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ABSTRACT

This study will, it is hoped, provide a contribution to the knowledge of the industrial geography of a small third world country, Libya, by shedding light on the location and development of its industries. Particular attention has been given to the role of the government in industrial development and industrial location, and the changes which have taken place in Libya's industrial structure and problems.

The study proper begins in part one, chapter two, by examining industrial structure and location from the late Turkish period to the mid-nineteen fifties. In chapter three an attempt is made to analyse the characteristics, location and growth of the oil industry, while the main developments and changes in the industrial structure and spatial patterns from 1964 to 1971 are discussed in chapter four. The roles of the private industrialist and the government, including the latter's measures of encouragement and industrial finance, as well as its direct participation, are critically examined in chapter five.

In part two, chapter six is a geographical analysis of the nature, location and regional distribution of industrial activities as they existed in Libya in 1971. Chapter seven deals primarily with the main factors which affect present industrial location as well as the relationship between industrial location in Libya and some theories of industrial location. The areal distribution and character of industry in the main cities (Tripoli and Benghazi) has been examined very closely in chapter eight.

Finally, in part three, chapter nine deals with the main industrial problems, whilst some important indicators for the industrial future and concluding statements are presented in chapter ten.

UNIVERSITY OF DURHAM

A GEOGRAPHICAL ANALYSIS OF INDUSTRY IN LIBYA,
WITH SPECIAL REFERENCE TO INDUSTRIAL LOCATION

by

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(GRADUATE SOCIETY)

Thesis submitted for the Degree of Doctor of Philosophy

in the Faculty of Social Science

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LIST OF ABBREVIATIONS

A.I.D.C.	American Industrial Development Council
B.P.	British Petroleum
C. B.D.	Central Business District
C.B.L.	Central Bank Of Libya
D.M.O.	Devlet Malzeme Ofise
E.E.C.	European Economic Council
G.D.P.	Gross Domestic Product
F.A.O.	Food And Agriculture Organization
I.A.C.S.	Islamic Arts and Crafts School
I.B.R.D.	International Bank For Reconstruction And Development
I.D.C.	Industrial Development Corporation
I.D.C.A.S.	Industrial Development Centre for Arab States
I.L.O.	International Labour Office
I.R.C.	Industrial Research Centre
I.S.I.C.	International Standard Of Industrial Classification
K.O.C.	Kuwait Oil Company
L.A.R.	Libyan Arab Republic
N.O.C.	National Oil Corporation
N.P.C.	National Productivity Council
N.P.O.I.	National Public Organization Of Industrialization
O.E.S.	Overseas Economic Surveys
O.P.E.C.	Organization Of Petroleum Exporting Countries
P.O.E.	Public Organization Of Electricity
R.E.I.B.	Real Estate Industrial Bank
U.N.	United Nations
U.N.I.D.O.	United Nations, Industrial Development Organization

CHAPTER I

INTRODUCTION

Libya is a large country in terms of its geographical area, covering about 658,000 square miles, and consisting of two widely separated coastal strips, in the northwest and northeast, as well as a huge desert hinterland in which there are scattered oases. In 1973 it had a population of about 2,275,000 ⁽¹⁾ and the country's settlement pattern is dominated by two major cities and some satellite towns.

Until recently the Libyan economy was clearly a deficient economy. The country depended mainly upon foreign and international organizations to finance the government's development programmes. At the time of its independence in 1951, there was little hope for a viable future for Libya, due to its small population, which was poor and illiterate, and to the lack of a resource base, as Benjamin Higgins described,

"Libya combines within the borders of one country virtually all the obstacles that can be found anywhere : geographic, economic, political, sociological, technological. If Libya can be brought to a stage of sustained growth, there is hope for every country in the world." ⁽²⁾

However, since the discovery of oil, and Libya's entry into the oil market in 1962, the economy has changed from being capital-deficient to being capital-surplus. As a result of this sudden growth, a dual economy has been created, transforming the former predominantly primitive rural economy with nomadic livestock breeders and subsistence farmers. Now there is a growing market in the towns where wage earners, such as government officials, tradesmen, teachers and office workers, are developing into a new middle class. ⁽³⁾

The value of Libyan oil increased from about LD 196 millions in 1964 to about LD 921 millions in 1971, and the gross domestic product

increased from about LD 365 million to LD 1480 million in this period. (4)

Like any other developing country which has surplus capital, the Libyan government allocated about 70 percent of the revenue from oil to development plans which cover many sectors and objectives, to improve the economic and social conditions in the country and raise the standard of living. The industrial sector has been included in official policy in the development plan, and efforts have been made to develop industrial projects. In fact, the industrial sector has gained in importance in terms of its contribution to the G.D.P., increasing from about LD 11.5 million in 1964 to LD 25 million in 1971. (5) From now on, the oil revenue can provide the industrial sector with the necessary funds and infrastructure, as well as enlarge local markets.

Definition Of Industry

Industry in this study refers to all modern manufacturing activities plus the oil industry. This particular interpretation of industry was adopted by the author from the last Industrial Census which, however, does not provide information about the oil industry; that was provided by a special census. Power stations and mining activities are excluded from the study owing to the lack of statistics. In short, apart from the oil industry, the term industry is used for those industrial activities in which machines are used to change the form of raw materials into more useful products, and which employ five or more workers for this process.

The Objectives Of The Study

There are several aims in this study :

1. An examination of the bibliography reveals that little of significance has been published on Libyan industry. This being the case, it is important that a study is attempted, in order to throw some light on it, and hopefully to provide a basis for future studies of this sector. Libyan industry is underestimated by existing research.

2. The study is intended to organize available data as well as add new data.
3. It is intended to describe and examine industrialization and the role of the government in its development, as well as describe changes and trends in Libyan industry. In addition, close scrutiny is given to the location, regional distribution, classification and problems of industries.
4. It is also intended to identify and discuss the underlying factors of industrialization and the extent to which they explain the spatial pattern.

Data Sources

A. Fieldwork

Most of the data in this study are the result of two periods of fieldwork, during the summer of 1972, and the summer of 1973. The first period was spent in collecting statistical data, literature and relevant materials pertinent to the study at various government libraries and departments. During the second period, questionnaires were prepared (Appendix I.1) using stratified sampling.

It was possible to interview 62 establishments, about 18 percent of the number of establishments employing ten or more workers, as recorded in the 1971 Census. Personal visits to the establishments chosen for interview made it possible to get information which it would be difficult to get solely through correspondence. The responses of the establishments visited were helpful, and only a few refused to provide information, but even these agreed to help after reading the official letters provided by the Faculty of Arts of the University. The most serious deficiencies of data were in relation to capital and finance, and in these cases findings were based on estimates made by the respondents themselves.

Because of the difficulty of one person conducting all the interviews in a short time, ten students were chosen from the geography department of Benghazi University to help collect the information. After they had been given instructions and guidelines for gathering the answers and relevant materials, they paired up into five teams and helped the respondents to compile the data. Each two interviewed one establishment under the supervision of the author. This was to ensure that all the answers were collected with accuracy. The remaining time of the second period was spent in Tripoli and Benghazi interviewing some industrial officials and visiting government departments to look for up-to-date statistical information.

B. Other Sources

Throughout this study much official statistical data are used, but they are largely from three major sources : 1. Census and Statistical Department, Industrial Census 1964 (1965); 2. Industrial Research Centre (I.R.C.), Industrial Establishments 1971 (1972), and Industrial Census 1971 (1973); 3. National Oil Corporation (N.O.C.), Libyan Oil 1954-1971 (1973). Data from the third source were used to emphasize the characteristics of the oil industry, but data from the other censuses were used to examine the characteristics and the changes in manufacturing industries which occurred in Libya between 1964-1971.

The census materials posed some problems for the study, because both tabulation and information differed from one census to another. This difficulty was particularly acute where the distribution of industries, value added and wages were concerned. For example, the 1964 Census does not give the regional distribution of the industrial groups, and neither 1971 census publication mentions the regional distribution of value added, capital investments and wages. This census, the most recent available, and the most frequently used, was published in two forms, one in 1972, and the other in 1973,

but both lack information on many topics, which makes the study limited in many parts. In addition, their figures differ. The Industrial Establishments, 1971 is mainly geographical, giving the characteristics of each establishment and its workers, and showing the distribution among the regions and the industrial groups, as well as size and ownership.

The Industrial Census, 1971 was intended to be more detailed, but unfortunately some important information is not included, such as :

1. There is no survey of the regional distribution of workers nor of sub-industrial groups.
2. It does not cover the distribution of workers by size of establishment, within the various regions and industries.
3. In the classification of workers, there is no information about the proportion of females who are employed in industries. The regional distribution of foreign workers is also omitted.
4. In terms of value added, capital investment, production costs and wages and salaries, information is available just for the industrial groups, while regional distribution is not included, nor the characteristics for each industrial group in each region.
5. There is also no information about plot and floor areas, manpower shortages and turnover, hours of working, training, and the capital sources.

It was decided, therefore, to use Industrial Establishments, 1971, because it identifies and precisely locates every establishment, indicating its nature and workers, thus providing easily the most accurate and reliable facts available for a geographical study of industrial regional distribution. Moreover, by checking the number of establishments in Industrial Census, 1971, it was found that some establishments known to the author were not included. Therefore, only a few figures are used from this census volume, and in making comparisons, adjustments had to be made.

Variables Used

Except in few places, the number of the industrial workers and establishments are the basic indices used in measuring the location, size and importance of the industry. They have been favoured over other variables because of the availability of detailed sources, their familiarity and simplicity, and their direct relations to other geographic elements in the community. For example, a change in the number of industrial workers in the community is reflected in altered demand for housing, schools and transport services. (6) Moreover, figures for workers are perhaps most widely used today because of their common inclusion in censuses and because of their freedom from the problems of inflation or deflation associated with statistics involving money. (7) Fuchs also wrote,

"The location of manufacturing activities is described both in terms of value added by manufacture and of total employment. In a few cases the choice of variables makes a considerable difference, but most of the results are similar for both measures." (8)

For two reasons, the study will be concerned with all establishments which have more than five workers. First, the number of establishments which have more than ten workers is very small; less than 345 establishments, and some muhafadat, such as El-Kaleg Muhafada, do not have any such industries. Secondly, the 1964 Industrial Census listed all establishments which have more than five workers under the category of large industry, and when this is compared with the 1971 Census, the study will give a clear picture with the same number of workers.

Major Research Difficulties

As in many developing countries, in Libya scholars are faced by local factors that research cannot fully overcome, such as the difficulty in obtaining precise figures. Even those which are published in many forms

rarely stand up to the exacting requirements of research, either because they are insufficient or incomplete, unclear in the case of the 1971 Industrial Census, or simply inaccurate as, for example, when two different numbers are given for the same item. Consequently, most of the tables are computed by the author himself. These shortcomings are due to the weakness of the census department.

Another problem is that there is no industrial location map of any kind in the country, either in the Ministry of Industry, or in the municipalities. These problems meant that the study has tended to be restricted to features for which fairly reliable information has been obtained.

Organization Of The Study

The study is divided into three parts. In part one, chapter two is devoted to the characteristics and distributional patterns of Libyan industry from the later Turkish period to the mid-nineteen fifties. In chapter three, the geographical location and growth of the oil industry are discussed in detail. To show the impact of the oil industry on the manufacturing sector, chapter four examines the growth of manufacturing industries in Libya between 1964 and 1971, with special emphasis on the changes in structure and industrial redistribution. The government of Libya has attempted to develop the industrial sector in many ways, and chapter five deals with the attitude of the government towards industry. Industrial policies and institutions concerned with financing private and public industries are discussed, and some consideration is given to protection.

Part two concerns the recent location of industry. Chapter six describes the nature of the industry and its present form, and outlines the actual regional pattern of distribution of various groups of industries. An attempt is also made to measure the intensity of concentration of industries by quantitative methods, using the coefficients of localization

and specialization. Chapter seven examines the relation between the location pattern of industries and various factors such as market, raw materials, labour, transportation, etc, which have an important influence on the process of industrial location. Some location theories are examined to see how they relate to industrial location in Libya. In chapter eight, the pattern of industrial distribution for the major urban areas is examined in detail, as well as future industrial zones and estates.

In part three, chapter nine evaluates some of the problems and obstacles confronting industrialization in the country, while chapter ten contains a summary and concluding statements.

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PART ONE

Industrial Development

2. The Industrial Past
3. The Oil Industry
4. The Modern Evolution Of Manufacturing
5. The Government Role For Industrialization

CHAPTER 2

THE INDUSTRIAL PAST

The industrial geography of Libya is closely related to specific historical events. Each period of the recent history of the country has had a distinct effect upon the economy, and the cumulative result is a relatively early stage of development. As a result of the Turkish Empire, Libya was late in acquiring industry, and until the Italians colonized the country it was still exclusively a country of handicrafts; subsequently these suffered a substantial decline, and at the same time new types of handicrafts and modern industry began to make an appearance. This chapter shows how the industrial sector developed, and outlines its nature and geographical distribution in Libya.

1. TURKISH PERIOD, 1911

At this period the majority of the people derived their livelihood directly from agriculture and animal husbandry. Industry was mainly in the nature of handicrafts, as the major supplier of goods for sale. There was still no opportunity for modern industry, almost a century after Britain had initiated the Industrial Revolution. This is certainly true of motive power, which is considered a necessary characteristic of industry. Owing to the simple life of the people, the lack of capital and power supplies, there was little motivation. In addition, transportation was a problem with the existence of several raw materials in different places, and there was a complete lack of the skilled workforce necessary to modernize industry. Moreover, the Turkish government concerned itself only with collecting as much additional revenue as possible from its colonies, through taxes and

tariffs on imported commodities, and with exporting the main raw materials to Turkey, or selling them in foreign markets.

This policy affected many goods, and a good example is the Tobacco Monopoly which was entrusted to the concern that held the tobacco monopoly in Turkey itself, the "Regine Company". Issawi stated that this was done because of a new trade agreement made after the American Civil War which destroyed the crop, and in addition the local consumption of tobacco in Turkey was greater than in any other country because of the spread of the habit of smoking. ⁽¹⁾ Consequently, in Libya, cultivation of tobacco was permitted only in Tripoli, in order to render supervision easier and less costly, and the type of tobacco leaves required were rather specific. The cultivation was only permitted under the following conditions ⁽²⁾ :

1. To follow the instructions given by the Monopoly
2. To accept the purchase prices established by the Monopoly
3. To raise no objection to its control and enquiries
4. To produce a testimonial of honesty
5. To undertake, through a deal drawn up by the "Mudir" *,
to cultivate tobacco for the exclusive account of the Monopoly
6. To prove ownership of a suitable plot of land.

One can understand from these stipulations that the government was looking for good quality and a cheaper-priced tobacco so that it would be better appreciated in foreign markets, and that it was anxious to prevent smuggling. Another example was the monopoly in natural salt, which came from various pans scattered along the Libyan coast. The finished product was exported to Turkey and the surplus sold in

* Mudir means mayor of the region

foreign markets. Some Europeans attempted to establish a tuna fishing and canning industry, but they were deterred by the Turkish authorities who demanded high taxation.

Handicrafts were the best-organized industry in the country and some of these handicrafts reached a high mark of excellence and enjoyed a high reputation abroad. These handicrafts may have benefitted from the tariff imposed on imported articles which assured local products immunity from competition with foreign manufactured goods, and with the backward Turkish industry too. The simple products of most handicraft activities could survive despite the transportation problems, although many Libyan towns were well-placed for the major caravan trade routes.

A further advantage to local craftsmen was the establishment of the Islamic Arts and Crafts School (I.A.C.S.) in Tripoli. This school, which was created with the help of popular contributions and encouraged by the authorities, was the first institution in craftsmanship. In 1909-1910 it had about 108 students. ⁽³⁾ There is no doubt that the school did a great deal to provide young craftsmen.

THE STRUCTURE AND GENERAL DISTRIBUTION OF HANDICRAFTS

The Libyan handicrafts which were able to survive depended on local raw materials in the rural and interior areas and on local and imported ones in urban centres. Three types of raw materials were used in Libya on handicrafts : agricultural, animal and mineral. The agricultural materials were mainly esparto and palm-tree fibre produced locally. Besides imported cotton and silk, local animals provided wool and hides, and the mineral materials included local pottery and imported metal. These were used in various handicrafts, and the most important ones are discussed below.

A. TEXTILE AND WEAVING

Some textile and weaving processes were developed to provide for the local demand for clothes. Artificial silk, wool, cotton and mixtures were used, producing various kinds of articles. The type of products reflected the distribution of raw materials and the market. In the interior, where people looked for cheap articles, there were plenty of woollen goods made from local materials. The weaving of luxury and semi-luxury goods which depended on silk, cotton and fine wool, was only located in the main cities, especially Tripoli. This was partly a result of its position close to Europe; it imported silk from Italy, Chinese silk through Marseilles, and cotton and fine wool from Great Britain. Cachia estimated the yearly production of silk barracani as about 3000 pieces, worth about 5000 Turkish lira, most of which was sold in Tripolitania, and the remainder exported to Cyrenaica and Egypt. ⁽⁴⁾

Weaving was the chief handicraft and was carried on in all Libyan cities and villages, using three types of looms. The heavy hand-operated shuttle was common in the cities; Tripoli, Benghazi, Misurata and Zletin; whilst primitive vertical looms and narrow horizontal looms were widely used in rural areas, and the latter were common among the nomads.

B. LEATHER PROCESSING

Each town had some leather workers, but this craft was especially concentrated in Tripoli, Benghazi, Misurata and Derna, because these were the major livestock slaughtering towns. Finished goods, such as "Sebbat", "Belgha" and belts using low quality leather, were made for the local population. Embroidered work, which demanded good quality leather, silk and silver, was made for the tourist trade in the cities. The leatherwork in cities was mainly done by special artisans, mostly Jewish women.

C. METAL AND POTTERY-MAKING

Many metal ornaments, articles of silver, gold and copper, brass plates and jewellery, found a market amongst the tourists and the wealthy local population. The work was concentrated in the two cities, Tripoli and Benghazi, and was exclusively in the hands of the Jews. This was due to the nature of the process which depended mainly on silver imported from the U.S.A., copper from Italy, and gold from France. In both cities, silver and gold were popular because of the widespread belief that money can be treasured by buying silver and gold articles.

Libyan pottery production was concentrated in Gharian, where deposits of clay were to be found, nearly every house in the town having its own pottery. It may also be noted that this town contained many troglodyte dwellings, cut in the soft stone. Pans, jars, and other household tools, were produced, using primitive kilns fired with wood grown in the vicinity. Since it was a low-value product and susceptible to breakage when transported on rough roads, it was made for the local areas.

D. OTHER PROCESSES

There were various other rural crafts which were limited to the areas located close to the necessary raw materials, where there was the necessary 'know-how' to stimulate the craft. Misurata and Tawargha specialized in mat-making and produced many types of mats with various designs and colours. The mats were manufactured on looms with twine, wool, palm or esparto cord interwoven with stems of rush which grows in great quantities around the marshes of Tawargha oasis. Misurata specialized even more in carpets, and owing to its skilled artisans had a high reputation, not only in Libya, but in many other countries. They wove the carpets by hand, in many sizes, reproducing various characteristic geometrical and mixed

designs. Some 7000 carpets were made yearly, representing a value of about 20,000 Turkish lira, and most of these were exported to Egypt and Cyrenaica. ⁽⁵⁾ Baskets, hats, ropes and fans were made from lengths of palm fibres in many oases, in the south, especially Sebha, Murzough and Kufra.

The foregoing discussion about Libyan industry shows that it was very diversified, the types of articles being dependent on local raw materials, imported materials being used in only a few specific places. Handicrafts based on widely available materials were found in nearly every town and village. Others which were based on raw materials of limited distribution tended to be monopolized by a few centres. The importance of local materials tended to result in local specialization, some towns usually being noted for one or more specific handicrafts.

However, there were two distinct types of location. First, there was a high concentration of handicrafts in Tripoli and Benghazi cities, which had the advantage of easily available local and imported raw materials. In addition, they were major markets for luxury and cheap goods. According to the Turkish census of 1911, these two cities were the largest, with Tripoli having about 30,000, ⁽⁶⁾ and Benghazi about 16,600 inhabitants. ⁽⁷⁾ These large numbers were due to their position as the main administrative headquarters of the Turkish government. Besides being a garrison town, Tripoli was also the centre for the Ottoman Fleet, the I.A.C.S. and the commercial centre for the caravan trade. Within Tripoli, handicrafts were located in the old city, particularly the south-east part, which is now known as Sug El-Mushir, Sug El-Turk, Sug El-Sayagh and Sug El-harir, between the Libyan and Jewish quarters and the harbour. In Benghazi,

weaving, embroidery, gold and silver work were located in the centre of the old city, while blacksmiths were to be found in old Fonduk in the south of the old city. In both cities handicrafts were located near the markets where producers could sell their wares. Production was chiefly in bazaars which took the form of unseparable producer-retailer units. Although the goods produced in these centres were of high value and relatively low bulk industry, they were able to take advantage of high-priced central locations. The second type of industrial location was small towns and villages where cheap goods were made with local materials and for local consumption.

Despite these small-scale industrial developments, at the end of the nineteenth century Libya remained essentially a producer of some raw material. Industrial activities were limited mainly to those necessitated by the isolation of the population centres and to low value products. These industries or processes mentioned above were largely working in small units producing necessities for limited demands.

2. ITALIAN PERIOD, 1911-1940

During this period, industrial development in general witnessed three different features : (a) a decline in the existing handicrafts in main towns; (b) the introduction of new types of handicrafts; and (c) the beginning of modern industry.

A. DECLINE OF EXISTING HANDICRAFTS

Although the handicrafts were well-organized and provided a large number of products, adverse conditions existed in Libya which cumulatively had the effect of seriously undermining the existing handicrafts. The important causes working towards this result were :

1. The competition with more highly developed forms of industry, especially machine-made industries, whose products could easily be imported from Italy.
2. A change in taste and fashions in the towns where foreigners lived, and where western types of goods, particularly clothes and shoes, were in great demand.
3. Increased taxation on handicrafts. As we shall see, the tax exemption which was given to industry by the Italians did not include existing industrial activities.
4. A shrinking of the handicrafts market, due to the departure of the Turkish citizens.
5. New jobs, provided in the Italian army and offices, attracted many craftsmen.

It is not surprising that handicrafts declined during this period, particularly those which depended on an urban market, such as leather-processing. Handicrafts were still favoured by people in the interior because of their simple life, and the majority were still unable to afford expensive foreign products, while some areas were protected by their geographical location.

B. THE INTRODUCTION OF NEW TYPES OF HANDICRAFTS

By the end of 1938, there were about 5239 people engaged in handicrafts in the four major cities. ⁽⁸⁾ It can be seen from Table 2.1 that about 37 percent of these artisans were newcomers (Italians) who came after 1911, and about 60 percent of them were located in Tripoli. The fact that the Italians came from different cultures and were engaged in this type of activity means that new kinds of handicrafts were introduced to the country.

Table 2.1 Italian And Libyan Workers Engaged In Handicrafts
In Major Towns, 1938..

Places	Italians	Libyans *	Total
Tripoli	1161	1900	3061
Benghazi	527	700	1227
Derna	161	200	361
Misurata	90	500	590
Total	1939	3300	5239

* includes non-Italian foreigners.

Source : Bank of Libya, The Economic Research Division,
Economic Bulletin, Multi Press, Tripoli, Sept-Oct. 1970.

Table 2.2 reveals that 1939 Italians were engaged in about twelve different types of crafts. Most of them either worked at old crafts, using new techniques (e.g. iron and metal, brassware or leather), or developed new crafts (e.g. photography, decoration, nursery gardens and marblware) to serve the European community with its different requirements. There are no statistics to show the distribution of Libyans in these new types of crafts, but there is no doubt that most of them were new, brought for the first time into the country by the Italians.

Table 2.2 The Distribution Of The Italian Craftsmen Among Crafts. 1938.

Type of crafts	No.of persons engaged	%
Transport repairs	250	12.9
Tailoring and dressmaking	248	12.8
Plants and nurseries	221	11.4
Iron and metal	219	11.3
Wood	210	10.8
Leather and shoes	164	8.5
Barbers and similar	164	8.5
Paint and decoration	76	3.9
Marble and stone	53	2.7
Photography	34	1.8
Goldsmithing and watchmaking	29	1.5
Various other crafts	271	13.9
Total		100.0

Source : Bank of Libya, The Economic Research Division,
Economic Bulletin, Multi Press, Tripoli, Sept-Oct, 1970.

C. THE BEGINNING OF MODERN INDUSTRY

We now arrive at a consideration of new forms of industry which were introduced into Libya at this time. Before discussing industrial development and evaluating the industrial structure, we must take into consideration certain facts underlying the modern industry. The improvement in agriculture along the north-west parts made it the economic core of Libya. The growing Italian community increased the market potentiality, especially for manufactured goods. Italian businessmen were encouraged to establish industrial establishments by tax exemption. According to Article 4 of Law No.501, exemption was only for new establishments employing less than 100 workers, at least two-thirds of them to be Italians. (9)

Furthermore, railroads, roads and harbours were built, providing the north region with the best transportation system. Italian power stations were established for the first time in the main cities. The Banco di Roma, which opened in 1907, became an agency to increase Italian influence, and private loans were guaranteed to the Italians by the branch. Other commercial banks opened, such as the Banco di Sicilia, Banco di Napoli, Banco d'Italia and Banco di Sparmi. A large skilled labour force was available from the Italians who came with industrial 'know-how' and modern industrial machinery by Italian establishments was imported. Besides all these, there was direct government investment in industry. Industries which engaged in processing agricultural and fishing products received about 191 million Italian lira. Consumer industries such as textiles, leatherwork, printing and paper received about 37 million Italian lira. ⁽¹⁰⁾ These made an important contribution to Libyan industries in this period and were to lay the foundations of modern industrialization, particularly in the north of Tripolitania.

INDUSTRIAL STRUCTURE IN ITALIAN TIMES

Apart from the previously mentioned handicraft activities, more modern establishments producing various types of manufactured goods were established in this period. Unfortunately, there is no record of the way the 789 establishments were distributed amongst the industrial categories. The only information found shows the distribution of Italian establishments among the different industrial groups (Table 2.3). It is apparent that the Italians held the control of industry, owning about 81 percent of all the establishments. They manufactured products for the local markets from local raw materials. Table 2.3 shows that the outstanding modern industry was the building materials group. This industry accounted for about half of the total number of Italian establishments,

Table 2.3 Distribution Of Italian Establishments Among Industrial
Groups In 1938.

Industrial groups	No.of establishments	%
Agriculture and foodstuffs	70	11.0
Industries related to fishing	33	5.2
Paper and printing	12	1.9
Wood	40	6.3
Chemicals	25	3.9
Building materials and work related	321	50.2
Metal work and transport equipment	91	14.2
Miscellaneous	47	7.3
Total	639	100.0

Source : Bank of Libya, The Economic Research Division,
Economic Bulletin, Multi Press, Tripoli, Sept-Oct, 1970.

and was largely due to the economic situation in which there was heavy Italian investment in construction, building and infrastructure for settlement. These establishments included the production of red bricks and cement blocks as well as flint and limestone quarries.

Agriculture and foodstuffs formed the third largest share of Italian industry in Libya. Olive oil processing was the major industry in this group, accounting for more than half of the total number of establishments. Other establishments produced beer, wine, macaroni, flour, tobacco, soft drinks, ice, bread and castor oil. The metal work and the transport and electricity groups were other important industries. The growth of these industries was due to the increased numbers of Italians using modern machinery. The fishing industry was also one of the main industries, with many establishments located along the coast. The industry became mechanized, and Italian-owned motor-driven fishing boats with greater range and better equipment made their appearance. This can be attributed to the wealth of tuna and sardines in the Libyan coastal waters. Other industries with sizeable Italian investment were confined to a few establishments, particularly for printing, and chemicals

such as gas, soap, gunpowder, candles and bitumen products. In some of these industries Italian investment was confined entirely to one or two establishments.

INDUSTRIAL LOCATION IN ITALIAN TIMES

A large number of establishments making basic items for local consumption were operating in various places by the end of the 1930s. Table 2.4 illustrates the distribution of 789 establishments which were recorded by the 1938 industrial and commercial census. It reveals that

Table 2.4 The Distribution Of Modern Establishments, 1938.

Places	Italian [*]	Libyan	Total	%
Tripoli	414	135	549	69.6
Benghazi	137	-	137	17.4
Derna	66	-	66	8.3
Misurata	22	15	37	4.7
Total	639	150	789	100.0

^{*} Includes non-Italian foreigners

Source : Bank of Libya, The Economic Research Division,
Economic Bulletin, Multi Press, Tripoli, Sept-Oct. 1970.

the locations of modern industries were in four cities : Tripoli, Benghazi, Derna and Misurata. Tripoli shows a high concentration of modern industry; it had over two-thirds of the total number, more than four times as many establishments as any other city. This was due to its increasing politico-economic importance, and the expansion of the market. Tripoli served as a major administrative and commercial centre and was centrally located with good rail links with the Jeffra plain and easy access to Italy. Establishment in this location could minimize transportation costs for both imported and local raw materials. Tripoli attracted most of the industrialists who had acquired their industrial investment capital through local commercial activities.

Furthermore, Tripoli was the largest city and it had the largest population growth, partly due to immigration of the Italians who, by 1942, numbered about 140,000 throughout the country, 70 percent of whom were in Tripolitania. (11) There was a greater percentage of European immigrants in the north-west than any other region, and there they formed part of an active aggressive business community. More than two-thirds of Tripoli's establishments were Italian-owned and 90 percent of the Italian establishments were in Tripolitania. In contrast, industry in Benghazi and Derna was mainly Libyan-owned because the Italians never settled in large numbers in Cyrenaica.

Within Tripoli, industry was located in three areas, (12) each with a different character.

1. the north-west of the city, between the old town and the municipal stadium, contained light industries such as tobacco, soft drink, fish canning, printing and some building materials. This area developed apart from the residential area, but close to the harbour, where it is easier to handle imported raw materials.
2. South Tripoli, south of the Moslem Cemetery, contained mechanical engineering and chemical industries, textiles, a tannery and the shoe industry. The low density of population and the extent of undeveloped land were the main reasons for location in this area.
3. The south-east of the city, at the Ben-Gashir gate, contained agricultural industries such as olive oil, flour milling, and the paper industry. The location had excellent links with the markets in the city and with the raw materials from the Jeffra plain. The Birra Oea establishment, on the other hand, was located in Dahra, north-east of the city, and its stores were located in the centre close to the market.

Within Benghazi three areas also can be distinguished :

1. An area south of the old city and north of Sidi-Hussein, between Salmani Sebka and west of the interior lake, contained food industries like flour, soft drink, macaroni, and also printing and textiles. This location had access to the railway station which connected the city with the rural surroundings and it was near the old city market and the harbour.
2. Sidi Hussein and Berka area, contained beer, ice, macaroni and soft drink industries, and had the advantage of a central situation on the main south road connecting the north and the south of the city. It was also near the Italian army headquarters and camps and the Berka local market.
3. South of the city Fuwehat contained the noisy industries such as tanning and building materials because of :
 - (a) the availability of raw materials like limestone
 - (b) the noxious odours from the tannery and the dust from building materials, and
 - (c) the availability of cheap land.

The industrial situation during the Italian period may be summarized by the fact that about four-fifths of the total number of establishments were small, with limited and out-of-date equipment in the case of the Libyans. Tripoli was the major industrial centre and the industry that did exist was largely Italian-owned.

Before leaving this section it should be noted that the development of modern industry during this period by the Italians was due to colonial motives and for the settlement of Italian families in Libya. The industry largely owed its origin to foreigners and was characterized by foreign investments, workers and ownership.

3. PERIOD FROM 1940 - 1956

The Second World War inflicted its greatest damage on the built-up areas, and as a result a large number of establishments were completely destroyed. Moreover, the Italian businessmen and the Jews emigrated, transferring their capital to Italy. The Italian commercial banks closed down except for the Banco di Roma. The political situation was unstable because the British and French occupation was transitory; hence their policy was based on care and maintenance, the aim of which was to enforce the laws and methods of the previous Italian Administration, with the exception of the Fascist and racial laws. ⁽¹³⁾ Besides this, droughts occurred in 1947, 1948 and 1949 which caused low demand in the markets.

However, in spite of this, some establishments remained in operation; those which had not been damaged or destroyed. The Foreign Office estimated that the number of establishments which remained in operation was over 100. ⁽¹⁴⁾ These included fish canning, tobacco, olive processing, macaroni, beer, soft drinks and textiles.

Industry was still under foreign control except in a few cases where Libyans had opportunity to take over some establishments after the evacuation of the Italians. There were no changes in location because this would have involved the construction of new buildings, and this was a difficult time as capital was in short supply.

In 1951 Libya was incorporated into a newly created independent state, but up to 1956 it remained an industrially backward area. This can be attributed to a variety of factors :

1. Lack of finance was a stumbling block to economic development.

The main problem of industrialization during this period was the shortage of capital as domestic saving power was very limited. Establishments depended upon their founders alone for their capital. Until 1963, except in a few cases, the capital invested was individually owned. Moreover, international loans and assistance were for other priority areas, and there was no foreign investment source available for industry owing to the economic situation of the country. Even when capital was available, there was preference for other sectors rather than industry. The mission of I.B.R.D. stated in their reports about the Libyan economy that :

"what has been holding back capital from investment in industry is rather limited opportunities for the establishments to exploit the opportunities that exist, and the feeling that present-day industry is rather precariously based on a market which depends heavily on income generated by outside forces through foreign aid military expenditure." (15)

2. There was an absence of planned industrial development and of experience in this field.
3. The Tariff Law No.19 of 1954 introduced a duty as low as 5 percent on most imports ⁽¹⁶⁾ and no tariff for all articles imported by American and British armies, so that many establishments closed down because of sharp foreign competition.
4. Some taxes were imposed on certain industries while there was no duty on the same commodities imported from abroad (such as beer), while the tax was the same for industry and commerce, viz. 10 percent.
5. The political division of the country into three provinces, each one with its own system of rules, was another deterrent for industrialization.

For these reasons, and the lack of skilled labour, raw materials and power, there was little hope for fast industrial development without government help. Although the government faced economic backwardness, this does not mean that it neglected industrial development completely during this period. The government showed great interest in developing industry by supporting the industrial sector with technical assistance, and by providing two training centres, with United Nations' assistance, in Tripoli and Benghazi. It also established three printing establishments in Tripoli, Benghazi and Sebha, and it took over the monopolies on the salt and tobacco processing. With aid from F.A.O. and the Netherlands government it established a date-processing factory, the first one which was established with United Nations and United States help. However, the situation was such as to attract only a relatively small number of establishments, only few entrepreneurs wishing to be involved in the industrial sector.

The I.B.R.D. report estimated that :

"Of the 3121 enterprises registered in the 1956 Census of employment and production, 87 percent employed less than 10 workers and 25 units more than 50 on an all-the-year-round basis". (17)

This reveals the backwardness of the industrial sector which still used largely traditional processes in small units. Food, textiles, wood, building materials and footwear were still the main industrial groups, as is estimated by the report :

"In terms of the value of output, about 50 percent of industrial production refers to food, beverage and tobacco products, 10 percent to textiles, clothing and footwear, another 10 percent to housing materials and furniture, and 30 percent to a variety of products and services which are largely based on imported materials." (18)

As far as location is concerned, Table 2.5 indicates that in 1956 nearly all industrial establishments were concentrated in Tripoli and Benghazi. They accounted for 77 percent of the total number of establish-

ments and for 90 percent of the total industrial workers. Tripoli by itself had more than half of the total of establishments and more than three-quarters of the workers.

Table 2.5 Industrial location, 1956.

Place	Establishment		Workers	
	Total	%	Total	%
Tripoli	1773	57	11,493	79
Benghazi	628	20	1,631	11
Other urban areas	720	23	1,380	10
Total Libya	3121	100	14,504	100

Source : International Bank for Reconstruction and Development, The Economic Development of Libya, John Hopkins Press, Baltimore, 1960, p. 437.

Besides the availability of facilities mentioned earlier, Tripoli, with the adjoining settlement areas, had an aggregate population of 250,000 and provided the largest single market in the country. The establishment of the U.S. Air Force Base at Wheelus, near Tripoli, and the sizeable foreign community, added a demand for manufactured goods. Purchasing power in Tripoli may well have accounted for nearly half of the total expendable income in the country, and it would appear that the bulk of the goods manufactured there were consumed within the city and its adjoining areas. (19)

However, some of the establishments located outside these two cities were justified by the importance of local raw material. This applies in the case of some establishments for tomato canning, fish canning, date and olive processing, and stone and marble cutting. Therefore, industrial location in 1956 was mainly due to the pattern of available resources and markets.

Consequently, in spite of the fact that before 1963 there was no systematic national development programme of the industrial sector, or other sectors, by 1959, the year of the great oil discoveries, some significant progress had been registered. Therefore, before studying this progress after 1964, it may be important to study first the development of the oil industry.

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CHAPTER 3

THE OIL INDUSTRY

This chapter discusses the geographical aspects of the oil industry including the industry's growth and location and Libya's position in the international oil industry. The study excludes all economic aspects such as prices and the oil revenue.

1. THE DEVELOPMENT OF THE OIL INDUSTRY

A. PRE EXPORTATION

The first indication of the presence of Libyan oil was the appearance of gas in 1914 in a well at Sidi El-Misri in Tripoli, at a depth of 160 metres ⁽¹⁾. The same thing happened at Zletin in 1928 and at Tajora in 1934. Traces of oil were discovered in 1937 at Mallaha, near Tripoli, at the bottom of a well 259 metres deep. ⁽²⁾ In the years immediately preceding World War II, vague studies with a view to confirming the presence of the precious mineral were made in the light of the very modest knowledge and means available. The eyes of the international oil companies were only focussed on the large area of North Africa in the 1950s when oil had been struck in large quantities elsewhere in the Middle East.

The oil industry in Libya started with the passing of Law No.25 in 1955, ⁽³⁾ which served to attract the international companies. The first companies which received permits to prospect in Libya were Esso Standard, Anglo-Saxon Petroleum, Mobil Oil, American Overseas, Oasis Oil, Nelson Bunker Hunt, Compagnie Francaise des Petroles, D'Arcy Exploration and American Oil Company. ⁽⁴⁾

Consequently, by the end of 1958, about 20 companies of various nationalities had obtained licences for exploring in different parts of the country. By 1960, these companies had obtained about eighty-two concessions, about 65 percent of the total area of the country. On 20th January of 1958 the first productive well, No. B2-1 in concession No.1 in the fourth petroleum zone, was discovered, and it was named Al-Atshan. It inaugurated the second stage of the history of the oil industry in Libya.

B. EXPLORATION AND DEVELOPMENT

Even though Libya has held its prominent position in the world of petroleum only since the sixties, oil was discovered earlier in many places. In July 1958, Oasis Company discovered the Bahi wells which produced 800 barrels a day from a depth of 1700 metres. In June 1959, the Esso Standard Company discovered a large field at Zelten which produced oil from a depth of 5500 feet at a rate of 17,500 barrels a day. In August of the same year, at a point a few kilometres from the first, a field producing oil at a rate of 1500 barrels a day from a depth of 5770 feet was discovered. ⁽⁵⁾ The Zelten field lies about 150 kilometres from the Mediterranean Sea Coast and about 400 kilometres from Benghazi.

After that almost every month brought news of further discoveries, because the companies had a special incentive to press on as fast as they could, the surrender clause in the 1955 Law undoubtedly stimulating not only rapid exploitation but also a fragmentation of concessions almost unknown in the more traditional oil-producing areas of the Middle East. Concessionaires were expected to surrender one-quarter of their concession blocks at the end of five years, a further quarter after eight years, and within ten years concessions in the two northern zones of the country had

to be further reduced to one-third of their original size, and those in the two southern zones to one-quarter, surrendered areas were awarded again. (6)

By mid-1962 much field geology had been accomplished. Prior to launching intensive geophysical programmes, gravity and ground magnetometer surveys were begun, and a great part of the country was surveyed by aerial photography, and by that time there were 46 drilling rigs operating in Libya. Production and exporting began in 1961-1962, and records show that about 73.7 million barrels were produced, mainly from three fields, Zelten, Raguba and Dahra, and about 71.7 million barrels were exported from Marsa El-Brega.

After the early sixties the oil industry in Libya witnessed important institutional and statutory developments, especially during 1965-1966 due to two factors :

1. The announcement on 28th May 1965, inviting new companies and those already operating in Libya to submit applications for obtaining new concessions in areas relinquished by oil companies already operating in the country.
2. The decree of 20th November 1965 introducing certain amendments to the Libyan petroleum Law No.25 of 1955.

These two factors, with others which will be discussed later, played an important part in developing the oil industry. The result was that on 20th February 1966 the government gave awards to 49 companies, including 15 new companies. A total of 41 concessions were obtained, covering a total area of 193,000 sq. kms. Thus, taking into account the fact that certain oil companies had surrendered some parts of their previous concessions during this period, the total area covered by both the old and the new concessions, which numbered 95, went up to 572,000 sq. kms. In 1967 the total number of concessions reached about 136, including an area of about 597,475 sq.kms, owned by about 32 companies.

Some of these companies discovered oil in their concessions, but others were unsuccessful. In 1969 the principle of partnership in the oil industry became operative, with the agreement of the French ERAP group, and later three more agreements were signed. These agreements were with the Agip company, covering an area of 20,000 sq.kms. Ashland Oil and the Refining Company of Kentucky with an area of 7,500 sq.kms, and Sirtica Shell Exploration with five concessions covering 20 sq.kms. ⁽⁷⁾ By 1972 Libya was covered by 167 concessions, owned by 20 companies besides the National Oil Corporation (N.O.C.) which owned the majority of these concessions (Figure 3.1 oversize, see pocket of the thesis) and Appendix 3.1.

C. THE NATIONAL OIL CORPORATION (N.O.C.)

The National Oil Corporation was established in March 1970, replacing the General Libyan Petroleum Corporation (LIPETCO) which was established in 1968. The jurisdiction of the Corporation was extended in order to increase its effectiveness to include all steps of the oil industry, from the stages of exploration and production, to the subsequent stages of transport, marketing and industrialization. It also included the task of managing and operating companies dealing in the importation, sales and distribution of oil products in the country. ⁽⁸⁾ It worked towards its objectives either directly, or through joint-venture agreements, with others.

However, in the area of exploration and production, the N.O.C. in 1972 owned outright 75 concessions accounting for 42.6 percent of all concessions, and 13.6 percent were owned in association with the Aquitaine, Agip and Sertica Shell companies. These concession areas were transferred to the corporation after the companies had relinquished them due to the decree of 1965. Table 3.1 reveals that the corporation operated by itself in an area of about 234,000 sq.kms, about 76 percent

Table 3.1 The Distribution Of The N.O.C. And Associated CompaniesConcessions, 1972.

Owner	No. concessions	No. of Zone	Total area in sq. kms.
N.O.C.	23	1	73,947
N.O.C.	24	2	40,638
N.O.C.	5	3	15,800
N.O.C.	23	4	102,797
Total	75	-	233,182
N.O.C./Aquitaine	13	2	30,346
N.O.C./Agip	6	2-3	20,017
N.O.C./Sirtica Shell	5	2	19,964
Total	24	-	70,327
Overall Total	99	-	303,509

Source : N.O.C. Information, Facts and Statistics, Tripoli, 1973.

of it in the western part of the country (Zones 1 and 4), while the associated areas covered about 70,000 sq.kms, most of it concentrated in Zone 2. This may be explained by the fact that most of the companies withdrew from their concessions in the western part of the country owing to the low quantity of oil discovered there, and the high cost of exploration, production and transport.

In the areas of production, it is currently producing oil from the Um El-Froud oilfield at an average rate of 4000 barrels a day. This oilfield lies within the Sirte Basin and was discovered by the Phillips Company and surrendered to the N.O.C. in 1971. The product is transported through Mobil Oil pipelines, exported by the Ras-Lanuf terminals, and marketed by the N.O.C. itself. The other main activities of the corporation are the oil refineries, and Lubricating Oil factory in El-Zawia, and the petro-chemical complex, as we shall see later.

2. THE LOCATION OF THE OIL

A. LOCATION OF FIELDS AND WELLS

According to the Law of 1955, Libya was divided into four zones and each one was divided into many concessions (see Figure 3.1). Zone 1 covers the whole of the north-western part of the country, north of latitude 28° and between 18.5° E and 12.5° E longitude. Zone 2 covers all the north-eastern part, east of longitude 18.5° E and north of latitude 28° N. Zone 3 covers all the south-eastern part, south of latitude 28° N and east of longitude 18.5° E, while Zone 4 covers the rest of the country. In these zones operations started almost immediately after the granting of concessions, while exploration has mainly been carried on since 1958. By 1972, Zone 2 was the chief zone, and contained 85 concessions, covering most of its land, while nine of them covered all or part of the shore area. Zone 1 contained 51 concessions, more than half of them concentrated in the Sirte Basin. The south zones (3 and 4) contained fewer concessions, Zone 4 contained 27, concentrated mainly west of Hamada El-Hamra and the Murzough Basin, and Zone 3 contained 13 concessions concentrated in El-Sarir and the Sirte Basin.

It will be seen from Table 3.2 that the location of the oil has been concentrated in the two northern zones. These two zones have about 88 percent of all the oilfields and about 91 percent of all the producer wells in the country. Zone 2 is the major location area for oil, accounting for more than half of the fields and more than two-thirds of the producer wells. Moreover, Figure 3.1 shows that Zone 2 has important fields like Intisar A.G.O., with a production of 510,627 b/d, Zelten with 314,405 b/d, Nafoora and Augila with 237,113 b/d, Amal with 163,520 b/d, Samah with 51,186 b/d, Gebel with 18,151, Ora with 15,336, Beda with 7,752, Raguba with

Table 3.2 Number Of Oil Wells And Fields Discovered Up To 1971.

Year	Oil Wells				Oil Fields			
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 1	Zone 2	Zone 3	Zone 4
1958	-	-	-	-	1	-	-	2
1959	2	4	-	-	4	5	-	-
1960	26	15	-	-	3	2	-	-
1961	56	42	-	-	11	3	2	1
1962	27	52	5	-	7	17	-	-
1963	53	70	10	-	5	5	2	-
1964	47	149	17	-	4	11	1	2
1965	42	114	36	3	3	7	-	1
1966	2	116	23	-	-	4	1	-
1967	4	101	5	-	1	6	1	-
1968	-	80	7	-	-	6	-	-
1969	14	146	14	-	-	4	-	-
1970	27	127	11	-	-	3	-	-
1971	3	6	-	-	1	3	2	-
Total	303	1022	128	3	40	76	9	6

Source : N.O.C., Libyan Oil, 1954-1971, Tripoli, 1973.

3,000, Zaggut with 2,492 b/d. In Zone 2 also are located the major concessions. For example, concession No. 59 is the major concession, according to the number of its fields, which include Waha, Zaggut, Samah, Defa, Bel-Hedan and Gialo. It is the highest producer of all concessions in the country, averaging about 687,412 b/d, followed by concession No. 103, which averages about 570,627 b/d. In Zone 1 are located Bahi (103,079 b/d), Dahra (35,495 b/d), and El-Hofra (7,899 b/d). Zone 3 contains the El-Sarir field (424,553 b/d), while in Zone 4 are located the less important fields like the Al-Atshan field in the south-west, close to the Algerian-Libyan border.

Most of the concession areas are smaller in the northern zones, especially in the Sirte Basin, than in the southern zones. This may be because the companies concentrated their activities around the Sirte Basin (due to early forecasts of the probability of oil), and because of the early discovery of Zelten field in this area. Besides being close to the coast, the Sirte Basin has the advantage of being free from expanses of sand dunes, the more common topographical features being large stretches of flat rough sand, gravel pavements, salt flats and small mesas. ⁽⁹⁾ Transportation in this area has presented fewer difficulties than in most of the Libyan desert. These factors reduce the total investment for exploration and production. Transportation through the desert is very costly, especially if the field production is not in great quantity, as in the Al-Atshan field which was discovered early by Esso Company but has not yet been exploited for this reason. Thus the major location for the oil industry in Libya in terms of production fields and wells is concentrated in the Sirte Basin, south of the Gulf of Sirte, and extends between longitude 17° - 22.5° east and latitude 30° - 27.5° north.

B. LOCATION OF THE PIPELINE SYSTEM

Before it can be exported, the oil has to be carried through pipelines across the desert to the terminals, and loaded into tankers to be transported to the world markets.

As far as the first operation is concerned, this study will neglect the small pipelines which connect the wells with the field, and will be concerned only with the main pipelines. All the Libyan fields are inland fields, connected with the terminals by pipelines carrying crude oil to the shipping point. Fortunately, the oil

does not need a large number of pumping stations to move it to the shore. The exception to this is the oil from El-Sarir field which needs pumping to make it flow, because the crude oil is very waxy. There is also a useful clause in the oil law which allows one company to share another's pipelines and terminals if the capacity is available.

Figure 3.1 shows that the hinterland of the country is covered by a network of oil and gas pipelines flowing in many directions. There are five routes for crude oil destined to be exported, and every route has a group of pipelines (Appendices 3.2 and 3.3). About 4474.7 kms of pipelines carry the oil and gas to five points :

1. The Esso group constructed the first pipeline in Libya, a 173 km long, 36 inch line from Zelten to Marsa El-Brega, connected with the 87 km long, 20 inch line from Raguba. This group has the shortest distance of pipelines due to the proximity of the nearest terminal to its fields.
2. Oasis group has second place with 23.5 percent of the total pipeline length, connecting Gialo, Waha, Samah and Dahra with the El-Sidra terminals. About 423 km of Oasis lines go into concession 59, passing within 30 km of Esso's line from the Gebel field.
3. Amoseas, Mobil and Aquitaine have the longest distance of pipelines, about 25 percent of the total, connecting fields such as Amal, Beda, Nafoora, Khuff, etc. with the Ras-Lanuf terminal. This group has two long pipelines, one coming from Amal in the east and the other from Beda in the south.
4. The Occidental group has a short-cut pipeline from Intisar and Augila to the Zuwaytinah terminal.

5. Arab Gulf (B.P.) has the longest single line flowing from the El-Sarir field to Marsa El-Hariga, about 513 km. The quality of the El-Sarir oil suggested that a pipeline to Tobruk was most suitable, as since the harbour in Sirte Gulf is shallow, the pipeline would have to flow under the sea to reach the tanker berths, and this might have reduced the flow of the El-Sarir oil. So Marsa El-Hariga, with its deeper harbour, was considered more suitable for transporting the El-Sarir oil.

The Libyan pipeline pattern now has pipelines running from the Amal and Nafoora fields to Ras-Lanuf right across the Esso and Occidental pipeline system. The Zaggut pipeline runs across the Raguba pipelines and the Khuff, Dor and Beda ones across Samah ones. This large number of pipelines was due to the policy of the producing companies, which have separate terminals and pipelines. Their fields were not located close together; for example, Gialo is located in the east of the oil area, while Beda, owned by the same company, is a long distance away in the south of the area. Moreover, some fields were linked by pipelines before others; for instance, Waha was linked with Samah before Zaggut was connected with El-Sidra terminal.

Furthermore, the other possible explanation for the complexity of the pipeline network is that the government did not have any control over the companies, and in an indirect way encouraged this system. The distribution of the pipelines and terminals has been in line with government policy. It is an open secret that the distribution of the oil terminals in the country was in the past greatly influenced by political and economic considerations, especially before 1964. During the establishment of the first three terminals in the Sirte Gulf, Libya was divided into three provinces, each one having its

own local government besides the federal government. The location of terminals in a province would greatly benefit the province by giving greater opportunity for labour, taxes and customs, beside indirect benefit which would result, such as the building of roads. The provincial authority may have been behind the scheme when the first terminal was located in Cyrenaica. The second and third terminals, whose oil comes from Cyrenaica, were located in Tripolitania. The federal government was probably behind this to avoid the concentration of terminals in just one province.

This system involves some pipelines which are small in diameter and so increase transportation costs. In order to allow the oil to move much faster, large, rather than small, pipelines are needed, and the larger the diameter of the pipeline, the lower is the unit cost of optimum capacity, due to the fact that the cost of building and operating a pipeline does not increase in proportion to its diameter. (10) Moreover, in order to run and operate these lines at full capacity and less expense in the future, when the oil production rate will decrease, such a large number of pipelines may prove uneconomical. The companies will then have to abandon some of them and modify the system by constructing new ones. This may make the transportation of oil much more complicated, if we compare it with Kuwait, for example, where the transportation of the oil is a fairly simple process, as crude oil only has to travel from the fields to two tank farms.

The large number of separate pipelines in Libya is not economic, and it would be better to have fewer pipelines than this if the pipelines could be integrated. In Nigeria, for example, the Shell-B.P., Safrap, Agip and Phillips companies combine their fields with an integrated pipeline, the trans-Niger pipeline. In terms of exploration and production it is true that Libya has the advantage of not having its

industry monopolized by one company, and having instead many companies. But this advantage has its own drawbacks, among the most visible ones being the fact that there had to be added investment for laying separate pipelines for every company, rather than saving time and money by having fewer pipelines, as they would do if there were fewer companies.

C. LOCATION OF TERMINALS

Loading the oil at the terminal is the second operation in the system of crude oil transportation. The terminal point offers a coastal outlet for the crude oil and gas, through which it reaches the world markets for further utilization in various fields. It must be kept in mind also that the location of the terminals should be as close to the oilfields as possible to avoid the cost of additional pipelines between the oilfields and the terminal. The terminals, then, should be on the Gulf of Sirte. But, in spite of the advantage of its 700 km long shore, the Gulf does not provide certain conditions which are required for establishing terminals, such as sheltered deep water at the shore, a small harbour for the launches which guide and service the tankers, and a high ridge above sea level to make the oil flow naturally from the tanks to the shipping points by force of gravity, without the application of any pumping methods.

The Gulf of Sirte has no inlets or any kind of bays of a sufficient depth to enable tankers to reach the shore. Offshore it is also shallow for more than a kilometre and the coast is, in general, a sandy lowland containing stretches of long and high loose sand-dunes. The Gulf is also open to the strong winds which blow throughout the winter and have their effect on the Gulf. The

Ghibli winds blow during the spring with particular intensity in the Gulf and carry heavy loads of dust, making visibility very difficult. During the winter the northerly prevailing wind brings storms and increases the wave swells towards the south-east of the Gulf. (11)

When establishing new terminals, the companies had to take account of these geographical obstacles. Terminals situated in a shallow water area must be created either by dredging or by building a jetty towards the deep water, or by constructing berths in the deep water. To solve this problem of reaching deep water, the companies in the Gulf of Sirte preferred the third proposal, a submarine loading berth, with a system of several mooring buoys, but even this is costly to run because of the number needed, and the length of pipeline required to connect them to the shore, besides the amount of time which can be lost through berthing problems during bad weather. But it is simpler to instal than the other proposals, and more practical when only one company is involved.

Libya has now a unique situation amongst the producing countries in having five oil terminals. It is the first country to have this number in twelve years, all located on one sea coast, four of them being situated within 300 km of each other on the coast of the Gulf of Sirte. The fifth one is located in the eastern part of the country at Marsa El-Hariga in Bomba Gulf. A study of their locations and a comparison between them is given below.

1. THE FIVE TERMINALS

(1) Marsa El-Brega is located in the south-east part of the Gulf of Sirte, about 240 kilometres from Benghazi (see Table 3.3), at 30.25° N and 19.35° E. After the company discovered a large field in Zelten they started to look for various sites. Marsa El-Brega was

Table 3.3

Oil Terminals located in Libya, 1971.

Terminal	Location	date of shipments	No. of shipments	Total shipments in barrels
1. Marsa El-Brega	South-east of Sirte Gulf, east of Tripoli; 240 kms south-west Benghazi; 70 kms west Ajdabia	12 Sept 1961	362	159,798,152
2. El-Sidra	Sirte Gulf, 680 kms east of Tripoli, 370 kms south-west of Benghazi	1 June 1962	808	302,057,341
2. Ras-Lanuf	Sirte Gulf, 700 kms east of Tripoli, 20 kms east of El-Sidra	12 Dec 1964	423	169,109,216
4. Marsa El-Hariga	Gulf of Bomba, 470 kms east of Benghazi, in Tobruk	Jan 1967	355	152,304,203
5. Zuwaytinah	Sirte Gulf, 150 kms south-west Benghazi, close to Ajdabia	Feb 1968	616	219,529,457

Source : N.O.C. · Libyan Oil, 1954-1971, Tripoli, 1973.

chosen as a suitable site for an oil terminal because its location provided an elevated site for the tank farm, and it had foundations for a harbour large enough to receive cargo vessels. ⁽¹²⁾ Besides this, it was the closest point to its oilfields and was able to offer such a good harbour potential. The terminal has five berths, but before the berths were installed, it was dredged and a small harbour, two wharfs and a breakwater were constructed. A 500 metre peninsula was extended and enlarged with local limestone which was later buttressed with scarp metal on the seaward side to retard the effects of wave erosion. For the breakwater itself, one-piece, 2200 tons cellular concrete caissons were designed, each having dimensions of approximately

33 by 15 metres. ⁽¹³⁾ The pier 'L'-shaped wharf stretches seawards for 975 metres. It can accommodate cargo ships with a 24 foot draught. The second one extends about 300 metres north from the shore. This was designed to give greater protection for small boats and industrial facilities and to increase the docking space for shallow-draught ships. ⁽¹⁴⁾

(2) El-Sidra is located 30.38°N and 18.21°E on the west side of the Gulf of Sirte, about 130 kms away (see Table 3.3). The Oasis Company and its contractors selected this site, which offers relatively deep water close to the shore, a highland scarp on which they could build a tank farm, and reasonable proximity to its Dahra oilfield. The company built a small harbour for the launches and boats. A small breakwater built of local materials extends a few hundred metres from the shore. However, because the local stone was too soft, more than 2000 concrete tetrahedrons were fabricated at a maximum rate of twenty-two per day and dropped on the seaward side of the breakwater to resist the action of the sea. ⁽¹⁵⁾ The terminal has four berths located at different depths.

(3) Ras-Lanuf is located about 20 kms east of the El-Sidra terminal and about 110 kms west of Marsa El-Brega at 30.31°N and 18.34°E . The site was chosen by the Mobil Oil Company and its partners for the same reasons as the previous terminal. The terminal was connected to the oilfield by two major pipelines, and it has four berths as well. Like the previous terminals, it has a small harbour and a breakwater of 300 metres, protected by prefabricated steel cells on the outside like Marsa El-Brega.

(4) Zuwaytinah is located on the east side of the Sirte Gulf, east of Marsa El-Brega and close to Ajdabia town. The location was chosen by the Occidental Company because it offered a site close to its fields, deep water offshore, and proximity to Ajdabia where it is easy to get labour and some facilities. The terminal site is one kilometre west of the old harbour of Zuwaytinah.

(5) Marsa El-Hariga is located in the eastern part of the country at Tobruk city on the Bomba Gulf. The B.P. Company chose the site for many reasons. The site has a natural port protected from the prevailing winds and high waves, and deep water close to the shore for 270 metres (it is about sixty feet deep along the shore). Keeping in mind the nature of the El-Sarir oil, and the company's desire to build a separate terminal, the present location of the terminal is quite convenient for exporting this type of oil because, as mentioned earlier, the oil in the El-Sarir field has a high viscosity and a higher wax content than other Libyan crude oils. An underwater pipeline for offshore submarine loading to buoyed tankers in the shallow water of Sirte Gulf was considered a risk because the crude oil might jellify and solidify in the line. ⁽¹⁶⁾ The El-Sarir field is much further from the coast than any other of Libya's oilfields, especially from the Gulf of Sirte, and connecting the oilfield with any site at the Sirte Gulf would require almost the same length of pipeline. Moreover, the company saved more time and money in this location than if it had established a terminal on the Gulf of Sirte. However, because of its separate location, this terminal will be excluded from the following study.

