trans-

^{Williard}
7. F. A. Miller, op. cit., page 6.

8. E. Chalesworth, "A local example of the factors influencing industrial location", Geographical Journal, vol. 61, 1938, page 540.

port costs. Ibadan with a population of over one million people and a high proportion of wage earners have a greater effective demand for canned fruits and orange squash than Abeokuta whose per capita income is relatively smaller. On the question of transport costs on the collection of raw materials, any advantage that another location might have through not having to pay transport charges on raw materials produced close by would be out-weighted by the disadvantages arising from higher transport charges on the finished products. Although a location close to the sources of fruit supply may have its advantages, in general, closeness to raw materials does not make a serious reduction in the advantages of siting in the larger city of Ibadan.

Moreover, in addition to these measurable comparative costs, there are other advantages which make Ibadan so attractive to intending manufacturers. These include what one might call the 'Institutional Factors', such as close proximity to established business environment, recreational clubs and hotels and facilities provided by trade associations, and government incentives.

In the light of the results of this transport cost analysis presented here, it is evident that the degree of the significance of transport cost in the location of industries in Ibadan varies from industry to industry. It is important in the location of the Tella Fruit Juice Factory, the Lafia Canning Factory and the W.N.D.C. Pepsi Cola Factory, but it is not the main factor for the Steel Works Ltd.

It also becomes clear that for all industrial concerns which produce for a regional market, the locational advantages of the metropolitan area tend to be much greater than the inducements usually offered by Governments to attract industries to other centres. On the transport side, results of the comparative analysis for the furniture industry shows that transport cost advantage of alternative locations are not sufficiently large to attract away industries from a large city like Ibadan where processing cost advantages overshadow transport cost disadvantage.

In the case of the Lafia Canning Factory, the locational advantage of Ibadan is likely to be reduced when all the proposed citrus projects begin to produce fruits. Most of these, except for about 600 acres of proposed citrus plantings lie outside of the Ibadan region. Much of the acreage lies relatively close to the potentially large domestic fruit market centres. Based on the conditions just described it is doubtful if such proposed citrus production projects as it is presently planned will supply any great quantity of fruit to an Ibadan based fruit processing plant. Hauling costs and quality control problems would militate against transporting fruits to so great a distance. Having regard to the results of the analysis of transport costs in the location of industries in Ibadan as contained in this study, and to the present policy of the Government to encourage the location of industries in other parts of the region as a means of providing jobs

for the people, it is suggested that the most probable avenue of the success of such a policy lies in the improvement of transport facility, provision of cheap electricity supply and other urban amenities and perhaps most importantly, increasing the market potential of such other areas by raising the level of income of the people through Government and private investments in productive projects to offset their disadvantages in comparative locational factors. The provision of these facilities would result in better accessibility, greater speed of movement, lower freight rates on the haulage of raw materials and finished products and a general widening of markets for manufactured goods. The right type of labour which would improve the level of efficiency of production in general would also be attracted. It is the inadequacy or complete absence of these locational facilities in some parts of Western Nigeria that make such areas unattractive to manufacturers and which has hitherto been responsible for the spatial monopoly enjoyed by Ibadan in the location industries.

APPENDIX IQUESTIONS ASKEDPART I(A) GENERAL INFORMATION

Please supply all the relevant information by answering the following questions:-

- (1) What is the name of this firm?
- (2) Date of establishment:- Month Year
- (3) Address:-
- (4) Number and name of Street where the firm is located
-
- (5) What is the approximate size of the area of land covered by the firm

(B) FORM OF OWNERSHIP

Tick right the form of ownership that applies to this firm.

- (1) Sole proprietor
- (2) Partnership
- (3) Private limited company
- (4) Public limited company
- (5) Statutory Corporation
- (6) Government and Corporation
- (7) Government only

(C) SOURCE OF CAPITAL

From what source does this firm derive its capital? Please tick right and state the amount of capital in the ^{space} ~~space~~ provided

		£	₦	D
(1) Private Nigerian	=			
(2) Private non Nigerian	=			
(3) Government	=			
(4) Others (Specify)	=			
a	=			
b	=			
c	=			
Total	=			

(D) ORGANISATION OF COMPANY

- (1) Does this company operate more than one place of business?
-
- (2) If yes, where are the others?
- (a)
- (b)
- (c)
- (3) Does this company control other companies under different names?
 Yes or No..... Cross out which-
 ever is in-applicable. If yes to question 3.

- 4.1 (a) Name:-
- (b) Address
- 4.2 (a) Name
- (b) Address.
- 4.3 (a) Name
- (b) Address

(E) LABOUR SIZE: NO. OF EMPLOYEES IN CATEGORIES

TYPE OF LABOUR	NUMBER EMPLOYED
1. Professional	
2. Administrative	
3. Managerial	
4. Technicians	
5. Clerks	
6. Unskilled workers	
7. Working proprietors	
8. Unpaid family workers	
9. Others Specify	
10.	
11.	
12.	

(F) LOCATION

Tick right the most relevant factor or factors which ~~take~~^{made} you ~~to~~ decide to locate this firm in Ibadan.