2. COMPARISON OF THE SITE TERMINALS

This study will deal with the functions, the berths and the length of their submarine pipeline, the depth of water, the rate of the waves, and the capacity of each of these terminals. Taking function first, Marsa El-Brega has the advantage. It has a multiple-function port, while the others have a single function. Besides exporting crude oil, it has a small harbour suitable for small ships carrying the imports required by the company and the proposed industries. This may be more economic for the company than to import its requirements through Benghazi and Tripoli, as happens at the other terminals. Moreover, the government has now signed a contract for building a new harbour serving the proposed new petro-chemical complex, and costing about LD 11 million. ⁽¹⁷⁾ The Marsa El-Brega terminal has many advantages over the other terminals in the Sirte Gulf. This terminal has a tank farm about six kilometres from the shore at an altitude of about 43 metres above sea level, housing 16 storage tanks with 268,000 barrels capacity each. The total capacity in the storage tanks is equivalent to about twelve days of the company's 1971 production. From the farm, five separate submarine pipelines run to five berths (Figure 3.2.A). A 23-inch pipeline runs north-east of the terminal to berths one and two, a 42-inch pipeline leads to berths three and four, and a 48-inch one to berth five, each at a different length and at a different depth (see Table 3.4). The gravity flow in Marsa El-Brega permits a maximum loading rate higher than that of the other terminals; the maximum varies from 35,000 barrels per hour at berth one to 65,000 barrels per hour at berth three, and three of its berths have a higher rate than any of the El-Sidra berths.

Fig 3-2

FOUR OF THE LIBYAN OIL TERMINALS

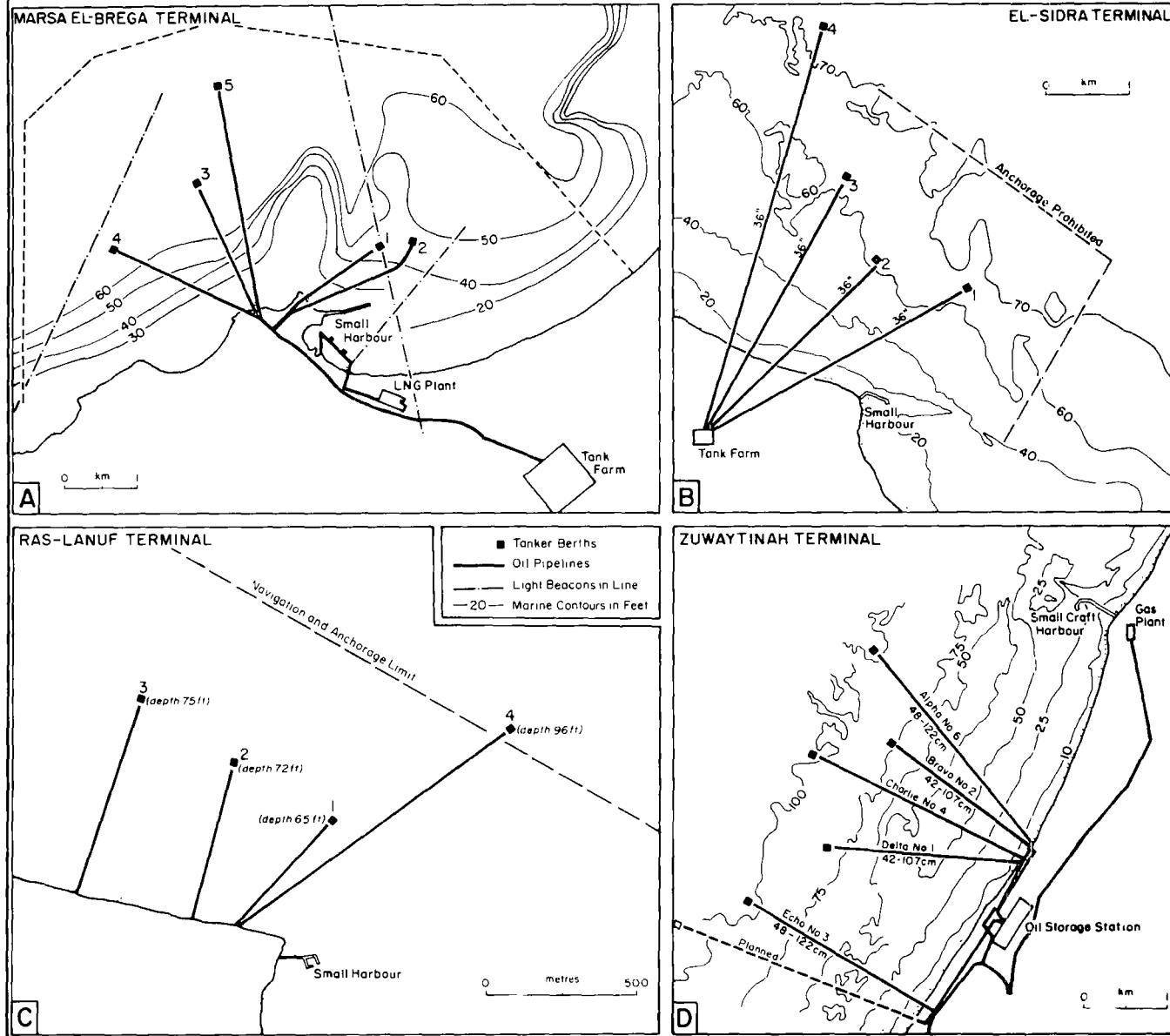


Table 3.4 Some Characteristics Of The Terminal Berths In The
Gulf Of Sirte.

Terminal	Berth No.	Depth in feet	Length of tankers allowed (in feet)	Approx. length of submarine pipeline (in metres)	The maximum loading rate barrels/hr...
Marsa El-Brega	1	42	434	1,220	35,000
	2	42	434	1,690	39,000
	3	96	unlimited	1,890	65,000
	4	72	,,	1,920	60,000
	5	140	,,	3,050	48,000
El-Sidra	1	62	800	1,950	44,000
	2	62	800	1,550	44,000
	3	63	1,000	2,280	44,000
	4	72	1,100	3,700	44,000
Ras-Lanuf	1	65	unlimited	1,520	60,000
	2	72	,,	1,780	60,000
	3	75	,,	2,230	60,000
	4	96	,,	3,750	60,000
Zuwaytinah	Alpha	100	,,	2,360	-
	Bravo	70	,,	2,230	-
	Charlie	100	,,	2,680	-
	Delta	70	,,	1,900	-
	Echo	100	,,	2,950	-

Sources : Direct Communication with Ministry of Petroleum, Information on the Libyan Terminals, Tripoli, Summer 1973; Esso Company, Information About Marsa El-Brega Terminal; Information collected through correspondence with Oasis Oil Company, letter dated 10th Sept, 1974; Brown, R.W. "Geographic Factors in the Construction and Operation of Libyan Petroleum Ports," The Libyan Economic and Business Review, Vol. 11, No.2, Autumn, 1966.

El-Sidra has an advantage in the number of storage tanks and their high capacity (19 tanks, 6,695,000 barrels) at an altitude of 73 metres above sea level. Its disadvantage is its loading speed which is by gravity at a maximum rate of about 44,000 barrels per hour at any berth. Each of the four berths is linked with a 36-inch pipeline (Figure 3.2.B); also they are located at a more shallow depth (see Table 3.4).

Ras Lanuf has fewer advantages than the two previous terminals both in the number of storage tanks and in their capacity (6 tanks, 3,000,000 barrels), but its loading capacity is better than either, by gravity, about 60,000 barrels per hour, through a 40-inch pipeline to four berths (Figure 3.2.C). This might be due to the altitude of its tank farm at about 99 metres above sea level. Ras-Lanuf has the same number of berths as El-Sidra, but fewer than Marsa El-Brega.

Zuwaytinah (Figure 3.2D) has two disadvantages, the long length of its submarine pipelines, most of them longer than two kilometres, and the terminals facing the north-western winds which blow during the winter.

With respect to the depth of the water, the wind, waves and swell, Table 3.4 shows that by comparing the depth of berths with their distance from the shore we can show that in general the water is deeper at the Ras-Lanuf terminal. For example, berth two in Ras Lanuf (about 1,780 metres from the shore), berth four in El-Sidra (about 3,700 metres from the shore), berth four in Marsa El-Brega (about 1,920 metres from the shore), and Bravo berth in Zuwaytinah (about 2,230 metres from the shore), are all located at the same depth (70 - 72 feet). In addition, it shows that the Ras-Lanuf berths are on average deeper than the others, but as a separate location Marsa El-Brega's berth No.5 has the advantage of depth over any other berth in Libya. It is up to 140 feet deep and can receive a large number of tankers.

Fig.3-3 SEA CONDITIONS IN THE GULF OF SIRTE

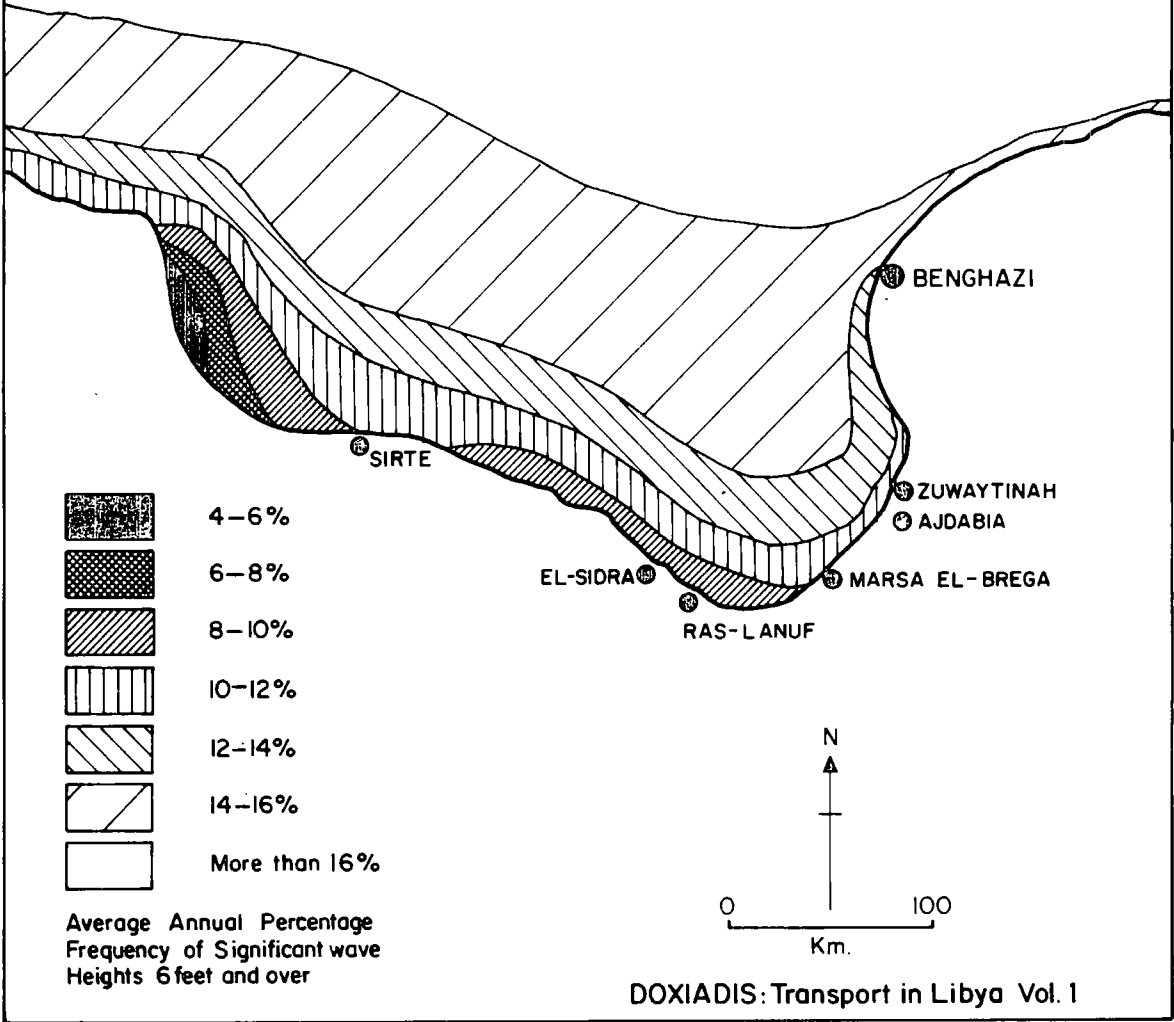


Figure 3.3 shows that the El-Sidra and Ras Lanuf terminals have better locations weather-wise than Marsa El-Brega and Zuwaytinah. High winds and waves, especially during the winter, can affect the loading operation. Adverse weather can stop the loading operation at the berths for many hours. Berth No. 3 at Marsa El-Brega and No. 4 at the El-Sidra terminals are completely different in design from the other submarine berths. These two are bow- and mono-mooring berths, which are designed to reduce average mooring time. Moreover, these have often loaded tankers in heavy weather, while the other submarine berths were closed.

However, one may wonder why Libya has this number of terminals, especially in the Sirte Gulf, where there is no natural location even for one terminal. This can be explained by the reasons which have been mentioned before. At present, since the new policy of reducing production, economically speaking, Libya should have fewer terminals in order to reduce investment, facilitate control, and establish large industrial areas, instead of these small ones. The berths are floating submarine berths, and it is easy to move them to a new site. Moreover, some of the present sites are close together, such as El-Sidra and Ras Lanuf, which are only 20 kms apart. There might not be any need to move the tank farm from either of them if the two sites were connected together. The number of shipments will decrease according to the new policy, and the berths in each terminal will work below their full capacity. Joined, they might not receive as many ships as the two sites would receive separately, but one can see from Table 3.5 that, for example, El-Sidra in its peak year loaded about 865 ships, with 345,500 thousand barrels. Working according to the new policy of production, the El-Sidra and Ras-Lanuf terminals exported about 438 million barrels in 1972. But the maximum oil loading rate from the berths given by the company indicates that the daily average rate

Table 3.5 The Total Exports And Number Of Ships At Each Terminal
1965-1972 (In ,000 barrels).

	Marsa El-Brega		El-Sidra		Ras Lanuf		Zuwaytinah	
Year	Total exports	No.of ships	Total exports	No.of ships	Total exports	No.of ships	Total exports	No.of ships
1965	205,948	535	184,380	680	52,368	176	-	-
1966	212,416	470	237,430	804	97,505	295	-	-
1967	215,183	484	228,999	708	122,977	354	-	-
1968	269,550	616	250,567	742	177,987	517	135,762	362
1969	267,291	594	286,000	734	233,032	676	218,696	577
1970	247,189	511	345,538	865	219,817	585	245,492	686
1971	159,798	362	302,057	808	169,109	423	219,529	616
1972	122,410	-	285,772	-	152,142	-	155,891	-

Sources : 1. N.O.C. Libyan Oil, 1954-1971, Tripoli, 1973.

2. Central Bank of Libya, The Economic Research Division,
Economic Bulletin, Tripoli, 1973.

is about 1,700 thousands of 100 percent tanker availability. (18)

This means that the El-Sidra terminal could handle the exports of the two terminals. A depth of about 40 feet is capable of handling ships with a displacement of up to 50,000 tons dead weight. The El-Sidra and Ras Lanuf berths are capable of handling ships more than double this size, and if they were to deal with ships of a capacity of 100,000 tons, only about 620 would be needed each year. This is less than the number of tankers received by El-Sidra since 1965 and less than the number received by Ras-Lanuf in 1969. The same thing could be said of Marsa El-Brega and Zuwaytinah. Marsa El-Brega's total exports in 1968 (269,550,000 barrels) are almost equal to the total amount (278,300,000 barrels) exported by the two terminals in 1972.

A detailed study of the advantages and disadvantages of a reduction in terminals is not the aim of this study, but it may very well be that a reduction in numbers would be beneficial.

A comprehensive analysis from the technical and engineering point of view might be worthwhile. This might consider reducing the four terminals in the Sirte Gulf to two, connecting the three pipelines of Esso, Occidental and Amoseas (Nafoora and Amal groups) together to one terminal and the rest of the pipelines to the other terminal.

3 - CRUDE OIL

A. CRUDE OIL PRODUCTION

The development of crude oil production within Libya compared with other members of the O.P.E.C. countries is shown in Table 3.6. Phenomenal growth in Libyan production during the 1960s gave it by the beginning of 1969 the fourth position amongst these countries and second amongst the Arab countries, behind S. Arabia. By this year, Libyan production surpassed Kuwait production. The table also observes two other features, namely the sharp upsurge of 1968, and the sharp decrease since 1970.

The extraordinary general expansion of oil production in the 1960s was due to many reasons besides the natural advantages of Libyan oil, in both geographical location and quality.

1. Libya was a country new to the industry, and discovery of new fields occurred monthly, whereas in other countries the discovery of new fields had stopped.
2. Libya was different from other Arab producers in the competitive atmosphere that prevailed among operating companies. Most Middle East countries have only a handful of operators to deal with, for instance,

Aramco Company in S. Arabia and K.O.C. in Kuwait, while Libya in 1972 had about 20 companies besides N.O.C., sitting on about 175 concession areas. According to Professor M. Adelman, this large number of companies and concessions was the most effective factor behind the Libyan success story :

"Today, a single lease covering the whole country is unthinkable. Libya, the greatest of the new countries, had welcomed 28 concessionaires by 1968. The lesson has not been lost on other countries : the more the exploring companies, the faster the development." (19)

3. As mentioned earlier, the provision of the oil Law required the periodic surrender of unexplored acreage; as a result, the companies were under pressure to explore as much territory as possible before concessions expired. (20)
4. Political factors were also important. The problems which occurred during the Iranian crisis, and the temporary closure of the Suez Canal in 1956, are still remembered. Since the end of the Suez crisis in 1956 the energy authorities of Western Europe counted primarily on the existence of alternative oil producing areas to provide security of oil supply in the event of difficulties with the oil-producing and transit countries of the Middle East. Companies were encouraged to search in other areas, especially in North Africa, and particularly in Libya, where discovery of new fields naturally created much competition for oil development with Middle East countries.
5. The government also pressed the operating companies to increase their capacity of crude oil production. This arose from the government's need for more money to finance its economic development plans.

6. Some companies increased their daily average rate of production by completing new producing wells, by increasing the production capacity of producing wells, and by increasing their pipeline capacity. For example, Esso Company completed the installation of a second pumping station between Zelten and the Marsa El-Brega terminal , in order to absorb the increasing quantities produced from the company fields, and this pumping station increased the pipeline capacity by 50,000 b arrels per day. The daily average product amounted to about 2.77 million barrels during 1968, as compared to 1.87 million barrels in 1967. ⁽²¹⁾
7. The sharp increase of 1968 was also due to the coming of new companies and the new large fields which were discovered in 1967. For instance, the Occidental Company discovered in 1967 its first field in Augila. In the same year they discovered the biggest well in the country in Intisar field in concession 103, with a production of 43,000 b/d of high gravity oil. ⁽²²⁾
8. The 1967 Middle East crisis, the closure of the Suez Canal, the shut-down of the Trans-Arabian pipelines, and the Nigerian Civil War which dropped the exports of the Nigerian oil from 500,000 barrels per day to about 50,000 barrels, all meant that the Europeans began to depend on imports from Libya.

Production declined after 1970 because the companies were ordered to follow the oil policy which was issued in 1970 in order to conserve the country's oil wealth. According to the new policy, the companies have been ordered a production cut-down of 780,000 b/d from their 1970 production. In terms of the companies' production, Table 3.7 shows that Oasis group produced about 35.5 percent of the total during 1972,

Table 3.6 Crude Oil Production In Libya And O.P.E.C. Countries From 1961 To 1972 By Thousands of Barrels.

Year	Abu Dhabi	Indonesia	Iran	Iraq	Kuwait	Qatar	S. Arabia	Venezuela	Algeria	Libya	Libyan actual % of increase
1961	-	154,863	438,804	367,851	633,280	64,675	540,237	1,065,757	120,791	6,642	-
1962	5,183	165,485	487,084	368,358	714,598	67,980	599,666	1,167,916	159,463	66,543	901.8
1963	17,593	162,054	544,325	424,090	765,150	69,884	651,890	1,185,511	184,061	161,272	142.3
1964	68,369	167,130	626,107	459,403	842,160	78,813	694,302	1,241,782	204,140	315,621	95.7
1965	103,003	175,430	696,520	479,099	861,527	84,902	805,190	1,267,602	203,916	444,862	40.9
1966	131,400	169,572	778,109	508,141	906,702	106,307	950,059	1,230,464	262,308	547,902	23.1
1967	139,467	184,471	950,180	448,239	912,427	118,100	1,024,263	1,292,874	301,385	635,285	15.9
1968	181,756	219,864	1,039,367	550,208	956,549	124,266	1,114,177	1,319,357	330,922	952,357	49.9
1969	218,798	270,863	1,232,155	555,241	1,012,306	129,746	1,173,877	1,311,837	345,420	1,134,839	19.1
1970	253,237	311,546	1,397,585	565,239	1,091,189	132,261	1,386,727	1,353,420	375,622	1,211,086	6.7
1971	341,056	325,617	1,656,918	618,335	1,166,796	157,206	1,740,722	1,295,403	286,686	1,007,692	- 16.8
1972	384,227	394,804	1,838,455	536,375	1,201,578	176,543	2,200,575	1,178,483	388,802	819,619	- 18.7

Source : O.P.E.C. Annual Statistical Bulletin, June 1973.

thus maintaining the leading position among the companies. Its daily production dropped about 12.8 percent in 1971, compared with the 1970 production. In 1972, the daily production continued to drop, but more sporadically and at a slower pace, about 3.3 percent. Occidental took the second place from Esso in 1970 and had a daily production record of about 18.9 of the total production in 1972. Its production also decreased, and a share rate of production, about 27.8 percent less than in 1971, was recorded, while Esso Company in the third position had a reduction of about 25.2 percent less than in the 1971 production. The only company whose daily production was increased in 1972 was the National Oil Co-operation (N.O.C.). The reason is simply that it is a public company. It was clear that the rate of cut-down was different between the companies, but unfortunately there is no official statement about this, though it might be dependent on the relations between the companies and the government. Also, it might be dependent on oilfield situation and the pipeline system of the companies. For example, Oasis, Mobil and Amoseas Companies, which had the lowest rate of cut, have most of their fields far from terminals with long pipeline systems. The companies which have less pipeline and important fields have had a high rate of cut-down. This might be sound for a future plan of nationalization. It also depends on the companies' situation, for example, the Occidental Company accepted the new order to cut-back at a large rate, because it is an independent company and heavily dependent on Libya for crude oil supplies.

B. CRUDE OIL EXPORTS

Marketing in the crude oil industry depends on the size of the demand and the consumers' needs, and not on selling what is produced. The marketing and distribution of the oil products to the market depends

Table 3.7 Crude Oil Production In Libya By Operating Companies,
1967-1972 in,000 of barrels per day.

Company	1967	1968	1969	1970	1971	1972
Oasis	630.0	686.1	789.0	946.1	824.4	796.9
Occidental	-	381.1	607.8	659.4	586.4	423.3
Esso Standard	495.9	613.7	618.3	570.6	349.1	260.9
Amoseas	128.9	243.9	369.1	322.9	261.5	233.8
Arabian Gulf (a)	165.2	159.6	156.4	212.6	196.3 ^(b)	66.5
Hunt	-	144.5	164.9	200.3	223.3	146.0
Mobil/Gelsenberg	204.2	237.1	264.2	252.9	186.5	162.8
Esso Sirt ^e	107.1	127.6	127.8	121.4	98.2	93.2
Agip	-	-	-	-	-	17.7
Aquitaine	-	-	5.1	19.9	16.8	16.0
N.O.C.	4.8	7.4	6.0	4.2	3.7	13.0
Amoco	4.4	1.1	0.5	7.7	14.6	9.4
Total	1,740.5	2,602.1	3,109.1	3,318.0	2,760.8	2,239.5

(a) Prior to 7th December 1971. B.P. (b) 2.2 T b/d produced by Arabian Gulf.

Source : O.P.E.C. Annual Statistical Bulletin, June 1973.

on where it is wanted and also on the quality, the quantities and the price required. The Libyan oil export operation to the market began when Esso Company started exports of Zelten crude oil in September 1961. Only eight years later, by 1969, Libya not only held the first position among the Arab oil-exporting countries, but also among the O.P.E.C. countries, but in 1971 the Libyan position dropped to fourth, behind Saudi Arabia, Iran and Kuwait, due to the new regulation (Figure 3.4).

In 1970 record exports were recorded, 7.7 percent more than the exports of 1969. The exports, according to the new policy, dropped in 1971 to about 18 percent less than in the previous years, and continued to decline in 1972.

Fig 3.4 CRUDE OIL EXPORTED BY SOME O.P.E.C. COUNTRIES FROM 1967-1972

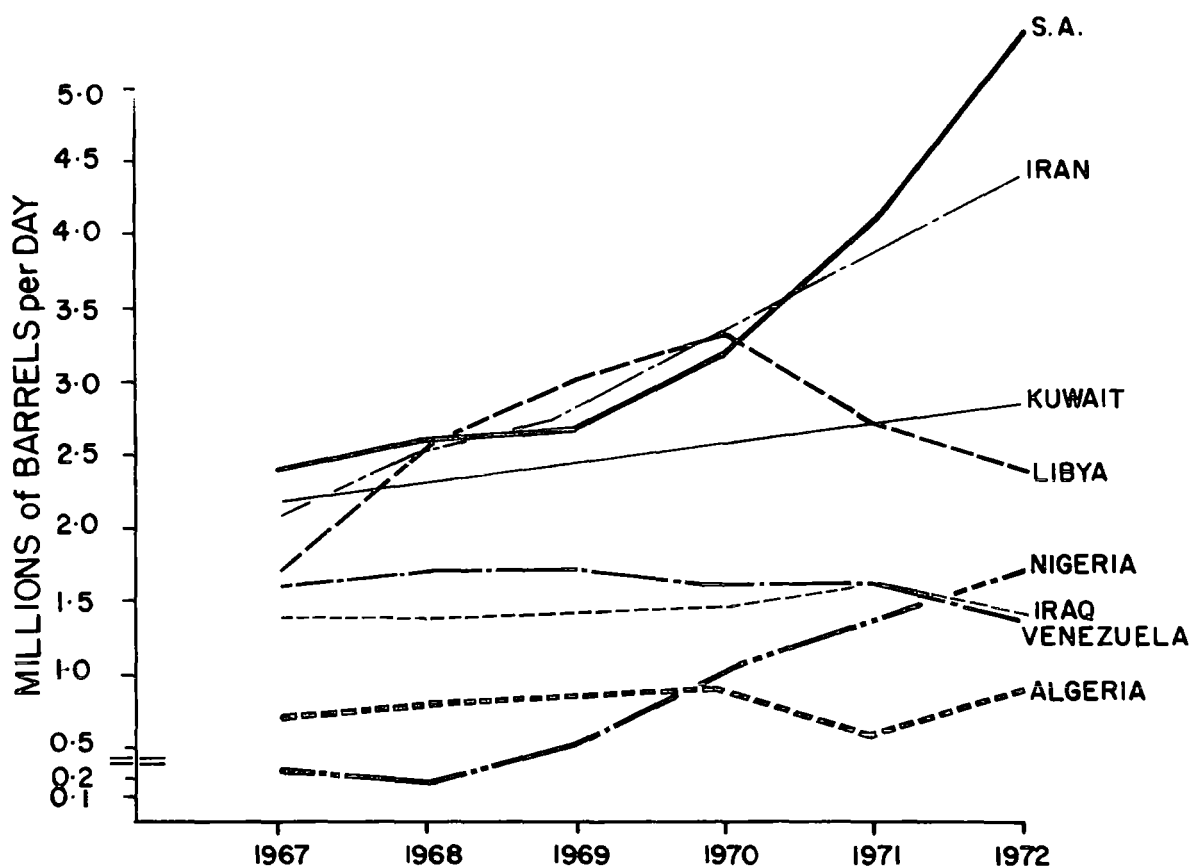


Table 3.8 The Distribution Of Libyan Crude Oil By Consumer Countries, 1966-1972 (in ,000 bbs) ⁽¹⁾

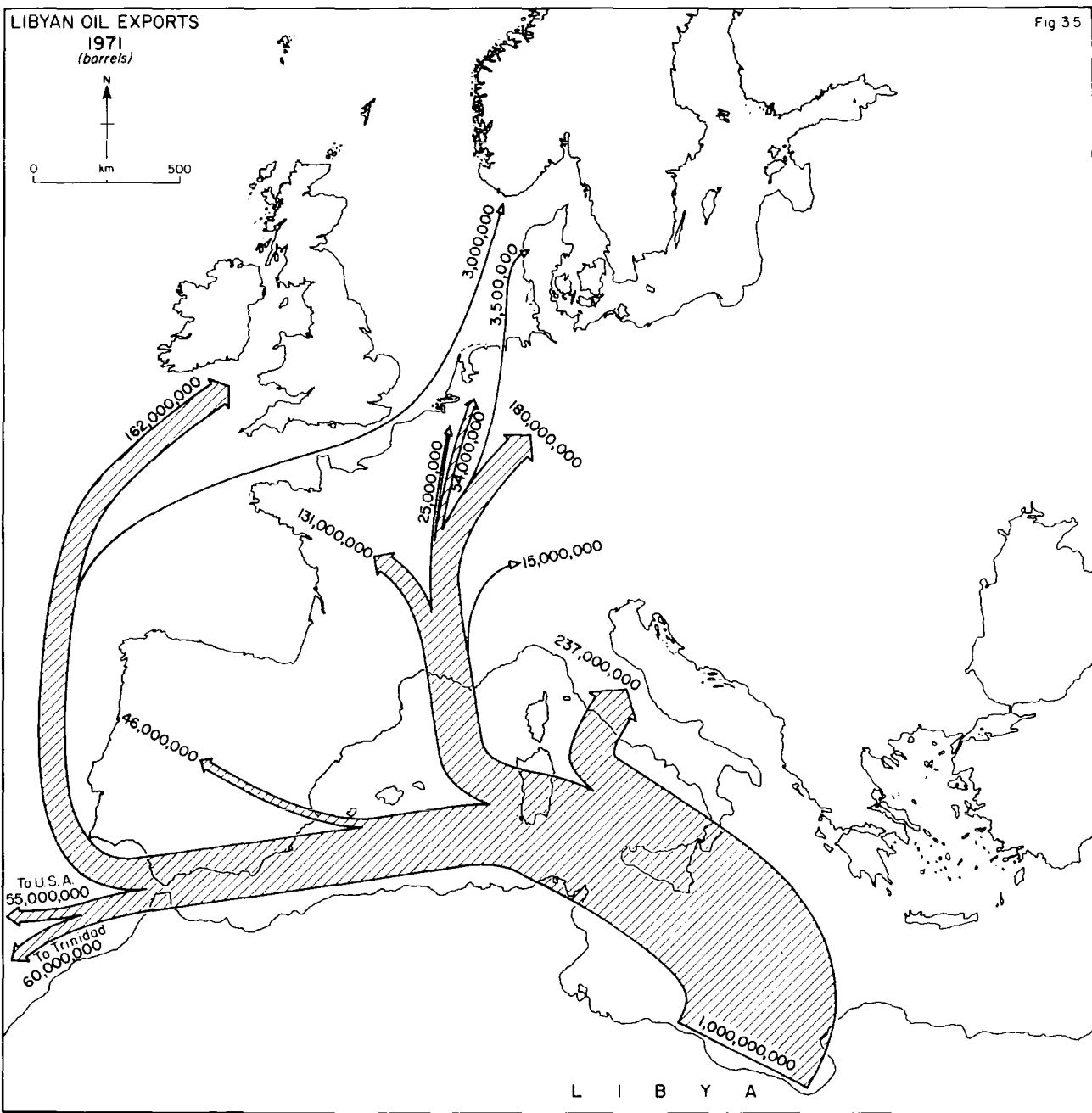
Country	Year 1966	1967	1968	1969	1970	1971	% of the total	1972	% of the total
Italy	65,692	128,413	200,171	252,689	306,310	236,991	23.94	164,517	20.74
W. Germany	188,311	149,914	214,909	252,794	220,968	180,125	18.19	173,963	21.92
France	64,217	84,882	101,522	130,320	166,222	131,308	13.26	79,218	9.99
Holland	53,373	55,945	71,328	110,937	110,791	54,233	5.48	49,234	6.21
Belgium	20,772	34,607	29,919	43,866	47,789	25,115	2.54	9,352	1.18
(2) Total of E.E.C.	392,365	453,761	617,849	790,606	852,080	627,772	63.41	476,284	60.04
Gt. Britain	75,970	75,406	170,941	154,542	178,822	162,042	16.41	106,784	13.46
Spain	21,056	28,103	56,697	59,241	58,840	45,624	4.61	21,902	2.76
U.S.A.	27,437	18,568	52,806	58,086	34,388	54,865	5.54	63,762	8.04
U.S.S.R.	-	-	-	-	-	-	-	13,999	1.76
Switzerland	4,792	5,563	7,518	11,505	18,272	15,299	1.54	12,341	1.55
Denmark	7,740	13,169	8,873	10,035	8,700	3,544	0.36	678	0.08
Norway	3,876	6,682	10,447	7,657	5,969	3,177	0.32	1,710	0.22
Trinidad	1,991	-	-	8,739	18,874	60,409	6.10	61,136	7.71
Others ⁽³⁾	12,124	26,629	19,295	20,219	30,895	17,321	1.75	34,714	4.38
Total	547,351	627,881	944,426	1,120,630	1,206,840	990,053	100.00	793,310	100.00

(1) Excluding N.O.C. exports. (2) During that time Gt. Britain and Denmark still outside E.E.C.

(3) Including W. Indies, Rumania, Brazil, Turkey, Yugoslavia, Greece, Canada, Argentina and Uruguay.

Source : Central Bank of Libya, The Economic Research Division, Economic Bulletin, Tripoli, Vol. 13, No.12, Oct-Dec 1973.

The geographical distribution of the crude oil market (Table 3.8) indicates that the greater part of these exports went to Western Europe, about 93 percent of the total exports in 1970, and 86 percent in 1971 (Figure 3.5). The E.E.C. countries absorbed about 70 percent of the total exports in 1970, but they dropped in 1971, and all the E.E.C. countries have contributed to this decrease, which was due to the new policy, as well as to the government's attempts to find crude oil importers outside Western Europe. As a result, Canada has resumed importation of Libyan oil, and Argentina appeared for the first time in 1971. Moreover, the imports by countries other than those of Western Europe increased from about 7 percent in 1970 to 14 percent of the total exportation in 1971. The high percentage of West European imports can be attributed to several factors besides the location factor. Firstly, the producing companies had outlets in Europe to which Libyan as well as other Middle Eastern crude oil could flow. Secondly, there were the price adjustments which made Libyan oil more competitive, especially before 1969. Thirdly, a dollar shortage prevailed throughout most of this period, and the fact that American and Venezuelan oil was dollar oil, and the oil of Libyan and other Middle Eastern countries could be paid for largely in sterling, helped to direct European demand towards it. ⁽²³⁾ Another important factor is the competition from other producers, whose oil competes with Libyan oil in the world market outside Western Europe. For example, the competition from the Gulf States in Eastern Asia affects markets, especially in Japan. There is competition from Venezuela in the markets of South America, and from Nigeria in South Africa. It is believed that the European demand for oil will rise. It is indicated that West European countries in 1970 used 12 million b/d of crude oil, almost all of it imported. The commission of the European community,



in common with other experts, now estimates that overall requirements will at least double in 15 years, indicating a probable figure of around 25 millions b/d for 1985. Against this, it is now hoped that indigenous production, chiefly from the North Sea, may reach some 3 millions b/d by 1980, and conceivably 4 - 4.5 millions b/d five years later. The area's probable import requirement in 1985 would, on this basis, turn out to be rather less than 21 millions b/d, some 75 percent or so more than in 1970. (24)

This increase is due to many factors :

1. To the technological progress which has required more and more energy and the growth of European industrial production.
2. The decrease of coal production and its use as a power source.
3. The increase in the capacity of the European refineries.

However, the future opening of the Suez Canal will mean that Libyan crude oil will be facing severe competition from Middle Eastern producers such as Saudi Arabia and Iran who are eager to expand their rate of production, especially since the Middle East countries were formerly the main suppliers to Western Europe which, after the Suez crisis, had shifted somewhat to suppliers from North African countries.

C. CRUDE OIL RESERVES

Table 3.9 shows that proven oil reserves are much less abundant than those of Middle East countries. In 1973, Libya's production amounted to about 3 percent of the known reserves, while the production in Saudi Arabia and Kuwait, for instance, did not exceed 1.8 percent of the reserves of these countries. Libya, with 4.8 percent of total world reserves, accounted for 3.7 percent of the world production, while Saudi Arabia, with 26.5 percent of total reserves, and Iran,

with 11 percent of total reserves, produced 12.9 percent and 10.3 percent of the total production respectively. From this table there can be no doubt that Libyan crude oil has a low rate of reserve compared with Middle East countries, but it is in a better situation than Venezuela. As for the reserve/production ratio in Libya, Table 3.9 indicates that Libya has a low ratio comparing with some of the Middle East countries. Its reserve/production ratio shows that it might have about 33 years to go with reserves at the 1973 level of production. However, Libya

Table 3.9 Total Of Oil Reserves And Production In Selected Producers
In Million bbs, 1973.

Country	Reserve Amount	% total of world	Production Amount	% total of world	Reserve/ Production Ratio
Libya	25,500	4.8	767.2	3.7	33
Saudi Arabia	140,750	26.5	2,662.3	12.9	53
Kuwait	72,750	13.7	1,010.3	4.9	72
Iran	60,000	11.3	2,139.6	10.3	28
Iraq	31,500	5.9	708.8	3.4	44
U.S.A.	41,800	7.9	3,780.7	18.3	11
Algeria	7,640	1.4	372.3	1.8	21
Venezuela	14,000	2.6	1,305.2	6.3	11
World total	531,700 *	-	20,713.0	-	-

* excluding U.S.S.R., Eastern Europe and China.

Source : Europa, Middle East and North Africa, 1974-1975,
Twenty-First Edition, London, 1974.

still enjoys a better position than most of the main producer countries, and the world as a whole, for the world reserve/production ratio in 1973 was only about 30. But it should be borne in mind that these figures might not give the accurate reserve of the country, because companies are understandably hesitant to publish precise figures on their reserves.

Moreover, new discoveries make for a wide margin of fluctuation in estimated proven reserves. ⁽²⁵⁾ But it is believed that the reserves will decrease in the long run if no new fields are discovered, and therefore it is almost impossible for Libya to sustain a rapid expansion of production.

4. DEVELOPMENT IN THE OIL INDUSTRY

One of the greatest aims of the oil policy in Libya is to encourage a rapid development of the country's hydrocarbon reserves to obtain for the country as much benefit from the oil operation as possible. In this section some aspects are examined which could greatly affect the long-term prospects for the development of Libya's oil resources on the one hand, and industrialization on the other.

A. THE GAS PROJECT

Natural gas is an important source of energy and a principal raw material for the petro-chemical industry, and is used in gas injection schemes to maintain reservoir pressure in the oilfields. In Libya, natural gas is produced in association with crude oil from various fields, and the quantity of the former is wholly dependent on the output level of the latter. Rough estimates of the 1971 output are in the order of 176,710 thousands of cubic feet per day. ⁽²⁶⁾ However, according to a study prepared for the Libyan government in the mid-1960s by the Illinois Institute of Gas Technology the country's natural gas reserves were estimated at around 350 billion cubic metres, of which more than two-thirds consist of associated gases. That Libya could therefore become a major gas exporter is reinforced by the fact that Libyan crude production has doubled since the study was prepared, and the figure for potential gas supply by 1972 must now be considerably higher than that quoted above. Moreover, it may indicate the potential

importance of utilizing natural gas in industrial development as well as for export, especially as the methane content of Libyan natural gas is between 65 and 75 percent.

Formerly there was no economic potential for this resource, because of the limited domestic demand and the technical obstacles to gas injection in the earlier years of production, where production in Libyan oilfields was being accomplished through water propulsion. (27) Vast quantities of gas flared in the atmosphere. Because of the rapid increased utilization of natural gas for many processes, it is now of economic importance.

The only project which was built in Marsa El-Brega, according to an agreement between Esso Company and the Libyan government, was designed to be one of the largest gas liquefaction plants in the world, with a capacity of 345 million cubic feet of liquefied gas daily. (28) The plant, which cost about LD 60 million, includes two 300,000 barrel storage tanks, furnaces and turbines, developing a total 330,000 horse-power with the plant refrigeration capacity equivalent to the air conditioning of 100,000 average-size houses. (29) Natural gas for this plant came from the major Raguba and Zelten oilfields. Two pipelines were constructed to carry the gas to the terminal, a 36 inch gas pipeline from Zelten to Marsa El-Brega, and the second one, a 20 inch line from Raguba connecting with the former one (see Figure 3.1). The terminal at Marsa El-Brega was chosen as the site for the plant because :

1. It is owned by Esso Company, the owner of the project, and the terminal facilities could be used economically and easily without charge, and at any time.
2. It is geographically the nearest one for these gas-producing fields, and
3. It has been developed in order to be suitable for handling gas tankers.

Production, which should have been exporting in 1968, was delayed until 1971 for various reasons, such as a series of accidents during construction, followed by a price dispute with the government. After the settlement of a nine-month-long price struggle with Esso Company, the first shipment of gas to Spain was made on 14th March 1971. During 1971, Libyan exports of gas were about 21,350,287 million thermal units, of which 17,204,379 million thermal units were shipped to Spain and 4,145,908 millions were shipped to Italy.

Due to increased demand for Libyan gas, another plant is now under construction in Zuwaytinah terminal, using natural gas which will come by pipeline from the Intisar fields. The new plant, which will cost about \$115 million, will supply about 12 million barrels of sulphur-free gas to Japan. In spite of the importance of the gas in terms of energy, and in producing raw materials for petro-chemical industries such as ammonia, urea, ethylene, propylene, methanol, butadiene, acetylene-black carbon, carbon disulphide and sulphur⁽³⁰⁾, the utilization of natural gas for local activities in Libya is still fairly limited. However, now a petro-chemical complex is under construction in Marsa El-Brega. This complex will include three units : (1) a unit for the production of ammonia, with a capacity of 1000 metric tons daily; (2) a unit for the production of methanol, with a capacity of 1000 metric tons daily; and (3) a refinery for crude oil with a capacity of 120,000 barrels a day.

B. REFINING

Amongst some of the oil-producing countries which are largely dependent upon oil for government revenue and the growth of national production, there has been rising concern about the establishment of domestic refinery plant and an expansion of the units in existence.⁽³¹⁾

In Libya, according to Paragraph 1 * of Article 21 of the Petroleum Law No. 25 of 1955, the producer companies were not under pressure to refine any percentage locally. However, after the oil production increased, the domestic scale of fuel and other oil by-products in Libya continued to increase in line with the increase in private and public means of transport, the increase of the fuel wholesales and its widespread use in industry and agriculture. Table 3.10 shows that the total wholesales of the fuel and other related oils in the country rose by about 167 percent during the period of 1966-1973. The total wholesales of the different types of fuel oils during 1973 amounted to about 14,12.8 million litres, a daily average of about 3.9 million litres, compared with 1.5 million litres in 1966. Yearly increase in wholesales was due to the use of sophisticated new equipment and the increase in the projects of development plans. Moreover, the achievement of the new design techniques of small refineries served the local market by operating efficiently and economically.

For these reasons the first refinery was established in Marsa El-Brega by Esso Company according to the following agreement with the government. (32)

1. That the refinery should be established on a purely commercial basis.
2. That all its crude input requirements should consist of Libyan oil.
3. That its products should be sold at a free competitive price which would permit the realization of a reasonable margin of profit.

* Paragraph 1 of Article 21 of Libyan Law stipulates that a concession holder who discovers petroleum in Libya and desires to refine it in the country shall have the right to construct, maintain and operate a refinery for this purpose in accordance with any legislation governing the refining of petroleum.

Table 3.10 The Total Wholesales Of Fuel And Other Oil In Libya
1966-1973 in,000 Litres.

Year	Gasoline		Kerosene	Gas Oil	Heavy Fuel Oil
	Premium	Regular			
1966	64,432	78,744	46,269	271,084	68,274
1967	78,628	77,969	52,300	316,326	70,505
1968	116,517	86,666	68,879	428,018	93,780
1969	154,751	81,809	88,010	489,607	101,164
1970	186,190	78,513	107,429	481,192	193,910
1971	208,106	76,347	80,814	371,024	182,213
1972	264,713	76,524	94,976	521,344	175,883
1973	329,911	76,408	97,200	670,077	239,166

Source : Central Bank of Libya, The Economic Research Division,
Economic Bulletin, Tripoli, Vol. 13, No. 12, Oct-Dec 1973.

Marsa El-Brega was selected as a site for the refinery for three reasons. First, because it was a crude oil-gathering centre from which supplies could be drawn. Second, because of the various services available at the terminal. Third, the terminal was under the control of the company which owns the refinery. The refinery, which started in 1967, could refine up to 8,000 barrels of crude oil each day. A comparison between its production and the local consumption (Table 3.11) shows that the production is still not enough to meet the rapidly expanding local market. Up to 1972, the refinery produced less than half of the nation's requirement of super gasoline, kerosene and naphtha.

The second major refinery at El-Zawia has a capacity of 60,000 barrels per day of crude oil. The plant, which cost LD 25 million, was started in 1971 by the National Oil Corporation. The reason was to meet the increase in local consumption. The plant now includes also a lubricating oil plant with a production of about 220,000 barrels per year. Therefore the area might be a big petro-chemical industrial complex in the future.

Table 3.11 The Percentage Of Output From Local Refined Products
to Local Consumption, 1971,

Kind of Production	% to the local consumption
Super Gasoline	39
Regular Gasoline	56
Kerosene	48
Naphtha	28
Fuel Oil	100

Source : L.A.R. Tripoli International Fair 1972, The International
 Department of The General Organization For Fairs, Tripoli, 1972

No official reasons were given for the choice of this location far from the raw materials which come from Marsa El-Brega and El-Sidra by sea. However, there must be some official reason behind it. Moreover, the location might have some advantages over the location of terminals such as Marsa El-Brega, for the following reasons :

1. The location is in the centre of the Jeffra Plain, where a large agricultural programme was started, and 40 kms from the largest urbanized area in the country, Tripoli, so the location is market-oriented, which has some advantages. For example, it will decrease the cost of transportation, because the cost of tanker freights are lower for crude cargo than for refined products. In this sense, the refinery will supply the western part of Libya, while Marsa El-Brega refinery supplies the eastern part of the country.
2. The greater availability of labour and lower wages in El-Zawia than in El-Brega, which is considered a desert camp involving high costs of transporting labourers.

3. Its proximity to the western countries reducing the shipping cost of the plant and for spare parts, as well as the cost of maintenance.
4. The location of this site might also avoid the problem of concentration of refining activities.
5. A large amount of land is available for future expansion.
The area may be suggested for more petro-chemical industries, especially the fertiliser industry with easy access to nearby agricultural land where there will be a large demand for fertilisers.
6. The site will be suitable in the future for using the crude oil of the western part of the country (Zones 1 - 4), after the completion of the proposed pipelines of the west.

The rapid development of the oil industry provides the government with significant revenues, thus giving it an opportunity, for the first time, to invest these funds in developing the economy. There is no doubt that the oil industry has had its effects on mitigating the backwardness of the industry. Therefore, the following chapters will examine the impact of the oil on the industry after 1964, as well as the industrial development policies adopted towards it.

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CHAPTER 4

MODERN EVOLUTION OF MANUFACTURING

The immediate economic impact of the oil industry was increased population and funds in the towns and increased per capita consumption due to higher disposable incomes among Libyans and foreigners serving the oil industry and related activities. (1)

As a result there was a sudden increase in the demand for foodstuffs and manufactured goods. Thus, these might expectedly have led to significant expansion in industrial production to meet this increased demand.

The industrial manufacturing sector gained in importance in terms of number of workers and establishments. During the period 1964-1971, the years between the two most recent Libyan censuses of manufacturing industries, various industries in Libya experienced phenomenal changes relating to location and growth. During these seven years the overall increase in total persons engaged in industry was about 7489 workers, 81.1 percent of the 1964 number. An important advance has been made by Libyan industry in the past decade, with the application of the social and economic development plans, as well as the introduction of the loan system. But, did every industrial group and industrial region expand at this rate of growth, or did some have a different rate? If so, which regions had the fastest rate, and which had the slowest? Which industrial group had a rapid growth rate, and which had a declining one? Moreover, was the rate of growth and decline of these industrial groups the same, or different, in each of the regions? The purpose of this

chapter is to answer these questions and to identify and contrast the types of change in industrial location and growth which took place in the country during this period. By using national and regional manufacturing employment data for 1964 and 1971 it is possible to evaluate statistically the relative significance of a region's proportion of growth and decline industries and its particular structure. (2)

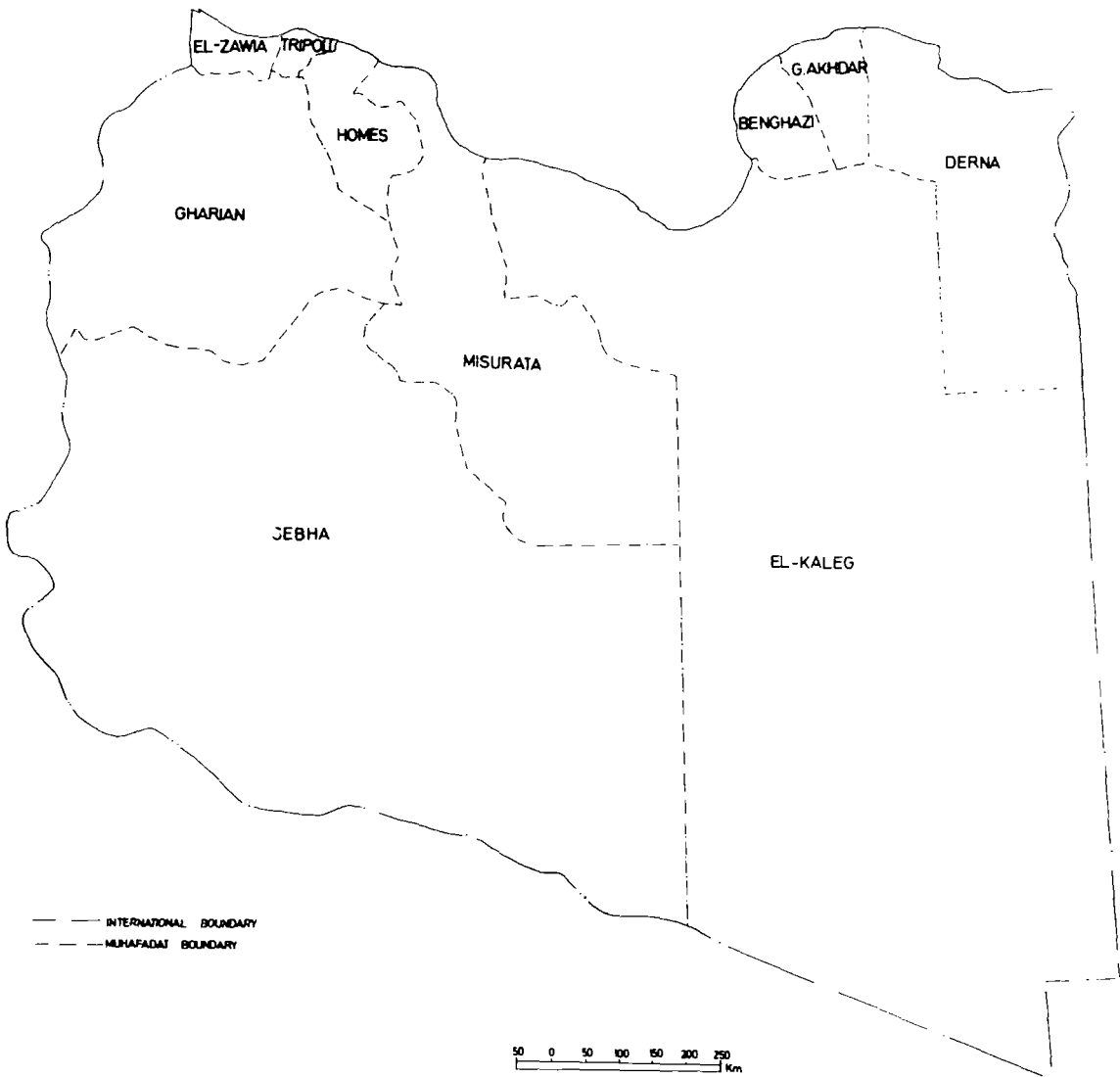
Industrial change will be discussed in two sections. The first section will discuss change in terms of the number of workers and establishments throughout the industrial groups and various regions. The second section will discuss change in terms of value added and value added per worker, as well as the wages and salaries unit throughout the industrial groups.

Before discussing the changes, it is worth noting that the information given by the 1964 census concerns the major regions (Muhafadat), not the sub-regions. Besides, the Muhafadat boundaries were changed in 1971 (Figure 4.1). Two points, therefore, should be kept in mind :

1. the comparative study of the change will mainly concentrate on the major regions (Muhafadat), and
2. since most southern regions are not important in terms of manufacturing industries, as shown later, and since most changes in the regional boundaries were in the south, a slight modification must be made to make the study more suitable and clear.

The Ubari and Sebha Muhafadat of 1964 will be considered as one Muhafada in the 1964 figures, which is Sebha Muhafada of 1971. The new El-Kaleg Muhafada will be excluded from the study since it did not show any industrial significance, but its omission will not affect the study.

Fig.41 NEW ADMINISTRATIVE MUHAFADAT IN LIBYA 1971



I. INDUSTRIAL CHANGE IN TERMS OF ESTABLISHMENT AND WORKERS

A. CHANGES IN INDUSTRIAL GROUPS

The industry or region which grew the most between the two dates did not necessarily grow the fastest because there is a difference between the amount of growth and the rate of growth. Amount is measured in terms of increased numbers, while rate is measured in terms of percentage. Therefore, this study will consider both aspects of growth. A comparison of changes throughout the industrial groups between 1964-1971 is shown in Table 4.1. The industrial groups are as in the International Standard of Industrial Classification (I.S.I.C.) which is used for the study in Chapter 6, except for the clothes and pottery industries which change their groups between 1964 and 1971. The former separated from the textiles group and moved to the leather and shoes group, while the latter moved from the miscellaneous group to the building materials and non-metallic group. In spite of the fact that there is a net increase of 7489 workers during this period, with about 81 percent general growth, it is quite obvious that the change is uneven. Certain industries gained more workers, while others showed a decline, but the growth and decline are not at the same rate.

As far as the rate of growth is concerned, it can be seen from Table 4.1 that four of the industrial groups grew at a rate greater than the national average. These were the food, soft drinks and tobacco, leather, clothes and shoes, wood and furniture and metal work groups. On the other hand, four industrial groups actually declined either in numbers of workers or establishments, namely textiles, paper and printing, chemicals and miscellaneous.

The wood and furniture group, especially the carpentry industry, was the fastest growing manufacturing group. It expanded at a rate of 265 percent, exceeding by more than three times the national rate of growth.

Table 4.1 Change In Number Of Industrial Workers And Establishments Among Major Industrial Groups, 1964-1971.

Industrial group	Workers				Establishments			
	1964	1971	Net total employment	% of shift	1964	1971	Net total establishment	% of shift
			shift	shift			shift	shift
1. Food, soft drinks and tobacco	3235	8149	+ 4914	+ 151.9	142	364	+ 222	+ 156.3
2. Textiles	565	503	- 62	- 11.0	19	17	- 2	- 10.5
3. Leather, Shoes and clothes	134	308	+ 174	+ 129.9	8	16	+ 8	+ 100.0
4. Paper and printing	773	543	- 230	- 29.8	21	33	+ 12	+ 57.1
5. Wood and furniture	551	2013	+ 1462	+ 265.3	63	201	+ 138	+ 219.0
6. Chemicals	1718	1010	- 708	- 41.2	141	39	- 102	- 72.3
7. Building materials and non-metallic	1877	3198	+ 1321	+ 70.4	92	153	+ 61	+ 66.3
8. Metal work	346	956	+ 610	+ 176.3	26	73	+ 47	+ 180.8
9. Miscellaneous	35	43	+ 8	+ 22.9	7	6	- 1	- 14.3
Total	9234	16723	+ 7489	+ 81.1	519	902	+ 383	+ 73.8

* Electrical machinery and transport equipment repairs subtracted from this group because they were excluded from the 1971 census.

Sources: (1) Census and Statistical Dept., Industrial Census of 1964, Tripoli, 1965.

(2) Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

This boom in the wood and furniture group has given it the third largest share in the industrial structure of the country. It represented about 6 percent of the country's manufacturing workers in 1964, but by 1971 this proportion had increased to about 12 percent. As mentioned above, the boom of new projects for building and construction was due to the changed living standards involving new types of building and furniture, as well as the demand for modern decorations.

The public sector had a remarkable expansion in terms of building and construction in the last decade. During the 1963-1969 development plans, about LD 480 million were spent for this sector, including about 450 large projects, and 15,000 residential dwelling units, besides other projects constructed in developing the cities of Beda and El-Marg. Between 1969 and 1973 the number of construction and building projects was even more remarkable; about 51,681 residential dwelling units were constructed in various regions in the country.

Figures which are available show that the private sector witnessed the same expansion. In Tripoli, for example, the total built area constructed per annum increased from 73,416 sq metres in 1956 to about 105,182 sq metres in 1968 ⁽³⁾ *. Most of the demand for doors, windows, decorations and furniture for these units was from local industries. Furthermore, local production was cheaper than foreign production, due to the ease of importing materials such as wood, plastic, nails and other materials required by this industry. Carpentry is one of the simplest industries which does not require a high capital investment. It is also characterized by industrial workers requiring only a limited education and training. The fact that the total imports of articles produced from wood

* This area excludes the total area which was completed without permission from the Municipality.

declined after 1967 (Figure 4.2) indicates that the remarkable growth for this group occurred after that date.

Some of the reasons mentioned previously, besides the increased demand for agricultural tools, modern housing articles and furniture, also explain the rapid growth of the metal work industry.

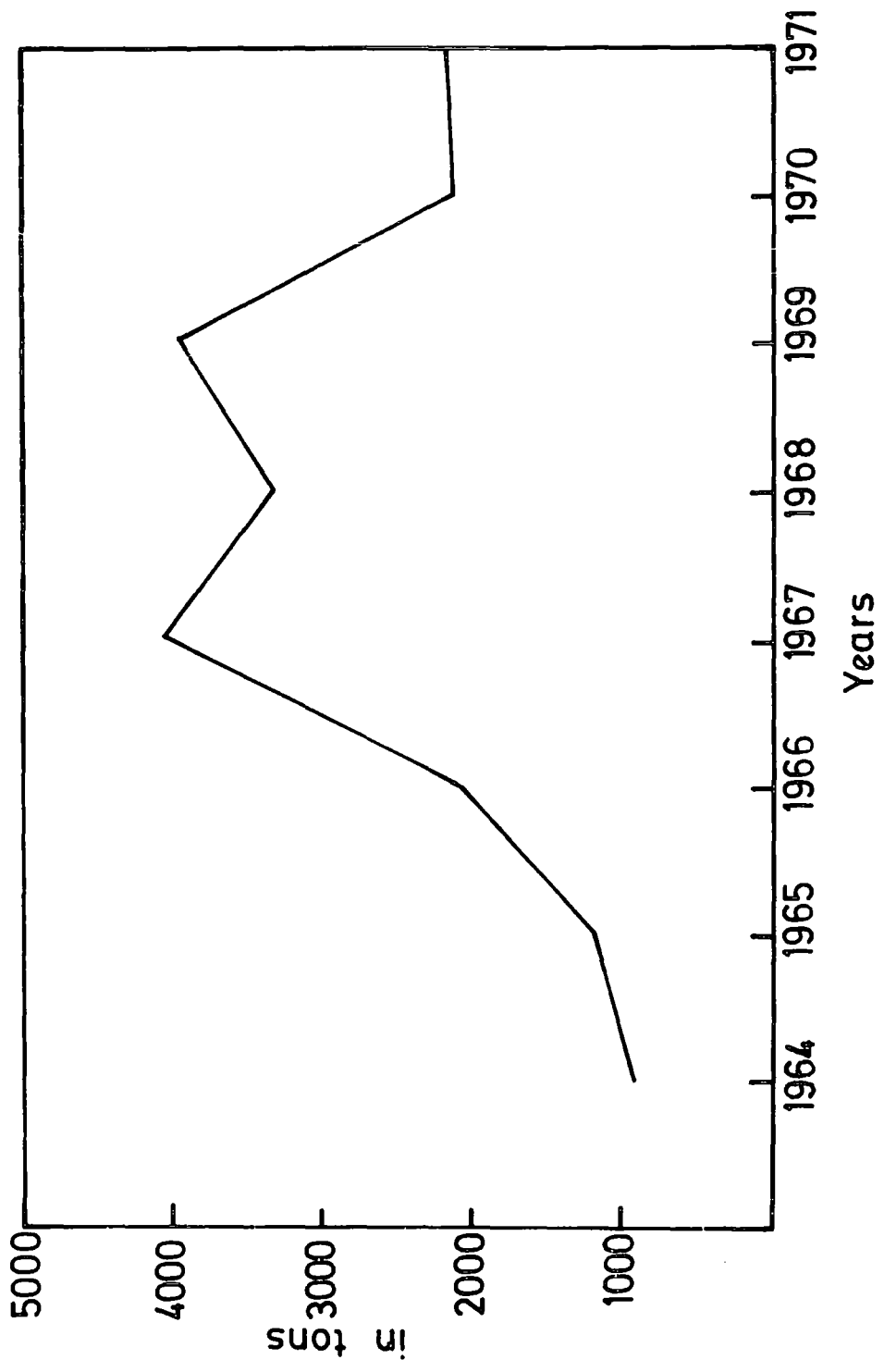
The food, soft drinks and tobacco industrial group ranks third with 152 percent growth, about twice the national rate. The actual increase rate for this would have been 158 percent but for the closure of four establishments which produced wine, beer and alcohol. They were discontinued for religious reasons, as Muslims are forbidden to drink or sell alcohol. In 1970 these four establishments employed 180 workers and produced more than six million litres of these different drinks. This industry in general is labour-intensive and is not heavily dependent on highly skilled workers.

Although the leather, shoe and clothes group showed a relatively rapid growth as a whole, the leather industry was stable, and the shoe industry declined, while clothes had a high rate of growth : 208 workers, 67.5 percent of the group's workers joined the clothes industry after 1964. The decline in the shoe industry was mainly due to lack of protection, as well as to foreign competition.* One result was the failure of the Mara Shoe Factory in Benghazi and its closure in 1964.

Building materials, with a 70 percent growth rate, showed slow growth compared with the wood industry. This may be attributed to technological change, as the industry became partially mechanized, especially in new establishments such as the cement factories in Benghazi and Homes.

* The Industrial Census of 1971 published in 1973 estimated the average price of the leather shoes produced locally at LD 1.400 and those imported at LD 1.470.

Figure.4.2 Imported Wood Articles 1964 -1971



As far as decline is concerned, it has been shown that three industrial groups experienced a substantial decline during this period. This decline would have been more dramatic if one assumed that these groups achieved the lowest growth rate, which is 22.9 percent in the miscellaneous group. Thus, if each of these groups had achieved the national industrial growth rate, there would have been an increase of about 458 workers in textiles, 626 workers in paper and printing, and 1392 workers in chemicals. Therefore, each group's comparative loss in relation to the lowest growth rate is about 192,407 and 1101 workers respectively. In terms of decline also, three groups of industries witnessed a decline in numbers of workers, while only two groups declined in the case of the number of establishments if we exclude the miscellaneous group.

The chemical group shows a sharper decline in the number of establishments than in the number of workers. This may be because new establishments tend to be larger and more capital-intensive because small establishments cannot compete with the new modern ones, and they fail to continue in operation, and because some establishments are affected by foreign competition, especially cheap articles from Japan, such as batteries, plastic and rubber items. Good examples are the failure of the Nasr Battery and the Plastic Shoe factory in Benghazi.

Although the paper and printing group experienced nearly a one-third decrease in the number of workers, the number of establishments increased by more than half during this period. This may be attributed to a gradual decrease in the size of each establishment, and the growth of new small ones, combined with a change in operational techniques to become more capital-intensive. The expansion of commercial centres may have encouraged the large establishments to set up new smaller branches, since the printing industry is considered to be market-orientated.

The textile industry was one of the old and common industries in Libya, and the change from old traditional establishments to new modern capital-intensive ones might be the main explanation for the decrease in the number of workers and establishments in this group of industry. Although the percentages of national net establishments and workers change by industrial groups over this period (Figure 4.3), it is clear that six of the nine groups are clustered within a fairly narrow range of percentage change, between -6.2 and 17.2 percent in the case of workers, and between -2 and 28.2 percent in the case of establishments. In order to clarify the percentage changes for these industrial groups in terms of change in establishments and workers, four industrial groupings may be made :

1. Groups which experience growth in both establishments and workers

- A. Food, soft drinks and tobacco (I)
- B. Leather, shoes and clothes (III)
- C. Wood and furniture (V)
- D. Building materials and non-metallic (VII)
- E. Metal work (VIII)

2. Group which experienced growth in workers and decline in establishments

- A. Paper and printing (IV)

3. Group which experienced decline in workers and growth in establishments

- A. Textiles (II)

4. Group which experienced decline in both workers and establishments

- A. Chemicals (VI)

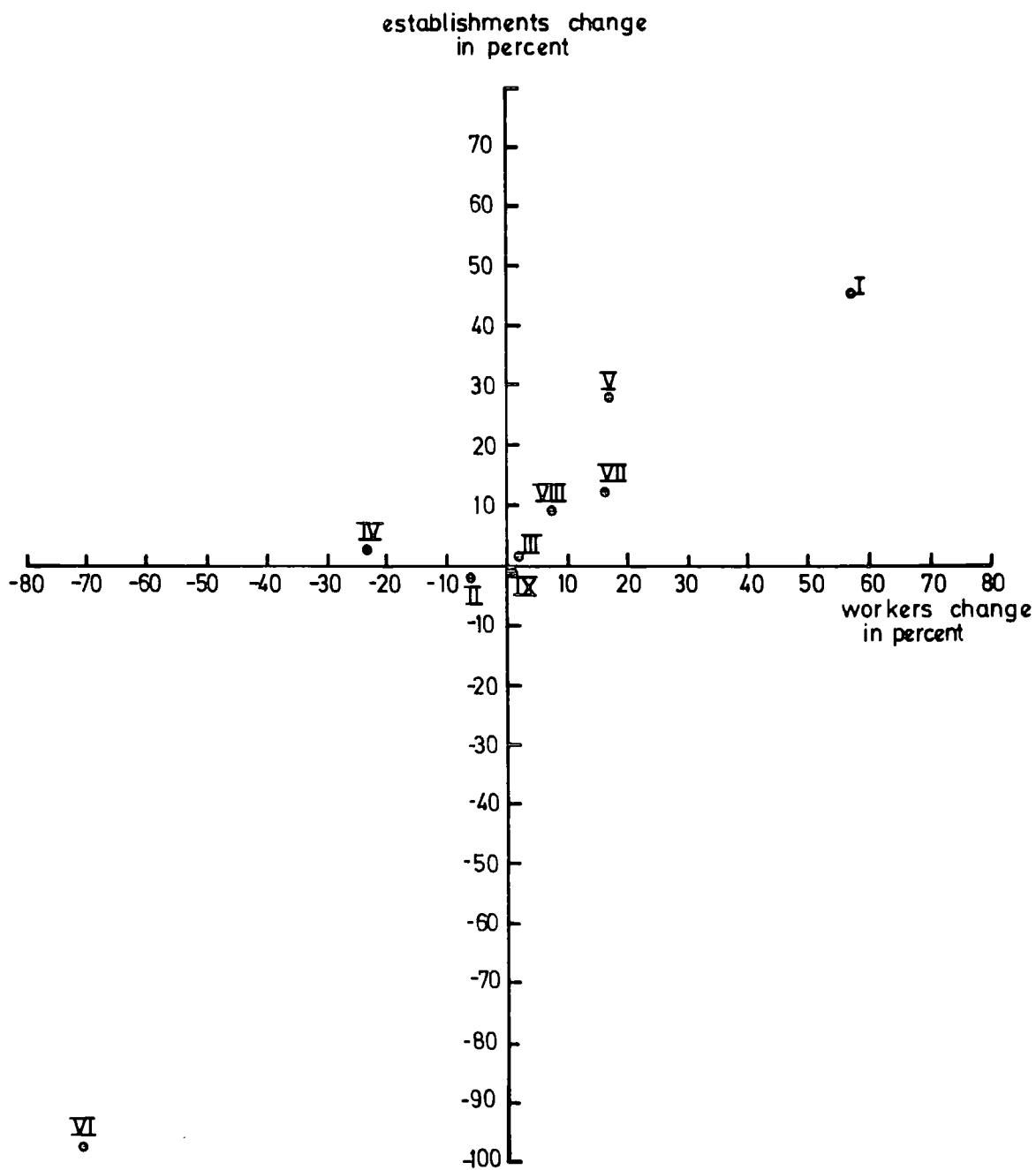


Figure. 4-3 Percentage of National Net Establishments and Workers Change by Industrial groups 1964 - 1971.

The growth in the large category in this period may be due to the setting up of new government establishments such as the cement factory in Homs and the furniture factory in Tripoli. In addition, the government encouraged the private sector, making available to them unlimited loans. The substantial changes which occurred may also be because some establishments began to take advantage of economies of scale. However, the proportional number of workers for the large category in 1971 has been reckoned at 46.9 percent and for the small category as 36.9 percent of the total number. In addition, the 1971 Census showed that eleven of the establishments which employed more than one hundred workers were set up after 1964. Accordingly, one can imagine that most of the expansion in the numbers of workers during this period was the large category.

It is probable that a high proportion of the new small establishments occurred in the food, soft drinks and tobacco, and wood and furniture groups. This is because both of these increased in the number of establishments, yet the former showed a decline in the average number of workers per establishment, from about 23 per establishment in 1964 to about 22 percent in 1971, while the latter still has the lowest average per establishment. In these groups, because many have some unpaid members of the family, small establishments are usually able to remain in operation, and they serve small local markets (e.g. bakers, dairies, and ice cream merchants), or operate as sub-contractors. This type of establishment may have an effect on the economy of the country because they operate in an inefficient manner and are traditionally organized. Therefore a large number of establishments with a low industrial potential should be consolidated.

C. CHANGES IN OWNERSHIP

Table 4.3 reveals that during the period under review sole proprietorship recorded the highest increase, of about 94 percent, while co-operative companies decreased sharply. State-owned (public sector) and joint-stock companies had a slight absolute increase. Keeping in mind that the co-operative and joint-stock companies are mainly considered as private, because most of the partners are individual traders, it means that the private sector still showed a greater increase than the public sector, and the public sector was still very weak. In addition, some of these public establishments were shifted to government control due to the departure of the Americans and the Italians, such as

Table 4.3 Change In The Ownership Of Industrial Establishments,
1964-1971.

Ownership type	No. of Establishments		Change in no. of Establishments	
	1964	1971	No.	%
Sole proprietorship	367	710	343	93.5
Co-operative company	188	123	- 65	- 34.6
Joint-stock company	49	52	3	6.1
State-owned	10	17	7	70.0
Unknown	8	-	- 8	-
Total	622	902	280	45.0

Sources : (1) Census and Statistical Dept., Industrial Census 1964,
Tripoli, 1965.

(2) Computed by author from data in I.R.C. Industrial Establishments Census, 1971, Tripoli, 1972.

the milk factory at Auguba Base (Wheelus Base). However, this trend in the private sector can be explained by the industrial development policy before 1970, as will be seen in Chapter five. The data in the table show

also that the co-operative and joint-stock company establishments, which are well-organized in other countries, are tending to disappear in Libya, and so the government should encourage this system to incite more private capital to enter the sector.

D. CHANGES IN REGIONAL PATTERNS

The different regions (Muhafadat) also showed varied types of change. In terms of absolute numbers of workers, Table 4.4¹ reveals that six muhafadat show an increase, while three muhafadat experienced decline. The industrial muhafadat which grew the most were Tripoli, Benghazi and El-Zawia Muhafadat, especially Tripoli. These were the only regions to gain more than 950 workers. Furthermore, these muhafadat contributed a total growth of 5,171 workers, or about 92 percent of the nation's total growth.

The Homes, Gebel Akhdar and Sebha Muhafadat were the regions where losses were registered. The largest loss was in Homes where the number of industrial workers decreased by 1970, followed by Sebha, 82, and Gebel Akhdar, 43 workers. The location of Homes between Tripoli and Misurata Muhafadat, the migration of young people from the south, and the change of the government headquarters in 1969 from Beda, might be the important reasons for these three declines. It may also be suggested that there is a direct relationship between the growth of population and of the industrial workers in the muhafadat. The area extending from Tajora in the east to Zuara and Nalut in the west, including Tripoli; Azizia, Ben-Ghashir, El-Zawia and Sabratha, is the area which had the largest increase in industrial workers, about 3675, nearly two-thirds of the nation's total growth.

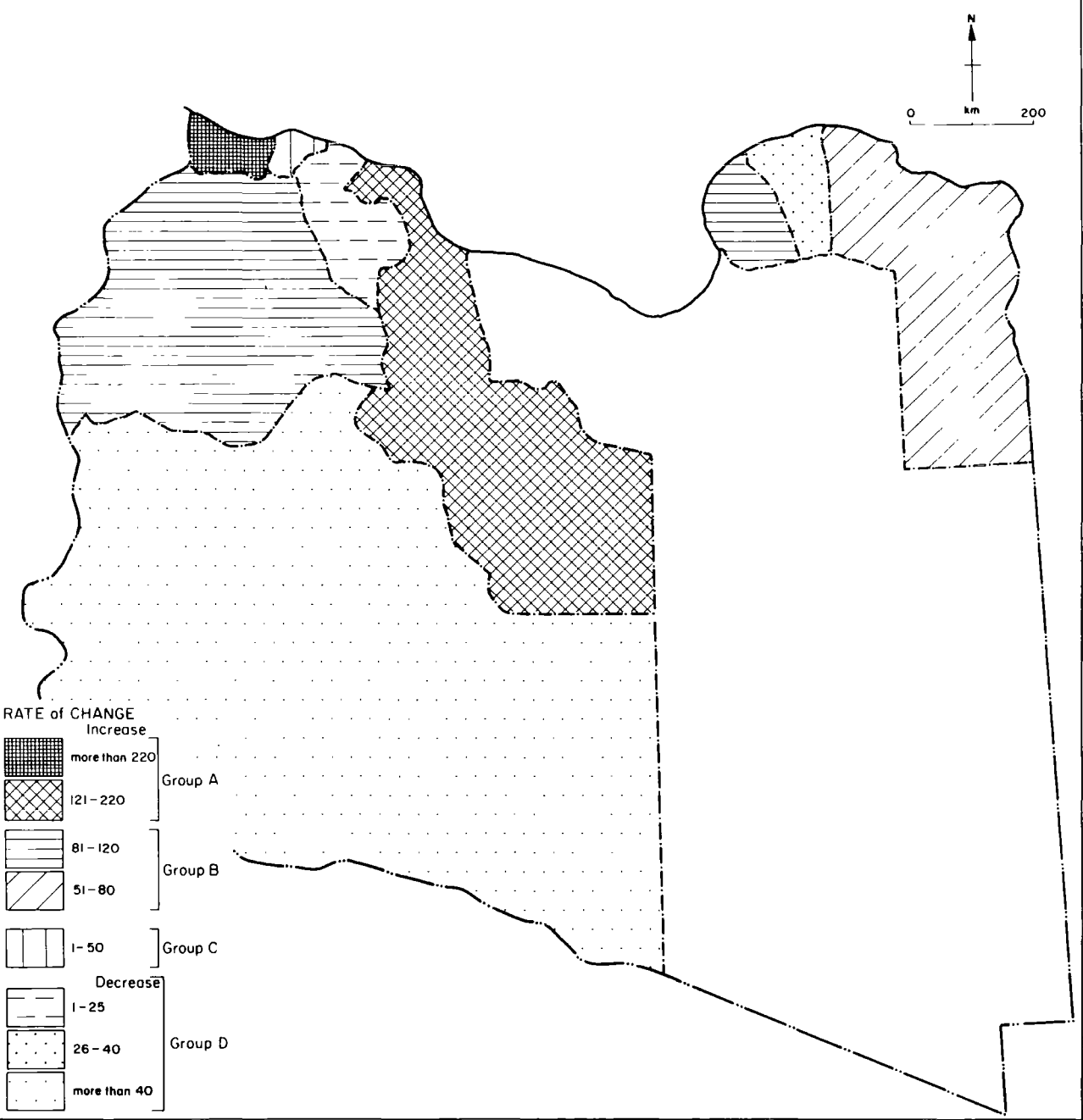
Furthermore, Table 4.4 also shows that at the end of this period in 1971 the pattern of distribution of the industrial workers was similar to the distribution of absolute growth, especially in the first four muhafadat. One can conclude that the muhafadat which gained the most workers were those which had the largest number of workers. However, the various changes in the regions during this period affected the order of the regions in terms of numbers of workers; for example, Homes lost its third place to El-Zawia, while the Misurata region moved ahead to fourth place behind El-Zawia, overtaking Homes and Derna which ranked fifth and sixth, respectively, in 1971.

As far as relative growth is concerned, Figure 4.4 emphasizes four types of groups :

- (a) those which grew at a high rate
- (b) those which grew at a moderate rate
- (c) those which grew at a rate less than the national rate
- (d) those which lost a number of workers.

In group (a) El-Zawia is the nation's most rapidly growing industrial region, registering about 325 percent growth in the intercensal period. This might be explained by reasons referred to above, and it might also benefit from proximity to Tripoli. It is followed by Misurata, with 210 percent growth. The gradual build-up of state-owned establishments in Zletin and Jofra provides the reason for Misurata's growth, and it might also be maintained that some industrial workers were moved from Homes to Misurata. The regions which had a moderate rate of growth (b) are Benghazi, Gharian and Derna, with rates of 86, 96 and 67 percent, respectively. Tripoli, with a 35 percent growth rate, is the only region whose growth was less than the national rate (c), while the last group (d) includes all the other muhafadat. Moreover, the greatest percentage change

THE RELATIVE GROWTH OF INDUSTRIAL WORKERS AMONG THE MUHAFADAT 1964-1971
Fig. 4-4



in industrial workers during the period meant relatively small numbers of workers, as they took place in centres which had small numbers of workers in 1964. For example, the outstandingly large percentage increase in El-Zawia and Misurata represented a smaller number of workers than in Tripoli and Benghazi.

Although the industrial census of 1964 does not give the distribution of workers by industrial groups among the regions, nevertheless since the highest growth in numbers of workers was in the food, soft drinks and tobacco group, and as the table shows that the food group had a high proportion of industrial workers in 1971, in El-Zawia and Misurata, one can suppose that the rapid growth in these two regions was mainly in the food, soft drinks and tobacco group.

Comparing the net change in number of establishments with net change in the number of workers (Table 4.4) among the various muhafadat, it is clear that they are not directly related, largely because of the disproportionate influence of more large establishments in some muhafadat such as Tripoli and the small establishments in other muhafadat such as Sebha. One muhafadat, Homes, recorded a decline in both number of establishments and workers, and another, Gebel Akhdar, had a stable situation in terms of establishment, but a decline in terms of workers. Elsewhere, there was an increase in establishments in all muhafadat, including Sebha and Ubari, whose total workers had fallen. The figures indicate, also, that Tripoli muhafadat, which recorded an outstandingly large increase in number of workers, recorded a relatively small increase in number of establishments, contrasting with Derna muhafadat which recorded a large increase in number of establishments and a relatively small increase in number of workers. There is no doubt that the muhafadat of Tripoli was a major attraction for large establishments.

Table 4.4 Growth Of Industry Among The Muhafadat In Libya, 1964-1971.

Muhafada	Establishments			Workers				
	1964	1971	Net shift in absolute number	1964	Rank	1971	Rank	Net shift in absolute number
Tripoli	350	373	23	7,378	1	9,985	1	2,607
Benghazi	96	238	142	1,850	2	3,446	2	1,596
El-Zawia	24	80	56	298	4	1,266	3	968
Misurata	26	52	26	230	6	712	4	482
Homes	74	54	- 20	711	3	541	5	- 170
Derna	23	53	30	238	5	397	6	159
G. Akhdar	13	13	0	135	8	92	9	- 43
Gharian	11	20	9	81	9	159	7	78
Sebha and Ubari	5	15	10	185	7	103	8	- 82
Total	622	898	276	11,106	-	16,701	-	5,595

Sources : (1) Census and Statistical Dept., Industrial Census 1964, Tripoli, 1965.

(2) Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

Tripoli, Benghazi and El-Zawia had over 92 percent of the total increase in number of workers, and 80 percent of the total increase in number of establishments during 1964-1971. With this in mind, the figures indicate that the government should take measures to help the development of Homes, Gebel Akhdar and Sebha Muhafadat, particularly to attract an equal share of the new employment in the growth industries, and to slow the rate of growth in Tripoli and Benghazi Muhafadat. This continuous pattern of concentration of industrial growth in these two muhafadat during the 1960s reveals that there was no effective action taken by the government to influence the distribution of industry before 1971.

To summarize, in Libya during the period under study, the food, soft drinks and tobacco, and the wood and furniture industrial groups, were the largest and the most rapidly growing industries. They boosted their share of Libyan industrial workers from about 35 percent and 6 percent to about 49 percent and 12 percent, respectively. These facts refute the projection given by a U.N. industrial economist in his study of industrial development in Libya. ⁽⁴⁾ The study forecast that all groups of manufacturing industries, with the exception of the textile group, would increase by 1973 (Table 4.5). These incorrect projections were based on growth of demand and the standard of living, and neglected other important human, social and political considerations. This reflects the difficulty in estimating industrial growth in Libya, and any study dealing with this should take all these factors into consideration. Also, it should be emphasized that Tripoli and Benghazi experienced the largest growth in terms of the number of workers and establishments, while El-Zawia registered the highest percentage growth. Rates of growth were more rapid in the north-western than in the north-eastern parts of the country. Finally, there was a higher growth in small-scale industries, and most industries were in the private sector.

Table 4.5 Change In Number Of Workers, According To Vardjan's
Projection By Industrial Groups, 1964-1973.

Industrial Group	No. of workers 1964	Projected no. of workers 1973	No. of shift workers	% of shift
Food, soft drinks and tobacco	3,235	4,960	1,725	53.3
Textiles	565	1,030	465	82.3
Leather, shoes and clothes	134	290	156	116.4
Paper and printing	773	1,410	637	82.4
Wood and furniture	551	1,770	1,219	221.2
Chemicals	1,718	2,760	1,042	60.7
Building materials and non-metallic	1,877	4,330	2,453	130.6
Metal work *	346	1,260	914	264.1
Miscellaneous	35	50	15	42.9
Total	9,234	17,860	8,626	93.4

* Electrical, Machinery and transport equipment subtracted from this group.

Source : Vardjan, V. Manufacturing Sector : Tentative Development
Programme 1964-1973, Vol.1, Tripoli, March 1969.

2. STRUCTURAL CHANGES

It may well be that the linking of changes in number of workers with the change in value added and with workers' wages and salaries would produce the most satisfactory indicator of all-round growth in industry, better than one depending on only one variable, such as number of workers, which may not always be useful as a barometer of growth or decline of industry. For example, an appearance of stability in any industrial group may be due to change in both number of establishments and number of workers, or an appearance of rapid change may result from growth in one establishment in an otherwise stable industrial group. Therefore, a study of change in number of workers alone does not illustrate fully the relative importance of these manufacturing groups.

This study attempts to discuss the relationship between changes in some of these variables among the various industrial groups.

Table 4.6 sets out the data used in this study, while Table 4.7 represents the relative percentage change in each of the variables under consideration. In general, despite the fact that the statistics are in current prices, some impression of the national characteristics of the industrial groups in terms of these variables can be gained from Table 4.7. Firstly, the manufacturing value added grew faster than any of the other variables during this period. It grew more than four times faster than the number of workers. Secondly, the wages earned increased more than the value added per worker, which means that the cost of workers increased during this period. This may be because of the degree of capital investment in some industries which required skilled workers with high wages, but, in addition, the workers' wages and salaries increased threefold. The basic wage increased from LD 0.500 to LD 1.500 as a result of government policy.

Table 4.6 Change In Value Added, Workers And Wages By Industrial Groups In Libya, 1964-1971 (in LD).

Industrial Groups	Value added		No. of workers		Value added per worker		Wages and salaries unit	
	1964	1971	1964	1971	1964	1971	1964	1971
Food, soft drinks and tobacco	2,571,924	12,718,000	3235	8,149	795	1,561	738,428	3,378,151
Textiles	266,597	715,266	565	503	472	1,422	156,655	356,232
Leather, shoes and clothes	35,059	146,997	134	308	262	477	27,581	147,084
Paper and printing	402,033	709,171	773	543	520	1,306	284,885	402,575
Wood and furniture	268,113	2,037,156	551	2,013	487	1,012	147,257	1,267,550
Chemicals	370,000	1,788,504	1,718	1,010	215	1,771	205,233	669,872
Building materials and non-metallic	926,744	3,881,184	1,877	3,198	494	1,214	608,926	2,644,451
Metal work	190,313	1,046,973	346	956	550	1,095	145,497	585,068
Total *	5,030,783	23,043,251	9,199	16,680	3,795	9,858	2,314,462	9,450,983
Mean	628,848	2,880,406	1,150	2,085	474	1,232	289,308	1,181,373

* Excludes the miscellaneous industry group

Sources: 1. Census and Statistical Dept., Industrial Census, Tripoli, 1965.

2. Computed by the author from data in I.R.C. Industrial Establishment Census 1971, Tripoli, 1972, and Industrial Census 1971, Tripoli, 1973.

Table 4.7 Percentage Changes In Some Variables In Libya Among
The Various Industrial Groups, 1964-1971.

Industrial Group	Value added	No. of workers	% change in Value added per worker	Wages and salaries
Food, soft drinks and tobacco	394.5	151.9	96.4	357.5
Textiles	168.3	- 11.0	201.3	127.4
Leather, shoes and clothes	319.3	129.9	82.1	433.3
Paper and printing	76.4	- 29.8	151.2	41.3
Wood and furniture	659.8	265.4	107.8	760.8
Chemicals	383.4	- 41.2	723.7	226.4
Building materials	318.8	70.4	145.7	334.3
Metal work	450.1	176.3	98.4	302.1
Mean	358.0	81.3	159.9	308.3

In terms of change within the various industries, results gathered from Table 4.7 point to some interesting and important facts. Firstly, there is an extremely wide range of growth rates among the different industrial groups. The wood and furniture groups had the highest rate of growth of total value added, followed by metal work, and these two groups also showed the highest rate of growth in numbers of workers.

Comparing the different growth rates (by industrial groups) of workers and value added, it is obvious that in spite of reduction in the number of workers in some industries, they showed a marked increase in value added per worker; the chemical group showed a dramatic increase, more than three times that of the textile group, and ranked second. Others that showed a marked growth in the number of workers had a growth in value added per worker less than the national rate of growth.

An analysis of value added per worker and the wage unit among the various groups indicates that the chemicals, textiles and paper and printing stand in a unique situation. These groups registered both the highest

value added per worker, and the lowest growth in wages unit. Groups which had the lowest value added per worker registered the highest growth of wages unit. The change of wages unit in the wood and furniture group is more than three times that of the chemical group, and more than 18 times that of the paper and printing group. A comparison of these variables reveals several facts. Firstly, the chemicals, textiles and paper and printing groups recorded the highest productivity per worker and, secondly, since the number of workers decreased in these groups, and they achieved the lowest rate of growth in the wage unit, one can presume there was a capital-intensive trend in these groups during the period under consideration. Meanwhile, the food, soft drink and tobacco, leather, shoes and clothes, wood and furniture and metal work groups, with a high change in the number of workers, wage and salaries unit, and a low change in value added per worker, were still mainly labour-intensive, using the traditional system of operation and equipment.

In order to obtain further insight into industrial growth, and the difference between the patterns of growth in this period, it is advisable to apply some form of correlation analysis to these industrial variables. The results of these correlations are summarized in Table 4.8. It is clear from this table that in the case of the changes in value added and in numbers of workers, there is a positive correlation during the period. Those industries where value added increased more than average tended to achieve higher than average change in number of workers, except for the chemical group where the number of workers decreased. In contrast, industries with less than average increase in value added gained less than an average increase in number of workers.

Turning to the change in value added per worker and in number of workers, the table indicates that the correlation is negative, and this is significant (at 0.05). It means that the industries with an above-

Table 4.8 Matrix Correlation Of Changes In Some Variables In Industry
In Libya, 1964-1971,

Variables	Value added	Workers	Value added per worker	Wages and salaries
Value added	-	0.762	- 0.429	0.690
Workers	0.762	-	- 0.738	0.762
Value added per worker	- 0.429	- 0.738	-	- 0.714
Wages and salaries unit	0.690	0.762	- 0.714	-

average increase in value added per worker tended to have a lower than average increase in the number of workers.

This result tallies with the relation between the change in value added per worker and wages unit. The correlation is statistically insignificant, but most of the industries which increased above the average in value added per worker tended to achieve the least rate of change in wages unit. It is clear that new production techniques were introduced for some industries, and it agrees with the previous results affecting industries such as chemicals, textiles and paper. But the benefits from technical progress were varied, the chemical group recording more benefit than other industries.

So during this period those industries which achieved above average increase in value added per worker experienced below average increase in workers and in wages and salaries. On the other hand, industries which achieved a small increase in value added per worker tended to show that their workers and wages increased more than the average growth.

To conclude, it can be seen that an expansion and growth of industry was evident in Tripoli and Benghazi. They were the only areas which recorded a substantial increase in industrial workers, because they

are in a good position to attract new industrial concerns with good growth prospects. The rapid growth of industry in these two muhafadat may shed light on the concentration problem and the future of regional planning (see Chapter nine). The chemical industry was the most successful industry during these years, and in spite of the decrease in its number of workers, it achieved the highest growth in productivity. The wood and furniture, metal work and food, soft drinks and tobacco groups, achieved a great increase in terms of workers, but a low rate in productivity per worker. These industries are still carried on in small-scale establishments with a traditional system. Moreover, in spite of general industrial growth, Libya's industrial growth was still slow during this period as a result of poor industrial policies. Finally, it seems that large establishments have grown rapidly in recent years, and this may be expected to continue in any future period of accelerated growth.

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CHAPTER 5

THE GOVERNMENT ROLE FOR INDUSTRIALIZATION

This chapter discusses industrial development and, in particular, the role of the government. The development of local industry by the government took two forms. On the one hand, laws were made which encouraged industries, and on the other hand, it financed and participated directly in production. Each of these aspects will be discussed in separate sections. However, before discussing them it is important to throw light on how the industrial development policy was carried out during the period of the study to show to what degree the government was serious in this policy.

I. MEASURES OF ENCOURAGEMENT

A. INDUSTRIAL DEVELOPMENT POLICY

The beginnings of Libyan government intervention in the economic development of the country date back to 1953, following the report of a U.N. Economic Survey Mission. This involved the expenditure of just over LD 18 million and was confined to repair of war damage and improvements in the most urgently needed basic facilities in agriculture, transport, health and education. ⁽¹⁾ In fact, the early years of the Libyan government saw little positive action in economic development, and particularly in the industrial sector.

The most important assistance in the industrial sector was attempted during the first comprehensive five-year development plan, 1963-1968. After 1960, due to the increase of the oil revenue, national economic planning began to evolve, but industrial policy in Libya before 1969 was very different from that since 1969, and this

is reflected in the industrial development plan. Table 5.1 reveals the big difference between the two approaches. In the period 1963-1968 the industrial sector was allocated LD 14,706,000, with a small 3 percent share of the total planned investment. The table illustrates that the development plan for industry was directed towards the private sector which supported research and training, provided credit, and established industrial estates. The government, as part of a deliberate policy, aimed at promoting the private sector, except in rare cases where it had to undertake a project or participate in it for special reasons, as it declared in the first 5-year plan :

"The basic policy of the government is to encourage, whenever feasible, the maximum degree of private investment in the industrial sector of the economy. When state intervention is deemed necessary, it is firmly held by the government that its function is to assist and support infant industrial enterprises so that they may in due course become independent and self-sustaining undertakings within the private sector, functioning without further state intervention other than the normal regulatory functions of the state.

In our country it is recognized that this process may require more time and more finance than in other more advanced economies, but the process should be the same and the final result be a vigorous, self-reliant private industry." (2)

However, although the industrial share of the 1963-68 development plan was 3 percent, actual investment was more if we bear in mind the benefits which indirectly went to industry from investment in other sectors, for example, water supply, electricity and transportation (estimated at about LD 10.7 for water and LD 08.8 millions for electricity) If we evaluate the development policy plan before 1969 we can conclude that industrial development was not a major target because in giving high priorities to agriculture and the infrastructure, it paid scant attention to industrial growth. Moreover, the need to build up basic infrastructure by constructing such things as roads, ports, airports, public buildings and public utilities greatly affected

Table 5.1 The Industrial Development Plans, 1963-1973, According
To Projects (LD , 000).

	Project	1963-68	1968-69	1969-70	1970-71	1971-72	1972-73
1	National Public Organization of Industrialization	-	-	-	6,445	20,700	35,510
2	Industrial Estates	797	258	-	-	-	-
3	Industrial Research	89	150	340	345	600	988
4	Industrial Credit	10,095	6,000	6,000	11,500	9,000	8,800
5	Strengthening Mineral	183	100	-	-	-	-
6	Fisheries Development	794	195	435	1,698	700	700
7	Establishing Industries	2,117	897	725	-	-	-
8	Developing Traditional Industries	-	-	80	92	570	620
9	Encouraging Industry	-	-	280	400	430	2,330
10	Industrial Training	631	100	-	-	-	-
	Total	14,706	7,700	7,860	20,480	32,000	48,948

Sources: 1. Ministry of Planning, Industrial Development Plans, unpublished.

2. I.D.C.A.S. Industrial Development Directory : Libya, Arab League, Cairo, 1970, p. 22.

the allocation of capital expenditure in the development plan. And even in the industrial sector the state was not concerned with direct participation, and the funds for some projects were spent in other ways; for example, the industrial estate allocation was spent on building houses in Benghazi and Misurata for traditional handicrafts. Moreover, industrial credit was mostly spent in real estate, as we will see later.

This might be excusable because of the lack of experience of the government in industrialization, and entrepreneurs can realize easily which projects are profitable. But this does not seem valid in the case of Libya, a state with a large quantity of capital, because depending on the private sector, which is unable to promote industrial development, will not produce the best result for industrialization. The private

sector's inadequate investment in industry may be attributed to the weakness of the incentive laws and to the great success achieved by others in trade and real estate, which do not need skilled labour, and give a high and quick profit. Even private investment may be concentrated on one type of industry which has high profits, while other industries which make use of a valuable natural resource but with low profits will not develop. Besides, the private sector will not be concerned about the social benefit for the region involved, so some regions will be neglected.

It might be said that the government was busy during this period developing an infrastructure and public works for future industrial development, but that does not excuse it from neglecting direct aid to industry, because it was in a situation to do very much more in the way of direct participation in industry, without seriously reducing expenditure on infrastructure. Consequently, the private sector played a major role in industry before 1969, and particularly during the last six years, when it sponsored a programme of liberal credit for private entrepreneurs.

It can be seen from Table 5.1 that after 1969 industrial development increased remarkably, and the public sector began to receive more attention. The National Public Organization of Industrialization (N.P.O.I.) was established with a large share of the total industrial plan (as we shall see), and the Industrial Research Centre (I.R.C.) was established as well. This change in emphasis can be explained on the grounds that the public sector did not receive enough attention during the previous years, and as a positive reaction of the government towards industrialization.

The regime which came to power following the revolution of 1969 introduced certain measures which had a direct effect on industry. The most important changes were in the share of industry in the development plan, and in industrial policy. The share of the industrial sector in the plan

was increased from 3 to 10 percent in 1970-71 and to 15 percent in 1972-73, thus moving it to first rank in the economic sectors, followed by agriculture at 14.2 percent. The aim was to achieve progress at a compound rate of 14.5 percent for the non-oil economic sector, while the anticipated expansion for the mineral and oil sector was 2.5 percent annually. (3)

The new policy aimed to stress the strong role and responsibility of the government in promoting the public sector. The industrial policy of 1970 as declared in the official resolution can be summarized as follows. (4) The public sector was to carry on the essential industries and those which required investment on a large scale which only the state could provide, as well as those medium-size industries which also required considerable capital and were of a highly complex nature. Small projects producing consumer goods for the demand of the market, and depending on less complicated machinery, would be left to the initiative and enterprise of the private sector. Foreign minority participation was permitted only in industries utilizing the latest technology or producing for the export markets.

Consequently, the policy was a mixture of state intervention and private enterprise. State control was extended more widely and more deeply than would be considered desirable in a capitalist or free-enterprise type of economy; at the same time, there was a greater reliance on productive activities than would be considered appropriate in a socialist society. This means that the government followed the same policy as many African states, which is described as African Socialism. (5)

Despite the fact that in a theoretical sense the public and private sectors were complementary, there was not a balance between the two sectors. For the private sector, the policy still concentrated on providing financial loans, at this time limited to LD 60,000, while the funds for the public sector are unlimited, and industrial research

was available for the public sector only. It did not show any kind of co-operation such as publicly supplying standardized components and primary materials and leaving the final production to the private sector. Some state-owned industries which are now under construction or under investigation are similar to some private industries such as tomato canning, soft drinks production and flour milling. Moreover, since state-owned industries are run on a large or medium scale, and so can offer high salaries, they will attract workers from the private sector. The adoption of such a policy for industrial development may therefore lead in the long run to the destruction of the private sector.

B. EXEMPTION FROM TAXES AND TARIFF PROTECTION

The first step by the government to stimulate the industrial sector in recent years was the Law of 1956 which was amended in 1961. It gives grant incentives for existing and newly established industries with an installed source of power of not less than 10 h.p. and employs at least 10 workers. ⁽⁶⁾ These incentives were :

1. The exemption of all industry from taxes, including income tax for a period of five years from the commencement of production.
2. Exemption from property tax for a period not exceeding ten years.
3. Exemption from duty of the raw materials, machines, equipment and spare parts required by the industrial establishment for production purposes, for a period not exceeding five years.

It is obvious that despite this law, with its exemptions, the inducements do not amount to much, and could not provide a significant or desirable amount of assistance to infant industries. Income tax is low, only 13 percent, and, in fact, many establishments do not pay it, owing to the lack of a strong administrative system. The exemptions,

especially from tax, are for a short period of time, if compared with the period in Iraq, which is six years, or Kuwait, Mexico and Brazil, where it is up to ten years. ⁽⁷⁾ It excludes establishments which employ less than ten workers. The exemption procedure is complicated, requiring applications from each establishment needing exemption, and a long time passes from the filling in of the application to the announcement of the government's decision, due to the complicated set of rules and procedures. Many entrepreneurs have found themselves paying the rates before getting exemption permission. Furthermore, the raw materials exemption has been applied within strict limits in order to avoid misuse by the entrepreneurs because some imported materials, like cement, flour, wood and paper, are semi-manufactured and are used either in industry or for final consumption. Up to the middle of the 1960s, the taxes and tariffs were very important to the Libyan revenue, and a large materials exemption was very costly.

As for tariff protection, this is a well-known policy for promoting infant industries in most developing countries. It is generally recognized that industry in Latin America and in Asian countries has developed in an atmosphere free from competition from imported goods. However, in Libya the Tariff Law No. 59 of 1957 was ineffective, due to inflationary pressure. Moreover, it appears that the government was not serious in its concern to protect industry, as is clear from the failure of many establishments which could not compete with foreign production. In addition, some of the leading government officials were involved directly or indirectly in the commercial sector and they did not desire the progress of industrialization, which would injure their businesses. In 1968, Tariff Law No. 38 of 1968 replaced the

1957 Law. It increased the duties on a number of manufactured goods by rates ranging from 5 to 40 percent; some were subject to import licences, and others were banned. Because of this law, a Tariff Committee was set up for protection, with the result that others were protected in 1971. Even so, some respondents interviewed stated that many industries still face severe foreign competition. The manager of a new shoe establishment (public) stated that competition with foreign products is one of the problems affecting the success of the establishment. (8) This may be partly because tariffs for all imports of industrial goods are relatively low, and partly because of the inflexibility of local industrial production. The government was later forced to exempt some industries supplying the same goods to the consumer at lower prices, such as milk, salt and tomato paste.

It is doubtful whether without any protection, countries such as Libya can succeed industrially and compete with foreign industries which have long experience. Any procedural aids for domestic industry will certainly be justified, but the question is, which kind of protection should industry have? Tariffs, bans, quotas, or a subsidy system? It should be borne in mind that these incentives have their dangers, under conditions such as exist in Libya, where the market is small and only one or two large establishments can represent the market.

A tariff system encourages monopolies and exploitation, especially when the leading industrialists are well known to each other and can very easily arrange to maintain high prices with low quality. In a short time it might injure other domestic sectors, for example, the high price of fertilizers may affect the cost of agricultural goods. Another fact should be kept in mind; introducing a protective tariff for particular articles means raising the price to the consumer, whether they are manufactured locally or abroad. This system might be acceptable if local industry supplied the whole domestic market. But when local industry

supplies only part of the market, why should the consumers pay a higher price for those articles that will continue to be imported? (9)

A system banning imports may not improve the quality of production, as Adams noticed :

"The philosophy of eliminating imports rather than working for efficient production and improved quality is contagious, and is evident in the private sector of the economy also. Private producers come to expect the government to protect their market by means ranging from high duties to outright prohibition on imported competing products. (10)

The Quota system used in many countries to protect industry by limiting the volume of imports can lead to corruption through importers who may secure high prices by creating scarcity. Direct government subsidy in lieu of protection, with an equivalent amount paid directly to the local manufacturers for each article produced, shifts the cost of production from the consumer to the government. This system appears to be ineffective in Libya. The subsidy may be higher than the actual cost, either because entrepreneurs declare false bills or, in the case of estimates, the decision of the officers may be affected by considerations of fairness and other arbitrary personal prejudices and contacts.

Despite all of these dangers, there is no alternative and Libya should have special protection, suited to its circumstances. One might go farther and suggest that it should have two kinds of protection. For industries whose productive capacity is sufficient for local demands, banning imports seems the most reasonable system. In the case of industries where local demand is more than its production capacity, a quota system might apply to fill the gap. But to avoid the dangers of these two systems of protection, a highly qualified committee must be set up to control carefully applications for protection. In both cases the committee should control the quality and the price of the local product and its price level as compared with imported substitutes, so as to know whether any protected industry is becoming more or less

efficient. In the latter case the committee should project the volume which must be imported for each industrial item, after carefully estimating further demand and local production of the item. The committee should know that efforts at protecting in the short run are not enough for some industries since infant industries take time to assimilate new techniques and operate them efficiently.

It is true that such measures can be costly and may lead to some waste in capital, but in Libya the supply of capital is elastic, and the waste may be absorbed if one considers the long-term benefits of industrialization. The government could compensate for the reduction in tax revenue from the industrial sector by increasing taxes on land, real estate, commerce and construction.

C. FOREIGN INVESTMENTS

Although Libya has enough money for investment, foreign capital should be encouraged to enter the country to stimulate private investment. This is because Libya is still in the stage when it must look to foreign companies to carry out some projects affecting industrial development. It is obvious that attracting foreign investments to this field brings many advantages, such as foreign technical skill and experience, and the bridging of the gulf between the existing techniques in Libya and those attained by highly organized industries abroad. Besides, it would bring a new administrative and management system, and could also expand the market abroad.

The government introduced a law in 1958 regulating foreign capital investment in the country which was replaced by another in 1968. (11) The law excluded the oil industry, which was the subject of a special law, and provided many exemptions for any enterprise with a paid-up capital of at least LD 200,000 and with at least 51 percent foreign investment :

1. exemption from customs duties on imported machinery, tools, equipment, spare parts and raw materials utilized by these enterprises for a period of five years.
2. exemption from income tax for a period of five years.

In spite of all this, there is no sound basis for foreign capital invested recently in industry. This may be explained by the limitation of the market, and a fear of nationalization such as has happened in other countries in the Middle East. The International Bank Mission recommended that :

"The government should do everything possible to clarify its intentions with regard to foreign investment and to clear up any prevailing doubt or misunderstanding." (12)

To get benefit from foreign capital, a suitable atmosphere must be generated by guarantees, because foreign capital will not enter the country until it is certain that the reward will be great. The guarantees should refer to :

- (a) The remittance of profits and repatriation of capital.
- (b) No nationalization for a fair period of time, and when nationalization occurs, fair and equitable compensation.
- (c) Subsidies for exporting part of the production.

Such guarantees may manage to attract some foreign companies to establish branches in Libya.

D. THE INDUSTRIAL RESEARCH CENTRE (I.R.C.)

Research into modern industry is an important factor in its growth and development. The role of research is not only important in the profitability of possible new industries and in attracting industrialists to start such industries, but it is also a duty of government. (13) The role of the government in Libya in this field will now be evaluated.

I.R.C. was created in 1970 in order to improve industrial research and technical assistance, and to recommend to the public and private sector the best way of developing industry. The creation of this centre was another step forward in helping the country reach its goal of industrialization. The function of this body is best explained by its statutes, which may be summarized as follows : (14)

- (a) Conducting either directly or through other parties researches and studies relating to the establishment of new industries, including the feasibility of industrial projects, methods, and their priority;
- (b) Carrying out the researches and studies necessary for developing programmes and submitting to the authorities concerned suggestions and recommendations in this respect, whether governmental or private;
- (c) providing technical assistance to existing and planned industries, covering equipment, operation and management of the establishment, improving the productivity and the quality of the production, as well as diversifying and marketing their products;
- (d) Studying the quality and quantity of the country's mineral resources and the possibility of using them as raw materials for industry.

The centre, during its short life, has made a number of contributions to industry, such as surveying existing industries, making detailed feasibility studies for several industries in the public sector, and studying various mineral resources. However, it is clear from evaluation of its achievements that it has been used as an investment for public industries, and this is only a limited objective, other objectives being neglected. This may be because it is still in an early stage, because of the large number of projects planned by N.P.O.I.

at this time, and because its technical staff is small. In these circumstances, the I.R.C. cannot play a significant role in the promotion of industry.

Small private establishments cannot afford to spend capital on research, but most of the new entrepreneurs in industry are ex-merchants who are faced with the problem of not knowing in which industry to invest. Besides, in a world where continuous changes occur both in processes and products, the adoption of new techniques and products in the Libyan environment is as important as developing new raw materials. Leaving private industrialists to choose their projects without complete feasibility studies and advice may bring undesirable results. For example, they might choose labour-intensive techniques for their establishments when capital-intensive methods might be more appropriate. Most private investment has been made in industries which have succeeded in the past, so that investment in new ones has been limited. This has tended to build up some industries, while others have disappeared.

Offering services to the private as well as the public sector, making market studies for proposed industries, giving technical help and advice and helping in many other ways such as in selecting techniques - all this could aid industrial development.

Besides the incentives mentioned above, many others have been provided by the government, such as reducing the electricity rate by 50 percent, and encouraging fishermen by paying for a large amount of new equipment. This addition to financial loans and direct participation will be discussed in the following section.

2. INDUSTRIAL FINANCE AND DIRECT PARTICIPATION

The aims of this section are :

- (a) to discuss the role of financial institutions in providing industrial finance to the private and the public sectors;
- (b) to analyze the importance of the contribution which the financial system might be able to make in the promotion of industrial development; and
- (c) to examine whether there has been a satisfactory distribution of resources among the different regions and industries.

At present there are two financial institutions in the country besides the commercial banks : the Real Estate Industrial Bank (R.E.I.B.) and the National Public Organization of Industrialization (N.P.O.I.).

The study is divided into four parts :

- A. a brief outline of loans by commercial banks to the industrial sector,
- B. the role and contribution of the Industrial Development Corporation (I.D.C.),
- C. R.E.I.B. of Libya and industrial growth in the country, and
- D. the efforts of the N.P.O.I. in industrial development.

A. THE COMMERCIAL BANKS

The commercial banks are one of the sources of loans for various purposes such as commerce, construction, agriculture and manufacturing, mostly for short-term credit with a fixed interest rate. In Libya, as in other developing countries, commercial banks are the most developed form of financial intermediary. Therefore, a quick glance at the structure of their credit will help to illustrate this point.

It is clear from Table 5.2 that despite the recent emphasis on industrialization in Libya, and the fact that bank advances to industry multiplied more than twelve times over the period of 1958-70, modest use is being made of commercial banks' credit. The credit to the industrial

Table 5.2 Loans Extended By Commercial Banks To Industry, 1958-70

(in LD, 000).

Year 1	No. of loans 2	Total value of loans 3	Total Credit 4	% to 3 to 4	% contribution of 3 to G.D.P.
1958	250	933	7,761	12	-
1959	321	1,470	11,217	13	-
1960	591	1,296	14,545	9	-
1961	693	1,454	15,126	10	-
1962	422	1,988	18,244	11	10
1963	278	1,820	22,769	8	10
1964	295	2,235	28,733	8	8
1965	266	2,368	35,417	7	7
1966	348	3,712	47,258	8	8
1967	477	4,449	54,431	9	9
1968	748	9,090	73,601	12	9
1969	1119	10,450	92,835	11	8
1970	849	12,050	96,079	12	7

Source : Central Bank of Libya, The Economic Research Division,
Economic Bulletin, Tripoli, Vol. 11, No. 5-6. Sept-Dec 1971.

sector was small compared with that to other sectors such as general commerce which received about 39 percent of the total credit. This meagre extension of credit to the industrial sector can be explained by the lack of demand for industrial loans because businessmen are

frightened of the financial insecurity of industry. Also, the banks prefer to make more profit by concentrating on short-term credit. The decrease of the percentage allocated to industry after 1963 was due to the establishment of the Industrial Development Corporation in that year, which began to make loans, in addition to those made by the banks which were the only institutions which previously granted loans for industry.

Moreover, the table shows that the percentage allocated has increased since 1967, possibly owing to a shift of many businessmen to the commercial banks to avoid the restrictions of the R.E.I.B. Loans are more easily and rapidly obtained in the commercial banks, because personal surety is accepted and there is simplicity in the routine.

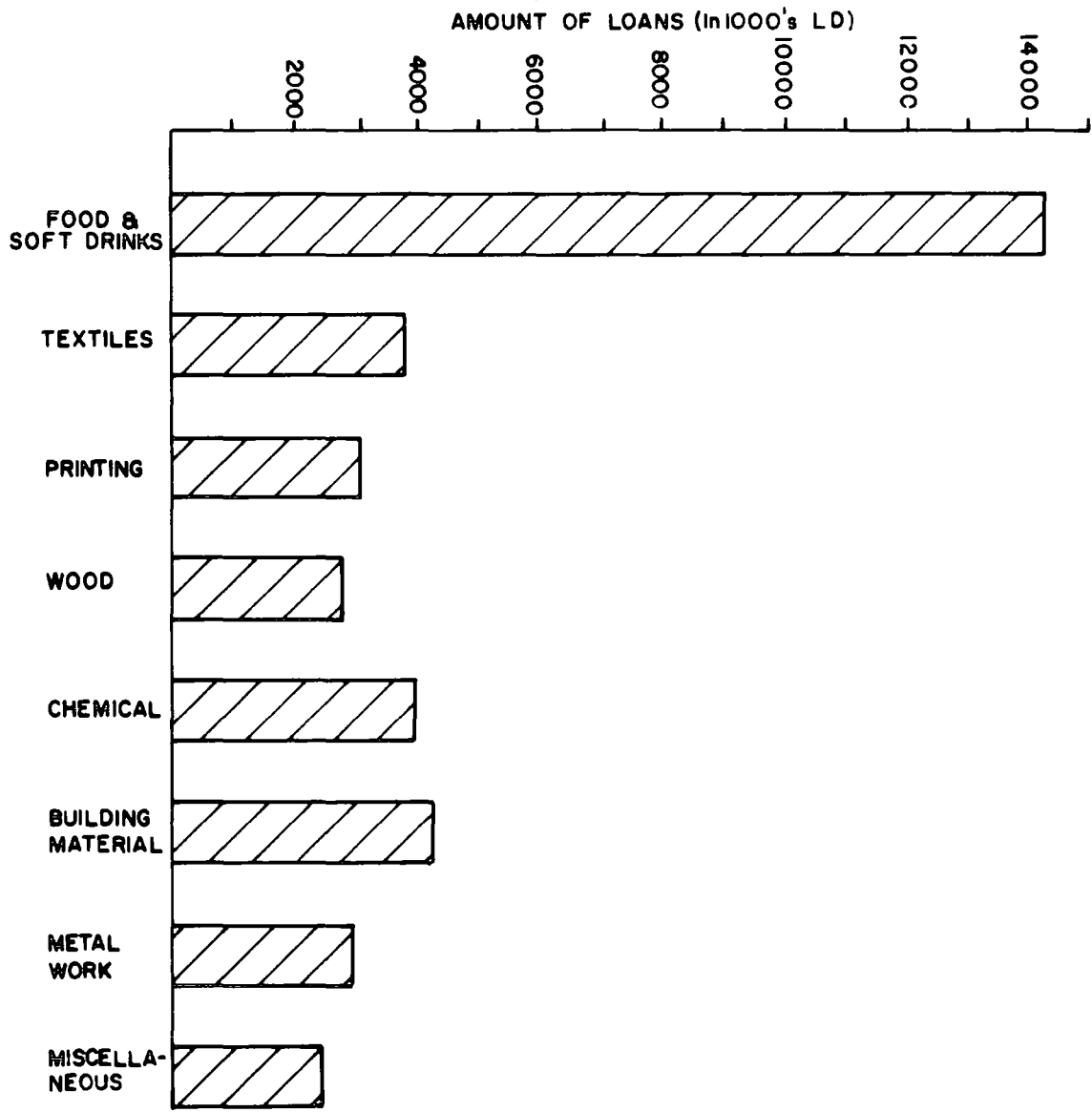
In order to estimate the share of total bank credit that has fallen to industry, the overall contribution that bank credit resources have made to the economic development of Libya as a whole must first be borne in mind. Table 5.2 shows that from 1964-1968 the contribution of commercial bank credit as a percentage of the G.D.P. rose slightly and fluctuated between 7 and 9 percent. Credit facilities specifically channelled towards the industrial sector show almost the same narrow fluctuation. It is apparent from this almost stable percentage for the commercial banks and industrial credit that there has been no increase in the share of the commercial bank credits directed towards the financing of industrial development.

In spite of the increase of the total loans from LD 933,000 in 1958 to LD 12 million in 1970, the banks have played a relatively small role in the promotion of industry, if account is taken of increase of the total credit and of the average size of the loans, which was not more than LD 10,000 in 1970. In Libya, such a small loan is inadequate even for the construction of medium-sized buildings, so the loans must

be for working capital and for the establishment of small workshops and traditional industries, especially in the building materials industry, and for the processing of foods. Examples might be bakeries, dairies, soft drinks, processing of olive oil, limestone and bricks. As Figure 5.1 shows, foodstuffs and building materials account for half of the total amount of the loans. As would be expected, small loans are usually for short periods. Many of the traditional and small factories which have small numbers of workers have received loans from commercial banks. Unfortunately, there are no figures to show what percentage of the loans are used for working capital rather than for fixed capital. The higher percentage received for foodstuffs and soft drinks can be explained by the fact that their processes require working capital more than fixed capital. The percentage was lower for processes such as carpentry, printing and chemicals, which import their raw materials throughout the year, than for foodstuffs, such as olive processing and flour milling, for which in Libya the requirements for the whole year are bought during the growing seasons. So short-term loans are used mainly for working capital, whereas fixed capital requires longer loans. (15)

The new industrial policy limits to LD 60,000 the amount of money that can be lent by the R.E.I.B., which is not therefore able to promote the growth of larger industries. Entrepreneurs who require larger sums of money must turn to the commercial banks, but these will only provide short-term loans. The amount and type of capital required to finance the establishment and running of manufacturing industries in Libya, as in other developing countries, is greater than the commercial banks, as they are now constituted, can provide. This is especially true in view of the propensity of the banks to concentrate on short-term lending.

Fig. 5.1 THE DISTRIBUTION OF THE COMMERCIAL BANK LOANS AMONG INDUSTRIES 1966-1970



One might suggest that the Central Bank of Libya (C.B.L.) could have encouraged the commercial banks, especially now that they have been nationalized (1970), to provide industry with more credit by inducing them to ease their lending policies through the provision of generous discount facilities, either in the form of lower interest, or of longer-term loans, where industrial development is concerned. It could have adopted even more specific measures so that credit extended to certain sectors should not exceed a fixed amount or a given proportion of the total credit supply. ⁽¹⁶⁾ The banks should also check from time to time to ensure that money borrowed, supposedly for industrial purposes, is not spent on other projects.

Moreover, it would be better for industrial development if the government through the Central Bank authority would not allow the commercial banks to give loans haphazardly. The government ought to ensure that loans are granted according to the general policy of industrialization, which should include a priority list for industries. Before a loan application is accepted, the commercial banks should require the entrepreneur to furnish the necessary information about his establishment, and the application should be approved by the Ministry of Industry. Such policies might enable the commercial banks to be more successful in the industrial development field. It might be possible, because the deposits and the liquid assets of the commercial banks have increased. The deposit held with Central Bank rose from LD 22.7 million at the end of 1970 to LD 120.2 million by the end of 1971, an increase of 429 percent during the year. ⁽¹⁷⁾ This is the result of increasing confidence in the banking sector. But the amount of credit, as mentioned before, did not grow at the same rate, as is reflected in the increase of the bank's liquid assets.

B. THE INDUSTRIAL DEVELOPMENT CORPORATION (I.D.C.)

Recognizing the problems created by the scarcity of capital in the early fifties and following the suggestion of the International Bank of Reconstruction and Development (I.B.R.D.), which was :

"The lack of an organized capital market in Libya is something of a handicap to industrial development. Moreover, there is no institution to which the prospective entrepreneur can turn for technical advice in establishing a new industry. To remedy these deficiencies, the Mission recommends that the government should set up an agency to provide both credit and technical assistance for industry", (18)

the government of Libya established the I.D.C. under the Resolution No. 2 of 1963 in order to fill a gap in the credit system. The main objectives were defined by its ordinance as being :

"to secure loans, to give technical assistance, and to study the possibility and participate in the development of industry in Libya. " (19)

The corporation, which was terminated in 1965, was the first specialized institution in the country to deal with the development of the industrial sector.

For the first year (1963-1964) its capital was about LD 1 million, of which LD 700,000 came from the reserve budget, and LD 300,000 from the development budget. (20) Up to September 1965, the corporation had granted financial assistance to 31 privately-owned industrial projects, and had allocated about LD 494,000, as shown in Table 5.3. It shows that industries which received most assistance from the corporation were those providing light consumer goods from local raw material, such as tomatoes, wheat, olive oil, sea products, wool and traditional textiles, received about 60 percent of the total loans, and were responding to the increased local demand for consumer goods following the discovery of oil; private and public expenditure on consumer goods increased more than 320 percent from LD 40.3 million in 1957 to about LD 170.6 millions in 1962. (21)

Table 5.3 Distribution Of Loans By I.D.C. Among Industrial Groups
 In Libya, 1963-65.

Industrial group	No. of loans	Total amount in LD	% of the total
Foodstuffs and soft drinks	6	148,000	29.9
Textiles	3	148,000	29.9
Wood	8	8,050	1.6
Chemicals	4	36,500	7.5
Building Materials	5	66,500	13.5
Metal work	3	86,050	17.4
Handicrafts	2	1,100	0.2
Total	31	494,200	100.0

Source : I.D.C. First Report On Its Activities from May 1963
to December 1964, Tripoli, 1965.