- (1) Nearness to raw material
- (2) Nearness to the main market for final products
- (3) Availability of cheap labour
- (4) Availability of skilled labour
- (5) Efficient transport facility
- (6) Cheap fuel and power supply
- (7) Availability of factory site
- (8a) Government incentives: specify
- (8b) Political influence
- (8c) Which of the factors in 'F' is first in importance to you in the location of this firm in Ibadan?
-
- (9) Any other reason for locating in Ibadan not included in the list above? Specify
- (a)
- (b)
- (c)
- (d)
- (10) Did any other town occur to you when you were thinking of the establishment of this firm? Yes or No. If yes

- (11) Names of such towns:- (a).....
(b).....
(c).....
(d).....
(e).....
- (12) What advantage has your present site over those towns listed in question 11?
- (13) Having decided to locate in Ibadan, name the sites within Ibadan which occurred to you.
(a).....
(b)
- (14) Why ~~do~~^{did} you finally select the present site?
- (15) Has there been any shift of plant from your initial site? Yes or No. If yes,
- (16) Name of town where you first located
- (17) Why did you shift your business from the town named in 16 to Ibadan? i.e. state whether it is due to
(a) change in the level of production requiring a larger market

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- (b) exhaustion of raw materials
- (c) discovery of new sources of raw material
- (d) strategic nature of location relative to competitors
-
- (e) better transport facilities
- (f) Government considerations
- (g) others; specify:
- (a)
- (b)
- (c)

(18) Are you considering shifting this firm to somewhere else?
Yes or No

If yes:-

(19) To where?

(20) Give reasons

.....

.....

(21) Do you regard the present government policies to your business
as satisfactory?

Yes or No



If yes:-

- (22) In what respects
-
-

If no:-

- (23) In what respects
-
-

(24) What changes has there been during the establishment of this business in:

- (a) Marketing
-
- (b) Production methods
-
- (c) Use of raw materials
-
- (d) Quality of products
-
- (e) Transport facility
-
-

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		£	S	D
Uniform cost	=			
Provision for non return of containers	=			
Advertisement cost	=			
Hotel and travelling expenses incidental to Marketing	=			
Printing and Stationery	=			
Licence and Insurance	=			
Depreciation of trucks	=			
Others - specify	=			
1.	=			
2.	=			
3.	=			
4.	=+			
5.	=			
TOTAL	=			

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PART II(D) PROCUREMENT OF RAW MATERIAL

Description of principal raw materials, sources, quantity, cost and total transport costs incurred in the collection of raw materials.

Please fill in the table below. Give figures for 1965 only

1	2	3	4			5			6			7		
List of raw materials used in your firm	Source/ Sources of raw materials	Quantity of raw materials bought	Price per Unit £ S D			Total cost of raw materials at source to to exclude transport cost £ S D			Transport Cost per Unit £ S D			Total Transport Cost £ S D		
1							2							
3							4							
5							6							
7							8							
9							10							

(E) DISTRIBUTION OF FINISHED PRODUCTS

Please, fill in the table below. Give the figures for 1965 only.

1	2	3			4			5			6		
List of finished products	Quantity produced	Price per Unit £ S D			Total value of products £ S D			Transport cost per unit to market £ S D			Total Transport cost to markets £ S D		
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

(F) PROCESSING COSTS

Please fill in this table. Only 1965 figures are required.

1	2	3	4	5	6
Labour Cost Salaries and Wages etc. £ S D	Cost of power Electricity and others £ S D	Cost of Water £ S D	Cost of Equip- ments include depreciation maintenance etc. £ S D	Other costs £ S D	Total £ S D

(G) GENERAL

Please answer the following questions.

- (8) How much did you spend on raw materials in the year 1965? =
 £ S D.
- (9) How much did you spend to bring the raw materials to the
 factory? = £ S D.
- (10) What is the amount in money value of your finished products
 for 1965? = £ S D.
- (11) Give the weight of your manufactured products for 1965

- (12) How much did it cost you to distribute your finished products
 in 1965? = £ S D.

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APPENDIX IIPRODUCTION COSTS ON 500,000 BOTTLES OF PEPSI-COLA IN
MUSHIN AND IBADAN - AN ARITHMETIC
CALCULATION

	Ibadan			Mushin		
	£	S	D	£	S	D
1. Transport cost	1,190	=	=	1,460	=	=
2. Processing costs	8,730			11,540	=	=
Total costs	9,920	=	=	13,000	=	=
Total no. of bottles of Pepsi Cola	= 500,000			No. of bottles produced 950,000		

If Mushin produces only 500,000 bottles instead of 950,000 bottles, production costs would be as follows:

A. Since cost of production on 950,000 bottles of Pepsi Cola = £13,000.

∴ Cost of production on 500,000 bottles of pepsi cola =

$$£ \frac{13,000}{950,000} \times \frac{500,000}{1} = £9,540$$

i.e. Total cost of producing 500,000 bottles of pepsi ^{cda} in Mushin = £9,540.

B. Transport cost on 950,000 bottles = £1,460

$$∴ \text{ " " " 500,000 " } = £ \frac{£1,460}{950,000} \times \frac{500,000}{1} = \underline{\underline{£768.42}}$$

C. Processing costs on 950,000 bottles = £11,540

$$∴ \text{ " " " 500,000 " } = \frac{£11,540}{950,000} \times \frac{500,000}{1} = \underline{\underline{£607.68}}$$

$$\text{Total} = 6842.10$$

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