According to Table 5.4 Tripoli received more than half of the loans amounting to about one-third of the total credit, the average size of each loan being LD 9,000. In contrast, Benghazi received fewer loans but about 43 percent of the total credit, with loans averaging about LD 30,000. That does not mean that the loans in Benghazi were for larger industries than in Tripoli, since two of the loans to Benghazi amounted to LD 180,000. Muhafadat Derna, G. Akhdar, Homes and Sebha received only about 8 percent of the total, while Muhafadat Misurata, Gharian and Ubari received nothing. For distribution of loans among the muhafadat, however, it is not fair to judge the work of the I.D.C. over two years, since it was the first specialist institution and neither entrepreneurs nor its officers knew what it ought to do, especially in developing regions.

It is clear that there are factors which worked against the success of the corporation. As part of its function it was authorized to act like the ordinary commercial banks, giving loans in order to

Table 5.4 The Distribution Of Loans By I.D.C. Among Muhafadat, 1963-65.

Muhafadat	No. of loans	Amount in LD	% of the total
Tripoli	18	165,250	33
Benghazi	7	210,050	43
El-Zawia	1	80,000	16
Homes	1	18,000	4
Derna	2	4,500	1
G. Akhdar	1	16,000	3
Sebha	1	400	0
Total	31	494,200	100

Source : Fieldwork, Summer 1973.

obtain profit from the interest accruing. Also, there was no system for the approval of loans, which were affected by the personal influence of the borrower. For example, the director approved a loan of LD 100,000, about 20 percent of the total loans, to only one establishment in Benghazi, and this was against the regulation of the corporation. Moreover, it did not borrow money from non-government resources; it continued to be heavily dependent on government finance for its loan operations and activities. This dependence meant a certain amount of uncertainty as to the availability of resources, thus affecting the functioning of the corporation. It could not itself achieve anything in its object of establishing or taking control of any industry, and failed to enter into agreements for establishing new industries or expanding existing ones in terms of associate companies. The 25 percent share allowed by the ordinance of I.D.C. for participation did not encourage entrepreneurs to use I.D.C. loans for new industries, though an exception was its participation in the Cement Company.

Moreover, it lent money without supervision, and despite the stipulation of its ordinance that 60 percent of its loans must be for small-scale concerns, it made loans to medium and large projects, as

shown in Table 5.5, when loans of more than LD 50,000 accounted for more than half of the total credit. Perhaps it could have achieved more if it had had more qualified administrative staff and its capital had been increased.

Table 5.5 The Distribution Of I.D.C. Loans By Size (In LD).

Size of loans	Total amount of loans	% of the total
less than 10,000	52,200	10.6
10,000 - 49,000	182,000	36.8
50,000 - 100,000	260,000	52.6
more than 100,000	-	-
Total	494,200	100.0

Source : I.D.C. First Report On Its Activities From May 1963-
Dec 1964, Tripoli, 1965.

C. REAL EAST INDUSTRIAL BANK (R.E.I.B.)

This bank was established in September 1965, replacing the former Industrial Development Corporation with the aim of meeting the short- and long-term credit needs of housing and industry. The primary purpose of this fully-fledged development bank was to encourage the housing and the industrialization of the country. In order to achieve this, the bank was permitted to make loans to industrial enterprises, to participate in the equity capital of industrial companies, and to facilitate the import of machinery and raw materials for industrial purposes. It was also permitted to encourage a large number of new entrants in the industrial field by providing financial assistance and technical, economic and administrative advice, as well as the preparation of feasibility studies. ⁽²²⁾ Thus the framework for this bank is broader than the mere provision of capital. It incorporates such

activities as stimulating investment through the provision of capital, passing judgement on the feasibility of new projects, and developing technical and administrative help for the private sector. The following discussion examines the role and achievements of the bank in industrial development during the first seven years of its operation.

Table 5.6 itemizes the structure of the industrial bank's sources of funds during 1965-73. The paid-up capital increased more than ten times from LD 790,000 to LD 8 millions. This was due to the large sums of money for investment in the industrial sector, which resulted from the government's policy of industrializing Libya as rapidly as possible. Another improvement was the reduction in the percentage unrepaid credit in industrial loans from 45 percent in March 1968 to about 18 percent in March 1970, and from 4 percent to 2.7 percent in the same period for real estate loans. (23) It is quite clear that the bank was conceived as a government institution. Thus the act gives the government, through the Minister of Industry and Minerals, the right to appoint the board of directors and the managing director of the bank, besides the right to give the board of directors instructions of a general character. Resulting from government control, its order cancelled the rate of interest for the bank loans from 1967. This affected the sources of the bank's capital which can be obtained from public and private corporations, and from private individuals besides the paid-up capital from the government. Therefore, the bank became completely dependent on government resources. This dependence seems to have had a serious effect, in that unnecessary delay is involved in distributing the loans to borrowers, thus delaying establishments from starting operations on schedule. In addition, owing to the lack of resources, the bank cannot meet all demands. For example, in Benghazi, the bank loaned only 48 percent of the applications prior to November 1971. (24) Most of the loans were never used for industrial

Table 5.6 The Paid Up Budget Of Real Estate Industrial Bank Up To 1973 (in LD,000).

Year	Total	Government paid up	For Real Estate	For Industry	% 4 to 1
	1	2	3	4	
1965-66	790	790	-	-	-
1966-67	3,540	3,540	-	-	-
1967-68	10,095	10,095	-	-	-
1968-69	6,000	6,000	-	-	-
1969-70	6,000	6,000	-	-	-
1970-71	11,500	11,500	8,000	3,500	30
1971-72	9,000	9,000	8,000	1,000	11
1972-73	8,000	8,000	8,000	-	0

Sources: 1. R.E.I.B. Report Of The Board Of Directors From 7.9.65 to 31.3.70, Tripoli, 1970.

2. Ministry of Industry, Achievements Of The Industrial Sector : Tripoli, 1972.

purposes, but were spent on real estate. It is clear from Table 5.7 that the bank failed from an industrial point of view. It did not grant 50 percent of its loans to industry as was stipulated in Article 6 of its ordinance. ⁽²⁵⁾ In all years except 1968-70, when the bank's board clamped down on housing loan applications, more than 90 percent of its loans were given to housing. Two factors may help to explain this :

- (a) the simplicity of making housing loans, and
- (b) the inefficiency of the bank staff employed to examine the industrial loans.

Although the yearly paid-up amount was increased, and it might have been expected that the share of the industrial sector would increase as a result of the new attitude of the government, Table 5.7 shows that no

Table 5.7 The Distribution Of The Loans By R.E.I.B. Prior To 1973

(In LD).

Year	Total amount of loans (1)	Real estate loans (2)	Industrial loans	% of industrial loans to total
1965-67	6,573,224	5,981,225	591,999	9.0
1967-68	5,436,301	5,138,111	298,290	5.5
1968-69	5,084,455	3,704,519	1,379,936	27.1
1969-70	5,812,432	4,744,618	1,067,814	18.4
1970-71	11,133,775	10,091,525	1,042,250	9.4
1971-72	17,483,134	16,396,468	1,094,666	6.3
1972-73	20,810,115	19,932,826	877,283	4.2

Sources : (1) Ministry of Industry , Achievement of the Industrial Sector, Tripoli, 1972.

(2) R.E.I.B. ; Industrial Loans, 1972-73, unpublished paper.

improvement was made in industrial loans, whose share declined by about 20 percent in 1973 relative to the 1972 value. This might be explained by the factors mentioned before, or perhaps the bank's board could not understand the new policy when they provided for industrial loans only the amount which was only paid-up yearly from the government for this sector from 1970-71. In the case of real estate loans, the bank provided the yearly paid-up amount besides the capital which it had. The paid-up capital provided for industry loans decreased from 30 percent of the industrial share in 1970-71 to 11 percent in 1971-72, and to zero in 1972-73, and so the bank had to start to give loans from its own finances. ⁽²⁶⁾ It might be explained also by the new policy itself, which defined the amount of the loan, as mentioned earlier, causing the bank to concentrate on small industrial loans and to give priority to projects with low capital requirements.

In order to devote more attention to industry and to secure specialization in its operations, the government should separate the bank

into industrial and real estate banks, as in many other countries. Since the bank is the only specialized financial institution granting industrial loans to the private sector without interest, it should examine its policy, which might dissuade the entrepreneurs from investing in medium and large projects. Here the bank is competing with the commercial banks.

There are no data to show the average loan size since 1970, but according to the new policy the bank should have directed the bulk of its financial assistance to small and medium sized projects to the comparative neglect of larger projects. This concentration on the small projects may be justified in a developing economy where industrial investment may logically be expected to progress from small to large projects. It may take some time for private investors to gain the necessary skills and abilities to sponsor and finance larger industrial projects.

However, by limiting itself to these projects involving relatively high overhead costs in loan investigation and supervision, the bank had to operate at a continual loss. ⁽²⁷⁾ Table 5.8 reveals that during the period 1966-69 over 60 percent of the total individual investments were of more than LD 50,000. However, the bank authorities did not realize the failure of the bank to assist the small industries prior to 1970. The administration takes a long time over the routine approval of each loan issued by the bank, and the bank's policy requires every applicant to offer assets as security. It may be that the medium and largest size industries receive the greatest percentage of loans because they meet the security requirements more easily than the smaller investors, particularly if the latter are entering the industrial field for the first time. Under these circumstances, it was apparently logical for the Real Estate Industrial Bank to change its policy, to concentrate on the provision of larger loans for the larger industries, while the Central Bank should have encouraged commercial banks to provide loans for small industries.

Table 5.8 The Amount Of Loans Approved By The R.E.I.B. By Size Of Loans
Up To 1969 (In LD).

Size	1966-67 amount	1967-68 amount	1968-69 amount	Total amount	% to the total
1- 5,000	25,460	44,576	110,526	180,562	8.0
5,001- 10,000	49,039	26,400	77,910	153,349	6.8
10,001- 20,000	45,500	16,000	46,500	108,000	4.8
20,001- 50,000	94,500	188,814	170,000	453,314	20.1
More than 50,000	377,500	22,500	960,000	1,360,000	60.3
Total	591,999	298,290	1,364,936	2,255,225	100.0

Source : R.E.I.B. Report of Board of Directors on Period 1965-1970,
 Tripoli, '1970.

Regarding the period of the loans, it can be seen from Table 5.9 that only 36 percent of the total investment was lent for more than eight years, whereas 47 percent was for three to seven years. The bank loans were thus chiefly for medium terms. This may be explained by the fact that the industrial sector in Libya consists mainly of light industries which have a quick turnover of capital. It can also be seen from the table that the share of long loans was very high in 1968-69, but this was due to the high proportion of loans of more than LD 50,000 (see Table 5.8).

Breakdown of the loans sanctioned by the bank provides more details about other aspects of the bank's loan activities. Study of the data presented in Table 5.10 reveals that also there is a significant diversification among the industries financed. Food processing (mainly tomato canning, olive oil processing, bakery and soft drinks) alone claimed about 54 percent of the total amount advanced by the bank, none of the remaining industries having received any substantial amount. Thus, the bank did little to develop the other, relatively neglected industries, which were no less important, since their development would

Table 5.9 The Amount Of Loans Approved By R.E.I.B. By Period
Of Loans Up To 1969 (in LD).

Period	1966-67 amount	1967-68 amount	1968-69 amount	The total amount	% of the total
1 - 3 years	81,250	20,003	210,899	312,152	13.8
4 - 7 years	462,249	221,287	448,537	1,132,073	50.2
more than 8	48,500	57,000	705,500	811,000	36.0
Total	591,999	298,290	1,364,936	2,255,225	100.0

Source : R.E.I.B. Report of Board Of Directors On Period 1965-70, Tripoli, 1970.

increase Libya's independence. It appears, therefore, that the bank had no blueprint for its activities, and its loans were decided on in a rather haphazard way.

On the other hand, most of these loans were for new projects. Despite the fact that the bank has limited its financial assistance to the traditional groups of manufacturing industries, it has directed a large proportion of its loans to new industrial projects.

Regarding the regional distribution of the loans made by the bank, Figure 5.2 indicates marked inequalities in the distribution of the loans made by the bank to industry throughout the country. Thus, of the total advanced by the bank up to 31 March 1973, 52 percent went to Muhafadat Tripoli, and 21 percent to Muhafada El-Zawia (Figure 5.3), and was mostly used for food processing, Tripoli and El-Zawia being situated in the best agricultural areas and the central markets of agricultural production. Furthermore, applications from eastern muhafadats were not rapidly received, and were sometimes deferred until the next meeting of the bank board in order to query some requirement, while applicants for loans duly approved by the Tripoli branch (headquarters) were received more quickly, and were therefore granted accordingly. Another possible

Fig 5-2. REGIONAL DISTRIBUTION OF THE AMOUNT LOANED
BY R.E.I.B. (1965 to May 1973)

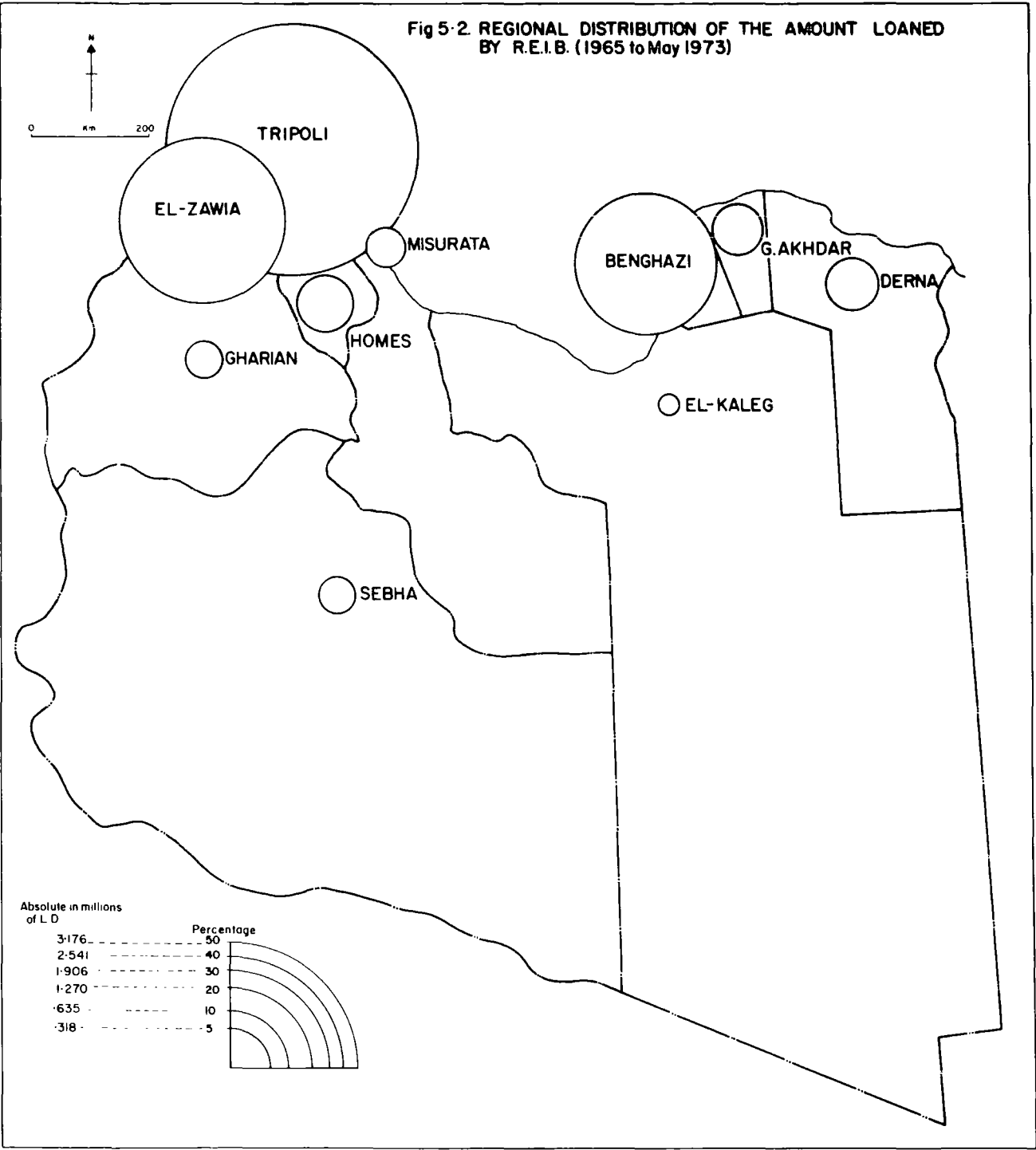


Fig.5-3 THE DISTRIBUTION OF THE NUMBER OF INDUSTRIAL BANK LOANS BY MAJOR GROUP OF MANUFACTURING INDUSTRIES IN EACH MUHAFAADA, 1965—MAY 1973.

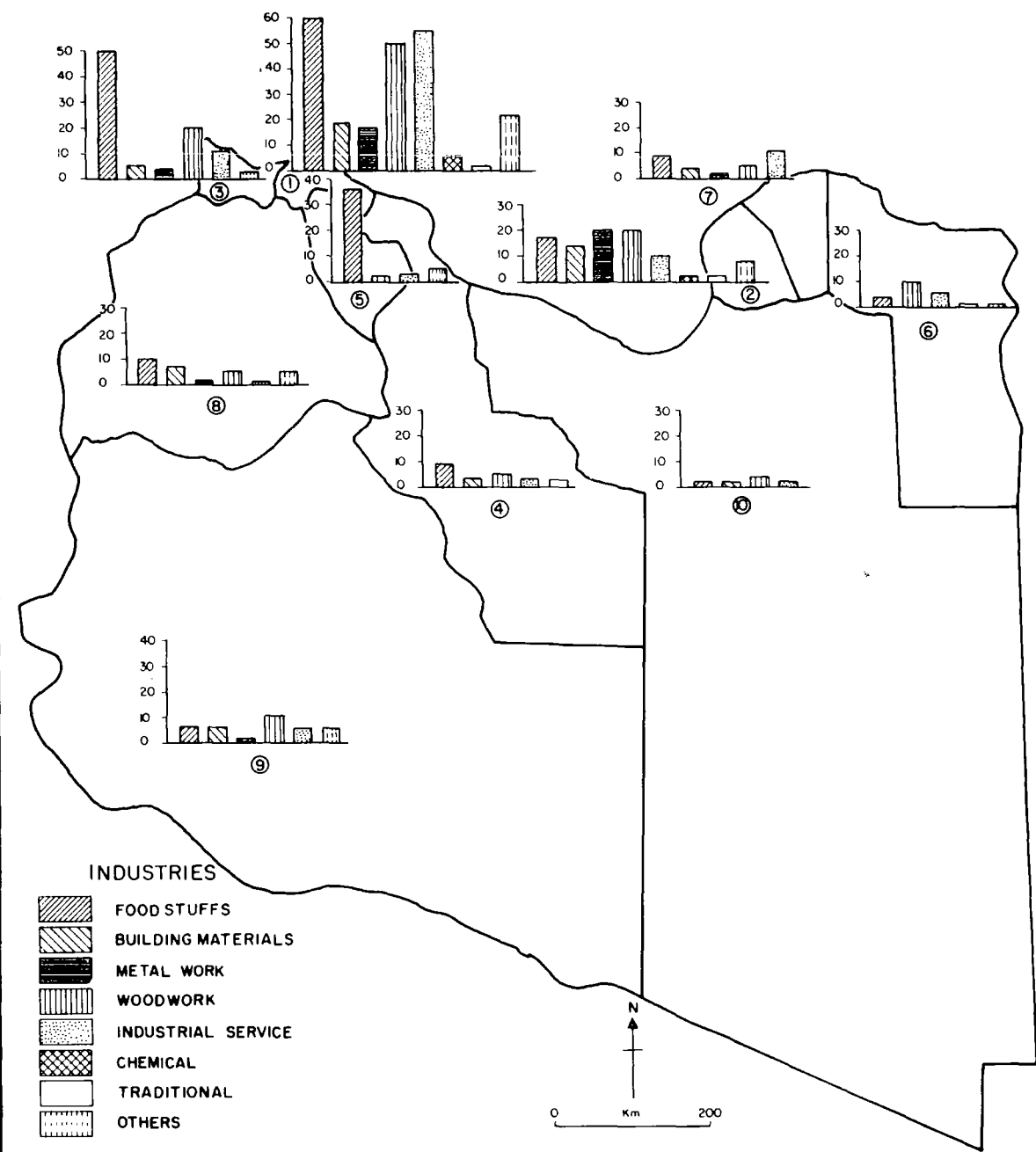


Table 5.10 The Distribution Of R.E.I.B. Loans Among Industrial Groups
Up To 1973 (in LD)

Industrial group	Total amount of the loans	% of the total
Food and soft drinks	3,447,097	54.3
Wood (carpentry)	234,710	3.7
Chemicals	174,500	2.7
Building materials	848,307	13.4
Metal work	80,000	1.3
Industrial services	720,026	11.3
Handicrafts	207,293	3.3
Miscellaneous	640,305	10.0
Total	6,352,238	100.0

Sources : 1. Ministry of Industry, Achievement of Industrial Sector,
 Tripoli, 1972.

2. R.E.I.B. Industrial Loans 1972-1973, Unpublished paper.

factor is that before the revolution local loyalties in Libya were very strong, the Libyans themselves acknowledging that their ties were first to their regions and second to the nation.

Industrial activities tend to concentrate in urban centres with attractive facilities (see Chapter 8). This does not contribute to the integration of the internal economy, nor has the government yet reduced very much the serious disequilibrium in the development of the component regions, or the disparity between their production and consumption capacities. (28) Private investors, presented with a variety of opportunities, selected those which assured the highest profits with the least organizational effort and minimum investment. Although this was wise investment policy from the standpoint of the individuals concerned, it did not lead to balanced industrial development from the standpoint of the country. (29)

The bank's objective should henceforth be to remove economic disparity between different regions by assisting less developed regions with a view to maintaining a regional balance in industrial development. The bank should give priority to rural industries and it might be advantageous for it to put a rate of interest on loans allocated to the cities such as Tripoli, while providing interest-free loans for rural areas.

In terms of participation, the bank has done little. Prior to 1971 the bank had taken in just one enterprise, a dry battery factory, by paying LD 232,000. The failure of the bank is attributable to its lack of technical staff and to the hesitation of the private sector in investing, the latter due to lack of confidence in industrial establishments controlled by companies or by the government. A good example is the cement company (Homes Factory) which has failed to encourage private investors, and has also been afraid of nationalization. The bank should participate in more profit-making industries in order to inspire confidence among the investors, and should disregard those industries which are unable to make any significant profit. Because the Libyans were, understandably, reluctant to invest in co-operative and joint-project industries, it is necessary to encourage more private investment in industrial establishments, and the government should attract the talent of private entrepreneurs.

The bank has only a small technical staff which is unable to provide technical assistance or professional advice to industries. In 1973 the bank carried out preliminary studies into about sixteen projects, including electric bulbs, bicycles, crown-cap, electric fittings, metal parts in carpentry, sandpaper, barbed wire, cotton, plastic bags and boxes, toilet soap, perfumes, chocolate and sheet metal work. However, these were not comprehensive studies undertaken by experts in the field. They did not consider the location or size of the project, its prospects, its profit potentiality or its importance from the standpoint of the national interest. Since the bank is the only organization to deal with this kind

of work for the private sector, it should have realized that there is more to industrial development than the granting of loans, and should have gone further in the provision of technical assistance. . Lewis has stated that the mistake of most agencies which deal with industrial development,

"was not that they lent money, but that they lent money without supervision , had the emphasis been more on managerial assistance and less on lending money, the result would have been different. " (30)

It is clear that the industrial bank's contribution to industrial development and location was limited as to the amount of loans granted. The bank limited its aid to those establishments with a capital investment of around LD 100,000, mostly plants for processing agricultural products, building materials and wood products. It did not pay any attention to regional location, providing technical information or market research. Its role in the location and development of industry was conservative and limited.

D. NATIONAL PUBLIC ORGANIZATION FOR INDUSTRIALIZATION (N.P.O.I.)

It has been stated that private investment has tended to take an interest in establishing only those industries in which there was low capital requirement and the prospect of earning quick profits, while industries with high capital requirement and complicated processes remained neglected. Consequently, the government changed its policy of industrialization by establishing public enterprises. Under Ordinance No. 26 of 1970 ⁽³¹⁾ it established the N.P.O.I. which is considered to be the major organ for implementing the development plan as regards the public sector, and is empowered to create industries in which private investors have shown little interest in Libya. It prepares industrial development schemes, takes necessary procedures for approving the various projects, and then implements them.

The methods by which it is able to discharge its functions are stated in (Appendix 5.1). It took over all the government factories which had been under the control of the various ministries (see Appendix 5.2). The capital of the organization has increased substantially, as shown earlier, and its operational activities have increased concentration by the government on industrialization through the public sector. Its share of the amount of industrial development increased from 32 percent in 1970-71 to about 74 percent in 1972-73. The number of projects has increased from five in the first year to eleven in the second year, and to about nineteen in the third year. Up to 1980 it will deal with 60 projects, with a total capital investment of about LD 486 millions, besides others which are under study. Since 1970 the organization has expanded from the stage of merely preparing and studying the feasibility of projects to include the actual work of building up the firms. Unfortunately, there are no tables to cover the amount spent by the organization during the first and second years, but in the third year its total expenditure was about LD 28 million, 79.5 percent of its budget for that year. Delays in the feasibility studies, construction, and in choice of location, sometimes postponed an establishment, such as a ready-made suit factory in Derna. These were the main reasons why the whole share was not spent. Most projects received more than LD 1 million from N.P.O.I., eleven more than LD 5 million, 13 more than LD 10 million, and one received LD 100 million. Moreover, most will be finished before 1977, and four after 1977, but before 1980. Up to the middle of 1974, five projects had been finished and started operation (a sardine factory in Jansur, a flour mill in Tripoli, a leather factory in Tajora, a shoe factory in Misurata, and a ready-made suit factory in Derna), beside the two animal fodder factories which were semi-finished. Table 5.11 indicates that the metalwork and engineering and building materials industries have been by far the largest

/recipients

Table 5.11 The Number And Total Amount Allocated By The N.P.O.I. Among
Industrial Groups.*

Industrial groups	Total	No. of Projects			Investment in LD million	
		Finished by 1975	Finished by 1977	Finished by 1980	Total amount	% of total
Food, drinks & tobacco	23	14	9	-	81	16.7
Textiles & clothes	4	3	-	-	20	4.1
Leather and shoes	3	3	1	-	6	1.2
Printing and paper	1	1	-	-	1	0.2
Wood and furniture	2	-	2	-	10	2.1
Chemicals †	5	-	3	2	59	12.1
Building material & non-metallic goods	13	8	4	1	124	25.5
Metal work and engineering goods	9	5	3	1	185	38.1
Total	60	34	22	4	486	100.0

* excluding the petrochemical projects.

Source : Industrial Research Centre, Industrial Census 1971, Tripoli, 1973.

† not all the projects are new ones, but some of them are expansions of old ones, such as the cement factories in Benghazi and Homes.

of the organization's funds. This is vitally important for the country as the construction of new housing, industrial and agricultural projects requires a large production of metal and building materials. This industry has not, so far, been attractive to private investors, due to the large investment required. The organization's attitude has been much in line with the government's general industrial policy. The table also reveals that the organization has concentrated on projects of foodstuffs, cement and building materials during its early years (by 1975), probably because these industries required limited capital and less complicated studies. Moreover, they are in accordance with the organization's aim of giving priority to industries designed either to further development of the country's natural resources or to manufacture goods that had previously had

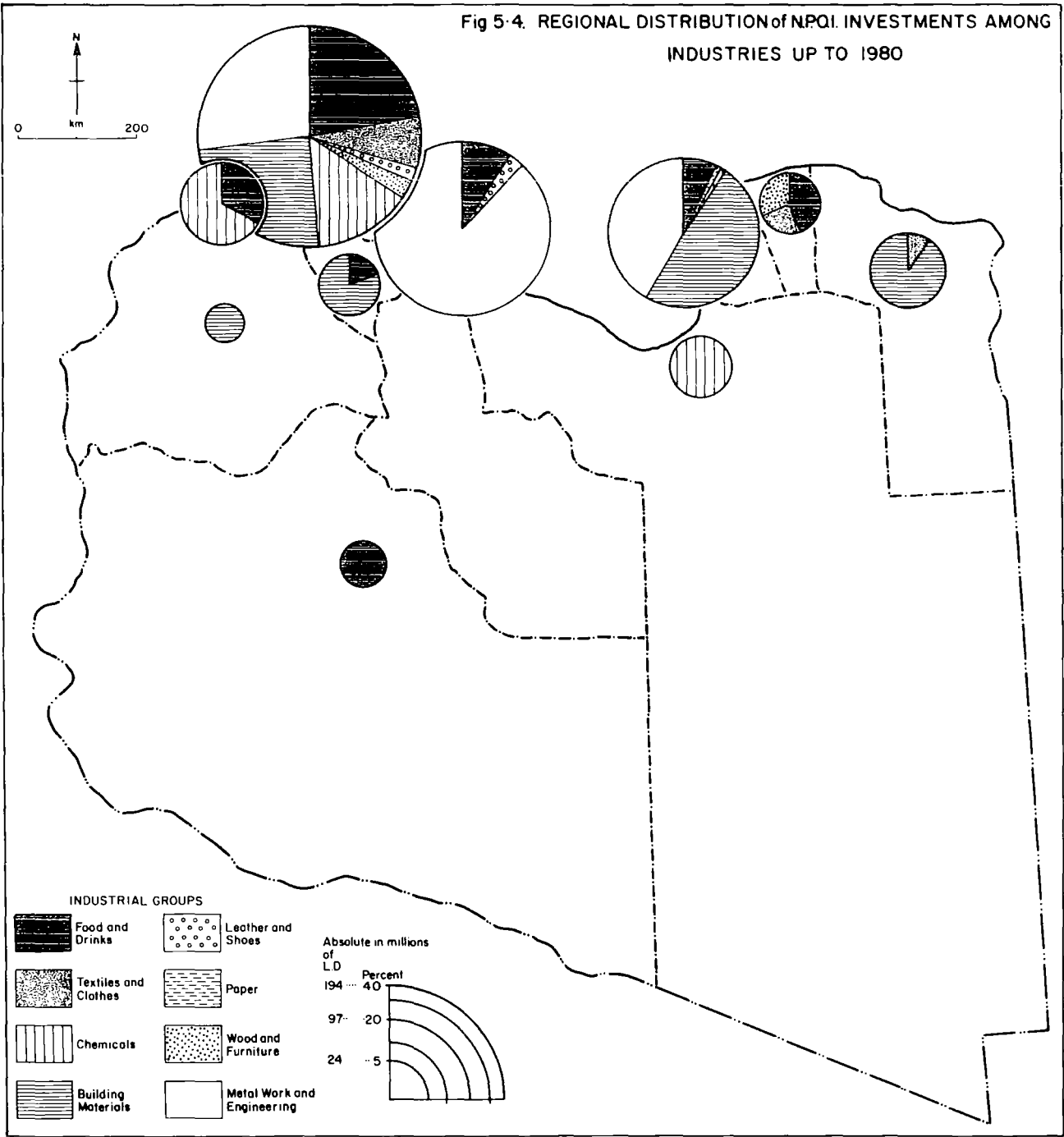
to be imported. Finally, new large-scale establishments, such as dairying, wire and cables, animal fodder, steel welded pipes, will appear in the country for the first time.

As far as location is concerned Figure 5.4 indicates that Tripoli has the greatest share, more than one-third of the total investments. It is interesting to note that although Misurata has the second-largest amount, the number of projects is not proportionally as large when compared to others, such as Benghazi and G. Akhdar, because the largest project, a steel factory with LD 100 million investment, is planned for Misurata. Tripoli and Benghazi have more than half of the total investments, a reflection partly of the low level of the infrastructure and the high cost of construction and raw materials in the more remote muhafadat. In Tripoli and Benghazi it is also easier to contact the local authorities for information. It should also be noted that seven of Tripoli's establishments are located in Jansur, Azizia, Ben-Ghashir, Garaboli and Tajora, and four of Benghazi's establishments are in El-Gawarsha and El-Abiar.

The organization was trying to find the right economic location for projects with their distribution among the whole of the muhafadat. It has projected new large industries to underdeveloped areas for the first time, e.g. a pottery factory in Gharian, tomato canning and soft drinks establishments in Sebha, wool-dyeing in El-Marg, shoe factory in Misurata and ready-made suit factory in Derna. This state-owned organization has obviously recognised that it must give priority to and concentrate more on the undeveloped areas.

Except in a few cases, market and raw materials were the most important factors of location for these projects. The food industry is distributed among most of the muhafadat, but highly concentrated in Tripoli. The higher concentrations of textiles, wood, chemicals and building materials in Tripoli were mainly due either to the market or

Fig 5-4. REGIONAL DISTRIBUTION of NPQI. INVESTMENTS AMONG INDUSTRIES UP TO 1980



to the use of imported materials. The location of metal work in Misurata was in order to use El-Shataj's iron ore, chemicals in El-Zawia and El-Kalæg to use Abu-Kammash salt and Marada potash, pottery in Gharian to use local clay, and textiles in El-Marg to use local wool. The location of the paper bags establishment in Benghazi was to serve the local cement factory.

The performance of the organization in the management, distribution and marketing of its products has been quite different from that in engineering design and construction, where it has scored its most conspicuous successes so far. In terms of management, it has failed to obtain sufficient skilled labour for its projects. It has been estimated that the first 24 projects created by the organization required about 1838 skilled labourers, of whom 163 were of university level. ⁽³²⁾ From Table 5.12 it appears that it could obtain only 66 percent of the required number of trained workers, owing to the shortage of technical institutions in the country and the undesirability of labouring jobs (see Chapter 9). More than half of these were trained abroad, while the rest were training on the job (Appendix 5.3). In addition, there was no co-ordination between training of trainees and completion of projects. For example, trainees sent to Egypt for the clothing and textile industries finished their training and returned long before their projects were ready. This might have caused them to move to other jobs. The organization must now co-operate with the new industrial training centres which have recently appeared, so that trainees are produced at the required times.

Most of the industrial concerns which the organization has established are still under construction, and the few which have gone into production are still in their first year. Table 5.13 reveals that during the period 1966-1967 all the public establishments under the Ministry of Industry, except the fruit processing factory, worked at a great loss.

Table 5.12 The Distribution Of Trained Labour Required By Industries
Of N.P.O.I. Until 30 June 1973.

Industries groups	No. of workers required (1)	No. trained and appointed (2)	Under training (3)	Total (4)	% (4) to (1)
Food and drinks	250	108	41	149	59.6
Textiles and clothes	472	179	219	398	84.3
Leather and shoes	478	5	307	312	65.3
Paper	24	-	-	-	00.0
Chemicals	204	46	72	118	57.9
Building materials	44	-	42	42	95.5
Metal work and engineering	366	11	179	190	51.9
Total	1,838	349	860	1,209	65.7

Source : N.P.O.I. Statistical Information About Skilled Labour Requirements
Until 30 June 1973, Unpublished statistics.

The total loss, amounting to LD 173,868, does not include buildings and machinery depreciation or other expenditure like building rents, profit taxes and the like. ⁽³³⁾ This resulted from a weak management system and excessive bureaucracy. It should be realized that the increase in N.P.O.I.'s span of control, as more and more industrial units come under its supervision, will demand extensive organizational readjustments. It is still too early for a judgement of the operation of the organization, but, to avoid failure, it should divide its projects among a number of small companies, each one specializing in one or more related industries. This would have the effect both of encouraging competition between the companies and improving their operational efficiency. It is also important for the organization to have a different hierarchical management system than in the private factories, under which the employers will hold well-defined

responsibilities for which they should be accountable to the company. Such a system of responsibility for individual projects should affect their operational efficiency. Incentives should be introduced; for example, the manager should be given a certain percentage of the net profit achieved by his enterprise, in addition to his regular salary. In Egypt, distribution of profits in public sector enterprises is governed by specific legislation whereby 75 percent of it goes to the state, 5 percent finances social and housing services for workers, 10 percent is pooled for central social services for the district, and 10 percent represents direct cash distribution to labour. ⁽³⁴⁾ In Libya, it might be useful to use this system, modifying some of the percentages, for example, by decreasing the contribution to the state, even to 50 percent, and increasing the other categories.

The previous discussion pointed out that the last two institutions deal with different sides of industrial development, loan-making and promotion. It was not clear why a separate organization was established, and not integrated with the industrial bank. Is it better to have separate agencies for industrial development? The government might have been upset by the experience of its neighbour, Egypt, whose bank failed, causing serious difficulties for its own industrial enterprises. If this was the reason, it was an invalid one, since failure of the bank was due to its policy, and was not relevant to Libya, which has different circumstances and a different industrial bank policy. In Libya, where coordination is weak, both between the different departments of the industrial sector and other departments (see Chapter 9), and between the bank and N.P.O.I., it is logical to have a combined organization which also includes the industrial research centre. It would save time and money, as well as reduce the duality in planning. Hanson has stated,

Table 5.13 The Expenditure And Returns Of Public Factories 1966-67

(LD)

Factory	Location	Total expenditure	Total returns	Discrepancy
Date packing factory	Hon	101,573,133	34,118,532	-67,450.601
" " "	Tripoli	51,765,130	34,665,926	-17,099,204
Rug centre and wool washing centre	Benghazi	45,207,477	3,659,205	-41,548,272
Gypsum factory	Tripoli	39,158,385	11,286,964	-27,871.421
Fruit processing factory	Tripoli	27,840,489	37,620,663	+ 9,780,174
Centre of Libyan handicrafts	Misurata	27,524,180	1,044,910	-26,479,270
Tannery	Tripoli	14,676,828	9,272,845	- 5,403,983
Shop of Libyan handicrafts	Tripoli	8,779,569	10,993,382	+ 2,213,813
Total		316,525,191	142,657,427	-173,867,764

Source : Vardjan, V. The Present State of Libyan Industries And Their Problem ; Tripoli, 1968.

"that in some circumstances, particularly where overall planning is rudimentary and coordination at top government level weak, there may be great advantages in having an operational agency capable of surveying the whole industrial scene and deciding whether particular parts of it shall be developed through direct promotion, through participation in share capital, or through the making of loans and advances. If the men running it are honest, competent and free from violent ideological prejudices, they may succeed in producing a more balanced and visible industrial pattern than would be likely to emerge from the horse-trading that all too often takes place between a number of different agencies with special responsibilities." (35)

This new organization then will be responsible for the general industrial policy, and with its special technical staff it should be able to see where financial help and direct promotion do most good, and where it is likely to be the best.

In conclusion, the government's role in industrial development before 1969 was indirect, but since then it has adopted a creative role of direct and indirect intervention to establish the base for industrialization in the country. Without government intervention, it seems that the private sector would have found it difficult to develop industry satisfactorily, especially in the early stages of industrialization.

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PART TWO

Industrial Location

6. Industrial Location And Structure
7. Factors Affecting Industrial Location
8. Industrial Location In The Main Towns

CHAPTER 6

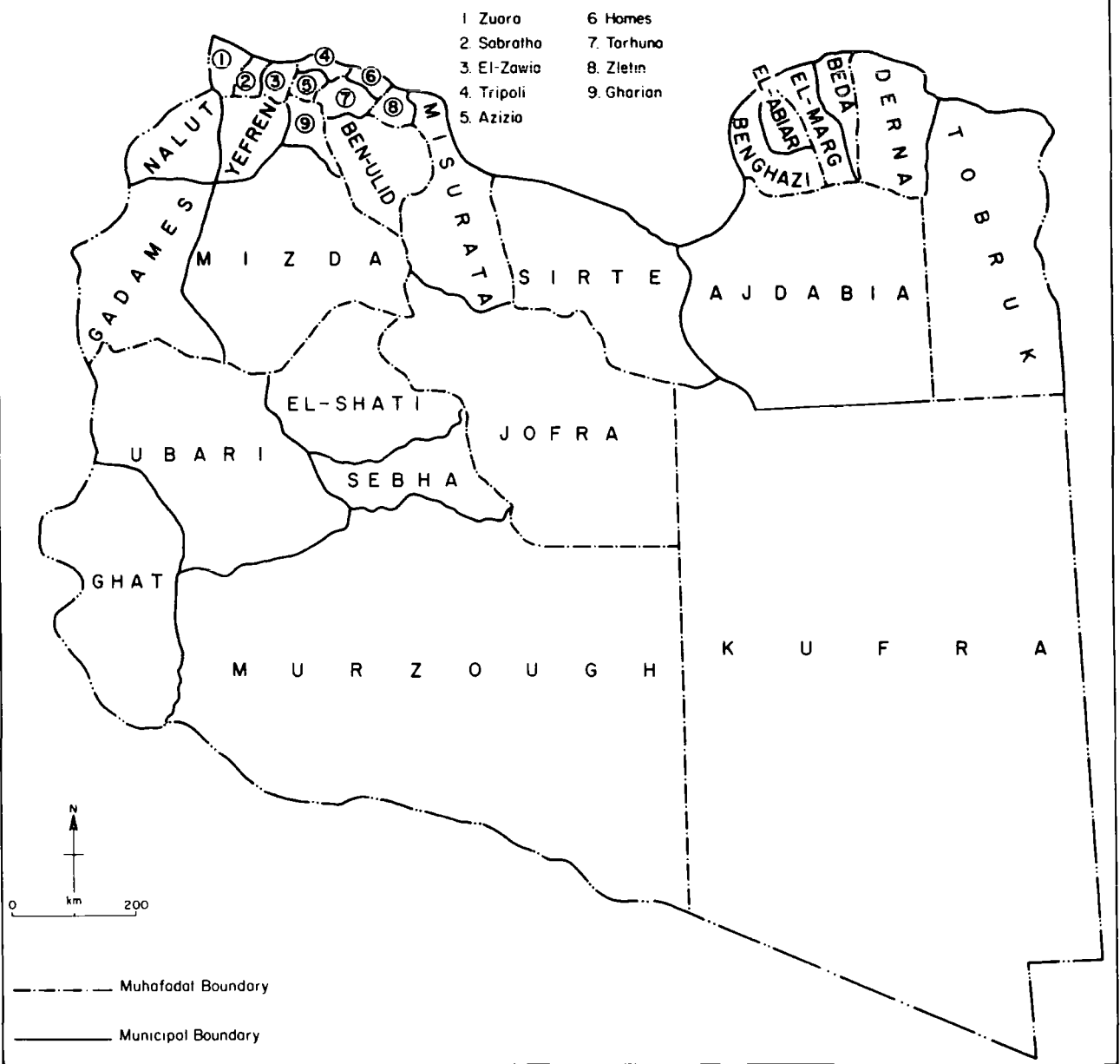
Industrial Location And Structure

In this chapter an attempt is made to analyse the areas of industrial distribution and concentration in the ten muhafadat and their municipalities (regions). The structure of manufacturing industries will be studied as they existed in Libya in 1971. Statistical data used for each of these studies were drawn from the industrial establishments census of 1971, and the International Standard of Industrial Classification (I.S.I.C.) was used to divide industries into groups according to type of activities involved.

Before proceeding to analyse the distribution of industry among these municipalities, it should be borne in mind that Libya is divided into 30 main municipalities (Figure 6.1), and due to the lack of a detailed administrative map, some minor municipalities are combined with major ones : Jansur, Tajora and Garaboli with Tripoli; Ben-Ghashir with Azizia; Zahra with El-Zawia; Sorman with Sabratha; El-Jamel with Zuara; Giado with Yefren; El-Gusbat with Homes; Gialo with Ajdabia; Ben-Jaud with Sirte; Tobra and Gheminis with Benghazi; Shahat with Beda and Gubba with Derna.

In 1971, Libya as a whole contained about 902 industrial establishments providing jobs for nearly 16,723 persons, with an average of about 18.5 persons for each establishment. Employment was not distributed uniformly among the establishments and muhafadat. Over three-fifths of the establishments employed less than ten workers, and comprised about one-quarter of the total workforce. In contrast, twenty-five establishments, 2.7 percent of the total, employed about one-third of the total workers.

Fig 6-1. THE MAJOR MUNICIPALITIES IN LIBYA



1. Industrial Location And Specialization

A coefficient of localization may be used to indicate which industries tend to be localized, and which tend to be distributed among many municipalities. Following Smith, ⁽¹⁾ the coefficients of localization (CI) may be expressed by :

$$CI = \frac{1}{2} \sum_{i=1}^N \left[\frac{100X_i}{X_t} - \frac{100Y_i}{Y_t} \right]$$

Where X_i is the number employed in a given Industry X in the ith areal subdivision or employment-exchange area.

X_t is the total regional employment in Industry.

Y_i is the employment in all industry in area i.

Y_t is the total regional employment in all industry.

The coefficient varies from 0 to 100, with a high number showing high localization and a small one showing an even distribution.

This method has not, as far as is known, been applied previously to Libyan Industries. Table 6.1 shows the result of this analysis in the nine industrial groups. The most highly localized industry group is the miscellaneous group, this being due to the fact that it is distributed in four municipalities, with Benghazi accounting for about 62 percent of its regional workers (see Table 6.4). Except for this group, the coefficients are in general fairly low. The highest group is building materials, when two municipalities (Tripoli and Benghazi) account for about 83 percent of the total regional workers.

The food, soft drinks and tobacco, wood and furniture groups were the lowest values. These are the most widely distributed industries whose products are consumed by all, and these industries are associated with the distribution of the local consumers. Industries involving the production of

Table 6.1 The Coefficient Of Industrial Localization In Libya, 1971.

Industrial Group	Total number in employment	Coefficient of localization
A. Food, soft drinks and tobacco	8,149	15.72
B. Textiles and clothes	711	22.20
C. Leather and shoes	100	23.61
D. Paper and printing	543	22.32
E. Wood and furniture	2,013	15.70
F. Chemicals	1,010	26.75
G. Building materials and non-metallic	3,188	27.20
H. Metal work	956	19.53
I. Miscellaneous	53	69.67

Source : Computed by author from data in I.R.C. Industrial Establishments Census, 1971, Tripoli, 1972.

bread, ice cream, milk, olive oil and woodwork serve people in direct and personal ways. The interesting point is that the textiles and clothes, leather and shoes, paper and printing, chemical and metal groups, have relatively very low coefficients too, but they are absent from most of the municipalities, and concentrated just in a few. The leather and shoes group occur in two municipalities, the textiles and clothes, paper and printing and chemical groups in three municipalities, and metal work groups in six. However, this may be explained by the fact that these groups of industries are concentrated in the two most highly industrialized municipalities, Tripoli and Benghazi, where the proportion of their workers is very low in relation to the total number of workers.

The coefficient of localization discussed above is useful in the discussion of any groups and all industry in one region, not for comparing

groups between different regions. As Barbour stated,

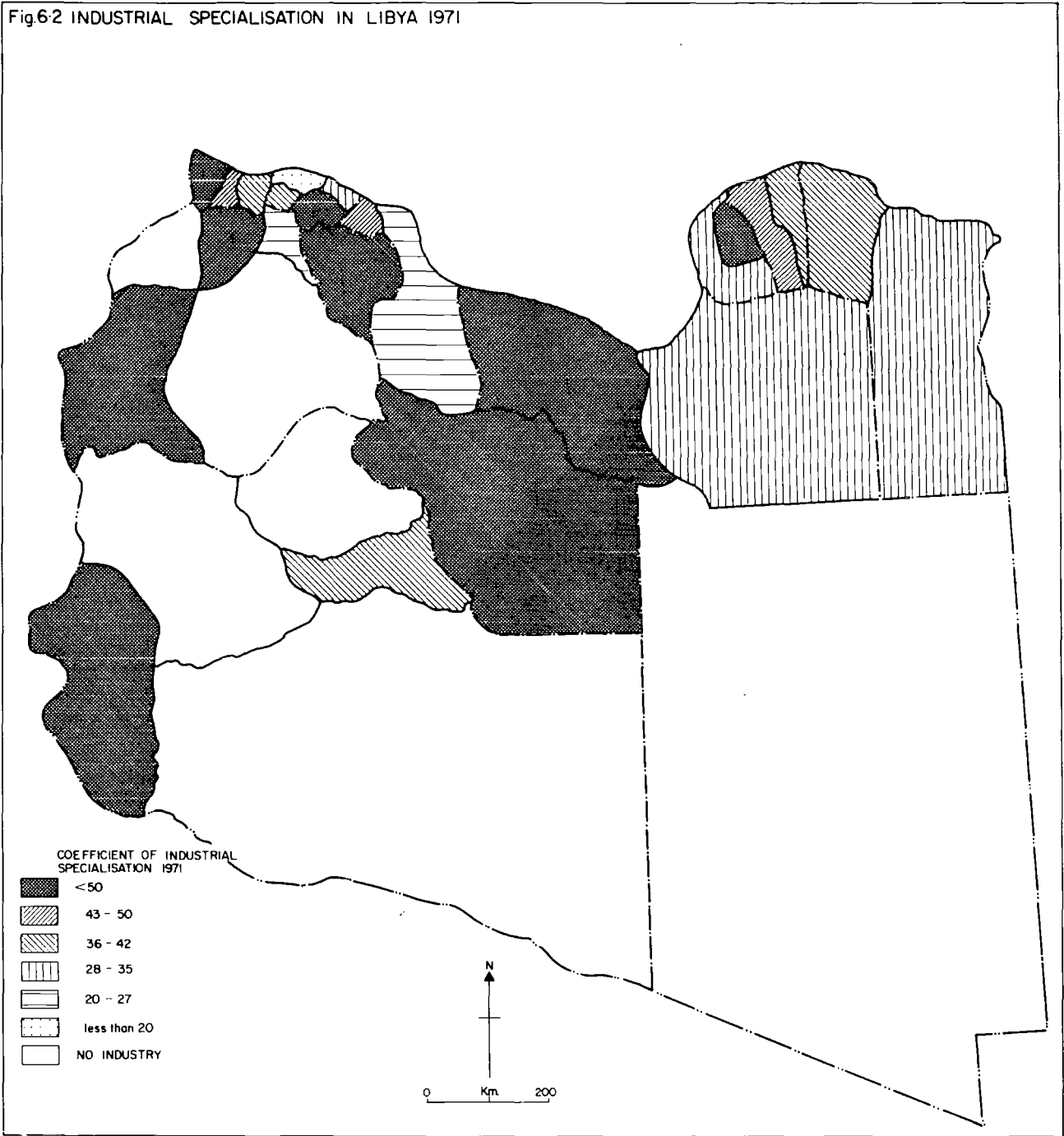
"The coefficients make a single national comparison between any particular industry and all industry in the country. They are therefore much less informative than location quotients, which compare the number of workers in an industry in any particular region with that region's total of industrial workers to reveal whether this is a high or low figure; the normal is 1.0". (2)

Applying location quotients, ⁽³⁾ to Libyan industries, Table 6.2 indicates that the food, soft drinks and tobacco group is very widely distributed in most of the municipalities. In general, except in El-Abiar Municipality, it is very low in the eastern municipalities of Libya, but high in some western municipalities such as Sebratha, Tarhuna, Gadames and Zuara. This may be because these municipalities have mainly food industries, while in the others the percentage of workers in the food industry is less important than other industrial groups. The textiles and clothes group is totally absent in 21 municipalities, and very small in Homes. The quotient is rather high in Benghazi and almost average in Tripoli. For the leather group, the value is above average in Tripoli and Benghazi, but absent from the rest of the municipalities. This is because the group with a low percentage of workers is located in municipalities with a large total number of workers. For the paper and printing group, the value is high in Tripoli, and slightly average in Benghazi, which can be explained by the fact that the activity and consumption of this group's production is associated with the concentration of commerce and urban centres. For the wood and furniture group, Derna, Tobruk, Beda, El-Marg and Sebha have high values, but it is absent in twelve municipalities. The construction of new building projects, especially in El-Marg and Beda, and their location far from the main ports, makes them dependent on local production of wood furniture and building materials, and the building materials group has very high values in the same municipalities. The high values of the latter group in Benghazi and Homes are due to the location of two large cement factories in these two municipalities. The values of the metal work group are

Table 6.2 Location Quotients For Libyan Industries, 1971.

Major Municipalities	Food, Soft drinks and tobacco	Textiles and Clothes	Leather and Shoes	Paper and Printing	Wood and Furn- iture	Chemicals	Building Mater- ials	Metal work	Miscellan- eous
1. Tripoli	1.01	1.10	1.37	1.37	0.99	1.48	0.73	1.05	0.17
2. Azizia	1.87	0	0	0	0.11	0	0.93	0	0
3. Benghazi	0.30	1.81	1.13	1.09	1.47	0.76	2.09	1.82	3.07
4. El-Abiar	2.09	0	0	0	0	0	0	0	0
5. El-Zawia	1.85	0	0	0	0.36	0.29	0.20	0	0
6. Sabratha	2.03	0	0	0	0	0	0.10	0	0
7. Zuara	2.00	0	0	0	0	0	0	0	0
8. Misurata	1.44	0	0	0	0.55	0	0.98	0.75	0
9. Zletin	1.94	0	0	0	0.24	0	0.13	0	0
10. Jofra	2.05	0	0	0	0	0	0	0	0
11. Homes	1.35	0.49	0	0	0	0	1.69	0	0
12. Tarhuna	2.03	0	0	0	0	0	0	0	0
13. Ben-Ulid	2.00	0	0	0	0	0	0	0	0
14. Derna	0.53	0	0	0.80	3.01	0	1.65	0.72	0
15. Tobruk	0.63	0	0	0	3.00	0	1.49	0.70	0
16. Beda	1.40	0	0	0	2.50	0	0	0	0
17. El-Marg	0.43	0	0	0	2.54	0	2.60	0	0
18. Gharian	1.35	0	0	0	0.92	0	0.42	0.87	31.45
19. Yefren	2.04	0	0	0	0	0	0	0	0
20. Gadames	2.00	0	0	0	0	0	0	0	0
21. Sebha	0.61	0	0	0	1.93	0	2.44	0	0
22. Ghat	0	0	0	0	0	0	0	0	314.3
23. Ajdabia	3.00	0	0	0	0	0	4.50	0	0
24. Sirte	2.33	0	0	0	0	0	0	0	0

Fig.6.2 INDUSTRIAL SPECIALISATION IN LIBYA 1971



relatively high in Tripoli and Benghazi owing to the need for workshop services in urban centres. The very high value in Ghat in the miscellaneous group is because the workers who account for this group are few in comparison with the total number of workers.

The above analysis does not give any indication of the degree of specialization of the municipalities. Of course, the degree of specialization must differ from one municipality to another, and each one probably specializes in one or two industries. A coefficient of specialization may help to determine the specialization of the municipalities from the tables of workers used before. As Isard says :

"The basic feature of specialization coefficients is the comparison of two percentage distributions applicable to given set of classification unity". (4)

(5)

The coefficient of specialization (C_s) is stated as :

$$C_s = \frac{1}{2} \sum_{i=1}^N \left[\frac{100X_i}{X_t} - \frac{100Y_i}{Y_t} \right]$$

where X_i is the number of workers in industrial category i in an exchange area

X_t is the total industrial employment in area X

Y_i is the regional employment in industry i

Y_t is the total regional industrial employment.

and the limits to the values of these coefficients are 0 and 100. Figure 6.2 and Table 6.3 reveal that there is a different degree of specialization from one municipality to the other. High coefficients are found in El-Abiar in the east, Sirte and Jofra in the middle, and Tarhuna, Ben-Ulid Zuara, Yefren, Gadames and Ghat in the west of the country. The urban areas, such as Tripoli and Benghazi, which contain all industry groups and have the largest number of industries, have low coefficients. Those with high coefficients are not particularly important as industrial regions, because their number of workers in industry is relatively small, and all these municipalities have only one industrial group, mainly the food industry. For example, Gadames has 16 persons engaged in industry, all of them engaged in the food industry group. Some

Table 6.3

Coefficients Of Specialization in Libya, 1971.

Major Municipalities	A	B	C	D	E	F	G	H	I	Specialization
Tripoli	0.53	0.44	0.23	1.18	0.09	2.88	5.20	0.29	0.27	5.56
Azizia	42.42	4.25	0.60	3.25	10.70	6.04	11.55	5.72	0.32	<u>42.43</u>
Benghazi	34.19	3.45	0.08	0.29	5.66	1.40	20.80	4.69	0.65	<u>35.64</u>
El-Abiar	51.27	4.25	0.60	3.25	12.04	6.04	19.06	5.72	0.32	<u>51.28</u>
El-Zawia	41.44	4.25	0.60	3.25	7.76	4.20	15.29	5.72	0.32	<u>41.45</u>
Sabratha	49.38	4.25	0.60	3.25	12.04	6.04	17.17	5.72	0.32	<u>49.39</u>
Zuara	51.27	4.25	0.60	3.25	12.04	6.04	14.06	5.72	0.32	<u>51.28</u>
Misurata	21.71	4.25	0.60	3.25	5.36	6.04	0.35	1.57	0.32	<u>21.73</u>
Zletin	46.01	4.25	0.60	3.25	9.17	6.04	16.67	5.72	0.32	<u>46.00</u>
Jofra	51.27	4.25	0.60	3.25	12.04	6.04	19.06	5.72	0.32	<u>51.28</u>
Homes	17.11	2.18	0.60	3.25	12.04	6.04	13.03	5.72	0.32	<u>30.12</u>
Tarhuna	51.27	4.25	0.60	3.25	12.04	6.04	19.06	5.72	0.32	<u>51.28</u>
Ben-Ulid	51.27	4.25	0.60	3.25	12.04	6.04	19.06	5.72	0.32	<u>51.28</u>
Derna	22.90	4.25	0.60	0.67	24.12	6.04	12.31	1.66	0.32	<u>36.44</u>
Tobruk	17.78	4.25	0.60	3.25	24.47	6.04	9.51	1.75	0.32	<u>33.99</u>
Beda	20.97	4.25	0.60	3.25	18.26	6.04	19.06	5.72	0.32	<u>39.24</u>
El-Marg	28.39	4.25	0.60	3.25	18.47	6.04	30.09	5.72	0.32	<u>48.57</u>
Gharian	17.27	4.25	0.60	3.25	1.04	6.04	11.06	0.72	9.68	<u>26.96</u>
Yefren	51.27	4.25	0.60	3.25	12.04	6.04	19.06	5.72	0.32	<u>51.28</u>
Gadames	51.27	4.25	0.60	3.25	12.04	6.04	19.06	5.72	0.32	<u>51.28</u>
Sebha	19.14	4.25	0.60	3.25	11.43	6.04	27.88	5.72	0.32	<u>39.32</u>
Ghat	48.73	4.25	0.60	3.25	12.04	6.04	19.06	5.72	99.68	<u>99.69</u>
Ajdabia	13.77	4.25	0.60	3.25	12.04	6.04	18.44	5.72	0.32	<u>32.22</u>
Sirte	51.27	4.25	0.60	3.25	12.04	6.04	19.08	5.72	0.32	<u>51.28</u>

Source : Computed by the author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

municipalities specialize in some industries and they have low coefficients. For instance, chemicals and leather and shoes groups are completely restricted to Tripoli and Benghazi which have low coefficients. The coefficient of specialization gives only a broad indication about the geography of industrial specialization.

Table 6.4 gives the number of workers by industry in the various regions. It is obvious that Tripoli, with 9,386 persons engaged in industries in 1971, is notable for its high numbers in all industry groups; more than 56 percent of the total workers is employed there. Each industry group in Tripoli employs more than 40 percent of the total number of workers in that industry group. Benghazi also figures high in most of the groups, but lower than Tripoli. In El-Zawia, Misurata, Homes and Azizia, industry is dominated by the food groups. In Derna, Tobruk and Sebha, the main industries are building materials and wood production. In other municipalities, most industries are unrepresented and people are engaged only in the food industry. The general conclusion that we may draw from the above analysis is that Tripoli and Benghazi Municipalities contain all industrial groups, but the others are highly specialized in one or two groups.

2. The Regional Distribution Of Industrial Activities

A. General Distribution Features

The next step is to identify and explain the regional location of various aspects of industry which so far have been considered at the national level. Table 6.5 indicates the location of the industrial establishments and workers among the major municipalities. When the distribution of establishments and workers in them is considered, industry is seen to be widely scattered and exists as points in widely scattered regions. However, the table shows a marked concentration in certain localities. The distributions of both variables emphasise the concentration mainly in the north-west and north-east municipalities.

Table 6.4 The Structure Of Employment In The Industrial Groups By Municipalities, 1971

Major Municipalities	Food, soft drinks and Tobacco	Textiles and Clothes	Leather and Shoes	Paper and Printing	Wood and Furniture	Chemicals	Building Materials	Metal work	Miscellaneous	Total
Tripoli	4,624	440	77	416	1,123	837	1,300	564	5	9,386
Azizia	546	-	-	-	8	-	45	-	-	599
Benghazi	493	261	23	120	600	156	1,351	353	33	3,390
El-Abiar	56	-	-	-	-	-	-	-	-	56
El-Zawia	862	-	-	-	41	17	36	-	-	956
Sabratha	259	-	-	-	-	-	5	-	-	264
Zuara	46	-	-	-	-	-	-	-	-	46
Misurata	305	-	-	-	29	-	81	18	-	433
Zletin	198	-	-	-	6	-	5	-	-	209
Jofra	70	-	-	-	-	-	-	-	-	70
Homes	318	10	-	-	-	-	155	-	-	483
Tarhuna	50	-	-	-	-	-	-	-	-	50
Ben-Ulid	8	-	-	-	-	-	-	-	-	8
Derna	70	-	-	7	98	-	85	11	-	271
Tobruk	39	-	-	-	46	-	36	5	-	126
Beda	23	-	-	-	10	-	-	-	-	33
El-Marg	12	-	-	-	18	-	29	-	-	59
Gharian	66	-	-	-	11	-	8	5	10	100
Yefren	43	-	-	-	-	-	-	-	-	43
Gadames	16	-	-	-	-	-	-	-	-	16
Sebha	29	-	-	-	23	-	46	-	-	98
Ghat	-	-	-	-	-	-	-	-	5	5
Ajdabia	10	-	-	-	-	-	6	-	-	16
Sirte	6	-	-	-	-	-	-	-	-	6
Totals	8,149	711	100	543	2,013	1,010	3,188	956	53	16,723

Source : Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

Looking at individual muhafadat, the leaders in both variables are Tripoli Muhafada (41.4 and 59.7 percent respectively), and Benghazi Muhafada (26.4 and 20.6 percent), followed by El-Zawia (8.9 and 7.6 percent). The least important muhafadat are El-Kaleg (0.4 and 0.7 percent), Sebha (1.6 and 0.7 percent) and G. Akhdar (1.5 and 0.6 percent).

Turning to the distribution of workers in industry, Tripoli Muhafada, with 59.7 percent, has almost three times as many workers in industry as Benghazi Muhafada, and more than eight times as many than the other muhafadat. In terms of number of establishments, Tripoli has not twice as many establishments as Benghazi, but more than four times as many as any other muhafada. Most of the industries are located in the largest urban settlement in the region. It is apparent that some municipalities, Murzough, Mizda, Nalut, El-Shati, Ubari and Kufra are without any kind of industry. It is clear that the roughly triangular area in the north-west of the country, extending from corners at Misurata, Yefren and Zuara, is the major industrial area. It contains about three-quarters of all the workers and more than 60 percent of the total establishments.

In addition, the table shows there is no close relation between these two variables. All the municipalities, except Tripoli, Azizia and Jofra, have a low number of workers and a high number of establishments, whilst the latter ones have a high number of workers and a low number of establishments. The average number of workers per establishment varies from one municipality to another. For example, only three have more than the national average, Jofra, 70 workers per establishment; Azizia, 33; and Tripoli, 26. The others have less; Benghazi, 14.5; El-Zawia, 16.5; Derna, 8; and Ajdabia about five. The reason in the case of Jofra is that this region has only one large establishment. Tripoli's high number is a reflection of the fact that most large and medium establishments are located in Tripoli Municipality.

Table 6.5 Regional Distribution Of Establishments And Persons Engaged
In Manufacturing Industries In Libya In 1971.

Muhafada	Major Municipalities	No. of Establishments	%	No. of persons engaged	%
Tripoli	Tripoli	355	39.36	9,386	56.13
"	Azizia	18	2.00	599	3.58
Benghazi	Benghazi	235	26.05	3,390	20.27
"	El-Abiar	3	0.33	56	0.33
El-Zawia	El-Zawia	58	6.43	956	5.71
"	Sabratha	16	1.78	264	1.57
"	Zuara	6	0.67	46	0.28
Misurata	Misurata	38	4.21	433	2.59
"	Zletin	13	1.44	209	1.25
"	Jofra	1	0.11	70	0.42
Homes	Homes	49	5.43	483	2.88
"	Tarhuna	4	0.44	50	0.30
"	Ben-Ulid	1	0.11	8	0.05
Derna	Derna	34	3.77	271	1.62
"	Tobruk	19	2.11	126	0.75
G. Akhdar	Beda	6	0.67	33	0.20
"	El-Marg	7	0.78	59	0.35
Gharian	Gharian	14	1.55	100	0.60
"	Yefren	5	0.55	43	0.26
"	Gadames	1	0.11	16	0.10
Sebha	Sebha	14	1.55	98	0.59
"	Ghat	1	0.11	5	0.03
El-Kaleg	Ajdabia	3	0.33	16	0.10
"	Sirte	1	0.11	6	0.04
Total		902	100.00	16,723	100.00

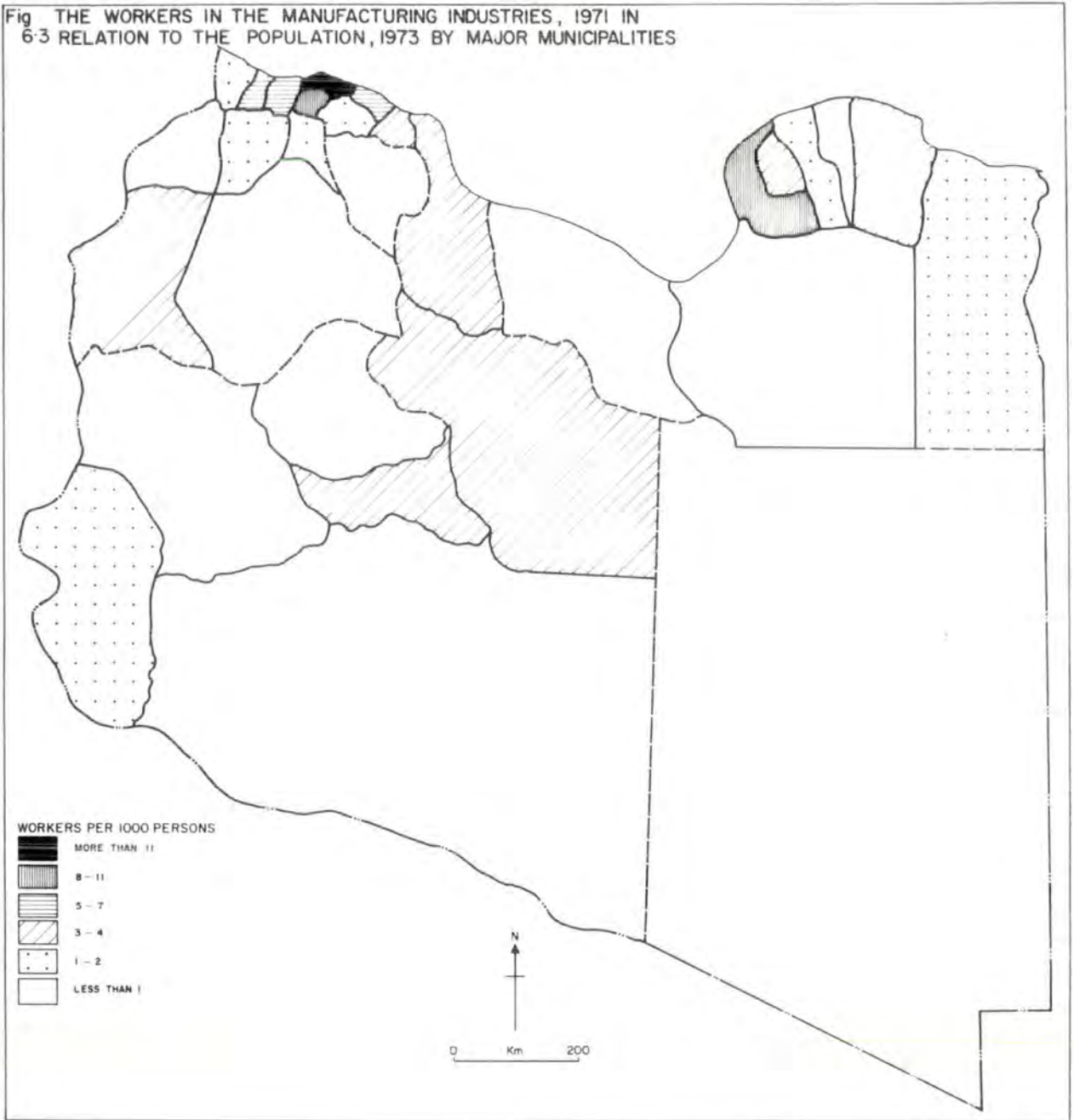
Source : Computed by author from data in I.R.C. Industrial Establishments 1971.

Figure 6.3 is a ratio map showing the various relationships between the number of the workers engaged in industries in 1971 and the total population in 1973. It is evident that they coincide to a certain extent. From this figure it is clear that the ratio varies from the maximum of 15 workers per thousand persons in Tripoli Municipality to zero in Ajdabia, Sirte, Ben-Ulid and Beda municipalities. Comparing these variations with the national average, which is 7 workers per thousand persons, one can distinguish two main different groups. The first group contains only four municipalities with a ratio number above the national average: Three in the north-west; Tripoli 15, Azizia 8, and El-Zawia 7; and one in the north-east; Benghazi 11; while the second group includes all the other municipalities, where the ratio is less than the national average. The concentration is highest in Tripoli Municipality, where the city itself has more than 550,000 inhabitants, and adjoining towns are large; Jansur with 30,630, Garaboli with 14,546, and Tajora with 34,449 inhabitants.

Indeed, from the above characteristics of distribution, one can make the following observations :

1. The municipalities which have larger cities have greater concentration of industry. Tripoli, Benghazi and El-Zawia Municipalities have, between them, about 72 percent of the total establishments, and about 82 percent of the total number of workers engaged in industry in 1971. The same also holds for the number of the workers in relation to the total population. This is generally higher in these municipalities and lower in others far from Tripoli and Benghazi, especially the southern regions.
2. There is a strong correlation between urban areas and the concentration of the industries. Urban areas tend to be the main poles of concentration of the number of workers engaged in industry. The distribution of industry illustrates that each activity of the municipality tends to be concentrated

Fig THE WORKERS IN THE MANUFACTURING INDUSTRIES, 1971 IN
6-3 RELATION TO THE POPULATION, 1973 BY MAJOR MUNICIPALITIES



in or around the main town. In general, the distribution of industry in Libya is both polarized and dualistic, because it is concentrated mainly in two poles, in the north-west and north-east of the country, and because it is concentrated in the north of the country, while there is nothing in the south.

B. Distribution By Establishment Size

Having studied the distribution of the industries among the municipalities, the census data may also be used to give some insight into the industrial character in terms of the size and structure of the establishments. From Table 6.6, which illustrates the distribution of the industries among three groups, certain conclusions may be drawn. Only 55 large establishments (with 50+ workers) employ 46.9 percent of the workers, while 749 small establishments (with 5-19 workers), 83 percent of the total number, employ 36 percent of the total workers. But this tendency for large establishments is not present in all the municipalities.

Furthermore, the table shows that the industries are to be found in all major municipalities, except the six mentioned earlier (see p.147). Large establishments are present in nine municipalities located mainly in the north of the country, whilst small industries are found in most municipalities except in Jofra (Misurata Muhafada). Medium size industries are present in only eight municipalities.

As is reasonably plain from the table, differences in the scales of manufacturing in municipalities are marked. Tripoli, Benghazi and El-Zawia have the largest number of small establishments, 513, or about 69 percent of the total number of small establishments, whilst Ghat, Ben-Ulid, Gadames and Sirte have less than two establishments in any group. This is partly due to the nature of the industries existing there. Other regions having a significant number of small establishments are mainly confined to the north, such as Homes, Misurata, Derna and Tobruk.

Table 6.6 Regional Distribution Of Manufacturing Industries And Employment By Major Municipalities, 1971

Major Municipalities	Small		Medium		Large		Total	
	No. of Establishments	No. of workers	No. of Establishments	No. of workers	No. of Establishments	No. of workers	No. of Establishments	No. of workers
Tripoli	259	2,158	57	1,698	39	5,530	355	9,386
Azizia	10	86	7	184	1	329	18	599
Benghazi	204	1,717	25	697	6	976	235	3,390
El-Abjar	2	13	1	43	-	-	3	56
El-Zawia	50	462	5	110	3	384	58	956
Sabratha	14	98	-	-	2	166	16	264
Zuara	6	46	-	-	-	-	6	46
Misurata	36	277	1	36	1	120	38	433
Zletin	12	79	-	-	1	130	13	209
Jofra	-	-	-	-	1	70	1	70
Homes	48	339	-	-	1	144	49	483
Tarhuna	3	30	1	20	-	-	4	50
Ben-Ulid	1	8	-	-	-	-	1	8
Derna	34	271	-	-	-	-	34	271
Tobruk	19	126	-	-	-	-	19	126
Beda	6	33	-	-	-	-	6	33
El-Marg	6	37	1	22	-	-	7	59
Gharian	14	100	-	-	-	-	14	100
Yefren	5	43	-	-	-	-	5	43
Gadames	1	16	-	-	-	-	1	16
Sebha	14	98	-	-	-	-	14	98
Ghat	1	5	-	-	-	-	1	5
Ajdabia	3	16	-	-	-	-	3	16
Sirte	1	6	-	-	-	-	1	6
Total	749	6,064	98	2,810	55	7,849	902	16,723

Source : Computed by the author from data in I.R.C., Industrial Establishments Census 1971, Tripoli, 1972.

In terms of the large groups, Tripoli is the dominant Municipality. Thirty nine out of 55, about 71 percent of the total group, are located there, while only a very small proportion of the establishments remain outside the Tripoli Municipality.

Another important aspect of the size of the establishments is the way in which workers in the nine groups are divided among these categories (Figure 6.4). It is obviously clear that Libyan industrial groups tend to fall into three different categories, with the leather, paper and miscellaneous groups standing rather distinctively outside this. The first category contains the wood, furniture and metal work industrial groups which are chiefly characterised by small establishments whose workers account for more than 52 percent of the total number of workers, whilst their large establishments have a low proportion of the total workers. The second category contains the food, soft drinks and tobacco and textile and clothes groups, characterised by large establishments whose workers account for more than 56 percent of the total number of workers, whilst the small and medium establishments contain relatively low proportions of workers. The third category comprises the building materials and chemicals groups which are not carried on exclusively in any one size of establishment, but tend to have a fairly low proportion of small establishments and similar numbers of large-sized workers. The paper and printing group has few middle-sized establishments, but mostly small and large-sized ones. The leather and shoes group also has mostly middle-sized establishments with few small establishments and no large ones. The miscellaneous group has mainly small establishments.

The distribution of different sized structures of all industrial groups among the various major municipalities throws light on several issues. First, in terms of large establishments, Tripoli is the dominant region for all groups of the industries. In the food, soft drinks and tobacco group, six municipalities have large establishments. Tripoli is by far the most

important municipality, with 3,776 workers, which is nearly ten times the number in El-Zawia, the second municipality, and about forty times the number in Benghazi. The paper and printing, wood and furniture, and metal work groups, are almost confined to Tripoli Municipality. None of the other municipalities has any establishment of large size in these groups of industries. Tripoli and Benghazi are the only municipalities with large establishments in the chemical and textile groups. Benghazi leads in the textile group with 53 percent of the total number of workers, whilst Tripoli has more than six times as many workers as Benghazi in the chemicals group. There are no large establishments in the leather and shoes groups in any of the municipalities. Excluding the food, soft drinks and tobacco groups, Homes is the only municipality outside Tripoli and Benghazi which has a large establishment. It has one building materials establishment with 144 workers (Figure 6.5).

Secondly, the distribution of workers in medium-sized establishments show a certain similarity to the distribution for large ones. Except in the groups concerned with food, soft drinks and tobacco and building materials, all medium-sized establishments are concentrated in Tripoli and Benghazi. Food, soft drinks and tobacco and building materials establishments are more widely distributed, each is found in six municipalities. For example, in the case of the former group, the municipalities are Tripoli, Benghazi, Azizia, El-Zawia, El-Abiar and Tarhuna, with Tripoli contributing about 40 percent of the total number of workers. In the case of the latter, they are Tripoli, Benghazi, El-Zawia, Azizia, Misurata and El-Marg, with a high concentration in Tripoli (43 percent) and Benghazi (42 percent) (Figure 6.6).

Thirdly, the distribution of small establishments is completely different. The food group figures in 22 municipalities to varying degrees, but Tripoli is still the leading municipality with about one-quarter of the

Fig.6-4. PROPORTION OF WORKERS
IN SMALL, MEDIUM AND LARGE
SIZED INDUSTRIES BY GROUPS

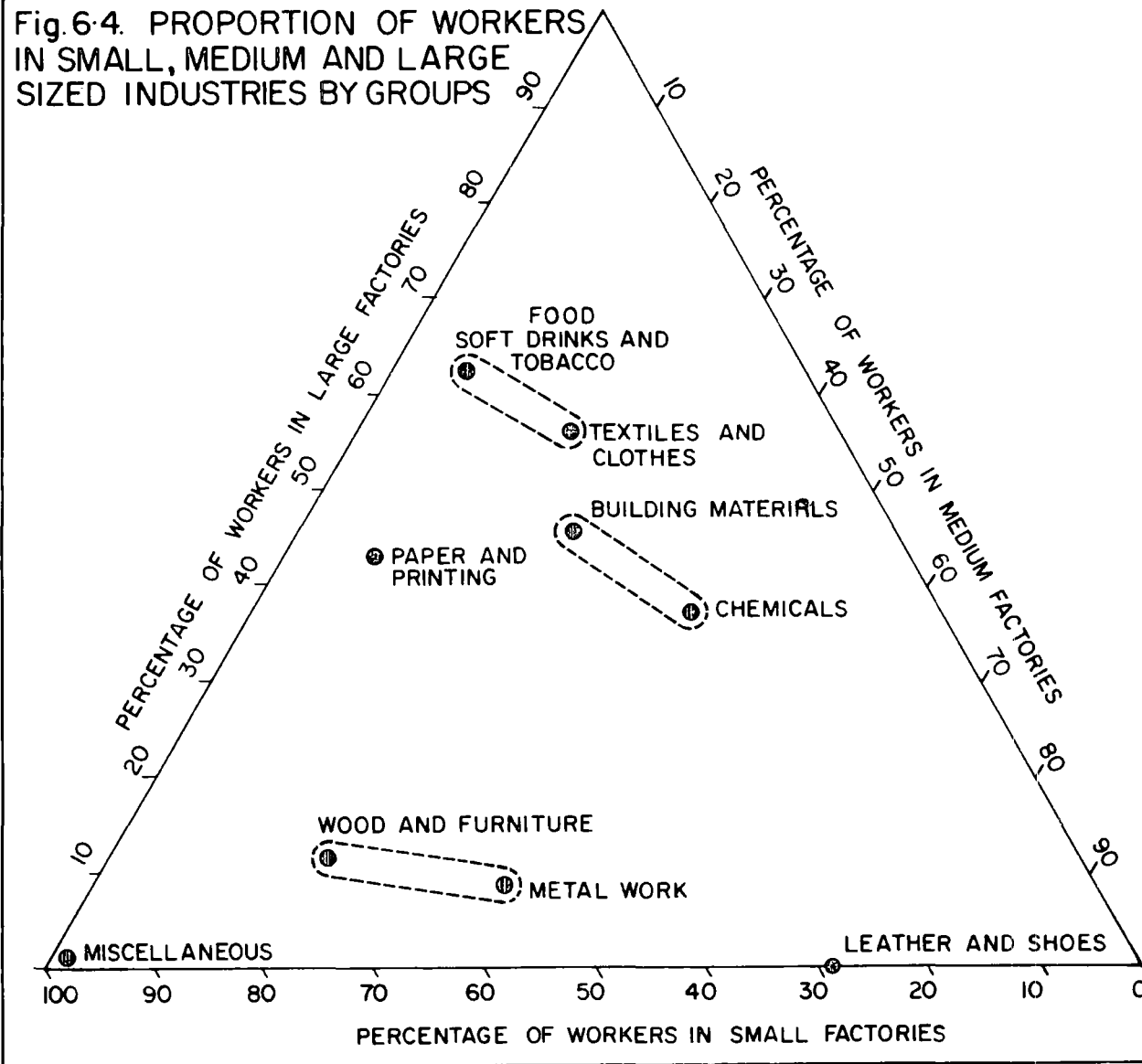


Fig 6-5. DISTRIBUTION OF WORKERS IN LARGE ESTABLISHMENTS
BY INDUSTRIAL GROUPS AMONG MAJOR MUNICIPALITIES
1971

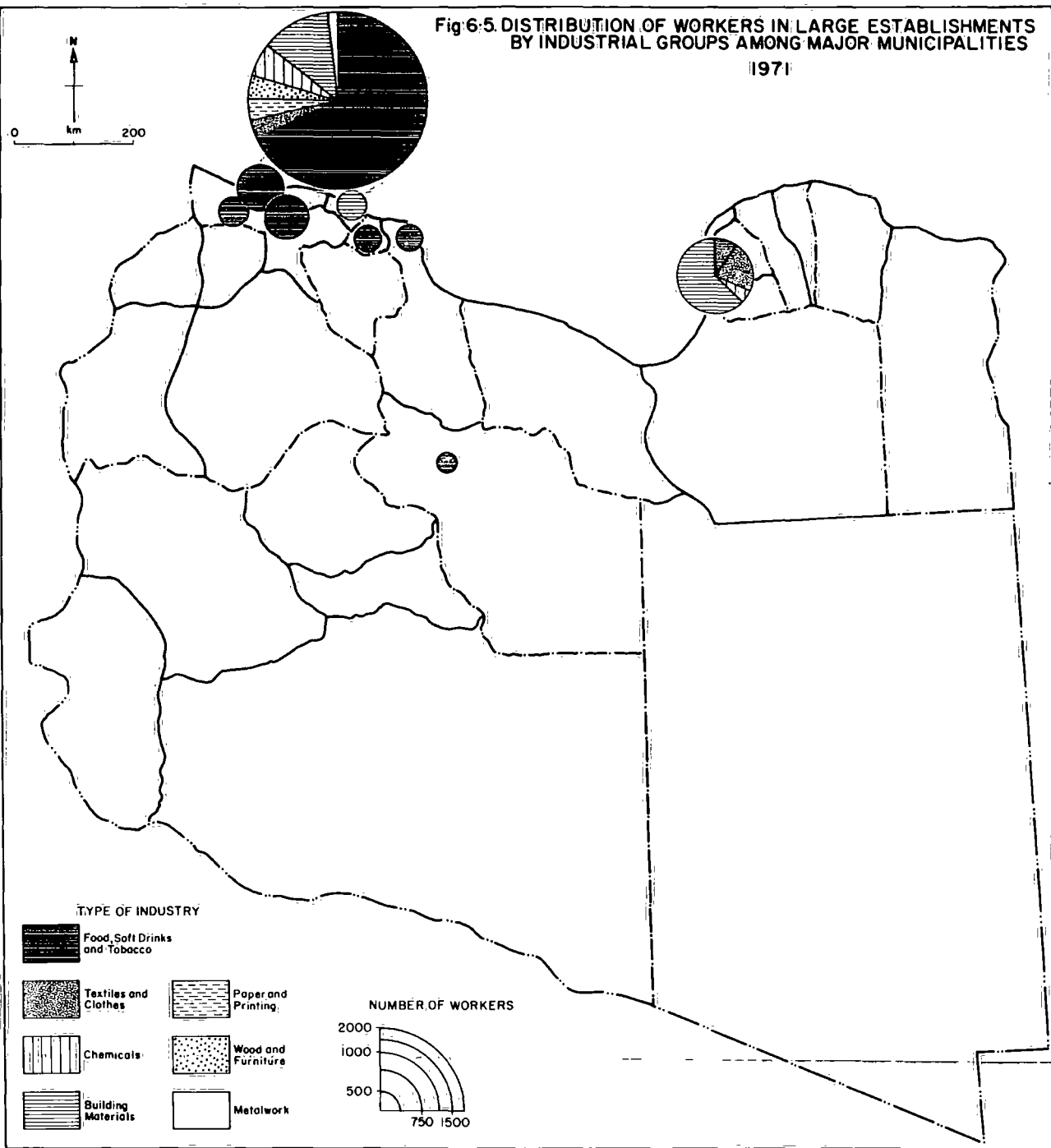
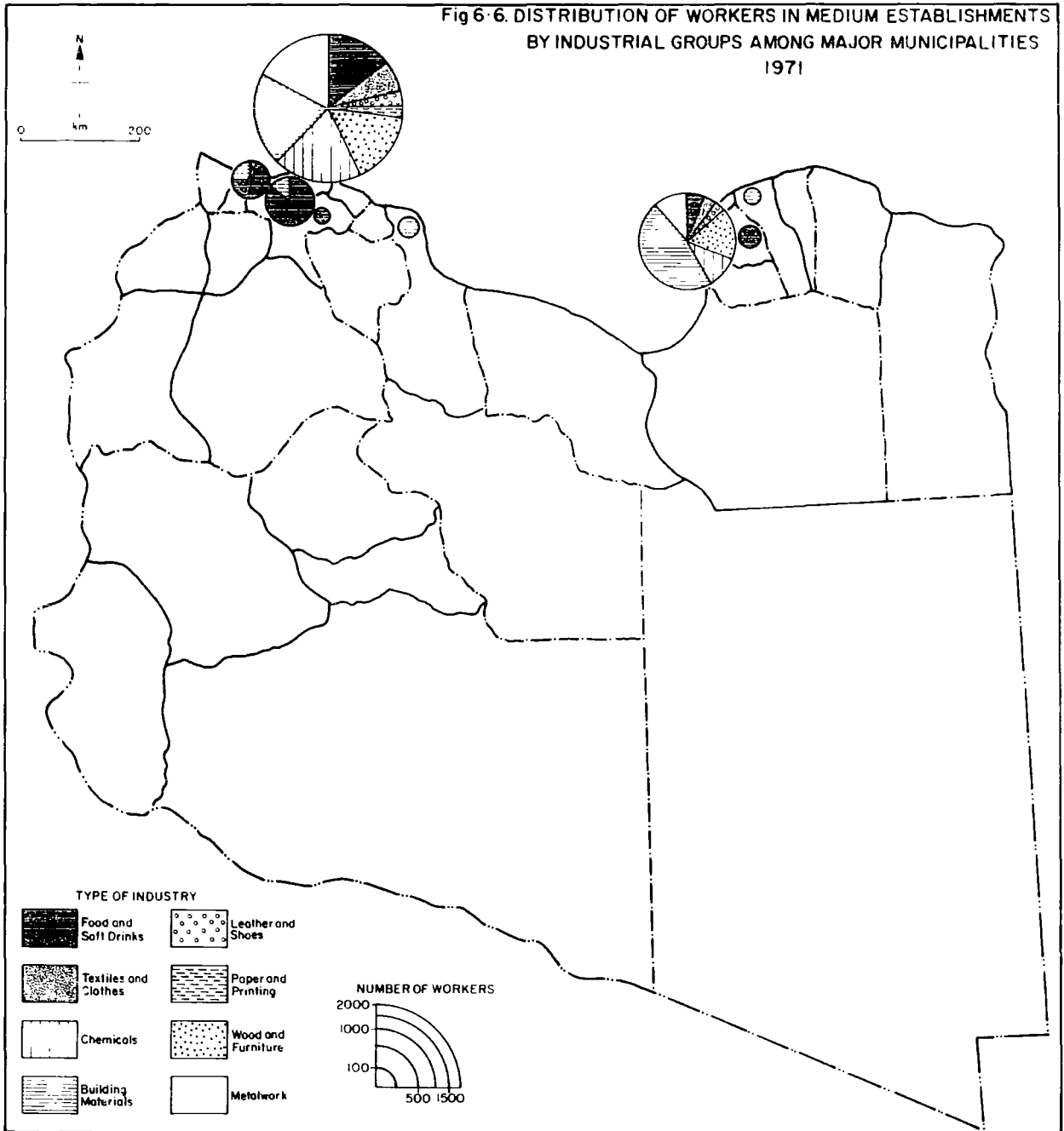


Fig 6-6. DISTRIBUTION OF WORKERS IN MEDIUM ESTABLISHMENTS
BY INDUSTRIAL GROUPS AMONG MAJOR MUNICIPALITIES
1971



total number of workers, followed by El-Zawia. The building materials industry in this size is distributed in 14 municipalities, but Benghazi leads with about 42 percent of the total, followed by Tripoli. The wood and furniture group is distributed in twelve regions, and metal work in six, with Tripoli leading in the former, and Benghazi in the latter. Other groups in this size are mainly concentrated in Tripoli and Benghazi (Figure 6.7).

The conclusion to be drawn from the above discussion is that most of the large and medium-sized establishments for all groups are located in Tripoli and Benghazi, while small establishments for most of the groups are distributed in most of the regions. In terms of the number of establishments, the wide distribution of small factories is mainly associated with potential consumer demand and local raw materials. They include establishments producing perishable items, or goods which gain weight, and hence have relatively high transport costs, such as drinks and some building materials. It seems that small-scale industry is ubiquitous in most of the municipalities, whilst medium and large are more localized.

C. Regional Distribution By The Type Of Ownership

A range of the data can be examined to give some crude index and measure of the type of ownership in industries. Considering the co-operative and joint-stock companies as the private sector, it is evident from Table 6.7 that in 1971 most of industry was controlled by the private sector, with about 87 percent of the total workers. However, as separate groups, it is clear that sole-proprietorship dominated the scene, accounting for about 45 percent of the total number of workers, more than twice the number in the joint-stock companies, which come next with about 21 percent of the total. The state-owned is the smallest group, with about 13 percent, and of this about half are engaged in one establishment, the tobacco industry.

Fig 6-7 DISTRIBUTION OF WORKERS IN SMALL ESTABLISHMENTS
BY INDUSTRIAL GROUPS AMONG MAJOR MUNICIPALITIES
1971

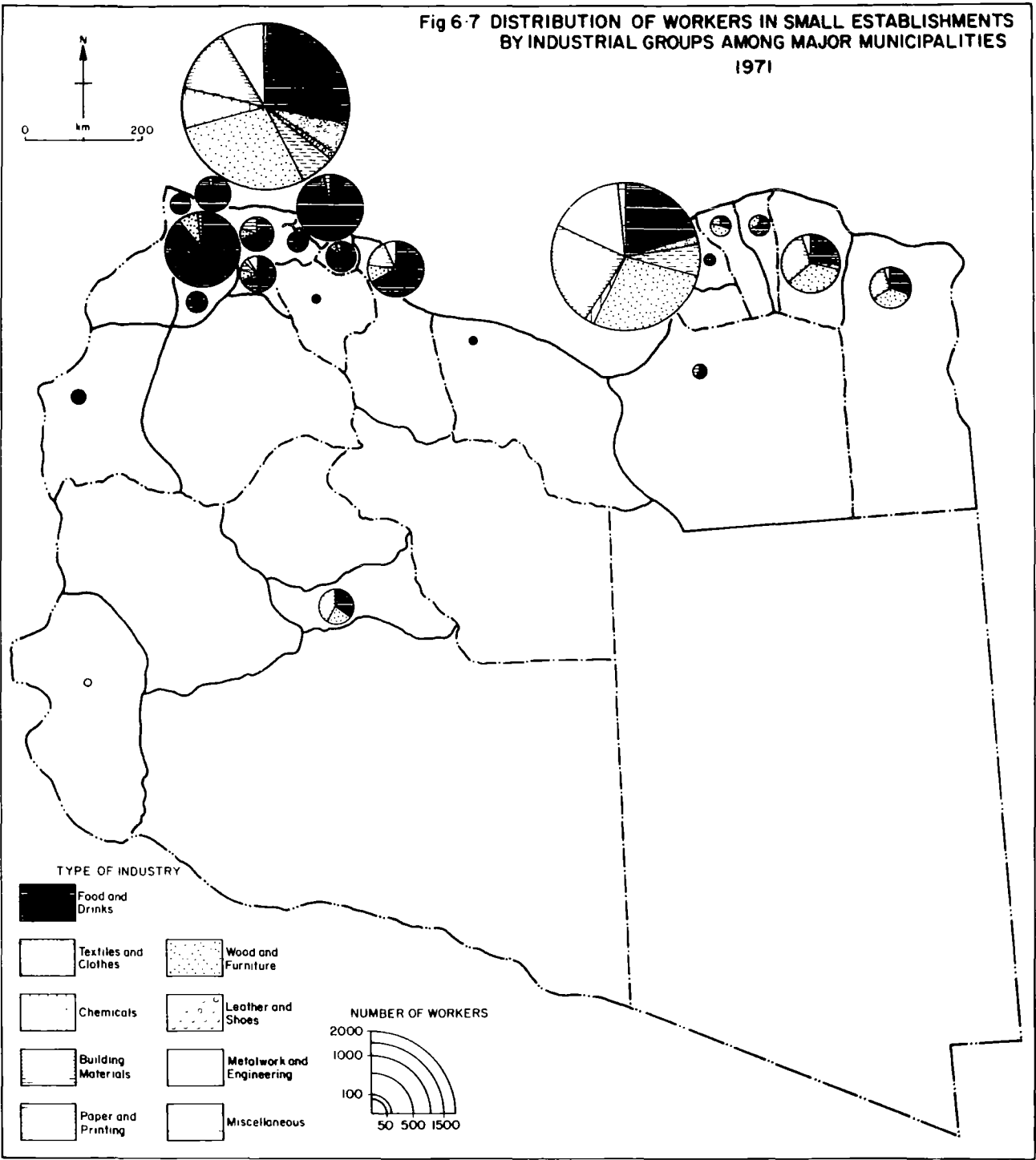


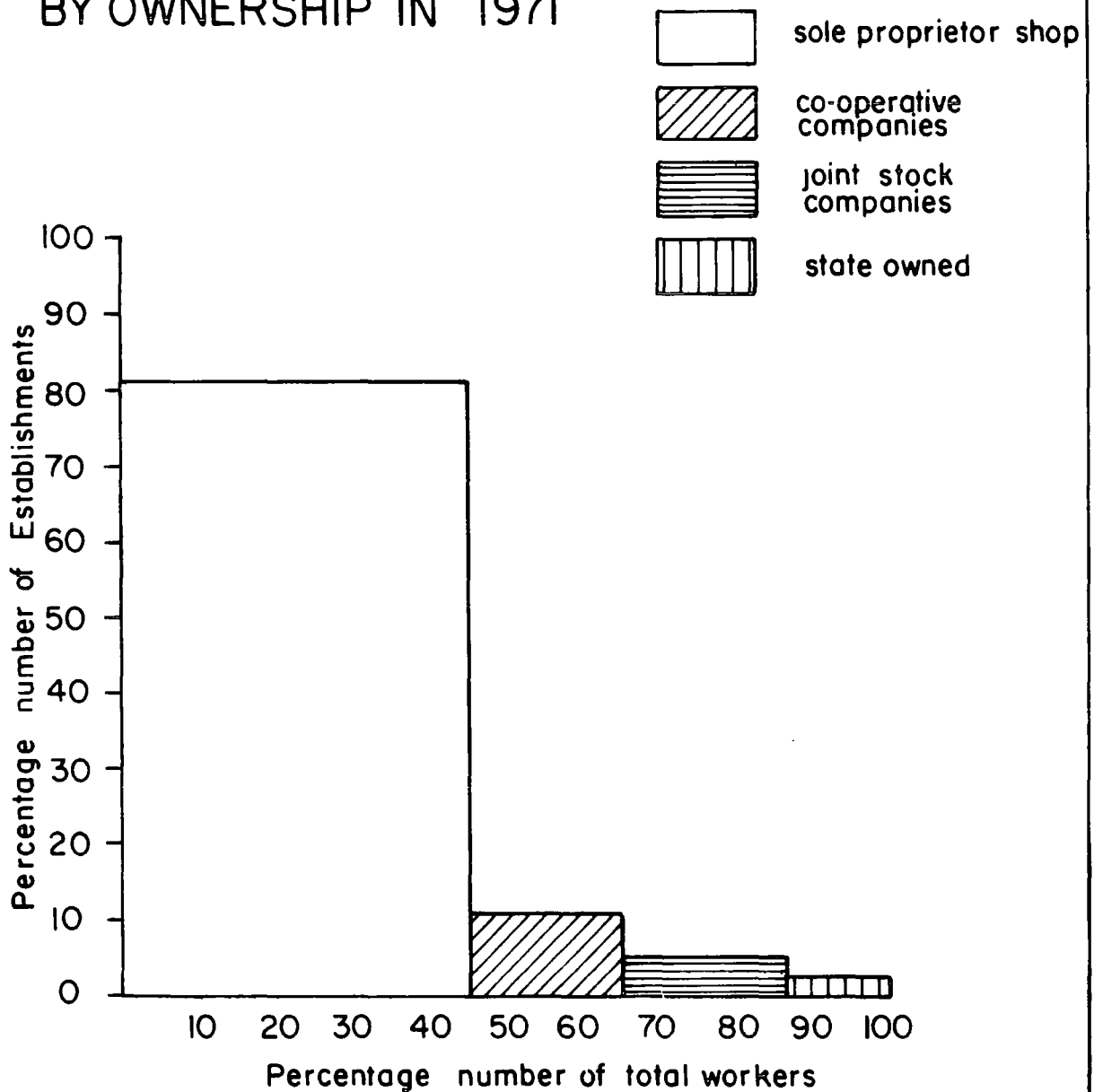
Table 6.7 Distribution Of Workers By Industrial Groups Among Ownership Types in 1971.

Industry	Sole Proprietor- ship	Co-op erative companies	Joint- stock companies	State- owned
Food, soft drinks and tobacco	3,192	1,294	1,937	1,726
Textiles and clothes	565	146	-	-
Leather and shoes	32	5	18	45
Paper and printing	276	142	125	-
Wood and Furniture	1,435	408	-	170
Chemicals	229	338	443	-
Building Materials	1,244	758	912	274
Metal work	553	204	199	-
Miscellaneous	48	5	-	-
Total	7,574	3,300	3,634	2,215

Source : Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

The table shows that sole-proprietorship dominates in all industrial groups, with the exception of the leather and chemicals groups. Sole-proprietorship and co-operative companies are found in all the groups, but mainly in food, soft drinks and tobacco, wood and furniture and building materials, which together account for 77.5 percent and 74.5 percent of the total workers in each ownership type respectively. State-ownership is involved in only four groups : food, wood, leather and building materials. Joint-Stock companies are concentrated mainly in the food and building materials groups, which account for more than three quarters of the total workers in this type. The food group accounts for 78 percent of the total workers in state-owned industries. In the leather group, state-owned

Fig.6·8 INDUSTRIAL DISTRIBUTION
BY OWNERSHIP IN 1971



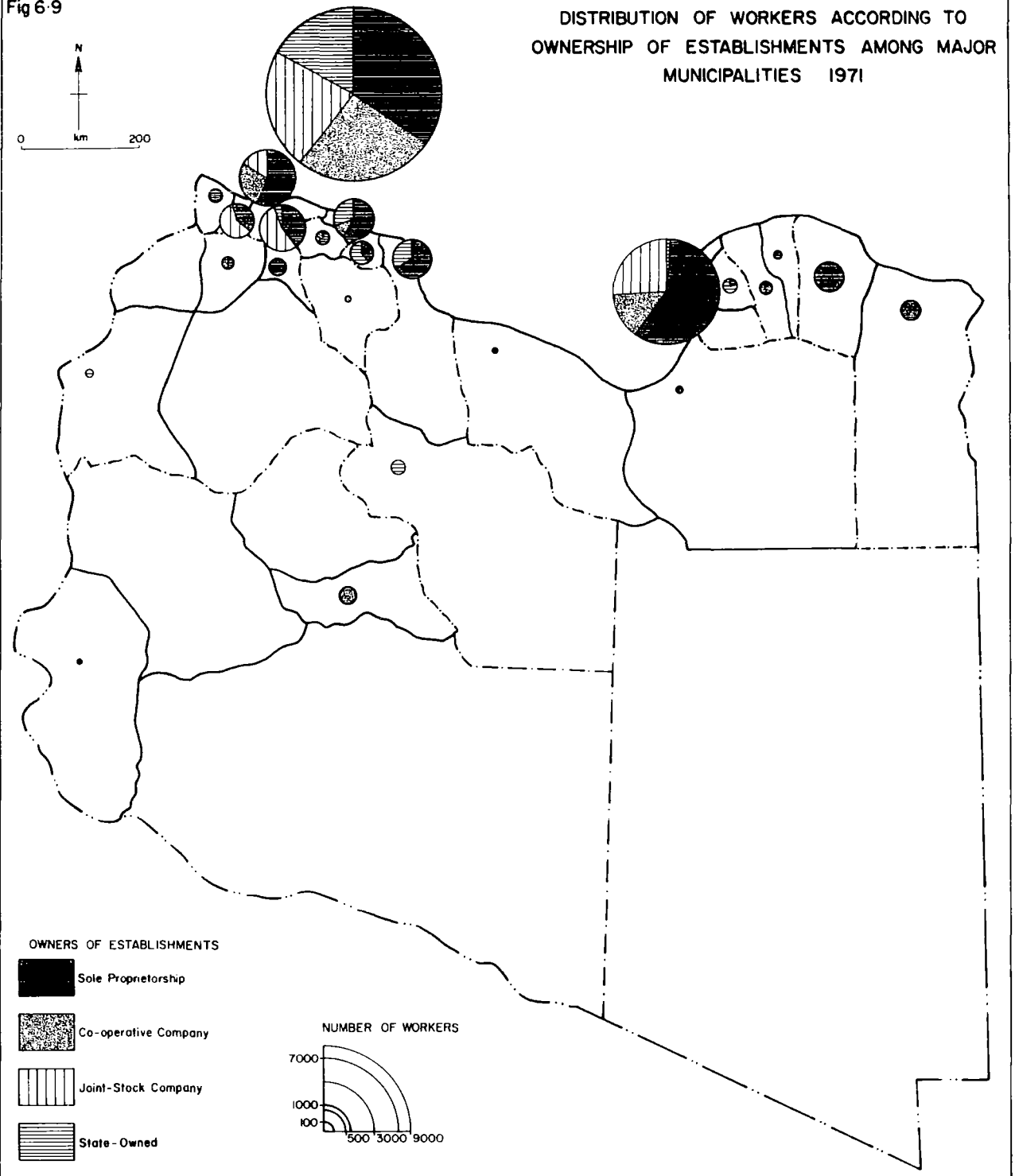
factories employ the highest proportion of workers, probably because all tanneries in Libya are state-owned. In contrast, in the chemical group joint-stock companies predominate, followed by co-operative companies.

Furthermore, detailed analysis indicates that sole proprietorship establishments are numerically important. The general picture is indicated by Figure 6.8 which shows both the marked numerical dominance of sole-proprietorship establishments in the industrial ownership structure, and its contribution made to total workers. It contains about 45 percent of the total workers, with 81.4 percent of the total establishments, whilst the state-owned, in contrast, accounts for 2.6 percent and 13.3 percent respectively.

With regard to the distribution of these types among the different municipalities, Figure 6.9 reveals that 21 out of 24 regions have sole-proprietorship type industry, but this is highly concentrated in Tripoli and Benghazi Municipalities, with about 69 percent of total workers in this type. Thirteen municipalities have co-operative company types, but Tripoli Municipality comprises about three-quarters of the total workers, and more than five times the number in Benghazi. Joint-stock companies are concentrated in only five municipalities, where there are cities and large populations. This can be attributed to the fact that all partners are involved in commerce, which is concentrated in the main cities, and, naturally, joint-stock companies are looking for high profits. Three of these five (Tripoli, Benghazi, El-Zawia) provide the best market and amenities in the country. State-owned industries are located in ten municipalities, mainly western ones, but the high concentration is in Tripoli Municipality, with 72.7 percent of the total. In addition, the figure shows that six municipalities have only sole-proprietorship establishments; Ghat, Sebha, Tobruk, Sirte, Gharian and Zuara. Ben-Ulid has only one co-operative company, whilst Gadames and Jofra Municipalities each have one state-owned establishment.

Fig 6-9

DISTRIBUTION OF WORKERS ACCORDING TO
OWNERSHIP OF ESTABLISHMENTS AMONG MAJOR
MUNICIPALITIES 1971



D. Distribution By Type Of Industry

The distribution of number of establishments and number of workers among the nine industrial groups is shown in Table 6.8. This emphasises the fact that three of the groups comprise about four-fifths of the number of establishments and the workers. Another important feature also indicated from the detailed structure and distribution of industry in the table is the tendency for industrial concentration in one industrial group, food, soft drinks and tobacco. The importance of this industrial group is clearly apparent. It is widely regarded as a pioneer industry in the process of industrialization. It accounts for more than 48 percent of the total number of workers and about 40 percent of the total establishments. In second position is the building materials group, with 19 percent of the total workers, followed by the wood and furniture group with 12 percent of the total. Other groups have a very low proportion, varying between 7 and 0.3 percent of the total, and apart from the miscellaneous group, the leather group has the lowest proportion.

The production of durable consumer articles is still a significant contribution in the industrial sector. The industry is still at the primary stage of development. Its accent until 1971 was on the utilization of simple locally-produced and semi-manufactured materials, hence the emphasis on food canning, olive oil, processing of cement and manufacturing cigarettes, matches, wood, plastic, aluminium and simple leather articles.

Table 6.8 The Distribution Of The Establishments And The Workers Among
The Industrial Groups In 1971.

Industry	No. of Establishments	%	No. of Workers	%
Food, soft drinks and tobacco	364	40.36	8,149	48.73
Textiles and clothes	27	2.99	711	4.25
Leather and shoes	6	0.67	100	0.60
Paper and printing	33	3.66	543	3.24
Wood and furniture	201	22.28	2,013	12.04
Chemicals	39	4.32	1,010	6.04
Building materials	152	16.85	3,188	19.06
Metal work	73	8.09	956	5.72
Miscellaneous	7	0.78	53	0.32
Total	902	100.00	16,723	100.00

Source : Computed by author from data in I.R.C. Industrial Establishments
Census. 1971, Tripoli, 1972.

3. Industrial Groups And Their Sub-Groups

The nine industrial groups will now be examined in detail in order to understand the differences between their distribution. Which kind of sub-groups does each major industry have? Which sub-groups are most widely distributed? To answer all these questions each of these major groups, with its industrial sub-groups, will be discussed separately.

A. Food, Soft Drinks and Tobacco

This group involves processes which are mainly dependent on local agricultural products, or, in some cases, on raw materials which are imported

and which are obviously more economically produced locally. But, in general, the industry is not well-developed, especially those industries which depend on local agricultural goods. This is partly because these commodities are mostly consumed fresh. Within this group, the 1971 Industrial Census recognises and gives detailed characteristics for only fifteen items; ice cream, milk products, coffee, animal fodder, fat, fish canning, tomato canning, fruit juice, olive oil, flour, bread, sweets, macaroni, soft drinks and tobacco. Table 6.9 indicates the distribution of these industries among the various regions.

Olive oil processing and tomato canning are the leading industries in this group, employing about 20 percent and 18 percent of the workers of the group respectively. Olive oil processing provides a clear example of the duality which exists in Libyan industry between traditional mills and modern factories. Except in Tripoli, the olive oil establishments are small and have only limited market areas. Generally they have less than 10 workers, and they tend to be seasonal in operation. The establishments are distributed in 12 municipalities, mostly in the north-west of the country. El-Zawia is the main region, with about 29 percent of the total workers of this process. The wide spread of numerous small establishments producing olive oil in the western municipalities is largely due to the scatter of olive oil production there, and its scarcity in other parts, and because olives are affected by long transportation. Besides, the traditional process is not complicated, and does not need high capital investments. Also, olive oil is much used in the daily life of the people. Therefore, it is more convenient to have it processed near the raw materials than to transport them. But with the improvement of transport facilities, new large ones will be more and more located in large towns.

Tomato canning occurs in seven large establishments with very modern machinery. These are located in three municipalities; Tripoli with about 55 percent, Azizia, 22.5 percent, and El-Zawia, 22.5 percent of the total of the workers.

Table 6.9 Regional Distribution Of Workers In The Food, Soft Drinks And Tobacco Groups By Sub-Groups, 1971.

Main Municipalities	Ice cream	Milk Products	Tomato Canning	Fish Canning	Olive Oil	Flour Mill	Bread	Sweets	Maca-roni	Coffee	Animal Fodder	Fat	Fruit juice	Soft drinks	Tobacco
Tripoli	62	29	806	50	305	171	293	544	340	11	53	-	80	680	1,200
Azizia	-	-	329	-	177	-	5	-	-	-	-	-	-	35	-
Benghazi	10	5	-	-	-	109	242	60	14	-	-	6	-	47	-
El-Abiar	-	-	-	-	-	-	13	-	-	-	43	-	-	-	-
El-Zawia	-	-	330	-	468	-	64	-	-	-	-	-	-	-	-
Sabrattha	-	-	-	166	68	-	25	-	-	-	-	-	-	-	-
Zuara	-	-	-	-	46	-	-	-	-	-	-	-	-	-	-
Misurata	-	-	-	120	96	-	89	-	-	-	-	-	-	-	-
Zletin	-	-	-	130	37	-	31	-	-	-	-	-	-	-	-
Jofra	-	-	-	-	-	-	-	-	-	-	-	-	70	-	-
Homes	-	-	-	-	280	-	33	5	-	-	-	-	-	-	-
Tarhuna	-	-	-	-	44	-	6	-	-	-	-	-	-	-	-
Ben-Ulid	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-
Derna	-	-	-	-	-	-	57	-	-	-	-	-	-	13	-
Tobruk	-	-	-	-	-	-	39	-	-	-	-	-	-	-	-
Beda	-	-	-	-	-	-	23	-	-	-	-	-	-	-	-
El-Marg	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-
Gharian	-	-	-	-	61	-	5	-	-	-	-	-	-	-	-
Yefren	-	-	-	-	36	-	7	-	-	-	-	-	-	-	-
Gadames	-	-	-	-	-	-	29	-	-	-	-	-	16	-	-
Sebha	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ajdabia	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-
Sirte	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-
Total	72	34	1,465	466	1,626	280	989	609	354	11	96	6	166	775	1,200

Source : Computed by the author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

Bakeries with 12 percent of the total food group workers have the greatest scatter among the municipalities, being located in 19 municipalities, though more than half are concentrated in Tripoli and Benghazi. The distribution of bakeries is related to the high daily consumption of bread, the wide spread of the market, and the perishable nature of the product. Besides, this industry does not need skilled workers, and in most cases it remains essentially traditional, with small bakeries supplying the various towns and communities in the large cities.

Canning of sardines and tuna accounts for about 5.7 percent of the total workers and is mostly located on the western coast. This industry is found in four regions, with Sabratha leading with 35.6 percent of the total number of workers, followed by Homes, Misurata and Tripoli Municipalities. The eastern municipalities show a very clear lack of this type of activity, because the only establishment built in Benghazi by the Italians was destroyed during the Second World War and no Italian businessmen remained in the eastern part, unlike the situation in the western regions. In addition, there is a shortage of fish due to the permission to use the national waters given to the Greek trawlers by the former Cyrenaican government and continued until recently. In the recent and early development of this industry encouragement was given to the western regions by the building of cold storage and the development of some trawlers, and the fisheries were helped through their co-operative societies.

The manufacture of macaroni is one of the oldest industries founded by the Italians in the country. Its location in Tripoli and Benghazi is adjacent to flour mills and urban markets. Sweets, milk, coffee and ice cream manufacture are also concentrated in Tripoli and Benghazi, which comprise all the workers involved in these processes, reflecting a strong linkage with the urban population consumption. Macaroni and sweets industries have large establishments, and their production is transported to other

municipalities in Libya. For example, most of the sweets consumed in Tripoli, Misurata and Homes come from the Benghazi establishments, and the macaroni consumed in Benghazi, Misurata and Homes comes from Tripoli establishments.

The flour industry operates in two different ways : Large establishments which buy grain, mill it, and sell the finished products, and in small towns and rural areas small traditional mills to which people bring grain for milling and then take the flour for their subsistence, or to shops.

Fruit and vegetable canning and animal fodder production are not well-developed because of the large consumption of fresh fruit and vegetables and the lack of raw materials for fodder. The two animal fodder establishments depend mostly on imported raw materials.

Soft drinks, with about 9.5 percent of the workers in this group, are concentrated in four municipalities; Tripoli, with about 87 percent of the total workers in this industry, is the important region. The Pepsi Cola establishment in Tripoli is the largest soft drinks factory in the country, employing more than 500 workers. Its market location is expressed in the origin of its raw materials, which are mainly imported from Europe, only water being locally derived. Elsewhere, the soft drinks processes are limited, except in Benghazi, Derna and Azizia Municipalities.

Up to now, Libya has only one tobacco establishment located in Tripoli, and it is the largest factory in the country, employing about 1,200 workers in 1971. It was set up by the Italians and it was, and still is, a state-monopoly. The establishment produces five types of production : cigarettes, cigars, tobacco, chewing tobacco and snuff. Its location is due to the proximity of the only growing area, because tobacco production is restricted by the government to western areas.

Finally, the contrast between the traditional and modern is still apparent in this group of industries. Production still comes mainly from small establishments, but some large-scale production has developed in recent years.

B. Textiles And Clothes

Textiles are generally acknowledged to be a pioneer in the process of industrialization, along with the food industry. Textiles have survived as a traditional industry with different types of articles in each part of the country. The domestic handicrafts industry is carried out exclusively by females, as part-time work, especially in the interior, producing coarse clothes for rural people - Barracans, woollen traditional dresses, and carpets are made by using vertical or horizontal weaving frames.

The modern textile industry employs 503 workers, and the establishments have long existed in two main cities, where Tripoli and Benghazi contain about 98 percent of the workers (Table 6.10). The industry depends heavily on imported materials, such as thrown silk yarns, wool yarns, cotton yarns, flex yarns, and synthetic fibres. None of the 17 establishments specialize in one type of production; all produce a combination of articles, such as ridas, foulars and ferrashias. Other branches of this industry, like knitted goods, are absent in the country.

Table 6.10 Regional Distribution Of Workers In Textiles And Clothes

Groups By Sub-Group in 1971

Municipality	No. of workers in textiles	%	No. of workers in clothes	%
Tripoli	232	46.12	208	100.00
Benghazi	261	51.89	-	-
Homes	10	1.99	-	-
Total	503	100.00	208	100.00

Source : Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

The respondents of the textile establishments ranked the city amenities as the important factor for location, largely because this industry depends mostly on female labour which is available only in the main cities. Proximity to the market and power supply is also very important. The clothing industry is a new industry in Libya, entirely located in Tripoli Municipality, and is carried on in small establishments, mostly tailoring.

C. Leather And Shoes

The leather industry forms a very small element in the present industrial structure of the country. Only four establishments occur and are concentrated in the large cities, but recently a new factory has been established in Tajora to produce large quantities of leather for the shoe factory in Misurata. The location depends largely on locally-produced hides (derived from nearby slaughterhouses), salt and water supply.

The leather industry employs 55 workers who work mainly in tanning rather than dressing. Traditional shoes are produced in two establishments with 45 workers located in Tripoli Municipality, where the market and raw materials are available; production is especially for the tourist. The largest is the Tajora shoe factory with about 27 workers. However, in spite of the absence of a modern shoe industry in Libya (the new modern one in Misurata started operation only in September 1974 and is not at full capacity), cobbling is one of the main handicrafts in the rural interior. This does not mean that previously there was never a modern shoe factory; as stated, early in the 1960s, one was established in Benghazi, but this closed down (see Chapter 4).

D. Paper And Printing

The location of paper and printing establishments forms a clear spatial pattern. The paper industry, with about 41 percent of the total workers of the group, is located in two regions, Tripoli and Benghazi, while

the printing industry, with 59 percent of the total, is located in three regions; Tripoli, Benghazi, and Derna. This may be because of the strong links between the paper and printing industries, on the one hand, and between printing and urban and commercial centres, on the other. The main products of the paper industry are commercial paper bags and roller papers, while those of the printing industry are largely stationery, bills, posters, commercial forms and the like. Other printing processes, such as publishing and periodical printing, are still absent in Libya.

E. Wood And Furniture

Wood processing employs about 89 percent of the total workers of this group. It is widespread in 12 municipalities, but more than four-fifths of the total workers are in Tripoli and Benghazi Municipalities. Derna, El-Zawia and Tobruk Municipalities are next in importance. This type of activity produces wooden articles such as construction timber, doors, windows, and similar items for house-building, and its location is mainly related to the market.

The furniture industry had 218 workers (Table 6.11) working in three establishments, two of them of large size. This is due to the fact that the profit in this industry is not very great in small establishments. Martin estimated that the most profitable size of establishments is probably one within the 50 to 100 worker range. ⁽⁶⁾ However, the industry is still in its early stages, and its main articles produced are wardrobes, tables, chairs, desks, and some decorative items. The major location factor in the furniture industry in Tripoli is the market, due to the link with the headquarters of the government department dealing with the buying of furniture.

Table 6.11 Regional Distribution Of Workers In Wood And Metalwork
Groups By Sub-Groups in 1971.

Municipality	Joineries	Furniture	Steel Workshop	Metal Furniture	Sheet metal	Aluminium workshop
Tripoli	905	218	39	180	320	25
Azizia	8	-	-	-	-	-
Benghazi	600	-	218	15	120	-
El-Zawia	41	-	-	-	-	-
Misurata	29	-	-	-	18	-
Zletin	6	-	-	-	-	-
Derna	98	-	11	-	-	-
Tobruk	46	-	5	-	-	-
Beda	10	-	-	-	-	-
El-Marg	18	-	-	-	-	-
Gharian	11	-	5	-	-	-
Sebha	23	-	-	-	-	-
Total	1795	218	278	195	458	25

Source : Computed by author from data in I.R.C. Industrial Establishments Census, 1971, Tripoli, 1972.

F. Chemicals

Within this group come 11 distinct sub-groups : industrial gases, paints, fertilizers, soaps, matches, tyres, rubber, batteries, perfumes, plastic and drilling mud production. Table 6.12 reveals that the paint and industrial gases branches are the leading industries, with 20 percent and 17 percent of the total workers respectively. The industry is markedly concentrated in Tripoli; the only other centres are Benghazi and El-Zawia. Tripoli is the major municipality for all chemical manufacturing except for drilling mud, which is used only for petroleum exploration, and Benghazi is the closest place to the oilfields.

Table 6.12 Regional Distribution Of Workers In The Chemical Group
By Sub-Groups in 1971.

Industry	Municipality Tripoli	Benghazi	El-Zawia	Total
Industrial Gases	137	35	-	172
Fertilizer	35	-	-	35
Paint	198	8	-	206
Perfumes	67	-	-	67
Soap	93	-	17	110
Tyres	15	-	-	15
Matches	70	-	-	70
Rubber	125	-	-	125
Plastic	48	5	-	53
Batteries	49	12	-	61
Drilling Mud	-	96	-	96

Source : Computed by author from data in I.R.C. Industrial Establishments
Census 1971, Tripoli, 1972.

In Benghazi there are only five types of chemical industries, while El-Zawia has only one sub-group, a soap establishment. In other municipalities the industry is absent, because it is largely dependent on imported raw materials which come mostly by sea.

G. Building Materials

This group has four types of industries : cement, cement products (bricks, pipes and prefabricated elements), lime and gypsum, and marble and tiles. From Table 6.13 it is obvious that cement production has the largest employment, with about half of the total workers, followed by marble and tiles processing with 38 percent of the total.

Table 6.13 Regional Distribution Of Workers In Building MaterialsGroup by Sub-Groups, 1971.

Municipalities	Marble and tiles	Lime	Cement Products	Cement
Tripoli	729	-	571	-
Azizia	39	-	6	-
Benghazi	344	5	743	259
El-Zawia	36	-	-	-
Sabratha	5	-	-	-
Misurata	41	-	40	-
Zletin	-	-	5	-
Homes	11	-	-	144
Derna	-	-	85	-
Tobruk	12	-	24	-
El-Marg	-	-	29	-
Gharian	-	-	8	-
Sebha	-	-	46	-
Ajdabia	-	-	6	-
Total	1,217	5	1,563	403

Source : Computed by author from data in I.R.C. Industrial Establishment Census 1971, Tripoli, 1972.

Cement brick processing is the main branch of the cement production industry, and it occurs in about half of the municipalities, but principally in Tripoli, and Benghazi, with more than 84 percent of the workers of this sub-group. The same can be said for the marble and tiles industries. The manufacture of cement is carried out in two large modern establishments. Libya's first cement establishment was opened at Homes in 1967, and more than 60,000 tons yearly were produced domestically, but following the increase in

domestic consumption another was opened in Benghazi in 1972, with an average yearly production of 200,000 tons. But they still produce less than half of the total consumption of the country.

The concentration of these industries in and around the urban centres is because of the construction of new building projects, whilst in the interior, by contrast, mud, timber and zinc were until recently used for building.

Table 6.13 shows that the marble and tiles industry is concentrated in the western municipalities where building projects are larger; in the east, it is found only in two municipalities, Benghazi and Tobruk. Natural stone, quarried in large quantities in El-Zawia region, has been largely used in the western municipalities as building materials, whereas cement products have tended to be located in the eastern municipalities, due to the unavailability of the natural stone. Vardjan stated,

"Stone quarrying plays an important part in providing raw materials for construction. This quarrying is (due to the concentration of natural resources) concentrated in the Mugata of El-Zawia. In 1964, according to the Industrial Census, 79 establishments employing five or more workers were reported to be engaged in stone quarrying in the whole country. Of these, as many as 62 were located in Mugata El-Zawia." (7)

H. Metal Work

There is little metal working, production being mainly carried on in small workshops and smithies, and it can be further divided into four types of industries : metal furniture, sheet metal working, steel workshops, and aluminium workshops. The activities are mainly in the main towns (see Table 6.11), and, in general, all the establishments are small, and deal with wrought iron, producing many articles for the new Libyan houses, such as iron-work gates, window frames and grills, tanks, railings and banisters. The location is linked to the city amenities and services, as well as the market. Imported raw materials and the products are bulky and expensive to transport.

To summarise, the following major conclusions can be drawn. Industrial location in Libya is mainly concentrated in the north of the country, particularly in two poles in and around Tripoli and Benghazi. The municipalities which have the main urban centres are the most attractive locations. These two municipalities also have the largest establishments, while the establishments which tend to be distributed over the other municipalities are small. Tripoli, with a limited number of exceptions, is the major centre for any particular industry. The food group is the leading industry in terms of number of establishments and workers. Finally, most of the manufacturing establishments during the period under study were small-scale establishments and private ownership prevails. The discussion of the distribution and structure of industries does not include the detailed reasons which affect location, and these will appear in the following chapter.

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CHAPTER 7

Factors Affecting Industrial Location

In a study of the industrial distribution in Libya, one must take into account the influence of industrial location factors. They are important in determining which attributes a region must have to attract industry. It is clear from the previous chapter that there are variations of industrial concentration among municipalities in Libya. Therefore the main objective of this chapter is to study the industrial location factors, with an emphasis on their influence on industrial location in the municipalities.

It is important to keep in mind the assumption that the location decision is generally a two-step process. The first step is the selection of the region of location. The second is the selection of a site within that region. ⁽¹⁾ Consequently, the discussion in this chapter is mainly concerned with the regional decision, while Chapter 8 will be concerned with the choice of site within the main cities.

Industrial activity in general is seldom, if ever, found evenly spread over the earth's surface, or distributed in an apparently random way. Some places and regions have a wide range and high density of industrial concentration, whilst others may have only a little industry. Although industry may be dispersed in a fairly regular manner throughout whole regions or countries, with no area standing out as particularly important, other countries may have a high concentration, perhaps largely confined to one region, one city, or even certain sections of a region. ⁽²⁾

Regions have different degrees of industrial concentration and industries adopt different patterns. The distribution pattern of industrial establishments in any region is the result of an exceedingly complicated series of inter-relationships, likely to involve each diverse decision-

making processes as the logical analysis of economic factors, the judgements of powerful executives, the persuasive influence of government agencies, and the broad planning of strategic decentralization. ⁽³⁾ This means that there is no single factor capable of completely explaining industrial location. The existing location is the composite effect of many and diverse socio-economic factors, which include market, transportation, workers, raw materials, amenities, suitable building area and government policies.

The relative importance of the various location factors in the country can be assessed by examining the results obtained from the answers to question No. 46 of a questionnaire which was designed to sample some 62 establishments located in different places in the country. The answers list basic factors that affected the decision where to locate particular establishments. Respondents were asked to rank the factors of importance in regard to "Why this precise establishment's location was chosen." The results of the answers are shown in Table 7.1, which is arranged according to the number of times a particular factor was marked as a dominant, secondary, third, or fourth factor.

The result which appears clear from the table is that the amenities and services of the city stand out definitely as the prime locational influence, transportation second, market third, while land availability was in fourth place. Although ranked third as dominant factor, the market had the highest rating as the third factor, followed by labour supply as second. So, although in terms of the percentage of average weight, the ranking appears from the table to be not very dissimilar from that of the dominating factor, the market moves to second rank, the transportation factor to third place, and labour supply takes over the fourth rank from the land availability factor which ranks fifth. Other factors of importance occur with less regularity than do the preceding five factors. Some factors, such as government policies and capital availability,

Table 7.1 Industrial Location Factors Due To Questionnaire According
To Number Of Times Ranked.

Factors	as dominant factor	as second factor	as third factor	as fourth factor	Total Points [*]	Percent of aver- age weight
City amenities and services	15	12	10	7	123	19.8
Transportation	13	11	8	9	110	17.7
Market	10	10	18	7	113	18.2
Land availability	9	9	2	5	72	11.6
Raw materials	7	5	4	13	64	10.3
Labour supply	5	8	12	12	80	12.9
Power	1	4	8	8	40	6.5
Personal choice	2	3	-	1	18	3.0
Total	62	62	62	62	620	100.0

* 4 points to dominant factor, 3 to second, 2 to third, and 1 to fourth.

Source : Fieldwork, Summer 1973.

do not show much importance as location factors, and it is clear that the amenities of the city, market, transportation, labour supply, land, raw materials, power and personal choice were the main factors of industrial location in Libya. An element of purely personal choice appears to be significant. Two establishments indicated personal choice as the leading factor for their locations. But it is worth noting, that its importance varies from industry to industry and from one region to another.

D.M. Smith maintains that :

"The various factors affecting plant location are well-known, but it is often very difficult to determine their relative importance in specific instances, and it is quite impossible to put all the factors together into some kind of mathematical model which could adequately predict the trends which have been observed." (4)

He also adds that all that can be attempted in this case is to examine each of the main influences in turn, in the hope of arriving at some reasonable conclusion.⁽⁵⁾ To obtain a complete understanding, it is valuable to study these factors individually in detail before discussing their relative significance as location factors. Some other factors were not mentioned in the table by respondents as factors of location, such as some physical factors, governmental policies and historical factors, because they do not have a clear direct effect for the respondents, but in general they have an indirect effect, and therefore the situation may be made clearer by studying these factors as well as those listed before. The factors are examined according to their importance in the table.

A. City Amenities And Services

In some countries the amenities and services in the city have probably done more than any other factor to attract industries into the cities. In Libya, the foregoing table indicates that this factor has been very significant for industrial location in the country. Fifteen respondents out of 62 indicated this factor as a dominant one in their location, and twelve ranked it as a secondary factor. Moreover, in terms of the percentage average weight, it is clear that it ranked highest among the factors, though only marginally so. So this factor has been the most compelling one in industrial location in Libya in recent years.

One might wonder why a location in Libya in or near a large city appears to have a certain attraction for industry. This may be explained by the imbalance in the number of amenities and infrastructure between the regions and agglomerations and the small scale of manufacturing.

The main advantages of the large cities for industrial location in Libya arise from their relatively well-developed services and infrastructure. For example, water services are inadequate in areas outside the large cities, and establishments located outside the main cities have had to

drill their own wells. Most small Libyan establishments are probably not able to do so, and, besides, well water is not of good quality. In answer to questions No. 39 and 40, it appears that 40 establishments required water for both processes, as raw materials and in cleaning. The quantity consumed was between 300 litres and 750,000 cubic metres per day, and it differed from one type of industry to another. Public water systems are limited to the cities, so all factories which cannot have their own wells have to be located near to the major cities. In Tripoli and Benghazi, plans have been made to develop water systems which will meet these cities' demands in the future.

Tripoli and Benghazi are also the only two cities which have urban transportation, covering most parts of the city, thus making it relatively easy for workers to reach their jobs. Communication facilities are generally inadequate elsewhere. The telephone and postal systems in Libya need more development. Establishments located at some distance from the main cities, such as Ben-Ghashir near Tripoli, or El-Abiar near Benghazi, have difficulty with communication.

Other amenities such as ports, airports, commercial facilities (banks, trade unions, chambers of commerce, insurance companies), educational institutions, cinemas, health services and workshops for maintenance, do not exist, or are less-developed in other areas. This might appear rather obvious in the case of a young nation such as Libya, but even the major cities, Tripoli and Benghazi, are still facing problems in some service facilities such as sewerage, as well as inadequacy of urban transportation.

Furthermore, small-scale establishments, which dominate in Libya, are also unable to provide special services for their workers if they are located far from the main cities. The answers to questions No. 16 and 17 in the questionnaire showed that the only facilities given by establishments to their workers were loans, a breakfast meal, and some safety clothes in some cases. Only nine respondents stated that they provided housing for

foreign technical workers, and eight that they provided transport facilities, but the establishments which provide these facilities are the largest ones. None of the respondents, for example, stated that their establishments provided housing, recreation pools, schools, clubs, or health centres. In addition, as we shall see later on, most of the skilled workers engaged in Libyan industry are foreigners who, of course, prefer city life.

The advantage which a new establishment derives from a location among other establishments engaged in the same activity is fairly obvious. An existing industrial concentration may contain a pool of labour with particular skills, or special educational institutions geared to the needs of the industry in question, both of which help the establishment to reduce the cost of training its workers. Factories may also join together to develop a research institute, a marketing organization, and other collective facilities that individual manufacturers would be unable to provide for themselves. (6)

B. Influence Of The Market

The proximity to the market is a very important factor affecting the location of the manufacturing industries. It has been recognized to be the most dominant of all location factors in the classical location theories. There is a general tendency for some industries to be located in or near the market, as they cannot operate economically far from the market. These industries, considered as 'market-orientated', are those whose finished products are costly or difficult to transport, because they are either bulky or breakable. Such industries are of three main types. Some make perishable products, such as bread, ice cream or newspapers, which must be processed near the place of consumption, as they are liable to go stale if not delivered quickly to the consumer. Some, such as tailoring, printing and maintenance services, require personal contact with the consumer. Others are linked to

the market because of increase in the bulk or weight of the final products, as in the case of furniture and metal work, where the weight of the products to be distributed exceeds the total weight of materials transported. For example, the distribution of soft drinks production throughout the country simply reflects the high cost of transport. Such manufacturing is to be found everywhere, therefore, more or less in proportion with population and income. (7)

Soft drinks, some food industries, such as bread and ice cream, printing, building materials and metal work are therefore generally the most widely distributed establishments. The question which arises here is how does the market affect particular industries in Libya? If the structure of the industry has a large number of small establishments, they will be scattered throughout many parts of the country, according to the distribution of the population and its income. But if the structure is on a large scale, the market may only give scope for one or two establishments throughout the whole country.

To answer this question, three types of studies have been used to illustrate the relation between the market and the location of manufacturing industries in Libya : (a) analysis of the questionnaire, (b) study of the relation between the market and general population distribution, and (c) study of the coefficient of linkage between the different groups of industries and the market.

The questionnaire answers show the market factor to be much more important than any other attraction except city amenities and services. It was stated as the dominant location factor by 10 respondents, the second factor by 10, and the third factor by 18. Comparing the location with the market reveals several interesting points. The answers to question No. 45 make it clear that the bulk of the output of the majority of the industrial establishments is orientated to the local market (original muhafada). But some of these establishments had a proportion of their total sales outside

their local muhafada, including tobacco, tomato, olive oil, macaroni, furniture and sweet establishments. These are mainly larger establishments with more than 50 workers. For example, the ten large establishments which are located in Tripoli and market in Benghazi accounted for about 20 percent of the total workers in Tripoli. The results obtained for establishments situated in Tripoli and Benghazi indicate that most of them marketed in more than one muhafada. Markets tended to be concentrated in muhafadat near to the factories and therefore easily accessible from them. Of twenty establishments in Tripoli, 18 stated that they had markets in Homes and Misurata, 12 in El-Zawia, 10 in Gharian, 10 in Benghazi, 5 in Sebha, 3 in El-Kaleg, and 2 in Derna and G. Akhdar. From Benghazi 10 stated that they had markets in El-Kaleg, and 7 in Derna and G. Akhdar, whilst only 2 gave Tripoli as a market for a portion of their products. However, even for these establishments, the marketing beyond the periphery of the local muhafada is sometimes quite unstable, varying with the availability of transportation and the amount of production.

One can deduce that only few establishments have a national market, and any establishment which attempts to achieve national distribution for its product from a location in Tripoli, Benghazi or Sebha must tackle the economic handicap of distance. So the local establishments tend to dominate the local market for their product. This might help to explain why the greatest population and most of the buying power in the country are concentrated on two poles agglomerated around two widely-separated cities, with a distance of about a thousand kilometres between them. For example, when 'Pepsi Cola' was produced only in Tripoli, before the Benghazi branch had opened, it cost 5p in Benghazi, whilst in Tripoli it cost only 3p.

The answers to question No. 57 show that most Libyan establishments depend on personal contact for selling their product. Only 18 respondents stated that more than 50 percent of their products were sold to the

wholesaler, while 37, according to Table 7.2, stated that more than 50 percent were sold to retailers and consumers directly. Only three sold most of their production to other establishments to be used as raw materials; these were those which produced olive oil and flour. None stated that they sold their products abroad. Table 7.2 reveals that 34 of total factories interviewed sold between 75 to 100 percent of their goods direct to retailers and consumers. These are grouped under wood and furniture production, chemicals, building materials, metal work and some food industries. It is clear that the very nature of these industries is such that the bulk of the produce should be directly sold to consumers. From the answers,

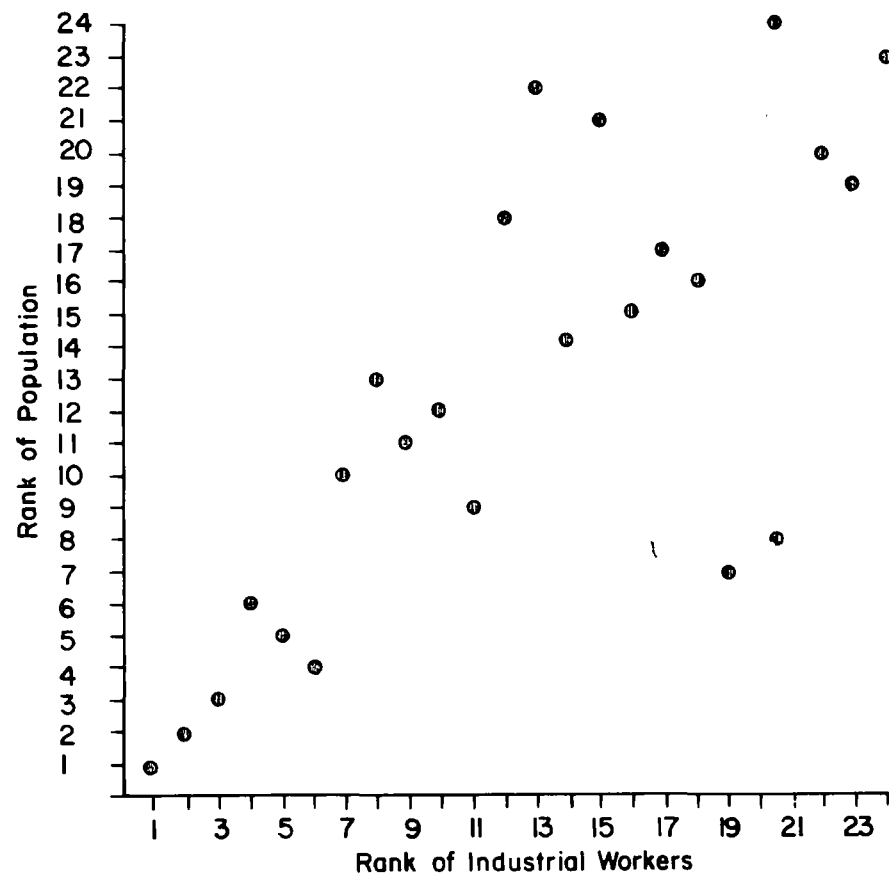
Table 7.2 Distribution Of Establishments By Proportion Of Total Sales
Direct To Retailers And Consumers By Units.

Industries	Less than 25%	25% to 50%	50% to 75%	75% to 100%
Food, soft drinks	1	1	2	7
Textiles	1	-	-	-
Paper and printing	1	1	-	1
Wood and Furniture	-	-	-	12
Chemical Production	1	1	1	3
Building Materials	-	-	-	8
Metal Work	-	2	-	3

Source : Answers to Questionnaire.

there appears to be a high degree of correlation between the industries which reported a high proportion of products sold beyond their local muhafada, and those which marketed through wholesalers. For example, the ten establishments in Tripoli which market in Benghazi, and the two which market from Benghazi to Tripoli, do so through wholesalers. The limited number of

Fig. 7-1 RANK CORRELATION COEFFICIENT BETWEEN POPULATION IN 1973 AND
MANUFACTURING WORKERS 1971, IN LIBYAN LOCALITIES



wholesalers and the difficulty of making personal contact with the widely distributed market may be the reason why the greater part of industrial production is unable to reach remote muhafadat.

The second way to explain the relation between the market and industrial location is through a study of the distribution and density of population. This study might be more accurate if it were linked with the per capita income or household expenditure in the different regions. Therefore the study will be concerned with the size of the market, comparing the total population distribution in the various localities with the total number of workers in establishments which employ more than five workers. The question which should be answered here is whether or not the distribution of the factories is in any way related to the general distribution of the population. Spearman's rank correlation coefficient (r_s) between the distribution and number of workers in different regions reaches a level of 0.76 (Figure 7.1), showing that there is a significant relationship between the population concentration (market) and the industrial location (Table 7.3). The important areal market differences find a reflection in recent population trends and density (Table 7.4). Figure 7.2 shows that between 1964 and 1973 Tripoli's Muhafada increased its population by more than 300,000, and Benghazi and El-Zawia Muhafadat by more than 80,000 each, whilst other muhafadat increased by less than 50,000. There was a decrease only in Gharian Muhafada, of about 26,000. These population trends increased the capacity of the Tripoli, Benghazi and El-Zawia markets.

Density differs in varying regions. The most densely-populated areas are the northern developed regions, especially in the Muhafadat of Tripoli, El-Zawia and Benghazi, where the great towns and main cities are situated. In 1973, in Tripoli Muhafada, there were about 236 persons per square kilometre, in El-Zawia 35, and in Benghazi 19. The higher mountain regions and south are very thinly populated, often having less than 8 persons per square kilometre in the mountain regions and less than one per square kilometre in the southern desert regions. In the case of the municipalities..

Table 7.3 Total Population (1973) And Number Of Workers Employed In
Establishments With More Than Five Workers (1971) In
Different Municipalities.

Municipality	Total Population (1973)	Total Industrial Workers (1971)
Tripoli	631,102	9,386
Azizia	78,015	599
Benghazi	311,531	3,390
El-Abiar	17,659	56
El-Zawia	138,556	956
Sabratha	58,166	264
Zuara	47,630	46
Misurata	103,302	433
Zletin	59,309	209
Jofra	16,705	70
Homes	89,695	483
Tarhuna	53,894	50
Ben-Ulid	19,084	8
Derna	64,528	271
Tobruk	58,869	126
Beda	75,739	33
El-Marg	55,332	59
Gharian	65,439	100
Yefren	48,097	43
Gadames	6,210	16
Sebha	35,389	98
Ghat	6,926	5
Ajdabia	65,533	16
Sirte	30,312	6

Sources : 1. Ministry of Planning and Development, Census and Statistical Department, Population Census 1973 (Preliminary Result), Tripoli, 1974.

2. Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

Fig 7-2 POPULATION CHANGE BY MUHAFA DAT IN LIBYA
1964-1973

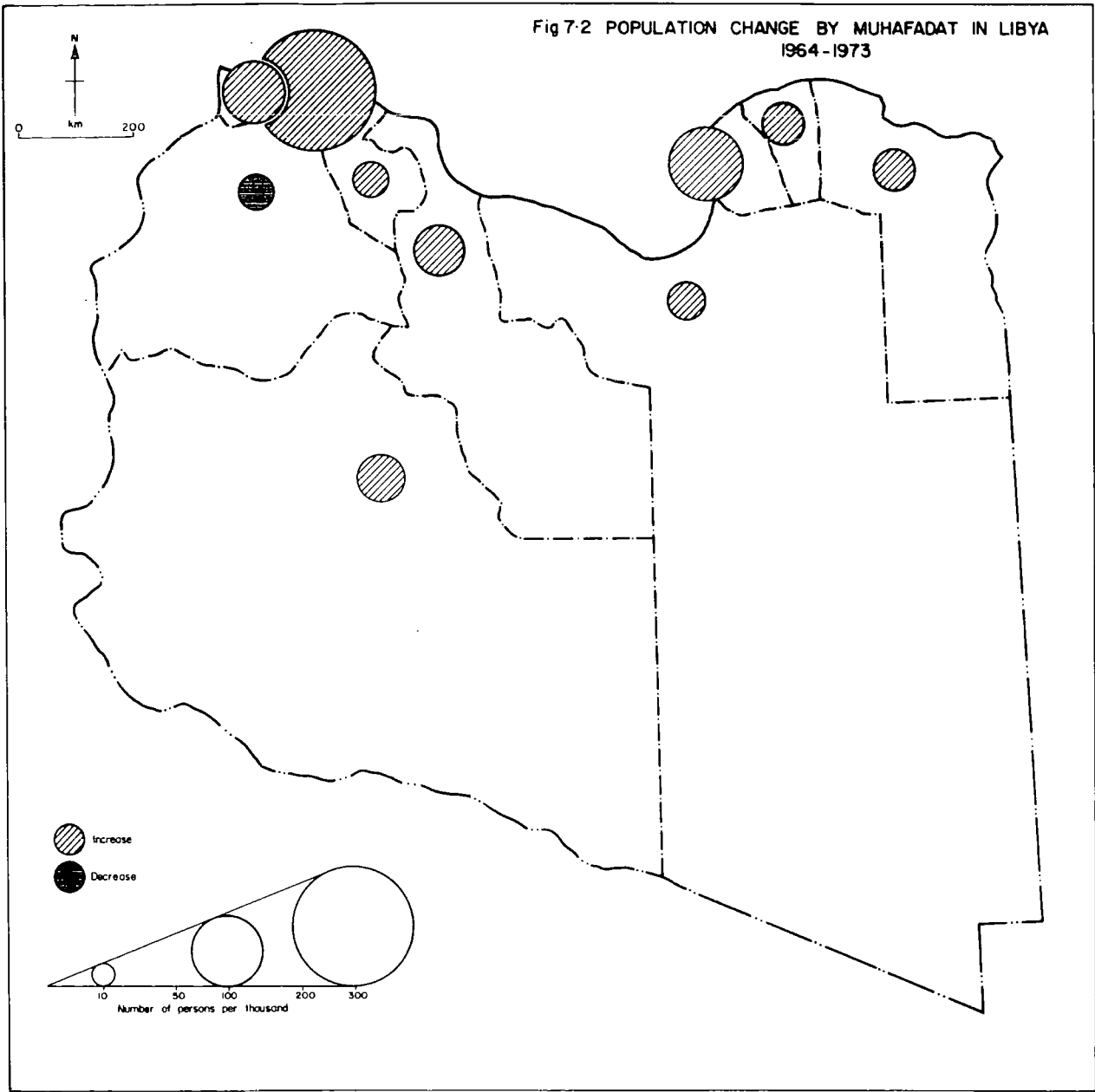


Figure 7.3 reveals that the density is rather more. For example, Tripoli, El-Zawia and Benghazi Municipalities have more than 400, 61 and 21 persons per square kilometre respectively.

The centralization of population in a few cities makes them economically the most active focal points and markets. The sizeable increase in population in Tripoli, El-Zawia and Benghazi, and their expected future growth, was found to affect closely the entrepreneurs' location decisions. Besides, the migration of people from rural areas to urban centres, especially into the large cities, has increased the concentration of buyers, which has favourably affected the market for industrial goods.

An attempt will also be made to study the coefficient of linkage between the market and the distribution of different industry groups. ⁽⁸⁾ In order to show this, Table 7.5 shows the regional distribution of the different industry groups in 1971 compared with the distribution of the population in 1973, while Table 7.6 shows the coefficients of linkage between the different industrial groups and the market. It can be observed from Table 7.6 that the industry groups all have a different coefficient of linkage. It is clear that two groups have a coefficient of linkage with the market of over 0.60 : food industries stand at 0.64 and the building materials group at 0.62. Other industrial groups have more than 0.45, with the exception of miscellaneous industries, though the leather and shoes group has a coefficient of only 0.46. This group is highly concentrated in Tripoli and Benghazi. Figure 7.4 indicates that Tripoli, with the exception of a miscellaneous group, has a plus deviation for all the groups; those with the highest plus deviation are the chemical group 51.5, the leather and shoes group 45.6, and the paper and printing groups 45.2.

In Benghazi, building materials stand at 27.6, the textile and clothes group at 22.0, and metal work at 22.2. In other muhāfadat, only El-Zawia and Derna have a plus deviation, except in the case of the

Fig.7.3 POPULATION DENSITY BY MUNICIPALITIES IN LIBYA, 1973

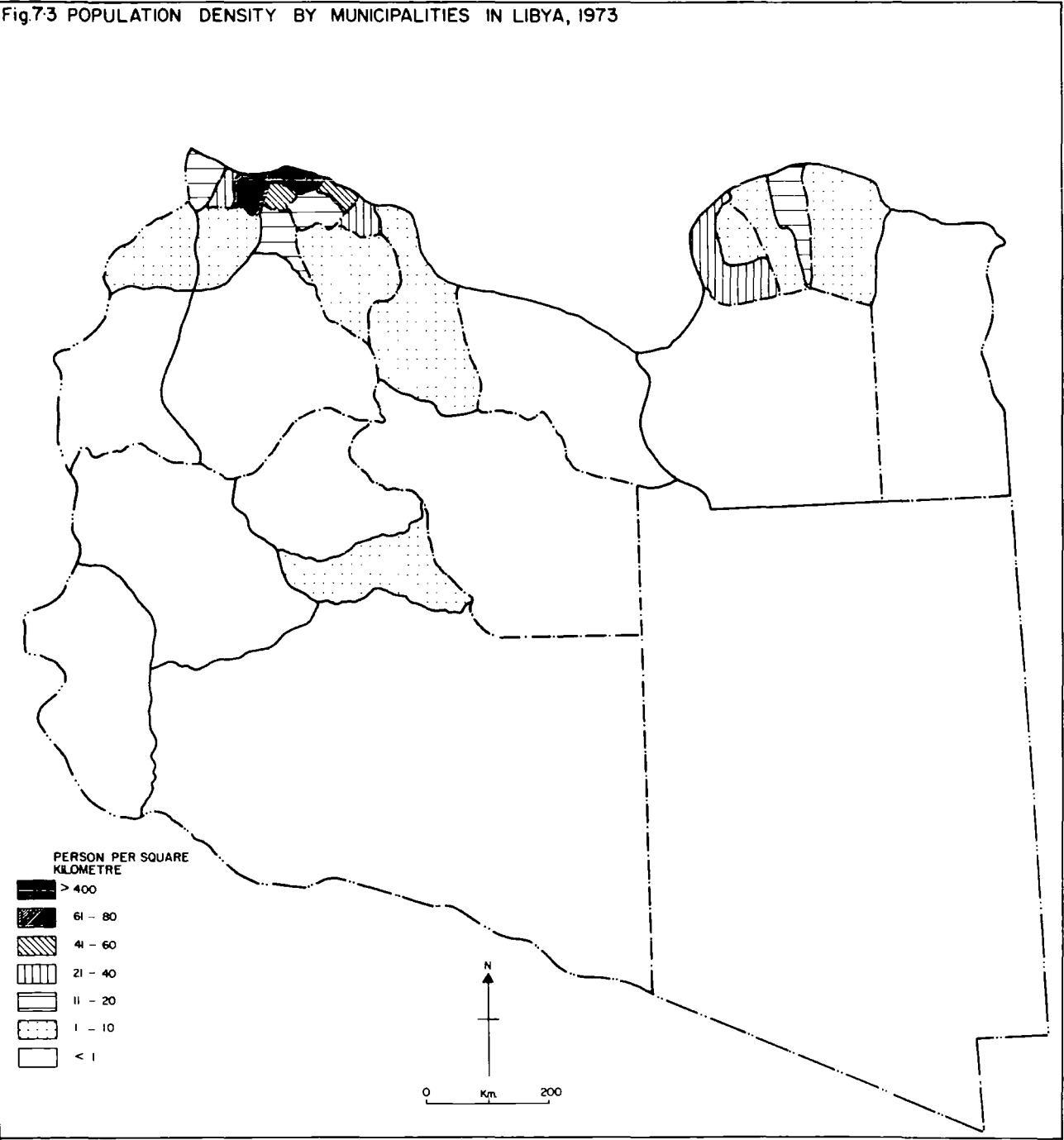


Table 7.4 Area, Total Population And Population Density By Muhafadat, In Libya, 1964-1973.

Muhafada	Area Thousands of square Kms	%	Thousands of Persons		% of the total		Population Density No. per 100 square Kms	
			1964	1973	1964	1973	1964	1973
Tripoli	3	-	406	709	26	31	13,533	23,633
Benghazi	17	1	225	331	14	15	1,324	1,947
El-Zawia	7	-	164	244	11	11	2,343	3,486
Misurata	148	9	130	179	8	8	88	121
Homes	25	1	137	163	9	7	548	652
Derna	103	6	84	123	5	5	82	119
G. Akhdar	17	1	91	131	6	6	535	771
Gharian	150	9	181	155	12	7	121	103
Sebha	559	32	67	112	4	5	12	20
El-Kaleg	720	41	80	108	5	5	11	15
Total	1,740	100	1,565	2,255	100	100	189	129

Sources : 1. Ministry of Planning and Development, Statistical Abstract 1970, Tripoli, 1972.

2. " " " " Census and Statistical Dept., Population Census 1973 (Preliminary Result), Tripoli, 1974.

Table 7.5 Regional Distribution Of Industry Groups And The Population In Libya

		Percentage of persons employed in various industries										
	Total pop. in 1973	% of the total	% of persons employed in 1971	food, soft- drink & tobacco	textiles and clothes	leather and shoes	wood and furn- iture	printing and paper	chemicals	building mat- erials	metal work	mis- cell- aneous
		A	B	C	D	E	F	G	H	I	J	K
Tripoli	709,117	31.4	59.8	63.5	61.8	77.0	56.2	76.6	82.9	42.2	59.0	9.4
Benghazi	331,180	14.7	20.1	6.7	36.7	23.0	29.8	22.1	5.4	42.3	36.9	62.3
El-Zawia	244,352	10.8	7.6	14.3	-	-	2.0	-	1.7	1.3	-	-
Misurata	179,316	7.9	3.3	7.0	-	-	1.8	-	-	2.7	1.9	-
Homes	162,673	7.2	4.3	4.6	1.5	-	-	-	-	4.8	-	-
Derna	123,397	5.5	0.6	1.3	-	-	7.0	1.3	-	3.9	1.7	-
G. Ahkdar	131,071	5.8	1.0	0.5	-	-	1.4	-	-	0.9	-	-
Gharian	155,162	6.9	2.4	1.5	-	-	0.6	-	-	0.3	0.5	18.9
Sebha	112,318	5.0	0.7	0.4	-	-	1.2	-	-	1.4	-	9.4
El-Kaleg	108,451	4.8	0.2	0.2	-	-	-	-	-	0.2	-	-
Total	2,257,037	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

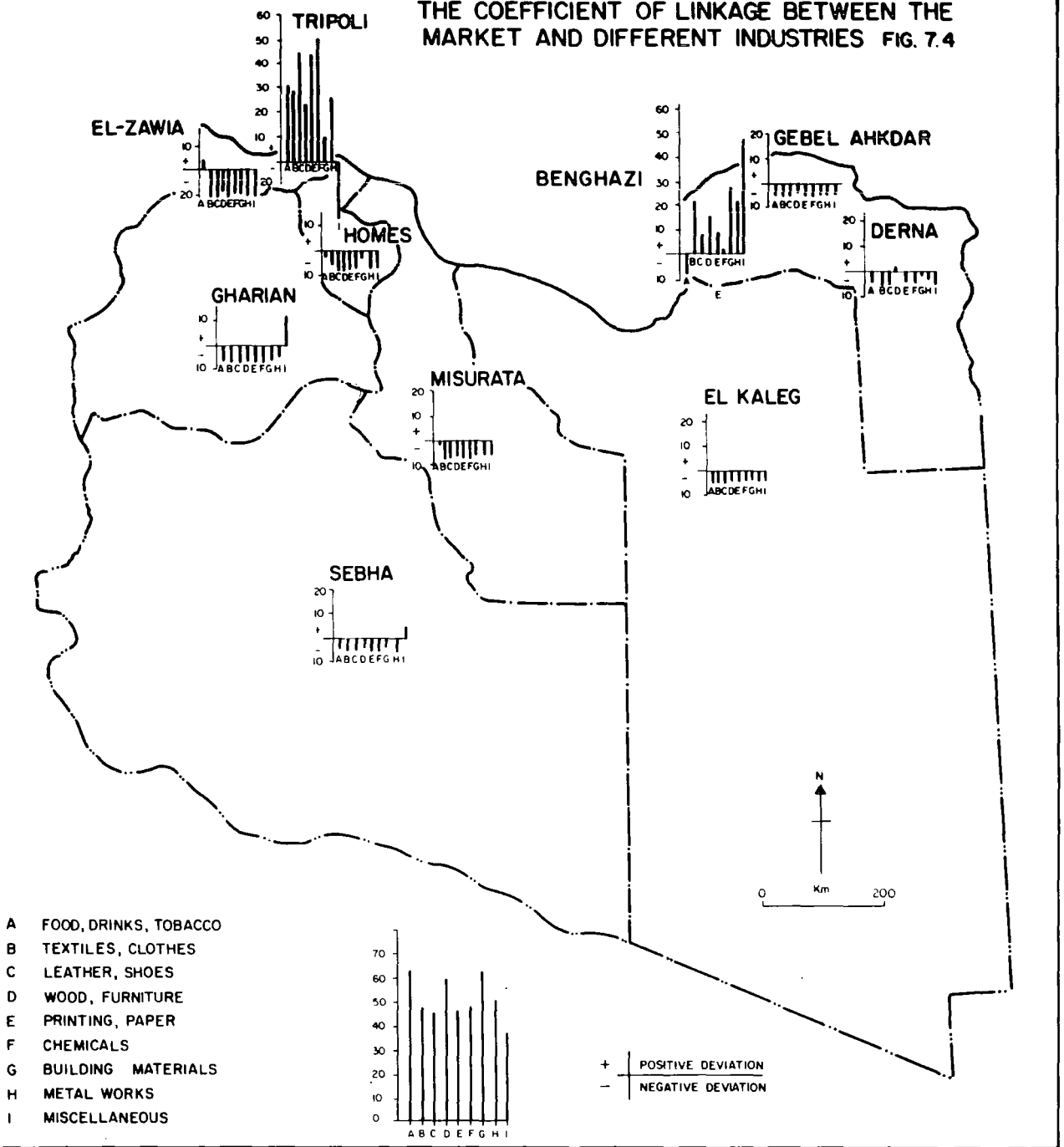
Source: 1. Computed by author from data in I.C.R. Industrial Establishments Census 1971, Tripoli, 1972.

2. Ministry of Planning and Development, Census and Statistical Dept., Population Census 1973 (Preliminary Result), Tripoli, 1974.

Table 7.6 The Coefficient Of Linkage Between The Different Industry Groups And The Market In Libya

Muhafadat	B-A	C-A	D-A	E-A	F-A	G-A	H-A	I-A	J-A	K-A
Tripoli	+28.4	+32.1	+30.4	+45.6	+24.8	+45.2	+51.5	+10.8	+27.6	-22.0
Benghazi	+ 5.4	- 8.0	+22.0	+ 8.3	+15.1	+ 7.4	+ 0.7	+27.6	+22.2	+47.6
El-Zawia	- 3.2	+ 3.5	-10.8	-10.8	-8.8	-10.8	- 9.1	- 9.5	-10.8	-10.8
Misurata	- 4.6	- 0.9	- 7.9	- 7.9	- 6.1	- 7.9	- 7.9	- 5.2	- 6.0	- 7.9
Homes	- 2.9	- 2.6	- 5.7	- 7.2	- 7.2	- 7.2	- 7.2	- 2.4	- 7.2	- 7.2
Derna	- 4.9	- 4.2	- 5.5	- 5.5	+ 1.5	- 4.2	- 5.5	- 1.6	- 3.8	- 5.5
G. Ahkdar	- 4.8	- 5.3	- 5.8	- 5.8	- 4.4	- 5.8	- 5.8	- 4.9	- 5.8	- 5.8
Gharian	- 4.5	- 5.4	- 6.9	- 6.9	- 6.3	- 6.9	- 6.9	- 6.6	- 6.4	+12.0
Sebha	- 4.3	- 4.6	- 5.0	- 5.0	- 3.8	- 5.0	- 5.0	- 3.6	- 5.0	+ 4.4
El-Kaleg	- 4.6	- 4.6	- 4.8	- 4.8	- 4.8	- 4.8	- 4.8	- 4.6	- 4.8	- 4.8
Deviation	33.8	35.6	52.4	53.9	41.4	52.6	52.2	38.4	49.8	64.0
	0.34	0.36	0.52	0.54	0.41	0.53	0.52	0.38	0.50	0.64
Coefficient of Linkage	0.66	0.64	0.48	0.46	0.59	0.47	0.48	0.62	0.50	0.36

THE COEFFICIENT OF LINKAGE BETWEEN THE MARKET AND DIFFERENT INDUSTRIES FIG. 7.4



miscellaneous group. In El-Zawia there is a plus 3.5 in the food group and in Derna a plus 1.5 in wood production. Other muhafadat have a minus density for all the industrial groups. These plus deviations in most of the industry groups in Tripoli and Benghazi and minus deviations in other muhafadat may be partly explained by the fact that the populations of these latter muhafadat need less industrial production than the populations in urban areas, because of their lower standards of living.

It may be concluded that most of the industrial groups are definitely market-orientated, since one can see that more than 80 percent of them are concentrated in the two muhafadat (Tripoli and Benghazi) which have the highest populations. Therefore the above analysis shows clearly the strong relationship between the distribution of the market and the distribution of the manufacturing industries in Libya.

C. The Influence Of Transportation

Transport serves to connect centres of production with one another and with centres of consumption. In so doing it links various parts of a country into one market, or different markets. Its changes have a major effect on both the cost of raw materials and that of the finished product. Therefore the difference in transport cost is regarded as one of the most important location factors for factories engaged in industrial activities. As it concerns raw materials and the market, some locational theories focus their attention on it almost exclusively. These theories maintain that a location where transport costs can be minimised will be the most suitable, although this depends on whether the industry involves high costs of raw materials or finished product. The lowest transport costs for both reduce the cost of production of the manufactured goods, and hence increase the economic advantage of industrial location. So good transport facilities can be a great benefit to an industry and can be an important

factor for its location, especially for modern industry which has a large production and demands a large quantity of raw materials.

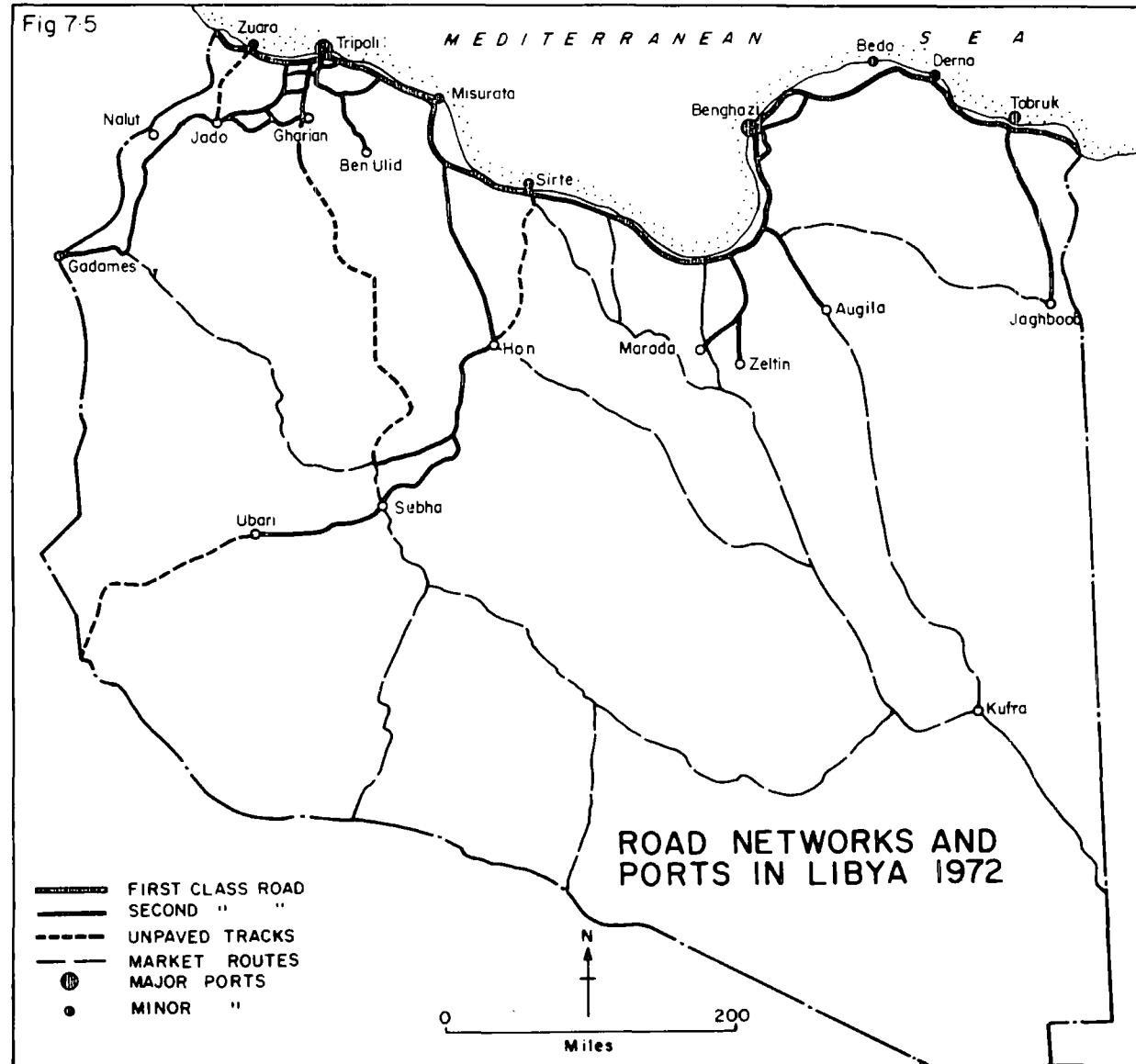
To understand the influence of transportation on the present location of establishments in Libya it is necessary to discuss two points : (a) the distribution and the system of transportation and (b) the degree of industrialization, keeping in mind the answers to questions designed to discover the effects of transportation.

With regard to the first point, distribution of the markets and raw materials in different places increases the importance of transport. With reference to transportation facilities, the main problem is caused by the lack of transportation between different regions. This lack is partly caused by natural obstacles. The mountain chains running parallel to the coast in the north-east and west, and the extent of desert in most parts of the country, pose great transport difficulties which have still not been solved in these parts. This inadequacy of the transport system has been a matter of concern in Libya, as it tends to preserve the existence of regional economies rather than an integrated national one, thus impeding not only industrial development, but the whole economic development of the country.

Motor transport is the dominant type in Libya. There is no system of railways or water-ways. The railway services, which started early during the period of Italian influence, and reopened in 1948 with 131 miles of track in Tripolitania and 104 miles in Cyrenaica, were closed in the early 1960s on the recommendation of I.B.R.D. experts, because they were operating at a loss and were unable to compete with road transportation.

The early modern surfaced roads were built by the Italians during their occupation of Libya. They repaired old tracks and, whenever necessary, built ways through mountain passes and erected bridges over wadis, but all these works were of an essentially military nature.⁽⁹⁾ In 1937, the coastal roads were built, adding over 1,100 miles of surfaced roads. In 1959 a motorway to the southern part of the country was started and completed in 1962.

Fig 7-5



It follows roughly the track of the old road, and links Sebha with the coastal motorway. Later, in 1966, the construction of a modern motorway parallel to the old coastal road was started and it was finished in 1970. This is the most important motorway in Libya, and it runs for about 1,822 kilometres from the west to the eastern borders, connecting the major cities of the coastal fringe. In addition, many other roads were constructed connecting small towns with the main cities and the coastal motorway, like El-Abiar-Benghazi and Gharian-Tripoli roads.

In 1972, Libya had in all some 6,669 kilometres of asphalted roads, and more than two-thirds of these roads were constructed between 1962 and 1971. In addition, there were 328 Km under construction and 1,363 Km out to tender or under design. ⁽¹⁰⁾ Figure 7.5 shows the road network and ports. It can be seen that the greater part of this network is concentrated in the north of the country, which accounts for about four-fifths of the total road mileage. The network has only one first class road which follows a lateral axis in the north. Many second class roads, which serve as feeders to it, are accessible from a large number of towns. Because of the expense and difficulty of constructing roads in the south there are only two second class roads, one connecting Sebha, and the other Jaghboub with the axis motorway. The sharp contrasts in population distribution and the low average density in the south mean that the roads have to pass for long stretches through uninhabited areas, and their construction entails high initial costs. Most second class roads have been laid to facilitate transport towards, or away from, Tripoli in the west, and Benghazi in the east.

The number of lorries in Libya increased four times and the goods capacity more than three times between 1963 to 1973 (Figure 7.6). Unfortunately, there are no available figures for the recent traffic volumes on main routes in the country, but the traffic density on Libyan roads in 1964 projected forward to 1972 by Doxiadis Associates (Table 7.7) might throw some light on this. It is noted that 31 percent of the vehicles are goods

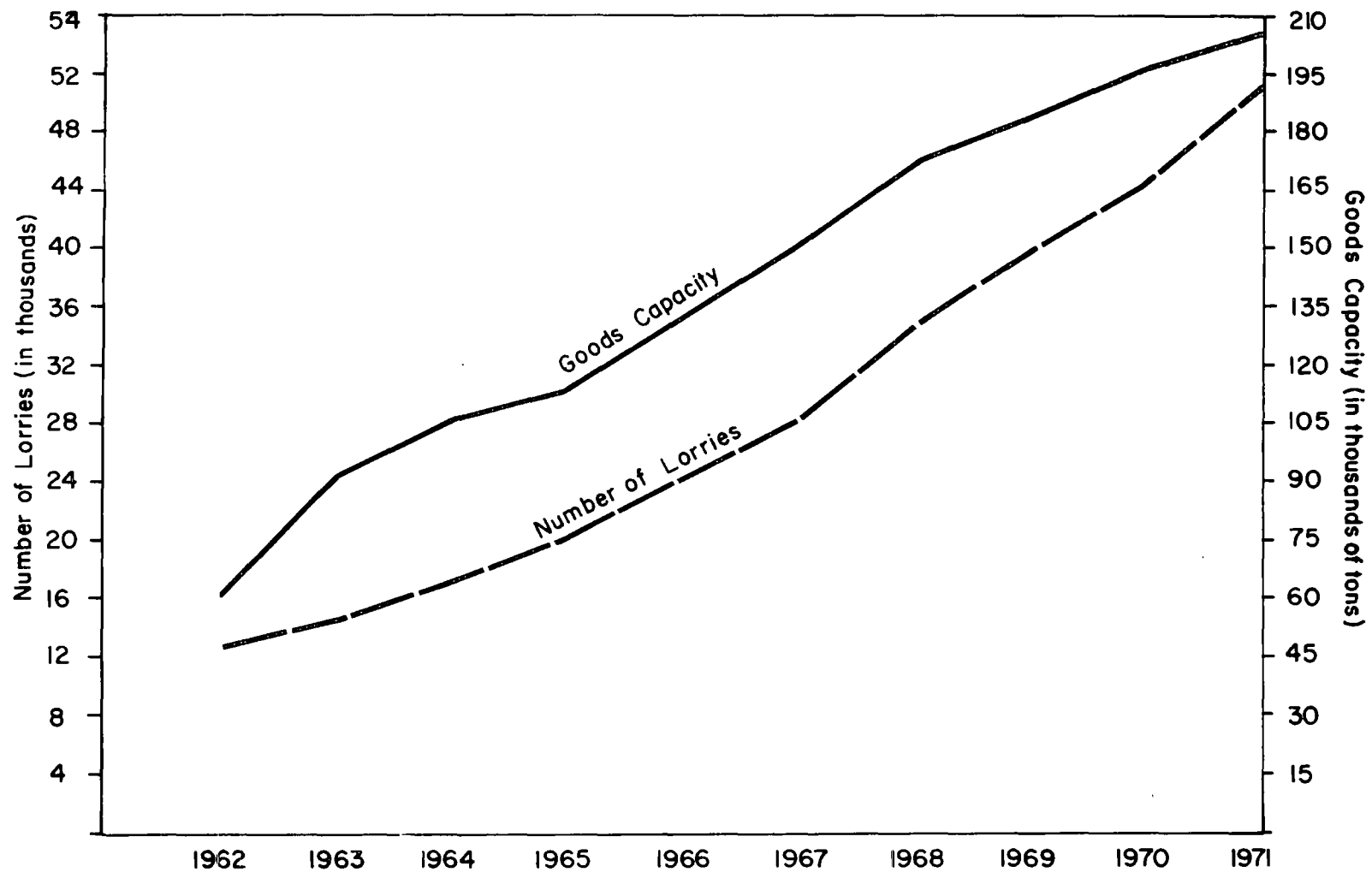


Fig 7-6 NUMBER OF LORRIES AND THEIR CAPACITIES 1962-1971

vehicles. (11) The traffic density is concentrated around the two cities, Tripoli and Benghazi. It was expected that about 16,800 vehicles per 16 hours would flow to West Tripoli; 7,000 to East Tripoli; 7,000 to West Benghazi; and 6,200 to East Benghazi. In Sebha, Zuara and some parts of Sirte Gulf, the roads would have less than 500 vehicles per 16 hours. The flow pattern is concentrated on the coastal area, especially south of Tripoli in the agricultural regions of El-Zawia, Zuara and Homes, and diminishes further east and south. Many areas are not connected with any kind of asphalt road; in Kufra, for instance, the lack of transportation facilities inhibits the use of some of its local raw materials (crop and animal production) in the sphere of industry.

If the distribution of the road system in Figure 7.6 is compared with the current population and the recent distribution of the establishments, it does not take much imagination to see the basic relationship between them. One can deduce from this the fact that all cities which have a high concentration of manufacturing industries, such as Tripoli, Benghazi, El-Zawia and Misurata, have good access to transportation routes, and all highly mechanized establishments which need good road facilities for their manufacturing are built with access to main roads, such as the cement factory on the Homes Road, The Arab Plastic Company on the Suani-Tripoli Road, and the International Industrial Company for Metal on the El-Zawia - Tripoli Road.

In terms of traffic, the open sea offers the easiest way of reaching world ports and moving the materials of foreign trade at least cost. There are about eight ports in Libya, but only two, Tripoli and Benghazi (Figure 7.7), have extended their facilities during recent years. Even they are still comparatively small, and can generally provide only for medium-sized ships, but the new port extensions and modern facilities in these two ports will provide for larger ships.

Fig 7.7 NUMBER OF COMMERCIAL SHIPS ENTERING LIBYAN PORTS 1963-1971

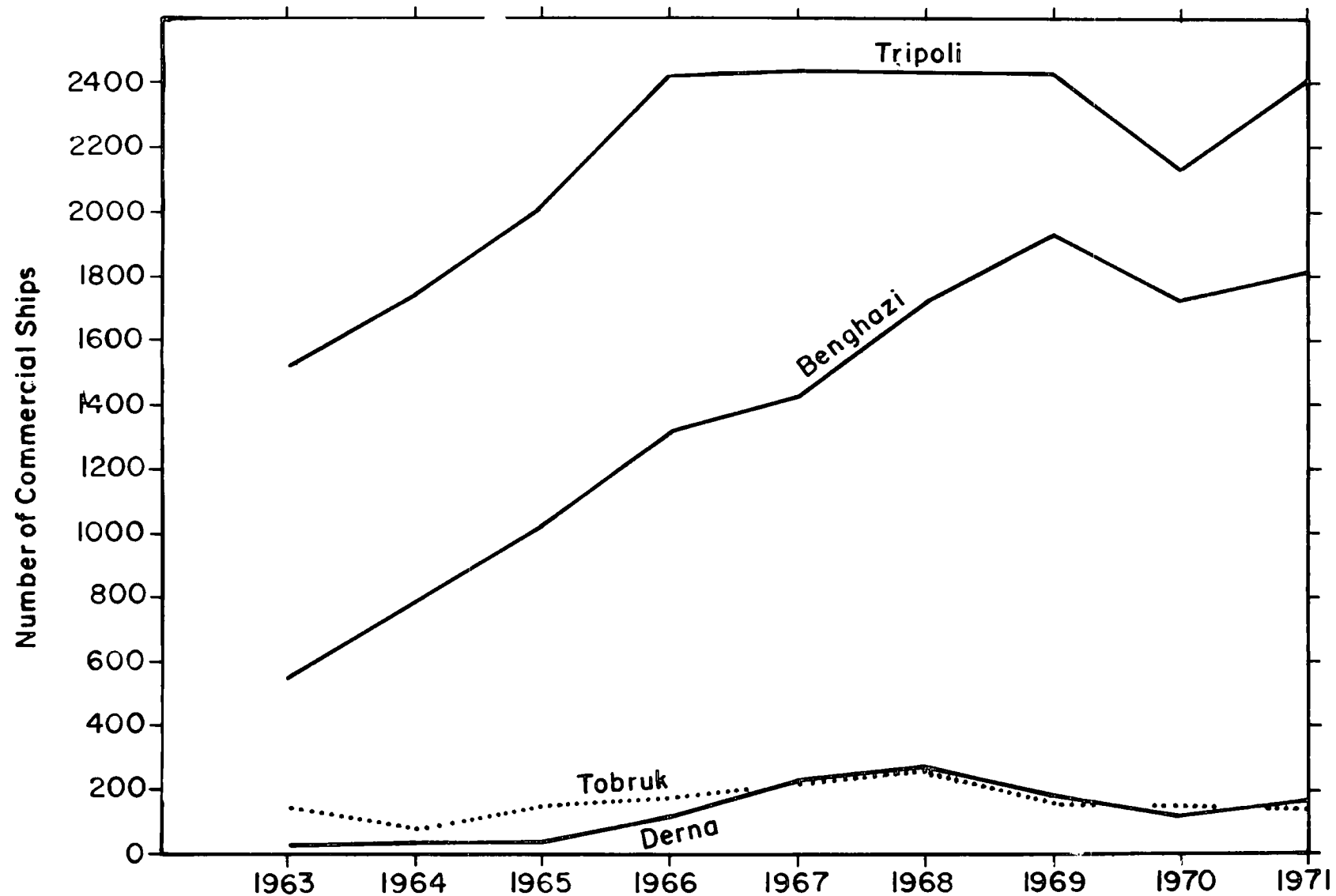


Table 7.7 Traffic Volume On Main Routes In Libya (One Day - 16 Hours
Counting On Both Directions).

Station	No. of all vehicles in July 1964 (1)	Projected No. of vehicles in 1972 (2)
Tripoli - west	4,553	16,800
Tripoli - Azizia	2,121	8,200
" - Ben-Ghashir	1,385	5,800
" - Tajora	1,630	7,000
Azizia	699	3,600
Benghazi - west	2,294	8,400
" - east	1,343	6,200
" - Brina	1,989	5,400
El-Zawia (Cross Bir-Ghanam)	1,195	2,200
Zuara - Border	94	400
Yefren - (Cross Bir-Ghanam)	1,001	2,000
" - Rumia	1,160	2,200
Misurata - west	790	3,000
" - east	594	1,600
Bu-Gren	58	1,200
Homes (Cross)	650	4,000
Tarhuna	683	1,800
Derna - East	136	700
Tobruk - west	190	1,200
" - east	644	1,000
Beda - west	1,028	4,600
" - east	1,049	4,400
El-Marg - west	806	3,000
" - east	536	2,400
" - south	228	600
Faidia (Cross)	399	500
Lamluda (Cross)	970	2,600
Gharian-Bu-Zeian	1,283	3,000
Ajdabia - west	135	500
" - east	470	1,200
Marsa-El-Brega	419	500
Sirte	370	1,000

- Sources : 1. Doxiadis Associates, Transport in Libya : A General Survey
And Study Of The Means Of Communications, Vol. 2, pp.486-487.
2. Computed from projected map of traffic volume 1972,
(Same Source), pp. 279-280.

As far as the second point is concerned, the degree of industrialization, the answers to questions, introduce some interesting points regarding transport as an important factor of industrial location for various industries.

Respondents were asked about the means of transport they use to carry raw materials and finished products. In the answers to question No. 51, the dominance of sea transport was revealed by the fact that 38 respondents stated it to be of the greatest importance in the transportation of their raw materials. Nine used both sea and air transport. Road transport was used by only five factories, while three used both road and sea transport. For transporting finished products, as all of the production is consumed locally, roads were the principal means of transport for all of them. According to the answers to question No. 52, it appears that trucks and small vans were the significant means of transportation; 16 quoted trucks and 7 small vans separately, while 28 quoted both of them as means of transportation for their products. In contrast, none of the respondents quoted carts, bicycles or porters as individual means of transportation.

In terms of responsibility for the transport of products, answers to question No. 53 show that 31 respondents indicated that the factory was responsible, and 15 the consumer and wholesale buyer, while 12 stated both of them. According to the answers to question No. 55, out of 58 factories only 28 respondents indicated that transport costs do not have any effect on the sale price in other muhafadat. Such is the Animal Fodder Factory in El-Abiar. It may be stated that transport costs have their effect when the transport of the products is the responsibility of the buyer without any price reduction from the establishments. Produce transported by the manufacturer to the buyer will have a better selling price than in the case of transportation by the buyer. For example, articles produced in Tripoli, such as textiles, and transported by the wholesaler, are more expensive in Benghazi than in Tripoli, whilst articles transported by the manufacturers, such as tobacco, biscuits, tomatoes and olive oil, are the same price in Tripoli and Benghazi. Thus, on the whole, it would appear that the transport costs of many factories are greatly affected as a result of moving goods.

From all the facts examined above, one can conclude that it may be possible to relate Libyan industrial location to the transport network which was initially responsible for the evolution of the greater part of the existing pattern of industrial location.

D. The Influence Of Labour

In many cases the labour force plays a large part in the distribution of the manufacturing industries. The quality and quantity of labour required depends on the type of industry. In Libya, the labour force was stated as the fourth most important factor for industrial location, on the evidence of its average weight in Table 7.1. Labour was listed as a dominant factor by five respondents, as a secondary one by eight, and as a third priority by 12. The influence of labour on industrial location in Libya is important because the country has an adequate labour supply. A high percentage of skilled workers are foreigners. Foreigners account for about 25 percent of the total labour force and for about 60 percent of the total skilled labour force (see Chapter 9). Therefore the labour force is a factor favouring Tripoli and Benghazi because of the relatively large amount of labour available, and the concentration of foreigners in cities. There is also a supply of ordinary labour owing to the high rate of population growth and migration from rural areas.

The number of immigrants from other areas to the city is higher than the emigrants from the city (Table 7.8). Most of these immigrants come to Tripoli from rural areas. The preliminary population census of 1973 reveals that the country is experiencing rapid urbanization, and although there are no detailed figures published yet, it seems that growth rates of urban centres have been more rapid than those of rural areas in recent years, reflecting the attraction of the cities. It may be that rural areas around Tripoli, such as El-Zawia, Gharian, Homes and Misurata, provide the

highest percentage of immigrants in Tripoli. A study of 213 migrants to Tripoli, undertaken during 1967 and 1968, indicated that a high proportion of immigrants who had settled down in Tripoli recently came to find employment in oil companies, industry, construction, trade or government departments. A very small proportion of immigrants who were questioned stated that they had come to Tripoli to join their families. ⁽¹²⁾ Socio-economic forces are the main stimulants of movements of the rural population.

Since the spatial distribution of the labour force is in part determined by the distribution of the population, and because most of the factories have an urban bias, the urban concentration of population in some regions dominates the distribution of labour-orientated manufacturing industries. Besides this, most of the new training centres and the emergency vocational training programmes were established in the main cities. Moreover, the labour unions are more active in the main cities than in any other area. The labour force in the cities is also more stable than that of rural areas where there is a high labour turnover and a high percentage of absenteeism owing to seasonal fluctuations according to the agricultural seasons. Besides, the answers to question No. 31 show that a high proportion, about 46 percent of all the workers in the establishments interviewed, come from a distance of less than one kilometre, about 27 percent from between one to five kilometres, and the same proportion from further than five kilometres.

All the evidence stated above indicates that the labour force has a dominant influence on location choice, and this appears to apply to many factories which have become established in Tripoli, El-Zawia and Benghazi Municipalities.

Table 7.8 Tripoli City : In And Out Migrants (Libyans)1958 To 1967.

Year	No. of in Migrants	Average per month	No. of out Migrants	Average per month
1958	2,388	199.0	315	26.2
1959	3,641	303.4	257	21.4
1960	4,115	342.9	686	57.1
1961	5,147	428.9	909	75.7
1962	5,260	438.3	863	71.9
1963	5,081	423.4	711	59.2
1964	4,943	411.9	821	68.4
1965	5,971	497.5	855	71.2
1966	5,730	477.5	1,899	158.2
1967	5,351	445.9	1,747	145.5

Source : Statistical Dept., Municipality Of Tripoli, 1968.

E. The Influence Of Raw Materials

The availability of raw materials is considered another of the most important factors for industrial location. In Libya, in spite of the fact that only seven of the respondents interviewed stated that raw materials were their dominant location factor, and that another five stated it to be a secondary one, it is a major location factor for many establishments.

The raw materials used by the Libyan manufacturers come from two sources, according to answers of questions No. 36 and 37 : (a) imported materials which are primarily semi-finished or finished products, such as cotton, timber, rubber, wood pulp, pig iron, metal, artificial and natural spun silk; (b) local materials which are essentially raw materials, in particular, wheat, olive oil, fruit, sardine and limestone. The influence

of these materials on location is firstly related to the cost and weight of the raw materials, and secondly to the perishability and type of the materials. The industries which use high-cost raw materials in relation to the gross value of the finished products, or heavy and bulky raw materials which lose weight in manufacture, or perishable materials, are mainly located near the source of the materials and near the ports in the case of imported materials. When this fact is applied to Libya, it can be seen that there is a strong correlation between it and the location of many industries. The answers to question No. 33 in Table 7.9 make it clear that Libyan industry is heavily dependent on large supplies of bulky imported raw materials. The table shows that 42 of the establishments, accounting for 68 percent of the total interviewed, stated that more than three-quarters of their materials are imported. Nine only stated that more than three-quarters of their materials came from a local muhafada, while one obtained its materials from other muhafadat. Besides this, some materials listed by the latter as local materials were really imported ones, such as flour, paint, dyes and yeast. Although Table 7.10 supports the above results, it is clear that the percentage of the imported raw materials to the total raw materials used in 1971 for industrial processes is very high, and in some cases it is more than four-fifths of the total material.

Table 7.9 The Percentage Of Imported And Local Raw Materials Used By
A Stated Number Of Factories.

Percentage of Raw Materials used	Number of Establishments Using Raw Materials from		
	abroad	Local muhafada	Other muhafadat
100	31	6	1
75 - 99	11	3	-
50 - 74	3	5	1
10 - 49	5	9	5
less than 10	1	3	2

Source : Results Of Questionnaire.

Table 7.10 The Percentage Of The Imported Raw Materials To Total
Materials Used For Industrial Processes, 1971.

Industries	Percentage of raw materials
Food, soft drinks and tobacco	73.3
Textiles and clothes	93.3
Paper and printing	90.9
Wood and furniture	70.0
Chemicals	87.6
Building Materials	69.0
Metal work	87.8

Source : I.R.C. Industrial Census 1971, Tripoli, 1973.

It is worth noting that in the answers to question No. 38 respondents stated that their materials lost weight during the industrial process, and 30 of them lost more than 15 percent of the weight of raw materials. Some who depended on imported materials such as furniture and metal work lost more than 20 percent of their raw materials. Keeping in mind the fact that most of the imported raw materials are transported by sea, as mentioned before, proximity to the coast and facilities for handling imports provide an important factor in the location decision. Therefore industries depending mostly on imported materials are attracted to the ports or to places within easy reach of them. Furniture, paper, textiles, chemicals and metal work are located in the Tripoli and Benghazi Muhafadat, and this may be partly explained by their good port facilities.

Many other industries which mainly depend on local materials are strongly influenced by their distribution. The first reason is that they are valuable, or that they lose weight and bulk in the manufacturing process and it is easier to transport the finished product. In this case transport costs on useless waste are avoided. The best examples of this are the location of

cement factories in Homes and southern Benghazi, the glass factory in Azizia, and the pottery factory in Gharian. Secondly, if the raw materials are perishable, the location must be close to their source in order to avoid destruction through travel or transport. The location of tuna and sardine processing factories in various places along the west coast, and olive oil, tomato and fruit processing plants in many regions in the north-west of the country are naturally due to the source of supply. The concentration of olive oil processing in many muhafadat in the western part accounts for the location of the majority of food establishments in these muhafadat. For example, they account for 14 of the food establishments in Misurata, 31 in Homes, 52 in El-Zawia, and 11 in Gharian Muhafadat. Table 7.11 indicates that in 1971 these Muhafadat had more than 93 percent of the total olive-bearing trees in the country.

Table 7.11 The Distribution Of Olive-Bearing Trees in Libya, 1971

Muhafada	No. of bearing trees	% of total
Tripoli	910,000	27.5
Benghazi	50,000	1.5
El-Zawia	915,000	27.6
Misurata	350,000	10.6
Homes	710,000	21.5
Derna	100,000	3.0
G. Akhdar	50,000	1.5
Gharian	220,000	6.7
Sebha	1,000	-
El-Kaleg	4,000	0.1
Total	3,310,000	100.0

Source : Census and Statistical Dept.; Statistical Abstract 1971,

Tripoli, 1973.

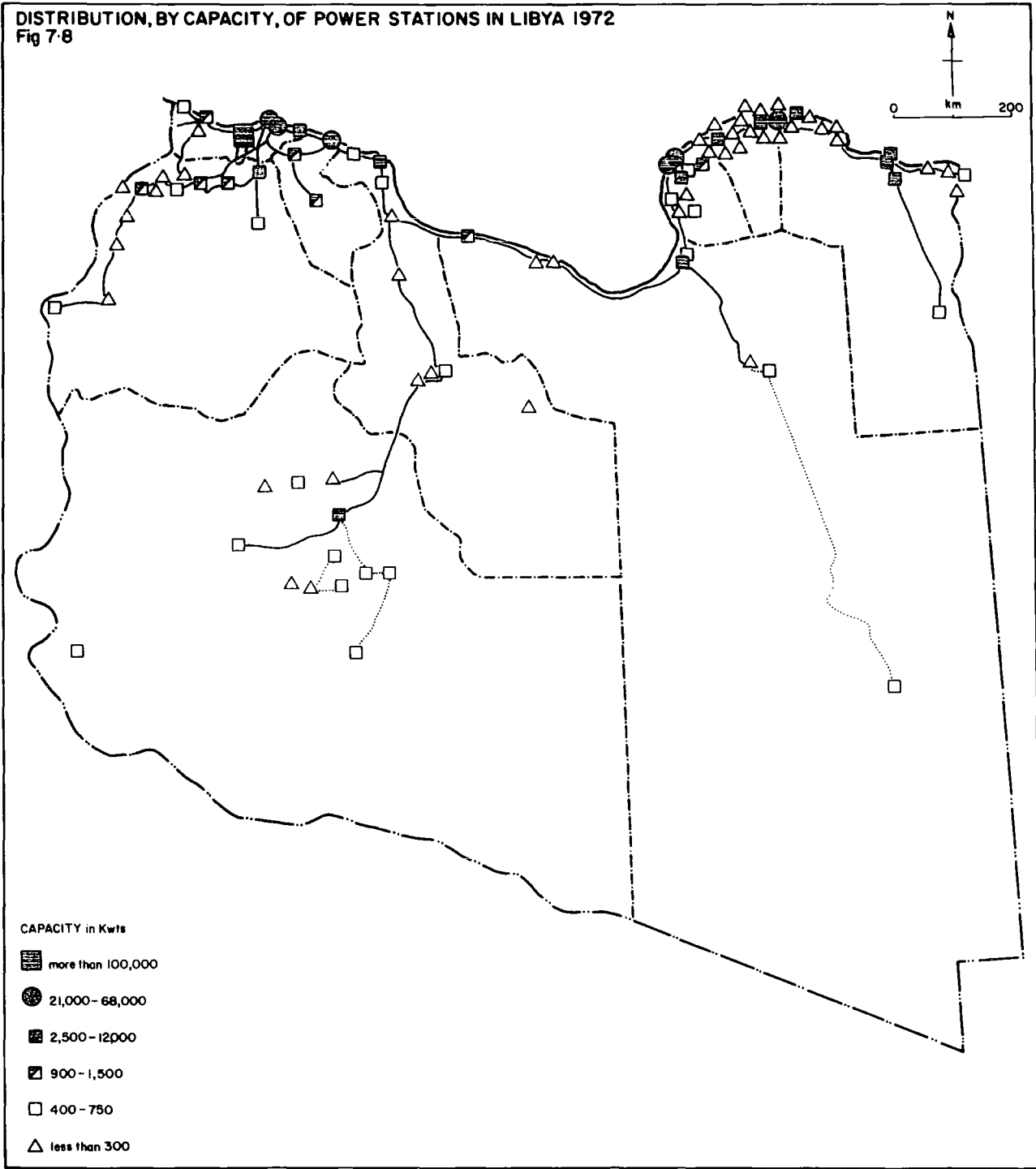
F. The Influence Of Power

In spite of the fact that only one respondent stated that power was a dominant factor, and only eight stated it to be a third priority factor, it seems that it also constitutes one of the important factors in industrial location in Libya. The answers to questions 22 and 24 reveal that 31 factories depended on electricity for power, 24 on electricity and oil, two on electricity and gas, and only one on oil. Forty-two of the establishments which use electricity obtained it from public power stations, 11 obtained it from public and private power stations, and only four had their own power station. This means that the great majority of Libyan establishments depend on electricity for power, and they obtain it mainly from public power stations. In the answers to question No. 50, 23 respondents stated that their locations were mostly restricted by the limitation of electricity. It seems that Libya is still poor in power resources in many parts of the country, and the power system serves to intensify the regional imbalance of industry in Libya. However, it is true that there has been a considerable increase in the area served by electricity and in power provision. Power production increased from about 40 million Kilowatts in 1954 to about 351 million in 1971, and electricity is now provided throughout most of the country, but most of the stations outside the main cities are of small capacity and are both technically and economically unsuitable for serving large industries (Figure 7.8).

Unfortunately, there are no data available for electricity allocated for industry, but the distribution of the total production of electricity from major public power stations^{*} in the country in 1972 can be seen in Table 7.12. Regionally the largest aggregate of potential electricity

* This excludes the electricity produced in the oil terminals and the oil company camps scattered through the desert.

DISTRIBUTION, BY CAPACITY, OF POWER STATIONS IN LIBYA 1972
Fig 7-8



production is found in the major cities, mainly Tripoli, Benghazi and El-Zawia, where there is the largest individual endowment. Outside the main cities, production is too small to stimulate any investment in large industry. About 84 percent of its total potential is used in Tripoli, Benghazi and El-Zawia, and except for these municipalities it has been inefficiently organized. There is no doubt that the concentration of the high potential of power in these areas helps to make them the most attractive municipalities of the country for industrial location.

The Gurgi Mill, for example, stated that its electricity consumption was about 1,700,000 Kilowatts yearly. If this is compared with the total electricity produced (Table 7.12), one can see that some municipalities have a lower electricity production than that needed for such a factory. So, for example, three of these types of factory would consume all of the Gharian electricity and almost half of the electrical power at Misurata. This means that industries using electricity will be located around the main cities.

G. The Influence Of Personal Choice

Recent studies of industrial location stress that other factors influence location, apart from the traditional ones. According to the replies to the questionnaire, it seems that personal choice is less significant in industrial location in Libya than the factors mentioned so far, but it is still an important factor. Two of the respondents indicated that their reason was that their factory was located in the place where they lived. Another three indicated personal choice as a secondary reason for their location.

The replies to question No. 47 indicated that all of those who listed personal choice as an important factor had their establishments

located in their home town. There is no information available to establish whether these entrepreneurs considered one or more alternative locations before deciding to locate their businesses in their home towns, or whether they showed no interest at all in locating their businesses at a distance from their homes, but the latter seems to be a more acceptable explanation for their decision. This may be because Libyans in general are not foot-loose in terms of shifting their homes. Most of the recent industries in Libya are in the private sector and are small-scale establishments. Many entrepreneurs seek a location close to their home town in the period of infancy of their factory, because their establishments, which perhaps cannot afford adequate means of advertising, can easily depend on existing human relationships for marketing their products. Moreover, the entrepreneur may expect more trust and encouragement from his home town environment than from a town where he is a stranger, though this is not so important in the case of large establishments, which are able to maintain a location anywhere in the country by virtue of an established reputation for quality or dependability. ⁽¹³⁾ Factories indicating personal choice as a main factor of location include two manufacturing clothes, two manufacturing furniture, and one for the manufacture of marble products. These are factories which depend on private orders for their production, and they need complete trust from their consumers. Therefore the establishment is located in an area or town where the entrepreneur knows most of the inhabitants, or where he has himself been in commerce as a wholesaler or retailer, and thus has good contacts with local wholesalers and retailers, which means that he is operating a factory in a friendly environment. This may give him the advantage of having regular customers, besides which he may also receive fewer complaints, if his product causes inconvenience to them, than in any other area. However, because urban inhabitants are the greatest consumers of industrial items, and in general have a more industrial mentality, than rural inhabitants, the establishments which are located under this factor are likely to be in the towns, especially in Tripoli and Benghazi.

Table 7.12 The Distribution Of The Power Stations And Their Production,
1972 (in Kilowatts)

Location	Production
Tripoli	382,738,840
Garaboli	5,478,790
Benghazi	238,610,340
Bnina	1,815,430
El-Abiar	4,250,100
Zahra	142,735,016
Zuara	2,476,590
Misurata	9,243,120
Zletin	1,081,888
Hon	780,490
Waddan	577,960
Homes	21,597,180
Tarhuna	1,895,010
Ben-Ulid	1,736,490
Derna	12,002,922
Tobruk	9,339,200
El-Adam	4,544,460
Beda	28,887,933
El-Marg	2,221,326
Lamluda	20,414,700
Gharian	5,345,030
Jado	1,845,940
Rumia	2,026,880
Nalut	749,650
Gadames	476,160
Sebha	9,729,116
Ghat	414,140
Murzough	713,095
Brak	1,319,910
Ubari	336,180
Ajdabia	5,456,300
Sirte	2,796,690

Sources : 1. Public Organization of Electricity (P.O.E.); Productions
1972-73, Tripoli, 1973.

2. Personal Communication with P.O.E. in Benghazi, 1973.

H. The Influence Of Physical Features

Some physical features of Libya, such as size, structure, relief and climate, may have some influence on industrial location in the country.

In brief, these features are not of great significance in themselves, but in relation to population size they have a bearing upon the size of the market. ⁽¹⁴⁾ This may explain the absolute lack of establishments in most parts of the country, especially in the south, centre and north-east, and their relative scarcity along the north coast.

In general, Libya has two main economic regions; the coast and northern mountains, and the semi-desert and desert regions. Except for the two narrow ribbons of coastal plain and the mountain ranges of the north-east and north-west, Libya is mostly semi-desert or desert; only about five percent of the total land area of 658,000 miles is economically useful, and about three percent is regarded as suitable for permanent cultivation.

Although climate ordinarily plays little part in industrial location, except in the narrow area along the coast and the two mountain regions, Libya is seen as a very undesirable place to live from the standpoint of the climate. Between the Mediterranean Sea in the north, and the Sahara Desert in the south, the country has five climatic zones which are as follows :

- (a) The Maritime Zone encompasses the coastal strips between Zuara and Misurata in the west, and between Benghazi and Derna in the east, with a width varying between 8-25 Kms. This zone is under the predominant influence of the Mediterranean Sea. The average yearly rainfall varies from 200 to 600 mms, with the heaviest amount falling around Tripoli. In general, it only rains during the winter, from October to March. During this period the winds are mainly from the West to North-West and bring rain clouds. In spring and autumn the area is affected by southern winds, the Ghibli, which carry dust and raise the temperature along the coast.
- (b) The Steppe Zone comprises the western part, a small area around Homes and Misurata, a small strip along the Gulf of Sirte, and the area between

the Gebel and the coast in the west and east. The zone is influenced less by the Mediterranean but is greatly influenced by the southern winds. The average rainfall is less than in the first zone.

(c) The Mountain Zone includes Gebel Gharbi and Gebel Akhdar. The average temperature on both Gebels is lower than in the first zone, but the average amount of rain is higher, about 330 mms at Gharian, and even higher on G. Akhdar, especially around Shahat, where it is about 580 mms.

(d) and (e) The Semi-Desert and Desert Zones cover most of the area of Libya, especially south of the highlands, where life is possible only around the oases or in small centres where underground water permits modest vegetation and limited cultivation. Temperature variation in these zones between day and night is very considerable. During the day the average temperature may reach $50^{\circ} - 52^{\circ}\text{C}$, but during the night, even in the summer, the minimum temperature may fall to below 10°C . ⁽¹⁵⁾ Rainfall is so infrequent that in some areas 15 or 25 years have passed without any rain.

Manufacturing industries need a favourable environment with facilities which are already available or which may readily be created. Most of Libya is covered by desert, and except in some cases, is economically disadvantageous, due to high overhead costs for transportation and power, and the lack of social benefits. This must be weighed against the advantages in deciding the issue. ⁽¹⁶⁾ In addition to the differences described, those of climate influence the people's life and their outlook. It is true that industry may be located in a desert area, but in the case of Libya, it may be costly in an unpopulated area with lack of transportation and infrastructure, especially for small establishments.

1. The Influence Of The Government

In recent years government policy has clearly been an important determinant of the location decision of manufacturers in many countries.

In other countries, governmental bodies have provided industrial estates and industrial projects in order to improve some under-developed regions, or have directed industries towards certain locations.

As we saw, up to 1970, the Libyan government had no strong stated policy for overall industrial development, nor did it interfere in any way with the location of industrial development. Its role was both as owner of some public establishments under the control of the Ministry of Industry, which were mainly located in Tripoli and Benghazi, and as promoter of industrial investment through the Industrial Bank, without direction to any particular area.

The uncertain policy for industrial location may be accepted at this stage in Libya as an incentive to private investors to become involved in manufacturing industries. The supply of entrepreneurial ability was mostly limited to the two large centres of economic activities because financiers who were residents of these cities preferred to keep activities close to their homes, in places where there was more infrastructure. Moreover, as there was a concentration of offices of financial assistance in Tripoli and Benghazi, such aid tended to be only available to establishments in this area. This may have encouraged the location of industries within them. The amount of the industrial loans approved by the Industrial Bank (see Chapter 5) may give some idea of how they were applied, and how they might have influenced the pace of industrial growth. The loans have helped the two cities, and even their surroundings, to become important industrial areas in the country, and have restricted growth in other parts.

At the present time some social and political factors, rather than economic considerations, appear in the cases of the state-owned establishments, to have determined locations in accordance with the new industrial plan (see Chapter 5).

J. The Influence Of History

The present distribution of manufacturing industries in Libya, as explained by the previous factors, does not show how the present pattern is related to the past distribution. Since the state of industry in Libya was induced by the Italians, a recapitulation of Italian policy would have provided a useful background for tracing the historical development of the distribution of Libyan industries. Unfortunately, there is no information available about their policies, but it was noted in Chapter 2 that most establishments owned by Italians were located in Tripoli and that there were some in Benghazi and Misurata. As previously mentioned, this was because

the foreign entrepreneurs^{neurs} intended to serve primarily the Italian communities which were concentrated near the headquarters of administration, and points of contact with Italy. It can be said that the Italian regime had a far-reaching influence on the evolution of the existing general pattern of industrial location, and the towns, and Tripoli in particular, greatly benefited by the concentration thereof both the Italians' private and governmental capital. This concentration of capital improved the cities' infrastructure and the other attractive industrial location incentives, which have had an important influence on present industrial location patterns.

K. Other Considerations

As regards location, there are still other factors to be considered, although they are much less important, such as the promotional activities of local bodies, the concentration of management, and the availability of capital, commercial banks and government departments, all of which have some applicability.

Finally, it can be concluded from the above methods of analysis that they lead to a clear picture of the factors underlying the existing

industrial location patterns. In most cases, urban centres function as a potent localising force for industries because of the availability of industrial components, such as labour, a relatively large market, etc. These advantages, which stand in contrast to what obtains in rural areas almost devoid of such facilities, tend to attract industries to urban centres.

Industrial Location Theories And Industrial Location In Libya

After studying the influence of various industrial location factors this section will discuss whether there is any relation between general location theories and industrial location in Libya. The literature on the theory of industrial location is extensive and complex, and yet, despite the great deal of work done on the subject, it can hardly be said that there is a well-established theory, especially for developing countries, so this study will concern itself only with the main theories. Most location theories which deal with industrial location discuss a number of characteristics that account for the location of factories. They tend to be deductive in method and deterministic in approach. ⁽¹⁷⁾ The characteristics which affect location are mainly transport, the market of raw materials, the labour force, and land availability. Their arguments rest upon a number of simplifying assumptions, but the most important of these assumptions is that entrepreneurs are motivated by the desire for maximum profit. ⁽¹⁸⁾ This means that entrepreneurs seek to increase profits or minimise costs in a suitable environment.

The location theories of von Thunen, ⁽¹⁹⁾ Weber, ⁽²⁰⁾ Palander, ⁽²¹⁾ Hoover, ⁽²¹⁾ Lösch, ⁽²²⁾ Greenhut, ⁽²³⁾ and Isard, ⁽²⁴⁾ are different in their premises and propositions, and in the kind of characteristics which these authors thought dominated the location decision. Some theories are based on just one or a few selected relationships, while other elements are taken

as given (a partial equilibrium theory). Other theories are based on more than one relationship (a general equilibrium theory). For example, von Thunen formulated his famous theory, which was concerned with the location of agricultural land, on the basis of the transportation cost and land rent.

In 1909, Alfred Weber wrote the first comprehensive theory to recognize the possibility of a general theory for industrial location. His framework for the selection of the right location "the least-cost" by any individual entrepreneur was mainly focused on micro-economic considerations. His work initially depended on three factors, two of which were described as general regional location factors, namely transport and labour costs. His third factor, which is an agglomeration of many small factors, including proximity to auxiliary industries, availability of better market facilities and similar advantages, he regarded as a general locational factor. He realized that the cost of raw materials and fuel differed from place to place, so he considered this under the transport cost.

According to his theory, the location which provides the lowest transport cost is the most suitable location. In deciding the proximity of the location to the area of consumption, there is an important factor to be considered, which is the nature of the product. For instance, raw materials which lose an essential amount of weight in the manufacturing process attract factories to the location of the raw materials. It is understandable that if the raw materials gain some weight in manufacturing, then this encourages a close proximity of the factory to the market areas. But in the case of more than one raw material being used in the process, then the choice of location will favour a location that provides the least transportation cost.

Nevertheless, he did not give unqualified support to the assumption that transport cost is the main factor in selecting a location. He assumed

instead that labour cost is also an important factor that cannot be omitted, especially in the situation where an industry is moved from a region of low transportation cost to a region of high transportation cost because the saving in labour cost surpasses the higher transport cost.

The third factor is that of the concentration in dispersion of industries. It is concerned with the choice of having factories close together, or widely dispersed. Benefits can be obtained from a close proximity to secondary industries, and good marketing outlets can encourage the centralization of industries in one area. Other factors in favour of dispersion may discourage centralization.

Weber's theory also paid attention to other factors such as rate of interest, banking, insurance and taxes. It considered them as related to special economic systems, and not important enough for a general location theory. According to his theory, a location which achieves the best interaction of the three factors is the best site for an industry.

Other significant contributions have come from Palander, Hoover, Losch and Greenhut, who have improved the generality of the least cost approach by their more realistic consideration of the market factor, but each to a different degree. Tord Palander's approach to industrial location was based on Weber's work, but there are things in Weber that he could not accept. Weber's analysis of agglomeration is criticised on the grounds that no factory would move away from the lowest transport cost location to a potential agglomeration point unless it was sure that others would do the same. ⁽²⁵⁾ He also looks at transport in terms of costs of movement rather than the weight to be transported. He concerned his analysis in terms of transport surfaces, lines and points, and by including variations in transfer rates with distance.

Furthermore, since Weber's theory was translated into English in 1928, there has been a growing interest in location theories, especially in America, building on the work of pioneers in this field. A number of

geographers and economists have modified and developed theories. Edgar Hoover based his work on two groups of factors with transportation costs and production or extraction costs as the determinants of location. The first group includes the cost of obtaining raw materials and the cost of transporting finished products, whilst the second group includes agglomeration and institutional costs. Hoover was much more concerned with the characteristics of freight costs. He stressed the fact that the cost of transfer does not increase proportionately with distance. (26) These theories mainly concentrated on transportation and production costs, so the major criticism of them is their omission of the demand factor. Lösch rejected the lowest cost location of Weber and his followers. His theory considered that all factories sell to a spatially continuous market instead of the punctiform pattern assumed by Weber, and the right site in his view is the location with the maximum profit. Greenhut and Isard also paid special attention to the demand factor as well as other basic variable locational factors, such as power, labour, transportation and cost of the agglomeration. Greenhut also gave full weight to the influence of purely personal considerations, introducing to location theory the concept of "psychic income" as a measure of the non-pecuniary satisfaction that a particular choice of location may offer to individual manufacturers. (27) Lösch thought this consistent in the theory as long as personal choice of location was not more important than the pecuniary profit.

In addition, during the last decade, many others have improved and modified this approach. Many attempts have been made to combine classical location theories with the more general economic theory of equilibrium. Smith stated that,

"spatial variations in total cost and total revenue create an optimum location at which profits may be maximized, and also a spatial margin beyond which profitable operation is not possible. Within the margin the firm is free to locate anywhere, providing profit maximization is not required." (28)

Indeed, his approach was against the concept of the traditional theories, which search for some optimum course of action based on the maximization of financial profits, in favour of an approach which stresses the economic limitations imposed on the freedom of locational choice. (29)

Recent approaches have built on the penetrating criticism of previous theories, and have been based on the argument that the choice of the entrepreneur and the behaviour of the organization shall count as factors in location decisions. More recent work has examined the social and business links between managers, bankers, financiers, government officials and administrators, and the manner in which information flows between different administrative personnel. (30)

The theoretical framework of the theories summarized above has been developed on the basis of economic factors, and has neglected other factors which are very important in location, especially for developing countries. It may be that these location theories were drawn only from the industrialized nations and so they have omitted the experience of developing countries. All the evidence has resulted in a general recognition of the failure so far of all researchers to produce a valid general theory to explain and provide guidelines for the solution of the problems of industrial location in the different situations existing in different countries.

Because location theories are based on a host of assumptions, the difference from country to country has failed to be recognized. For instance, Weber used the following assumptions. (31)

1. equal transport costs of all products;
2. many consumption centres;
3. equal costs of raw materials in all departments;
4. unequal distribution of raw materials.

And assumptions such as these support the idea that the entrepreneurs would want the establishments to be situated at the point of lowest cost, and that

they would favour the production site which enabled them to gain the highest level of profit. This assumption may be right in a country where there are government activities everywhere in the whole country, where all regions of the country are developed to the same degree, and where there is a more or less even distribution of development, population and infrastructure, and it is assumed that the entrepreneur has much information about the cost in each alternative location which can help him to choose the site at which he would obtain most profit. But in developing countries, and in Libya in particular, there is a lack of such information and most development is concentrated in a few regions. These economic factors have an important influence on the location decision for many industries in Libya, but it is a country with traditional and small-scale establishments, where there is no strong competition between them, where there is an inadequate supply of information, and where other non-economic factors are important for industrial location, for example, the amenities of the city, services, personal contact, geographical factors and government influence. As Tiebout has noted,

"Location theory is not in a condition to predict at the fine margin this analysis requires." (32)

The general pattern of concentration of industries in the municipalities of Tripoli and Benghazi is largely due to cost factors. The location of some industries which depend on imported raw materials such as chemicals, textiles, paper and metal work, is near the points where raw materials enter the country. Other industries are located close to their sources of local raw materials, if they are bulky or lose weight in processing, or if the goods are perishable. They save costs which would be greater if the establishments were located a long distance from the port or source of raw materials. This, in fact, indicates the importance of the transport cost mentioned by Weber and Hoover.

In terms of the demand factor (the market) indicated by Lösch, Greenhut and Isard, the previous study shows the importance of the market in Libya as a factor of location. The concentration of population in two areas, and the greater wealth of people in these regions compared with those in the underdeveloped areas is one of the main factors influencing industrial location.

A number of factors have been suggested by the theories for industrial location. But strangely enough no mention has been made so far of external economies, often considered the major factor for location. The concentration of industries in the Tripoli and Benghazi municipalities is not only a result of the cost of transportation and the demand factor, but also of the advantage gained by a number of external economies, which have undoubtedly affected industrial location in Libya. The infrastructure, social amenities and services, the benefits of proximity to government, the repair and service of establishments, and banking insurance facilities, are all most easily available and best developed in these two cities. Some entrepreneurs who have small establishments may not select the ideal location from the point of view of the cost factor, because that location is inadequate in necessary facilities, such as water, electricity and land. In Libya, the locations of many establishments are affected in this way. Moreover, some entrepreneurs seek to establish their establishments in their home environments, rather than in another place, even one providing a better location.

Besides, governmental influence, direct or indirect, which was omitted from the location theories, has also had an effect in recent years. By establishing factories under the public sector, some social and political factors have affected the decision on location. Some of the recent state-owned establishments were located for social and political reasons. For instance, the site of the ready-wear suit factory in Derna,

the shoe factory in Misurata, and the furniture factory in Beda, have very little economic justification. The raw materials are transported from Benghazi for the first and the third, and from Tripoli for the second, and the final products are sent to the markets in Tripoli and Benghazi. The location was chosen in order to develop these areas and provide jobs for people so that they would not emigrate to the major cities.

Broadly, the establishment of industrial estates in the future in a country which is still developing, linked with a government concern in industrial development, is found to affect the industrial location in some areas and perhaps reduce the volume of migration to the main cities. The social aim in locating establishments in these areas prevails and, later, by attracting other supplementary and complementary industries, housing and social amenities may provide a new infrastructure for these areas.

Finally, from the above study it can be concluded that industrial location in Libya is not due solely to economic factors. The development of some external economies in a limited number of cities is an important reason in this instance. Industrial location results from a combination of many factors, social, political and physical, as well as economic, and the application of a general location theory may be restrictive for any analysis of the industrial location in such a country.

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CHAPTER 8

Industrial Location In The Main Towns

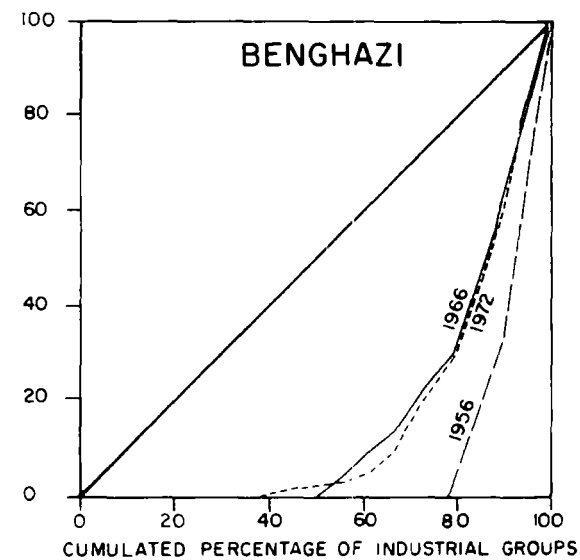
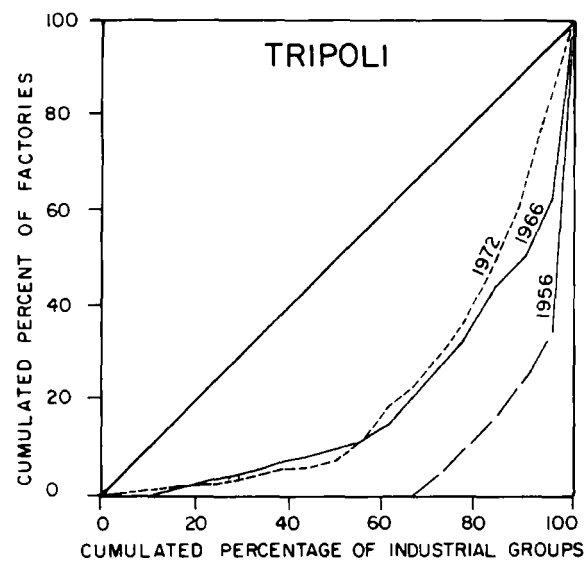
The previous chapter has analysed industrial location within the ten Libyan Muhafadat and their regions, using these as the basic units for the compilation and plotting of information. This has facilitated the handling of large masses of data without obscuring the differences between urban, rural and desert muhafadat and municipalities. It has been observed that there is a high degree of concentration in some of the municipalities. Within these municipalities are to be found the main towns whose industrial structures incorporate most of the industries found in Libya. Therefore this chapter discusses industrial diversity and location within the two largest towns in the country.

According to the industrial census of 1971, Tripoli and Benghazi were the most important industrial cities in the country, containing about 73 percent of all the establishments with more than 10 workers, and employing about 84 percent of the total workers. The types of industries present in the two towns, the elements of their structure, and other considerations such as which has the more rapid growth and industrial expansion, are the concern of this chapter.

The reason why Tripoli rather than Benghazi is called the industrial town of Libya becomes evident when the industrial structure of the two towns is examined. More factories are located within the contiguous area of Tripoli and, in addition, the establishments of Tripoli are larger and employ more people.

It is difficult to determine the extent to which diversification has increased in the two cities since 1956, and to compare the diversification of establishments in the two towns with that in Libya as a whole, because there are no annual statistics for industry in these two cities. Therefore this study examines all the factories listed in the 1971 Industrial Census,

Fig. 8-1 LORENZ CURVES FOR INDUSTRIAL ESTABLISHMENTS IN TRIPOLI AND BENGHAZI 1956, 1966 AND 1971



and excludes all those which closed before 1971. But it must be remembered that the number of establishments in Libya in 1971 was few, and the number which closed previously must be fewer. For this comparative study the diversification of the establishments has been calculated for these two cities, and for Libya as a whole. Table 8.1 presents data illustrating the percentage of factories in 18 branches of industry for three time periods, 1956, 1966, and 1971. Comparing Tripoli and Benghazi, Figure 8.1 shows that Lorenz Curves for each successive time period lie closer to the diagonal in the case of Tripoli than in that of Benghazi, and it can be concluded that the industrial structure of Tripoli has become more diverse than that of Benghazi. During these three periods the industrial structure of Libya has undergone major changes, most of which are reflected in the diversification indices. (1)

Although the changes in the country as a whole have been important, those occurring in Tripoli have been more so, as is illustrated by Figure 8.2. The 1956 diversification index for Tripoli was 15.0 and for Benghazi 17.0, as compared with a value of 21.0 for the whole of Libya in that year. In 1966 the index for Tripoli had risen to 40.0, a large increase of 25.0 during ten years, and in Benghazi it had mounted to 35.0, a rise of 18.0. During the same time the national index had increased by only 15.0. By 1971 the Tripoli index had risen to 45.0, an increase of 5.0, while the national index was 37.0, an increase of only 1.0. The figure for Benghazi had dropped by 1.0 to about 34.0. In other words, while diversification over the whole country was rising by a little less than 75 percent, that of Tripoli had trebled and that of Benghazi had doubled. It is quite clear that industry has been diversifying much more rapidly in Tripoli than in Benghazi, or in Libya as a whole. The value for Benghazi and Libya during the period 1966-1971 has remained virtually static, while in Tripoli the tendency is for diversification to continue to increase, but at a slower rate. It is clear

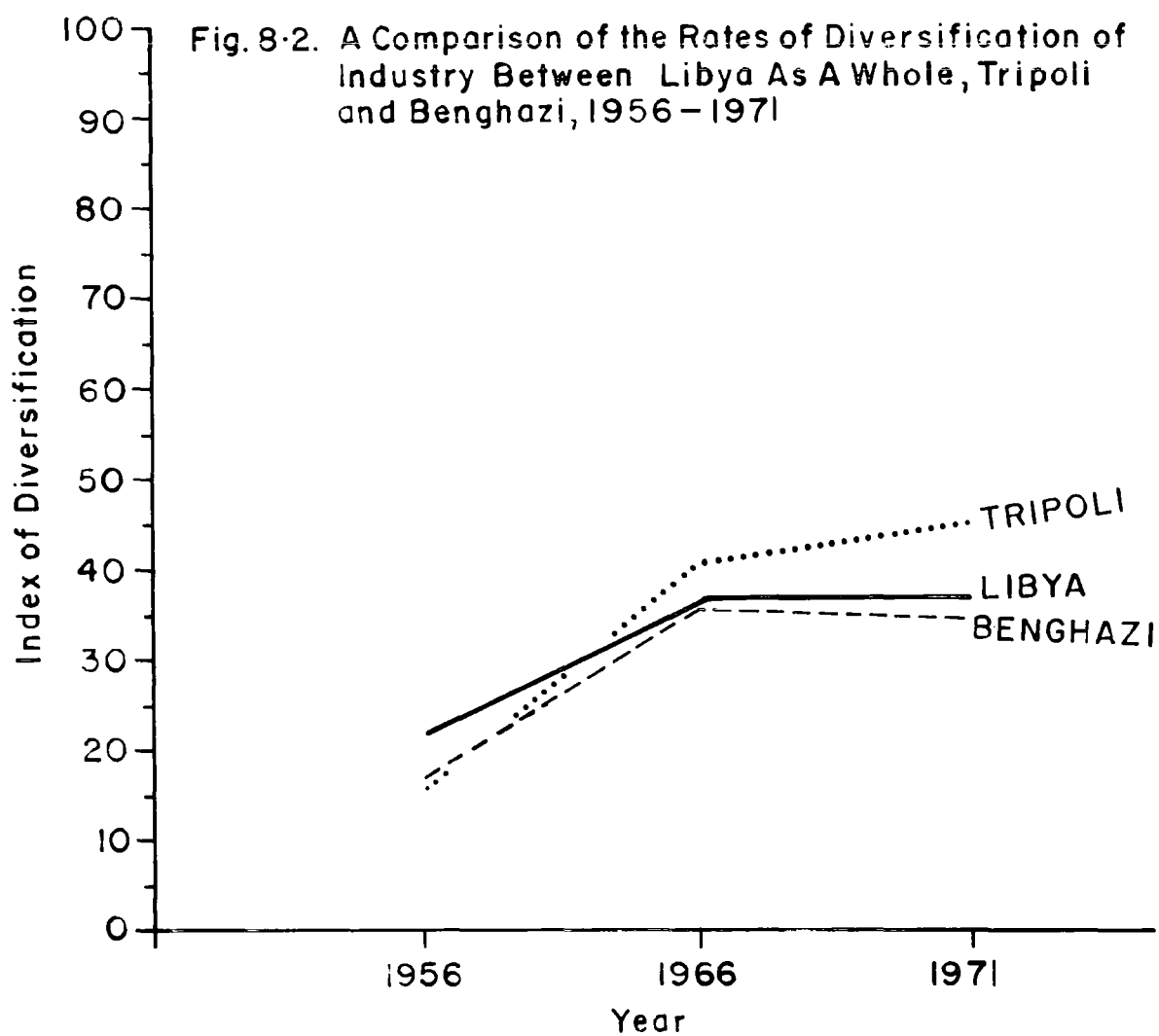


Table 8.1 Percentage Distribution Of Industrial Establishments In 18 Major Branches in Tripoli, Benghazi and Libya in 1956, 1966, and 1971

Industry	Libya			Tripoli			Benghazi		
	1956	1966	1971	1956	1966	1971	1956	1966	1971
Food processing	53.1	41.4	32.3	63.2	36.0	21.0	33.3	20.9	17.0
Soft drinks	6.2	2.6	1.9	-	-	1.8	16.7	4.7	2.0
Tobacco	3.1	0.7	0.3	5.2	1.3	0.7	-	-	-
Textiles	3.1	5.3	3.6	-	8.0	4.8	16.7	4.7	4.0
Clothes	-	0.7	1.9	-	1.3	4.2	-	-	-
Leather	3.1	0.7	0.3	5.2	1.3	0.7	-	-	-
Shoes	-	0.7	0.6	-	1.3	0.7	-	-	-
Carpentry	3.1	9.2	15.5	-	6.7	15.6	-	16.3	20.0
Furniture	-	1.3	0.8	-	2.7	1.8	-	-	-
Paper	3.1	1.3	1.5	5.2	2.7	2.4	-	-	1.0
Printing	12.6	7.9	3.8	10.6	8.0	4.8	33.3	13.9	6.0
Chemicals	12.6	6.6	5.8	10.6	8.0	9.0	-	6.9	4.0
Rubber	-	1.3	1.6	-	2.7	3.6	-	-	-
Plastic	-	0.7	0.6	-	1.3	0.7	-	-	-
Cement	-	-	0.6	-	-	-	-	-	1.0
Cement products	-	3.2	6.9	-	1.3	3.0	-	4.7	12.0
Other building materials	-	10.5	13.2	-	12.0	15.0	-	16.3	19.0
Metal work	-	5.4	8.8	-	5.4	10.2	-	11.6	14.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source : Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

that Tripoli is the most highly-diversified and most important industrial city in Libya. Moreover, according to the 1971 Industrial Census, Tripoli contains about 46 percent of all Libya's industrial establishments which employ more than 10 workers, all of them located within the city, whilst Benghazi has about 29 percent of the total, some of which are located in adjacent areas such as El-Gawarsha and El-Hawari.

There are several possible explanations of this. The increase in the importance of Tripoli for highly diversified manufacturing has been for historical, economic, geographical and political reasons. It has grown to be the largest metropolitan area in Libya, covering about 33 square miles. (2) From an historical point of view most of the Italian establishments were in Tripoli (Chapter 2). Some of these remained after the Italians had left and were taken over by Libyans, whose success in operating them encouraged other Libyans to establish new ones and renew old ones. Moreover, the conurbation with its present population of about 454 thousands is by far the most significant urban centre of production and consumption in Libya, as indicated by the concentration of skills and of high incomes. Table 8.2 shows that the total consumption expenditure of 1970 is nearly 10 percent higher in Tripoli than in Benghazi. The concentration of large numbers of people within a large city forms a market not only for mass-produced goods, but also for more esoteric products. (3)

The new functions of the city as the capital of the country and centre of most of the government administration, banks, insurance companies, oil companies, and of industrial research, cause it to receive more government investment than any other urban area. Concentration of economic activities carried out by either the national or international agencies, which moved from Benghazi and Beda, acts as a strong pulling factor in Tripoli. Labour is also more easily available in Tripoli than in Benghazi. Even if there is no unemployment, workers can be attracted from other establishments, besides

Table 8.2 Consumption Expenditure On Some Consumption Items in Tripoli
And Benghazi, 1970 (In LD, '000)

Consumption items	Tripoli	Benghazi...
Food	31,565	29,820
Consumer goods (other than food)	2,776	2,596
Clothing, textiles, furnishings	6,368	4,884
Household equipment and durables	6,896	6,041
Total	47,605	43,341

Source : Census And Statistical Dept. Statistical Abstract 1970, Tripoli, 1972.

which there are also some facilities available for training skilled workers. Tripoli close to largest industrial training centre (Nasr El Din Ghami Institute) and Faculty of Engineering, while in Benghazi there is only vocational training and the training centre was transferred to Tobruk (see Chapter 9).

Industry is also attracted by the various external economies made possible in Tripoli by the more adequate services and utilities, such as electricity. Tripoli has the largest power station in the country, with a production of about 351,000 thousand Kilowatt hours in 1969. It also has the main airport and port, its airport being deeper and with more facilities than that of Benghazi. Table 8.3 shows the great importance of the Tripoli port and airports. Furthermore, Tripoli has developed as the transport node for the whole western muhafadat. A large number of buses daily serve areas containing at least three-quarters of the western Muhafadat's population. Moreover, its location gives Tripoli two further advantages over Benghazi. Firstly, it is closer to the western countries, making raw

Table 8.3 Percentage Of Ships, Planes, Loaded And Unloaded, Tripoli
Port And Airport, 1971

Classification	Libya (1)	Tripoli (2)	% (2)-(1)
Number of commercial ships entering ports	4,513	2,439	54.0
Goods unloaded in ports (in thousand tons)	3,009	1,801	59.9
" loaded " " " "	20	10	50.0
Number of planes landing at airports	6,706	3,941	58.8
Goods unloaded at airports (in tons)	12,111	9,810	81.0
Goods loaded " " "	2,411	1,879	78.0

Source : Census and Statistical Dept. Statistical Abstract, 1971, Tripoli, 1973.

raw materials, machines, techniques and spare parts cheaper and easier to import. Secondly, it is located in the centre of a fertile hinterland which maintains about two-thirds of the Libyan population. Four of the main cities in Libya (Misurata, El-Zawia, Homes and Gharian) are located within 130 miles of Tripoli and the development of a new motorway system has extended its market as well as the supply of raw materials. Moreover, the urban settlements of this area perform as central places, serving areas within the city's market region.

A. Industrial Distribution And Location In Tripoli

The previous section has shown that Tripoli is the major industrial city. This section will study the distribution and location pattern of the manufacturing industries within the city and its 18 districts. Table 8.4 gives a detailed analysis of the number of establishments arranged by size. The table shows that 45 percent of the establishments within the city in 1971 were small (employing only 10-19 workers). The food, soft drinks, building materials and carpentry industries accounted for about

Table 8.4 Distribution Of Establishments And Workers By Industry
In Tripoli, 1971

Type of Industry	No. of establishments by size of workers				Total number of employment	% of total
	10-19	20-49	50 and over	Total		
Food processing	15	7	14	36	2,178	28.6
Soft drinks	1	-	2	3	674	8.9
Tobacco	-	-	1	1	1,200	15.8
Textiles	4	3	1	8	222	2.9
Clothes	4	1	2	7	186	2.4
Leather	-	1	-	1	22	0.3
Shoes	1	-	-	1	18	0.2
Carpentry	13	8	1	22	477	6.3
Furniture	1	1	1	3	218	2.9
Paper	-	1	3	4	210	2.8
Printing	6	-	1	7	140	1.8
Chemical products	3	7	4	14	582	7.6
Rubber	4	2	-	6	117	1.5
Plastic	1	-	-	1	16	0.2
Cement	3	1	2	6	265	3.5
Other building materials	9	12	3	24	645	8.5
Metal work	7	8	1	16	445	5.8
Total	72	52	36	160	7,615	100.0

Source : Calculated by author from data in I.R.C. Industrial Establishment
Census 1971, Tripoli, 1972.

57 percent of all establishments and of the total of workers. It is obvious that most of the industries in the city of Tripoli are still traditional.

The most important branch of industry, measured according to total number of workers, is food processing, which accounts for 29 percent of the total persons employed. A detailed breakdown shows that 1,158 workers, or 53 percent of the total number of food workers, were connected with six establishments, and that 688 workers, 32 percent of the total in this category, were connected with three tomato canning establishments. The area surrounding Tripoli to the south is the greatest centre for tomato production. In 1969 Tripoli and El-Zawia Muhafadat produced about 1,200,000 tons which accounted for about 93 percent of the country's total production. The establishments buy the produce during the harvest season from the farmers who bring it to them. The number of workers in these factories is not stable. There is a high seasonal peak in the summer, but numbers decline to about 40 to 60 during the rest of the year. This contrast is due solely to the nature of the work. At the height of the season, the work does not require experience, nor is it physically demanding, but a large number of workers are needed. During the rest of the year, however, the tasks are physically more taxing, and therefore strong and expert men are more desirable as workers. (4)

Building materials, and the manufacture of cement, bricks, flagstones and lime products are the next important industries by total of workers. The construction boom in the city has a great deal to do with the continued growth of this industrial category. Chemical industries, such as gas cylinders, toiletries, soap, perfumes and paints, can be related to the change in people's way of life, and the increased demand for more sophisticated articles.

As far as the location of these establishments within the city is concerned, it has been stated earlier that there was no formal policy for industrial location, either between the regions or within the cities. Therefore industrial sites within Tripoli were selected in the city by the entrepreneurs themselves, who sought somewhere close to the port, to the

C.B.D. and to their own homes. In 1968, the Municipality of Tripoli set aside special zones for the location of new establishments within the city, and asked the old establishments to move wherever possible in order to reduce industrial problems such as smells and pollution. After this, most new establishments were established in some of these zones, but others were located elsewhere for reasons which will be discussed later. In spite of the municipal order for old establishments to move, and the increase of the land values in C.B.D., only a few establishments complied. Of the 40 establishments interviewed (24 percent of the total establishments in the city), 33 were established before 1969, but only 6 establishments (18 percent) had moved from previous sites. The main reasons for re-locating establishments were the increased space required to gain economies in production and the desire to organize production techniques in favourable economic circumstances. Those establishments which have moved had either been unable to obtain space near their former sites or had wished to construct new buildings.

The industrial establishments in Tripoli are widely scattered throughout the city and to give a clear picture of their distribution the coefficient of location is very useful, since it indicates the degree of concentration of each type of industry. It is also an aid in finding out the industrial diversity within each of the 18 districts of Tripoli's city. To examine the coefficient of localization of the industries within Tripoli (used in Chapter 6), one should keep in mind the following classification originated by Sargent Florence : ⁽⁵⁾ industries with a value between 40 and 60 are moderately localized, those with lower values are fairly well spread over the region, and industries with values above 60 may be taken as heavily localized.

Tables 8.5 and 8.6 show the distribution of workers and the coefficients of location of 17 industrial categories in the 18 districts of the city. * Most of the industries are heavily localized. This is either

* The classification of the districts was due to the classification of the Tripoli Master Plan, final report of 1969.

Table 8.5 Distribution Of Industrial Workers By Industries For Each District In Tripoli, 1971

District/ Industry		Food	Soft drinks	Tobacco	Textiles	Clothes	Leather	Shoes	Wood products	Furniture	Paper	Printing	Chemicals	Rubber	Plastic	Cement production	Other buil- ding material	Metal work	Total in each district
1.	Medina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Central	33	-	-	-	114	-	-	-	-	-	27	-	-	-	-	-	-	174
3.	Omar Muchtar	220	-	1200	34	10	22	-	95	-	-	102	115	15	-	-	-	29	1842
4.	Ad-Dahrah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Garden City	55	18	-	-	-	-	-	-	-	-	-	-	-	-	-	31	-	104
6.	Sidi Kalifa	353	-	-	54	-	-	18	29	-	-	11	-	38	-	-	-	69	572
7.	Sug Talatha	30	-	-	28	-	-	-	186	-	52	-	-	40	-	-	-	14	350
8.	Georgompopoli	176	-	-	13	-	-	-	-	-	-	-	54	-	-	-	-	-	243
9.	East Gurgi	445	-	-	-	-	-	-	33	18	-	-	25	-	-	-	30	20	571
10.	Forest En Nasr	130	-	-	-	-	-	-	33	170	60	-	103	14	-	-	158	66	734
11.	North Sug El-Jumaah	65	-	-	93	52	-	-	12	-	-	-	-	-	-	-	13	-	235
12.	Sug El-Jumaah, Central	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12
13.	Fornaj	77	-	-	-	-	-	-	37	-	-	-	-	-	-	-	21	-	135
14.	University	26	-	-	-	-	-	-	-	-	-	-	22	-	-	75	-	-	123
15.	Hadbah El-Khadra	10	656	-	-	10	-	-	52	30	43	-	233	10	16	66	256	208	1590
16.	West Gurgi	370	-	-	-	-	-	-	-	-	-	-	30	-	-	-	46	39	485
17.	Gargaresch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	124	90	-	214
18.	East Fornaj	176	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	231
Total		2178	674	1200	222	186	22	18	477	218	210	140	582	117	16	265	645	445	7615

Source : Computed by author from data in I.R.C. Industrial Establishments Census 1971, Tripoli, 1972.

Table 8.6 Coefficient Of Localization Of Industries In Various
 Districts Of Tripoli, 1971

Industry	The Coefficient of Localization
Food	45
Soft drinks	78
Tobacco	76
Textiles	66
Clothes	84
Leather	76
Shoes	93
Carpentry (wood)	40
Furniture	69
Paper	63
Printing	66
Chemicals	36
Rubber	57
Plastic	79
Cement products	75
Other building materials	51
Metal work	42

because there is only one factory and 100 percent of its labour is therefore in one district (e.g. the tobacco and leather industries in Omar Muchtar Districts, shoes in Sidi Kalifa, and plastics in Hadbah El-Khadra District), or because most of the factories with large numbers of workers are located in one district. For example, two large establishments with 97 percent of the total workers in the soft drinks industry are in Hadbah El-Khadra; four clothing establishments employing 61 percent of this industry's total workers are in Central District; and one establishment with 78 percent of the furniture industry's total is located in the Forest En-Nasr District.

Table 8.7 Industries Arranged According To Concentration In Each District Of Tripoli

District	Industries
Central	Clothes and printing
Omar Muchtar	Tobacco, leather and printing
Garden City	-
Sidi Kalifa	Shoes, rubber and textiles
Sug Talatha	Wood, rubber and paper
Georgompopoli	Rubber and food processing
East Gurgi	Food processing
Forest En-Nasr	Furniture, paper and other building materials
North Sug El-Jumaah	Textiles and clothes
Sug El-Jumaah Central	-
Fornaj	Wood
University	Cement production
Hadbah El-Khadra	Plastics, soft drinks, metal work, chemicals and other building materials
West Gurgi	Food processing
Gargaresch	Cement production
East Fornaj	Paper

The foodstuffs, wood, rubber, other building materials and metal work industries have moderate coefficients of localization. The food industry is widely distributed, located in 15 districts, but its moderate coefficient results from about 80 percent of its workers being located in only six districts. In spite of the fact that the chemical industry is located in seven districts, it has a low coefficient, possibly because most of its workers are located in one of the industrial districts. Other industries show a high

Fig.83 DISTRIBUTION OF INDUSTRIAL WORKERS IN TRIPOLI 1973

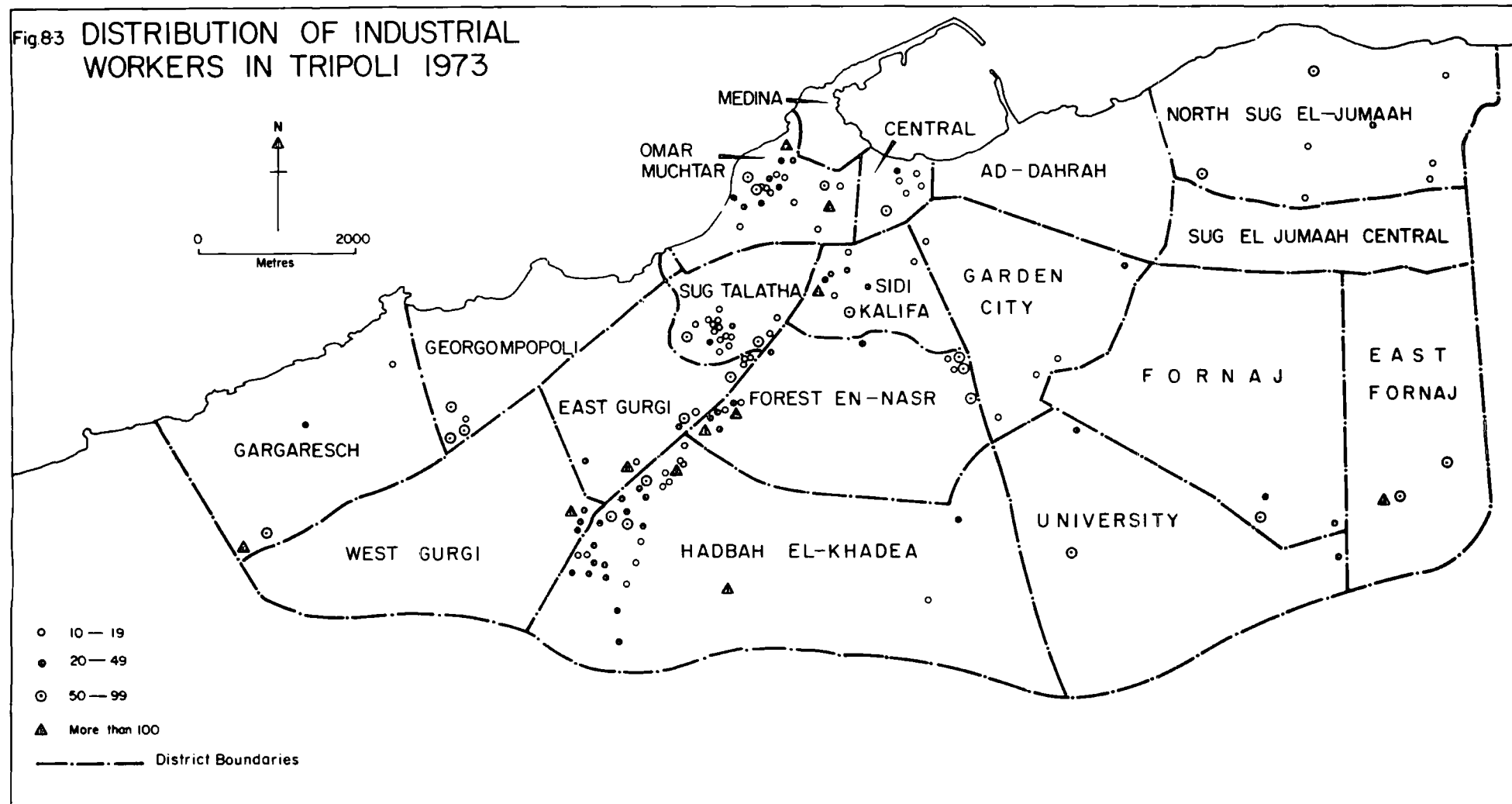
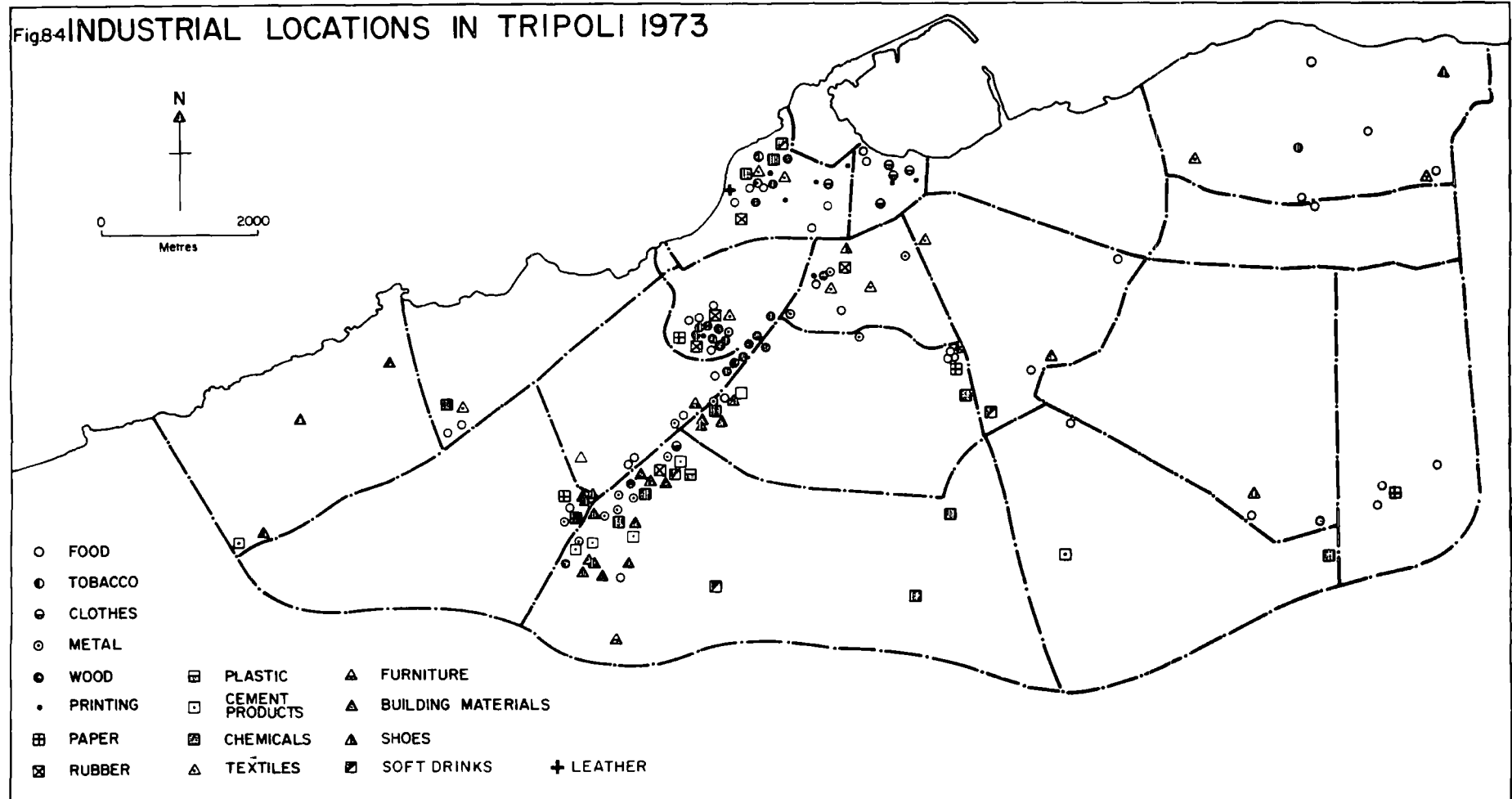


Fig84 INDUSTRIAL LOCATIONS IN TRIPOLI 1973



concentration, each of them located in a few districts. Table 8.7 shows the type of industry concentrated in each district according to coefficients of location. Only six districts depend significantly on one industry and the other districts have more than one. Five highly industrialized districts have about two-thirds of the total workers, each having three industries or more concentrated in it. These districts are Omar Muchtar, Sidi Kalifa, Sug-Talatha, Forest En-Nasr and Hadbah El-Khadra.

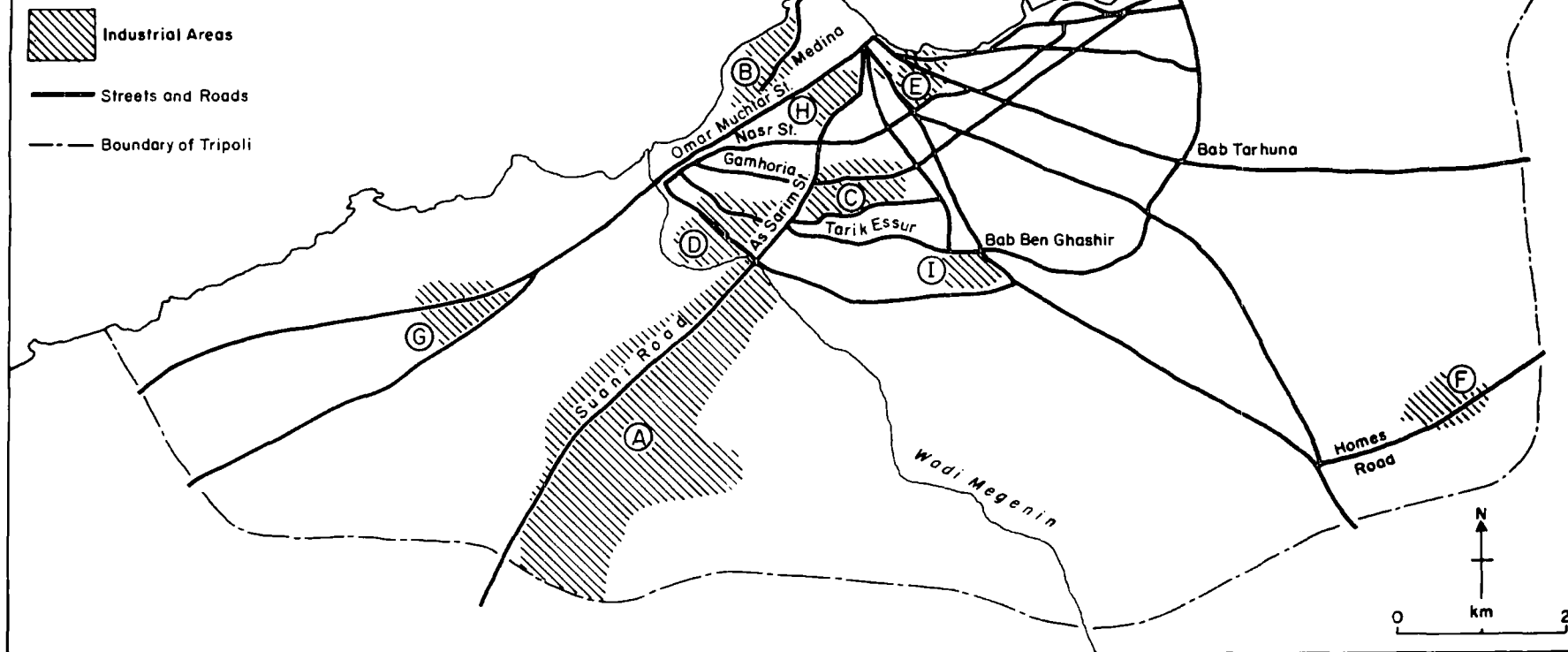
By comparing this distribution of industrial concentration among the districts in relation to their respective products with the answers to question No. 45 of the questionnaire, certain conclusions may be reached. Industries which deal with foodstuffs, wood and building materials production, whose products are mainly for local consumption in the city, are found in many districts, as close as possible to the local district markets. Other industries, such as tobacco, soft drinks, furniture, plastics and chemicals, are localized in one or two districts, especially in The Suani Road area, because their products do not depend on the local market, but are taken to other parts of the country.

Are industries distributed throughout each district, or are they concentrated in one or two parts of each district? Comparison of Figures 8.3 and 8.4, which show the various industrial locations in Tripoli, indicate that except in Sug Talatha district, industries are mostly concentrated either at the western or the eastern edge of each district, largely because they are adjacent to main roads.

Nine industrial areas can be recognized within the metropolis. They comprise about 6.6 percent of the total land in the city, ⁽⁶⁾ and correlate with four main roads, connecting Treipoli with other parts of the country (Figure 8.5) : (A) Suani Road, (B) North West, (C) Sidi Kalifa, (D) Sug Talatha, (E) North Central, (F) South east, (G) South west, (H) South Central, and (I) Bab-Ben Gashir. The rationale for determining and defining the types of industries that are characteristic of each area is now explained in detail.

THE MAJOR INDUSTRIAL AREAS IN TRIPOLI 1973

Fig. 8-5



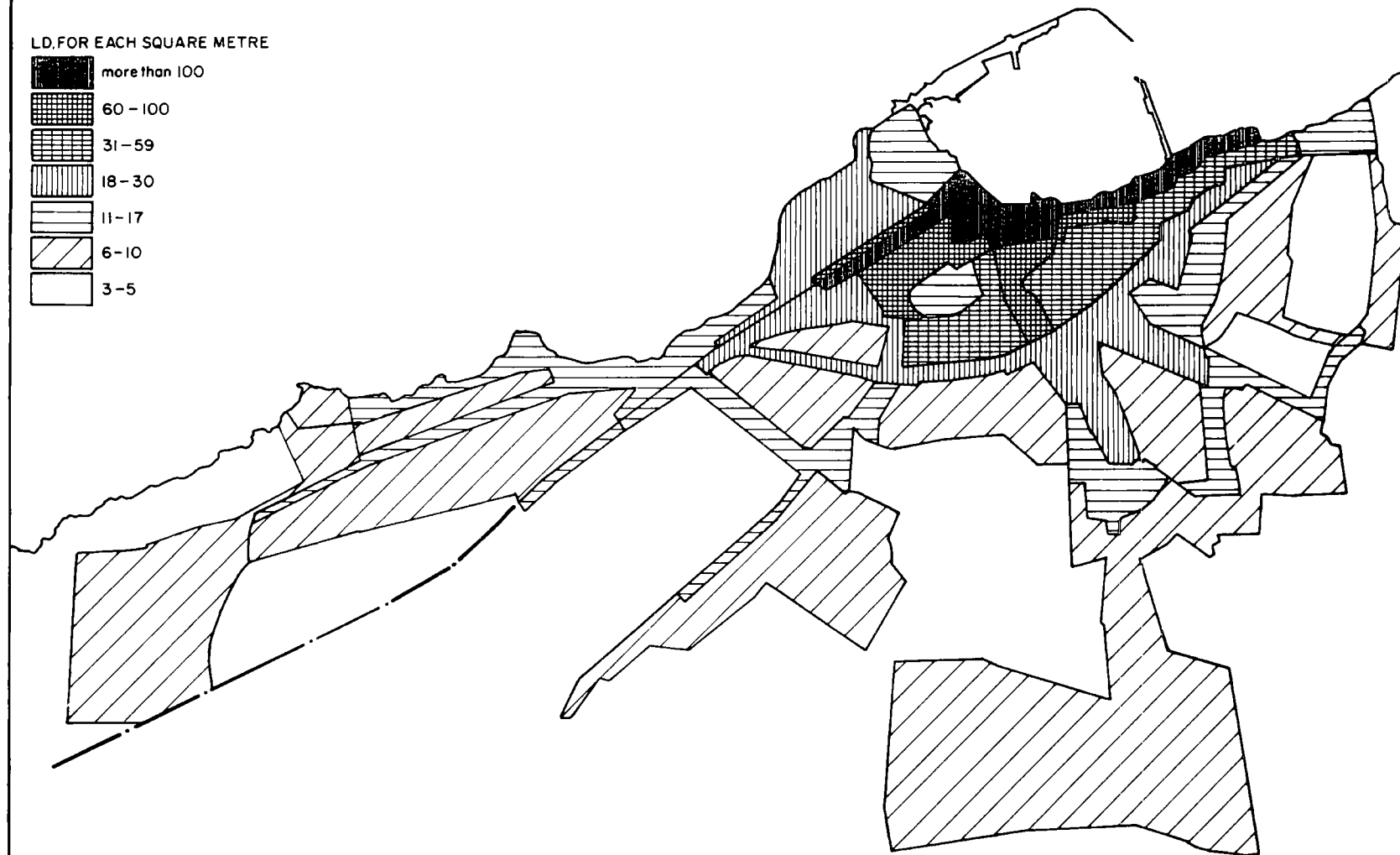
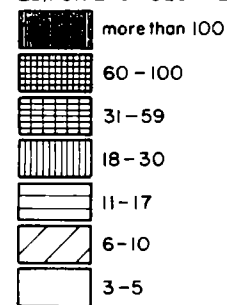
A. Suani Road Area

This is the main industrial area in Tripoli in terms of number of industrial workers, number of establishments and size. It extends from north-east to south-west along the Suani Road, covering the east part of East Gurgi Districts, the north-east of West Gurgi, and the west part each of Forest En-Nasr and Hadbah El-Khadra. In 1971, about 2,890 workers, 38 percent of the total workers in Tripoli, worked here, and more than one-third of the establishments in the city are sited here. Several industrial activities have been established on both sides of this road along a distance of approximately 3 Kms. Development as an industrial area is recent, 87 percent of the total number of establishments having been established since 1966, and most of the buildings were erected for industrial purposes. These factories are either newly-established or transferred from the inner part of the city and erected on larger plots of land in cheaper areas.

The industrial structure of the area is diversified. Leading industries are plastics, furniture, foodstuffs, building materials and chemical industries, the first two with 100 percent, and the latter with more than 50 percent of the total workers in each industrial group. Industries have been set up here for many reasons. Land was becoming increasingly scarce and expensive in the urban core, where annoying legislation was also proving less conducive to the establishment of large-scale production. Individual corporations have been erecting plants in outlying districts during the last seven years, where there were large lots of cheap land close to the city. The land value in this area is much cheaper than in other parts of the city (Figure 8.6). Much of the land in this area was zoned for industrial purposes, and this factor has to a large extent been responsible for the present expansion and diversification. The establishments are therefore capable of expanding over a wide area without increasing costs tremendously, especially those establishments whose raw materials and finished products

REPRESENTATIVE LAND VALUES - TRIPOLI CITY 1967 Fig. 8.6

LD. FOR EACH SQUARE METRE



Source: Tripoli Master Plan

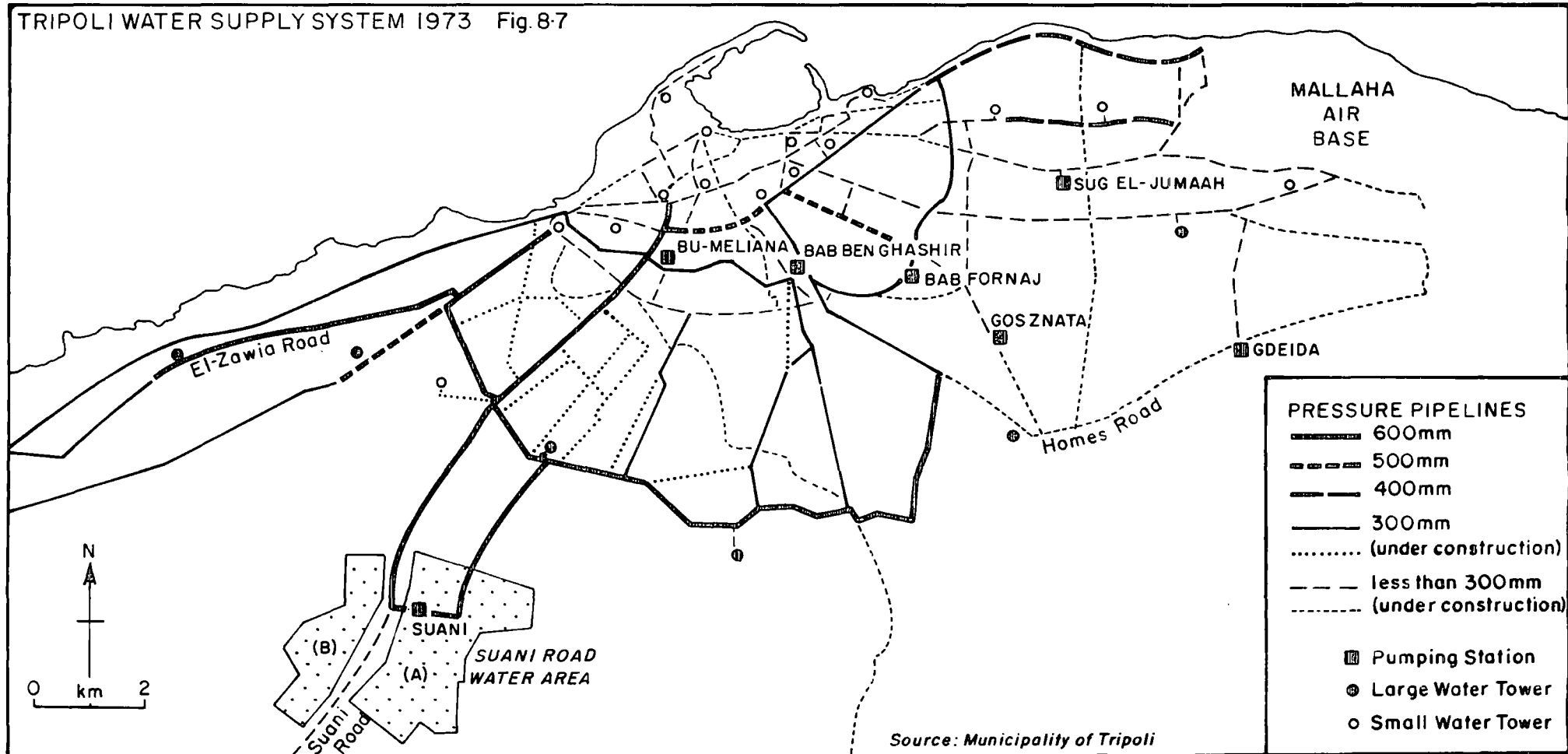
are bulky (e.g. building materials, metal work and soft drinks). This area can be extended further south to accommodate more industrial establishments. It is far from residential areas, and the municipality was right to decide that most heavy and noisy industries should be placed here to avoid considerable nuisances caused either by noise, such as that of cutting steel or clanking bottles, or by unpleasant smells, such as that of rubber or chemicals which can be smelt at a considerable distance during the hot summer.

Moreover, it is located near the Suani water station (Figure 8.7) which provides Tripoli with all its water requirements. The establishments can obtain their water from public pipelines, especially from the major pressure pipeline 'A' (600 mm) which passes along the Suani Road. On the other hand, half of the establishments interviewed had installed their own water supply by sinking wells. The public water is still required by some industries, especially the food and soft drinks industries, because of the salinity and high calcium content of Tripoli underground water. ⁽⁷⁾ Suani Road site is suitable for getting water any time, while establishments inside the city are sometimes unable to get the quantity which they need because of the small pipelines and the increased consumption inside the city in summer.

The location of the area along the main road also minimises the transport costs of raw materials and of finished products. The Suani Road runs from the north to the south-west, linking with the central business district to the north, and with the important agricultural part of the Geffra plain in the south, which provides a large proportion of the city's fruits and vegetables. In addition, many heavy vehicles travel this route carrying agricultural produce into the city and manufactured articles from it. Consequently some of the biggest garages, services and repair stations have been located on this road which has naturally and unavoidably become very congested.

The major handicap of this area might be its distance from the residential areas of the workers, but this problem has been tackled by providing

TRIPOLI WATER SUPPLY SYSTEM 1973 Fig. 8-7



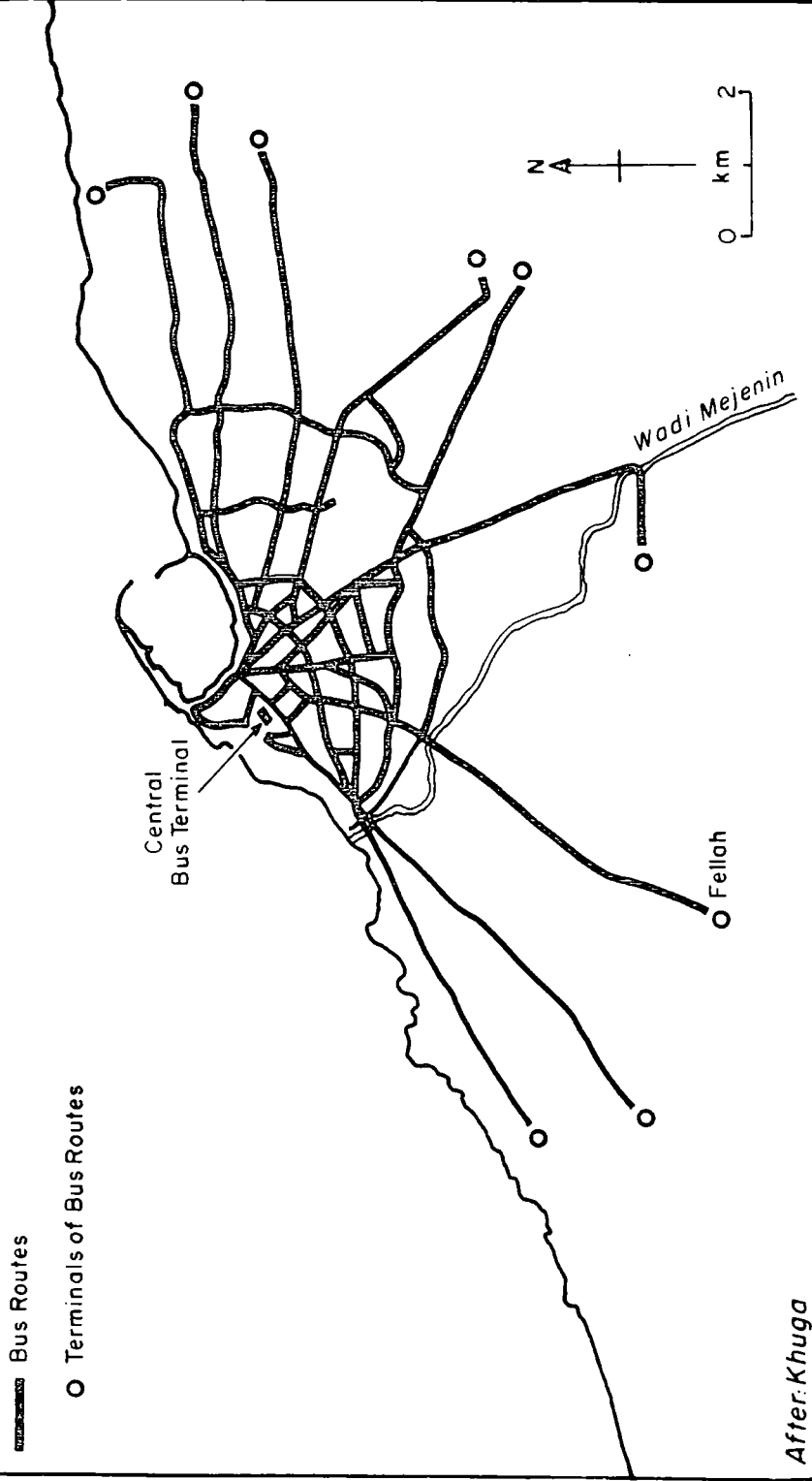
special transport services and public buses (Figure 8.8) which bring workers from different parts of the city. Twenty-two of the 40 city establishments interviewed were in this area, and five of these provided special transportation while workers for the remainder came either by public buses or by private cars. Table 8.8 reveals that the largest number of public passenger journeys on buses in 1967 was made on the Fellah and Gargaresch lines. ⁽⁸⁾ The Fellah line runs along the southern part of the Suani Road (see Figure 8.8).

Table 8.8 Distribution Of Daily Journeys To Work, Tripoli, 1967

Bus Line	Direction of journey	No. of journeys	Average no. passengers per day
Ad-Dahrah-Sug El-Jumaah	East	56	3,360
Arada-Sug El-Jumaah	"	56	3,360
Armus - Arada	"	56	3,360
Zhata - Arada	"	56	3,360
Jama Bent El-Bay	"	70	4,200
Sidi Msri - Fornaj	South-east	56	3,360
Gargaresch	West	84	5,040
Gurgi	"	56	3,360
Fellah	"	84	5,040
Hadbah El-Khadra	South-east	70	4,200
Accara - sh. El-Zawia	South	36	2,120
	"	56	3,360
Circle No. 1	C.B.D.	18	1,080
Circle No. 2	C.B.D.	18	1,080
Circle No. 3	C.B.D.	18	1,080
Circle No. 4	C.B.D.	28	1,680
Total		818	49,040

The twenty-two establishments interviewed here had 1,187 workers, and in answer to question No. 31, 27 percent were reported to live within one Kilometre, 47 percent came from between one and five Kilometres, and 26 percent lived more than five Kilometres away.

TRIPOLI - BUS ROUTES Fig.8.8



After: Khuga

As for the disadvantages of the industrial area, its location in the south and south-west of the city is satisfactory from the point of view of the prevailing north-westerly winds, but not for the Ghibli winds which blow over the city for many days during the year (Table 8.9). These south-westerly winds carry the fumes, odours, dirt and gases of the establishments over the residential areas. Moreover, there is no sewerage system in the area. Thus some of the establishments have constructed special sumps, some of which contain acids and alkalis which pollute the ground water, while others burn their sewerage in the area, in the case of the match works, causing frequent fire hazards and threatening their neighbours. There is also no regular service for the removal of waste materials; ten of the establishments interviewed rely on their own disposal trucks, the others selling their refuse, or even throwing it onto nearby land.

Table 8.9 The Number Of Days With Ghibli Winds In Tripoli, 1960-1964

Year	J	F	M	A	M	J	J	A	S	O	N	D	Total
1960	4	10	9	10	13	7	3	3	-	9	4	-	72
1961	-	-	3	9	12	3	3	1	2	3	6	8	50
1962	3	-	8	10	12	5	4	1	3	3	3	-	52
1963	9	10	9	7	2	12	5	2	5	-	8	13	82
1964	-	8	11	6	8	8	5	8	1	16	4	8	83

Source : Meteorological Office, 1966.

B. North-West Area

This is one of the oldest industrial areas, old industries operating here, including the tobacco establishment (established in 1924), The Tripoli Gas Company (1935), and The Libyan Company of Gas Production (1931). Here the tobacco, leather, and printing industries are highly concentrated.

These industries owe their importance to the fact that they were established before the area gained popularity as a residential area, its present main function.

In this old inner urban area the establishments have characteristically drawn their workers from the old city close by. The area is also close to the harbour and to the main power station. In the past the location was suitable since it was away from the residential area, but as time progressed, urban growth crept towards the west and the south and surrounded the area, and its location is no longer satisfactory. Moreover, its location in the north-west of the city means that the prevailing westerly winds annoy the residents living in the east and south-east of the area.

C. Sidi Kalifa Area

This is a small area in the west part of Sidi Kalifa district, where industries are clustered together in a few streets. It is within half a kilometre of As-Sarim and Gamhoria streets which connect it with the C.B.D. Approximately 550 or 7.5 percent of the industrial workers of the city worked in this area. The leading types of manufacturing are shoes, where all of the industry's workers are concentrated, rubber (24 percent) and textiles (23 percent). Such goods are orientated largely to a local market, hence their development here over the past ten years when land was made available for factory sites. The availability of workers and proximity to the pumping station of Bu-Meliana were further reasons for its development. Like the north-west area, the Sidi Kalifa area is unsuitably located from the point of view of the prevailing winds. Perhaps the location of industry in this area is one of the reasons which discourages rapid urban growth farther south, because the prevailing westerly winds carry some of the industrial pollution towards the south.

D. Sug Talatha Area

A small industrial area located in the southern part of the Sug Talatha district, north of Wadi Megenin, this is considered as the northern extension of the Suani Road area. The area has about 5 percent of the total workers, is dominated by light industry, and most of the establishments are small, employing between 10 and 30 workers. The important industries are carpentry, rubber and paper, which employ 41 percent, 34 percent and 25 percent respectively of the total workers. These types of industry are noisy or smelly.

The low density of residents, the cheapness of land, the wadi Megenin (which could be used for sewerage disposal; though it is far from ideal for this purpose), the proximity of the Suani Road and its wood stores, and the first ring road, were the main reasons for industrial location in the area. However, this area offers no other advantages to industries, because it is limited by urban growth and by the wadi whose flats are subject to flooding.

E. North Central Area

This area is occupied by very light industries which are scattered within one square Kilometre. Total industrial workers were slightly less than 200, mainly employed in clothing, printing and food processing. The industrial structure shows the expected emphasis on these three types of industry traditionally associated with city centres. Most establishments are of one-storey only, because all industries located here are light and small-scale and the rents are high. The market offers the advantages of easy contacts with consumers; other location factors were fluctuating demand for workers, the high transport costs of this type of industry and personal preference. Moreover the raw materials and finished products are small and not bulky and there are no serious problems concerning amenities, because these industries create little industrial nuisance.

F. South-East Area

This small area is located at the beginning of the Motorway which goes to the east of the country (Homes Road). Foodstuffs and the paper industry are concentrated here. It has the advantage of the availability of cheap land, and the motorway which provides a good link with the central commercial district and the eastern agricultural lands, used both as a source of raw materials and as a market. It is also located beside the main 600 mm water pipelines. The location from a climatic point of view might be suitable for industry, but this area offers little possibility for further extension, being bounded by arable land whose produce is of great economic value to the city.

G. South-Western Area

The area is located mostly in the southern part of Georgompopoli district on the main western road which connects the city with the western parts of the country. Its industrial structure reflects the significance of the large foodstuffs and textile establishments. The presence of the western motorway, the low cost of the land, and the availability of workers from surrounding areas were the location factors.

H. South Central Area

The area has a similar industrial structure to the north central area, and the reasons for its location are the same, thus the comments made about that area apply equally to this.

I. Bab Ben-Ghashir Area

This is a small old industrial area, all of those establishments were established before 1967. Its site beside the Ben-Ghashir pumping station and the eastern motorway, and the low price of land, were the main

was more rapid towards the east. During this period the Libyans were concentrated in the old residential areas of Mizran, Belkhair and Ad-Dahrah while the Italians built new residential areas to the east and south-east of the old city. Khuga stated that,

"The Italians succeeded in regulating the height and layout of multi-storey buildings, and also developed five residential areas on the Italian style. These areas are now located within the middle zone, I.C. Ad-Dahrah, "Case Popolare" and "Citta Giardino" and Shara El-Shatt. Three of these were reserved for Italian settlers and Shara El-Shatt residential quarter was reserved for high Italian officials (army and civil servants). The creation of "Citta Giardino" or garden city was inspired by the idea of garden cities as propounded by Ebenezer Howard. " (9)

The concentration of the population in the east during that time made the Italians locate their establishments on the open land in the south and north-west parts. Once a factory succeeded in its location, new entrepreneurs were encouraged to build close by, especially when there was no city planning system. The new growth of the city towards the south and west in recent years has influenced some new industrial locations, especially those of industries dealing with construction (such as carpentry, furniture, cement products, building materials and some chemical industries), so as to avoid the high costs of transportation, since most of their raw materials and products are bulky.

Moreover, in the east arable land and many gardens, the Air Base and a large number of government administrative buildings impede industrial development. In addition, the land value here is more expensive than in the south and none of the main roads leading to other parts of the country pass through the eastern area.

B. Industrial Distribution And Location In Benghazi

Benghazi is the most important city in eastern Libya, and its major growth pole. In 1973 the city had about 264,500 inhabitants, slightly

Although there is some diversification, activities connected with construction industries form a striking majority. Carpentry, plumbing and lime production are the large traditional groups. Comparing this table with Table 8,4, it is clear that establishments in Benghazi are more traditional than those in Tripoli. In Benghazi four establishments, only about 4 percent of the total, have more than 50 workers, while 36 (22.5 percent) of Tripoli's establishments are in this category. Tripoli also has more types of establishment than Benghazi : tobacco, rubber, clothes, plastic, matches, shoes and paints, which are already produced in Tripoli, have not yet appeared in Benghazi.

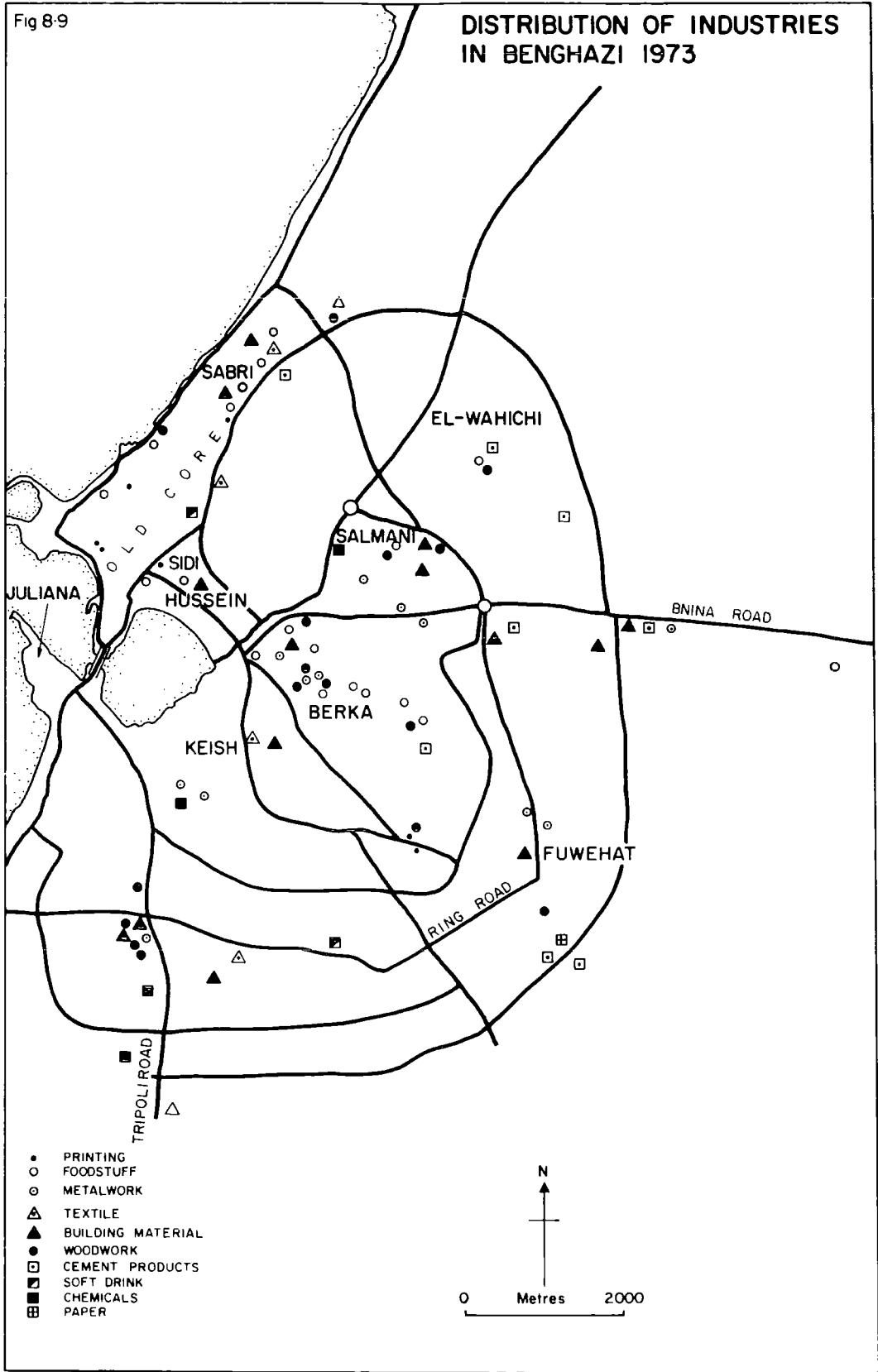
Turning to industrial location within Benghazi, Figure 8.9 reveals that in the city's present stage of development industry is not concentrated in any major belt or area. Several establishments of a traditional nature, such as carpentry, bakeries, soft drinks establishments and others concerned with building materials and metal work, exist in various sections of the city associated with crowded areas near the interior local markets, and generally near the main roads. Other establishments are scattered along the Ring Road, including a Pepsi Cola bottling plant, some building materials establishments and various metal work industries serving the whole city market.

The remaining industrial activities are mainly associated with oil exploitation and consist of oil company storage yards, such as Macobar Libya Inc., Borwed of Libya, and Tabalino, mostly located on the Tripoli Road, an unsuitable location because their fumes and dust affect recent urban residential areas, especially during Ghibli winds.

Industrial location in Benghazi contrasts with that in Tripoli. Unlike Tripoli, Benghazi has no particular industrial area. The distribution of establishments in Benghazi may be ascribed to the morphology and the shape of the city, which is divided by swamps into many quarters, such as Berka, Sabri, Keish, Fuwehat, Sidi Hussein, El-Wahichi and the old city. Each of

Fig 8-9

DISTRIBUTION OF INDUSTRIES
IN BENGHAZI 1973



these quarters grew up as an isolated area, in contrast to Tripoli. This might influence factories of each type to find locations in each quarter, especially in the case of traditional industries, so as to provide close links with the local markets. It is true especially of establishments which deal with daily demand, such as bakeries, printing, soft drinks and building materials, and these account for a high percentage of the small establishments within the city. Time is important and direct contact with the consumer is often imperative, because of the intermittent and ephemeral demand for their products. Industries of this type are generally composed of numerous small plants which are insensitive to the high rents of the central business district and contiguous areas. (11)

Most of the establishments in Benghazi are small-sized units, about 96 percent having less than 50 workers and 68 establishments less than 20 workers. Small establishments do not require specially constructed buildings; obsolete buildings are often suitable since the process units are relatively small and the processes are of seasonal character and have a fluctuating demand for workers.

C. New Industrial Zones

Having discussed the present industrial location in Tripoli and Benghazi, it is of value to discuss the proposals for new industrial zones in these two cities. Where are they to be located, and why? Have they a good potential for future growth? The previous section showed that industrial location in these two cities did not evolve according to any particular plan. There was no concept of zoning in Libya, residential areas and commercial business were allowed to develop alongside industrial plants, and industries allowed to establish themselves in residential areas. These trends, however, could not continue, and the cities of Libya, particularly those which accommodate modern industrial establishments, need

master plans to put forward basic policies for their development, to determine the framework of their structure, and to decide general relations between the various uses for land.

In both Tripoli and Benghazi new large establishments have contributed to the accelerated development of industrial zones. ⁽¹²⁾

Problems have been :

- (1) lack of suitable industrially zoned land in the old centres of the cities;
- (2) traffic congestion and the cramped condition of older industrial areas;
- (3) the increased use of the automobile as a preferred method of travelling to work, necessitating ample parking space for employees at new plant sites;
- (4) increased truck transport of industrial products, requiring additional space for service parking and loading;
- (5) a preference by institutional investors for financing construction in planned districts where security of investment is more certain;
- (6) change in the plant design for establishing new facilities demanding larger sites.

It would be more economic for establishments to be located together for their mutual benefit in zones where all could profit from the available facilities and site services. The regulations should be based on accurate studies of future urban growth and of factories affecting industrial locations, in order not to zone for industrial occupancy any district which for reasons of topography or other geographical features might be for residential use. ⁽¹³⁾ In 1968, the municipalities of Tripoli and Benghazi each set up a master plan for future development of land use within their cities, each one containing zones for the industries proposed

for future development. In Libya there was no legislation dealing with the location of industry within the cities, so these proposed zones may be effective in reducing the problems mentioned above. Moreover, they offer large areas of land for the organization of a suitable zone for industrial development in relation to services, communications and other facilities. The locations chosen by some establishments have previously been discussed, and the following study will throw light on the future trends of industrial location and expansion.

In Tripoli, the municipality chose many zones for industrial location from 1969. According to the master plan, these zones were distributed in various parts of the city (Figure 8.10), under certain classifications (Table 8.12) and preference standards. When the writer asked the chief engineer-in-charge in the municipality the main reasons for the location of these zones, and why just one or two zones had not been selected instead of such a large number, the answer was that when the municipality started to classify land use, it found that some industries were already established in these areas and since it might have proved difficult to transfer them, all the empty space around them was zoned for future industries, as is seen from a comparison of Figures 8.10 and 8.5. Obviously, this is an inadequate criterion for future industrial locations, because previously the choice of industrial location was that of the entrepreneurs themselves, some of whose locational decisions may be irrational. Moreover, most of the areas mentioned earlier (e.g. the Suani Road, the zone of Sidi Kalifa and the one beside Bab Ban-Ghashir) are located within residential areas. Sooner or later, these zones will be removed.

Studying these new planned industrial zones and their potential for future industrial location, it becomes clear that they are totally insignificant. Simply to delineate existing zones, without provision of the necessary facilities, gives no incentive to entrepreneurs to set up new

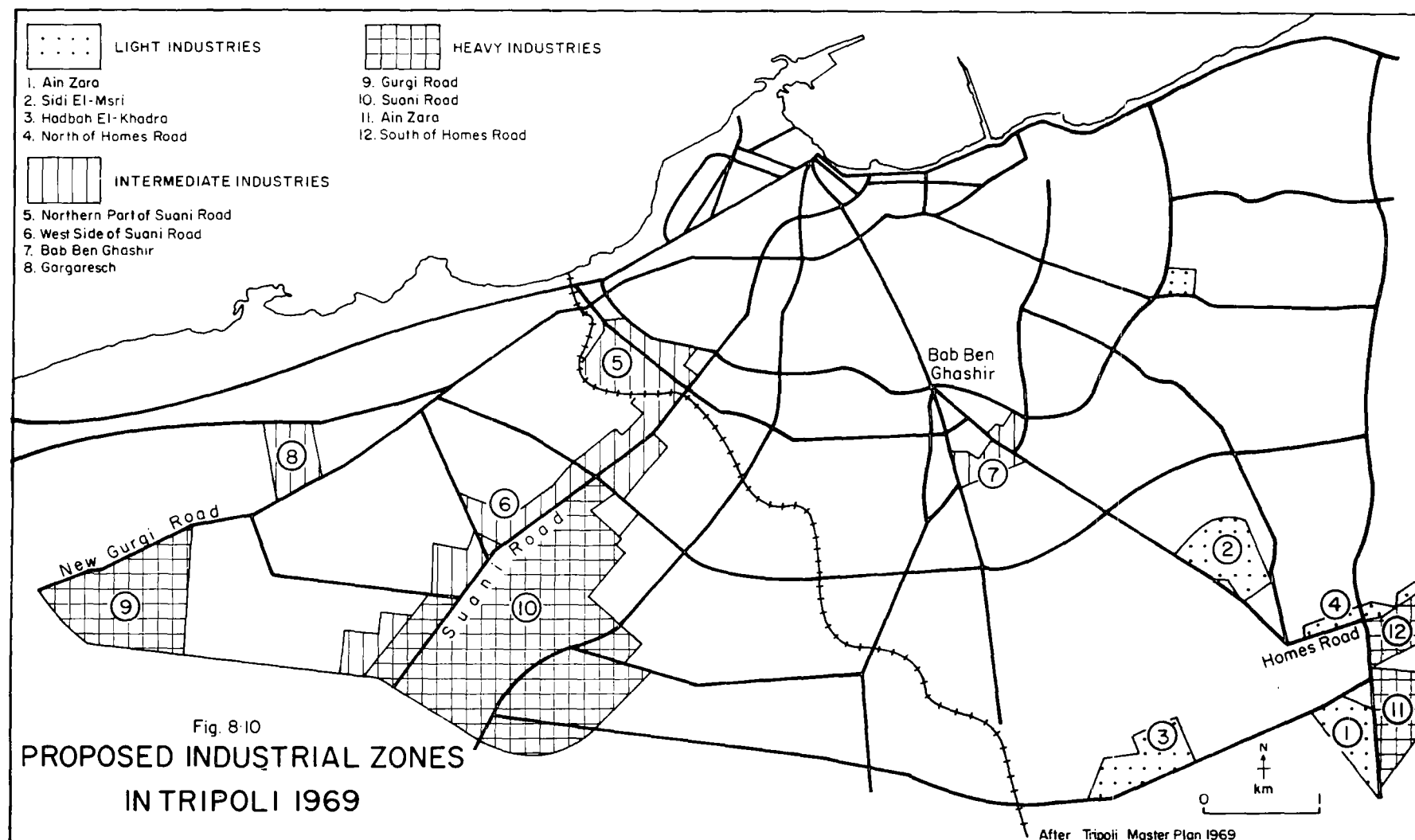


Table 8.12 The Industrial Zones Proposed In Tripoli, 1969

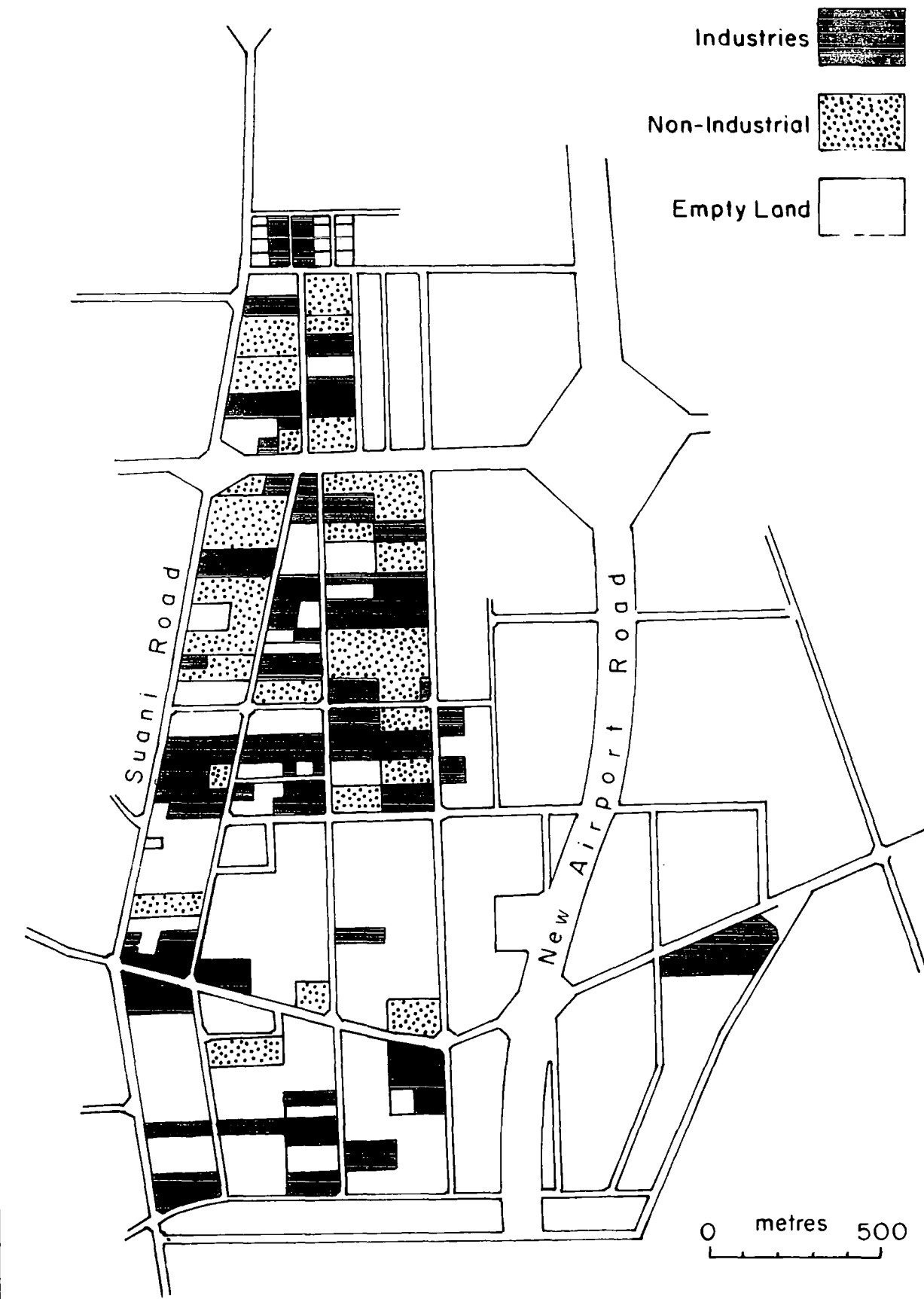
Categories	Location	Size in hectares
1. Light industries	1. Ain Zara	65,300
	2. Sidi El-Msri	26,600
	3. Hadbah El-Khadra	51,500
	4. On the north of Homes Road	28,600
2. Intermediate industries	5. North part of Suani Road	79,900
	6. South-west of " "	20,200
	7. Beside Bab-Ben-Ghashir	30,700
	8. Gargaresch	38,500
3. Heavy industries	9. Gurgi Road	13,700
	10. Suani Road	506,400
	11. Ain Zara	45,400
	12. South of Homes Road	97,000

Source : Ministry of Planning, Tripoli Master Plan, Final Report,
November 1969.

establishments there. Possibly because most of the land is private, the municipality does not have full control over zoned land, the size of a plot of land to be sold, or over its price. So the land of these zones was not classified and offered for sale, except for the north part of Suani Road, which was sold by the owner himself. In the southern zones there are no facilities, no paved roads, sewerage, communications or electricity, and some have no water supply as yet. Moreover, after establishing the new zones, municipal permission was given to some new concerns (The Mansura Textile Factory, Sidi Saud Factory and some carpentries in Sug El-Jumaah) to set themselves up outside the zones.

**INDUSTRIAL AND NON-INDUSTRIAL LAND USE
IN THE SUANI ROAD ZONE**

Fig 8.11



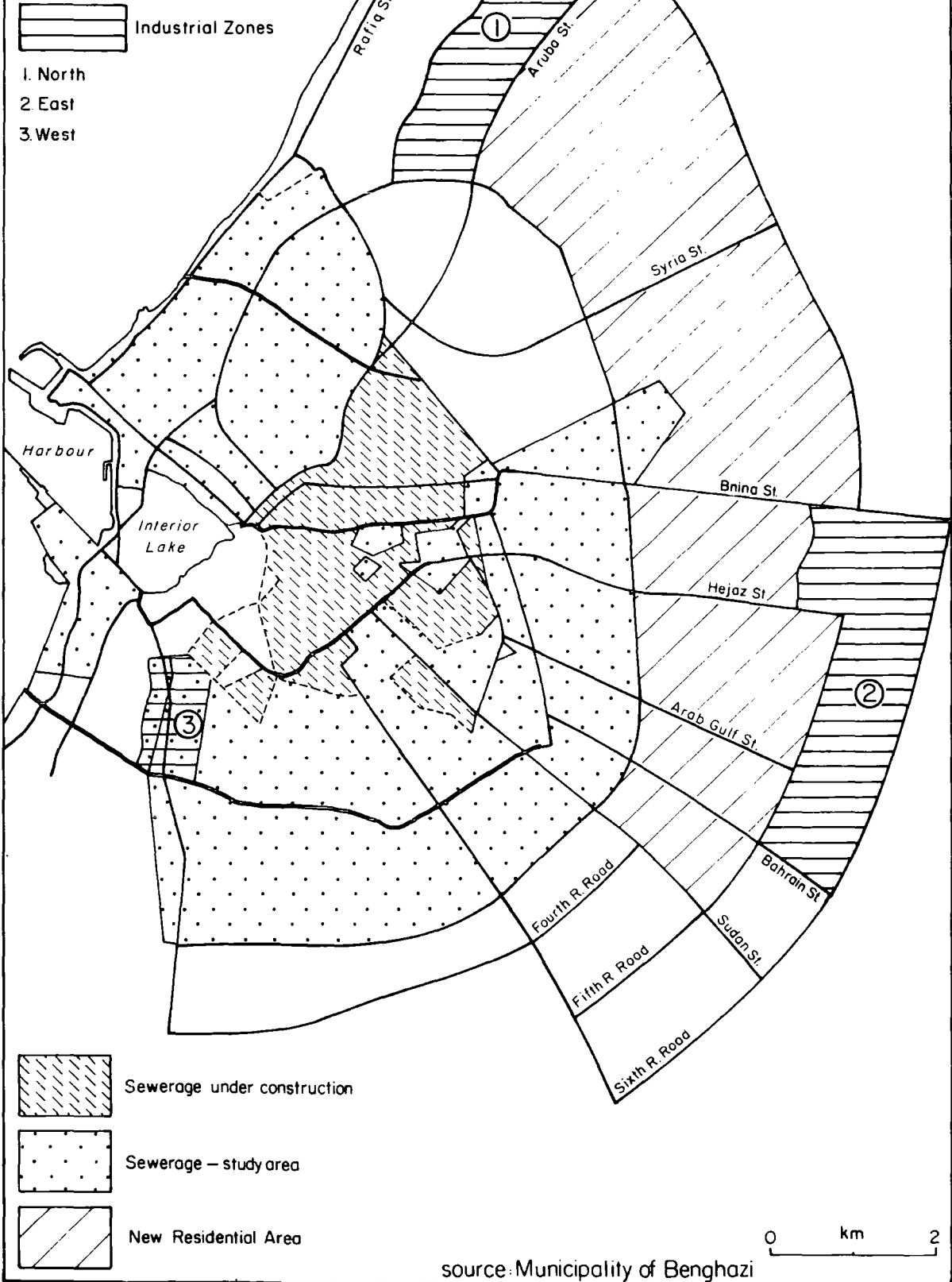
In these zones the municipality not only gave building permission to industrialists, but also allowed other commercial buildings, such as warehouses, open stores, garages and the general office headquarters of some companies to be set up alongside industrial plant, and Suani Road is an example of this (see Figure 8.11). The problem was that the zones, except for the northern part of the Suani Road Zone, failed to attract new establishments.

In these circumstances, the future of the zones is very limited, unless the authorities change their attitude. It should be explained that the municipal officers responsible for the location of industry within the city have many responsibilities and projects to deal with, and the problems of industrial location are inadequately discussed. The future of industrial location in these zones depends on the efforts of the municipality in controlling the land and selling it at a reasonable price over a long period of time, and in supplying it with the necessary facilities. But, since some of the zones are unsuitable for industrial location in any case, one might suggest that the municipality propose more suitable zones in future.

In Benghazi, the locations proposed are based on a different policy from that in Tripoli. The master plan for Benghazi has three industrial zones : western, eastern and northern (Figure 8.12). Two of these are located on the outskirts of the city where there are no established sites at present, except for two state-owned establishments under construction in the eastern zone. The third is in a residential area where many establishments already exist.

The western zone includes an area of about 140 hectares, with access to Tripoli Road, of which some 50 hectares are already occupied by the existing establishments, consisting of transportation and storage yards mainly related to oil extraction and construction activities. ⁽¹⁴⁾ The reason which is given by the master plan for choosing this zone is its proximity to the harbour and Tripoli Road. The area might have been a good choice

SEWERAGE SYSTEM and
INDUSTRIAL ZONES in
BENGHAZI 1972 Fig.8-12



when it was located on the outskirts of the city, but it is now surrounded by new residential areas. Recent urban growth of the city has been more rapid in the west and south, increasing the price of land from LD 1 per square metre in 1960 to about LD 5 or 7 in recent years. Pollution and other industrial problems affect the surrounding areas, because of the wind direction. Clearly this zone is unsuitable for future industrial locations, and the reasons for choosing it are invalid. The municipality should either prevent new establishments from setting up in this area, or make it into a specialist warehousing centre.

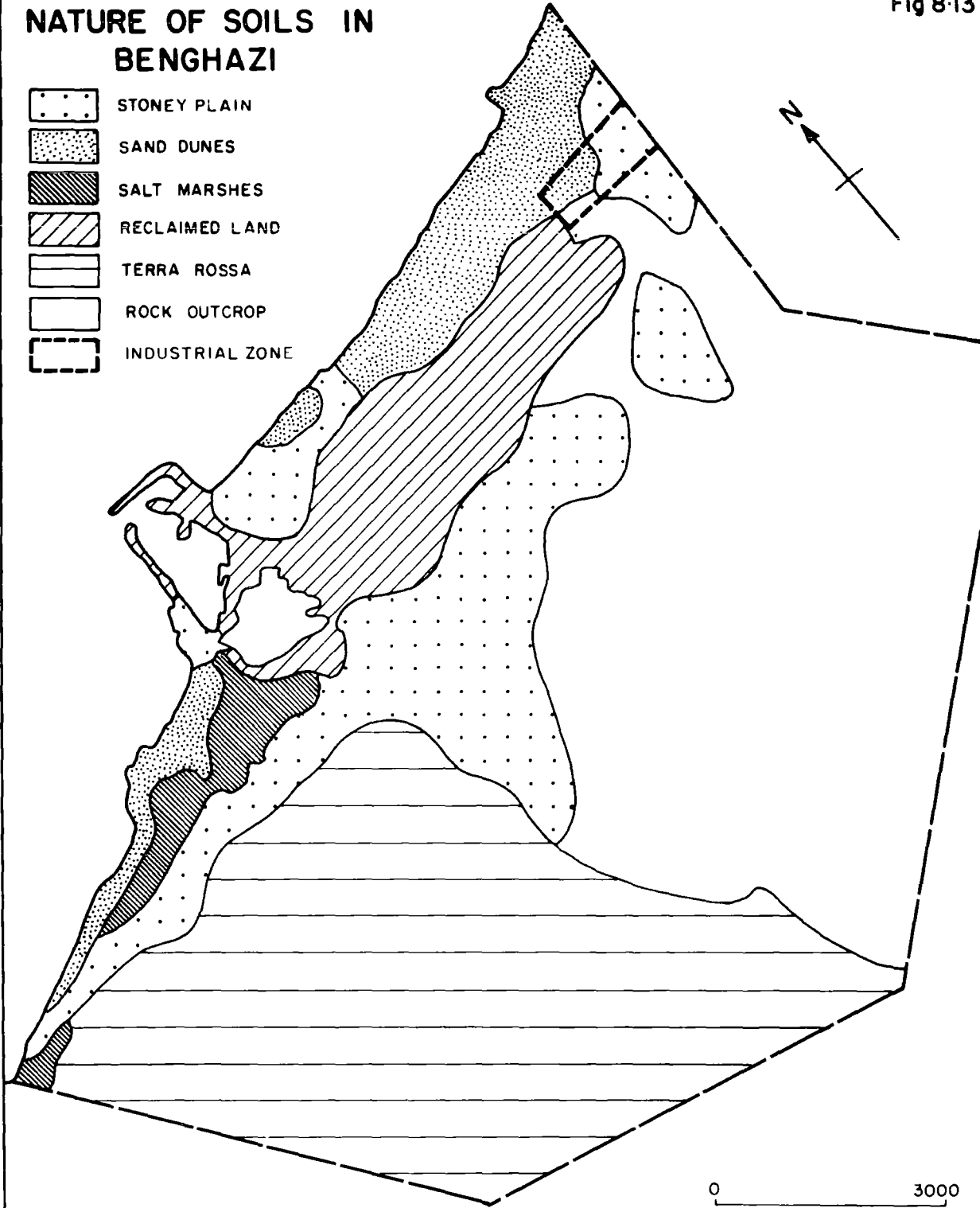
The Eastern Zone, covering an area of about 400 hectares, is bounded by Bnina Road in the north, the Fifth Ring Road in the west, Bahrain Road in the south, and Sixth Ring Road in the east, and is proposed for heavy and food production industries. Although the master plan does not give the reason for the choice of this area, there are probably several. The topography of the area, for example, is unsuitable for agriculture, consisting mainly of rocky outcrops (Figure 8.13), and avoids the region of rapid urban growth, so the land is relatively cheap. Moreover, the empty area to the north and east of the zone is an advantage, because it provides space for future expansion, and there will be no problems of wind pollution. The zone is also close to the main pumping station which supplies the city, so water is easily available in large quantities. Bnina Road connects the city with the eastern agricultural areas of El-Abiar and El-Marg plains, and adjacent land to the north has been proposed for an industrial residential area, which will satisfy labour requirements.

Up to 1973 only two establishments had been constructed in the zone, a wire and cables factory and a grain mill. Other establishments are intended for location in this zone. Because the municipal effort in developing the zone for industry stopped after outlining and dividing it into categories of industries (Figure 8.14), it is still without facilities and,

Fig 8.13

NATURE OF SOILS IN BENGHAZI

- STONEY PLAIN
- SAND DUNES
- SALT MARSHES
- RECLAIMED LAND
- TERRA ROSSA
- ROCK OUTCROP
- INDUSTRIAL ZONE

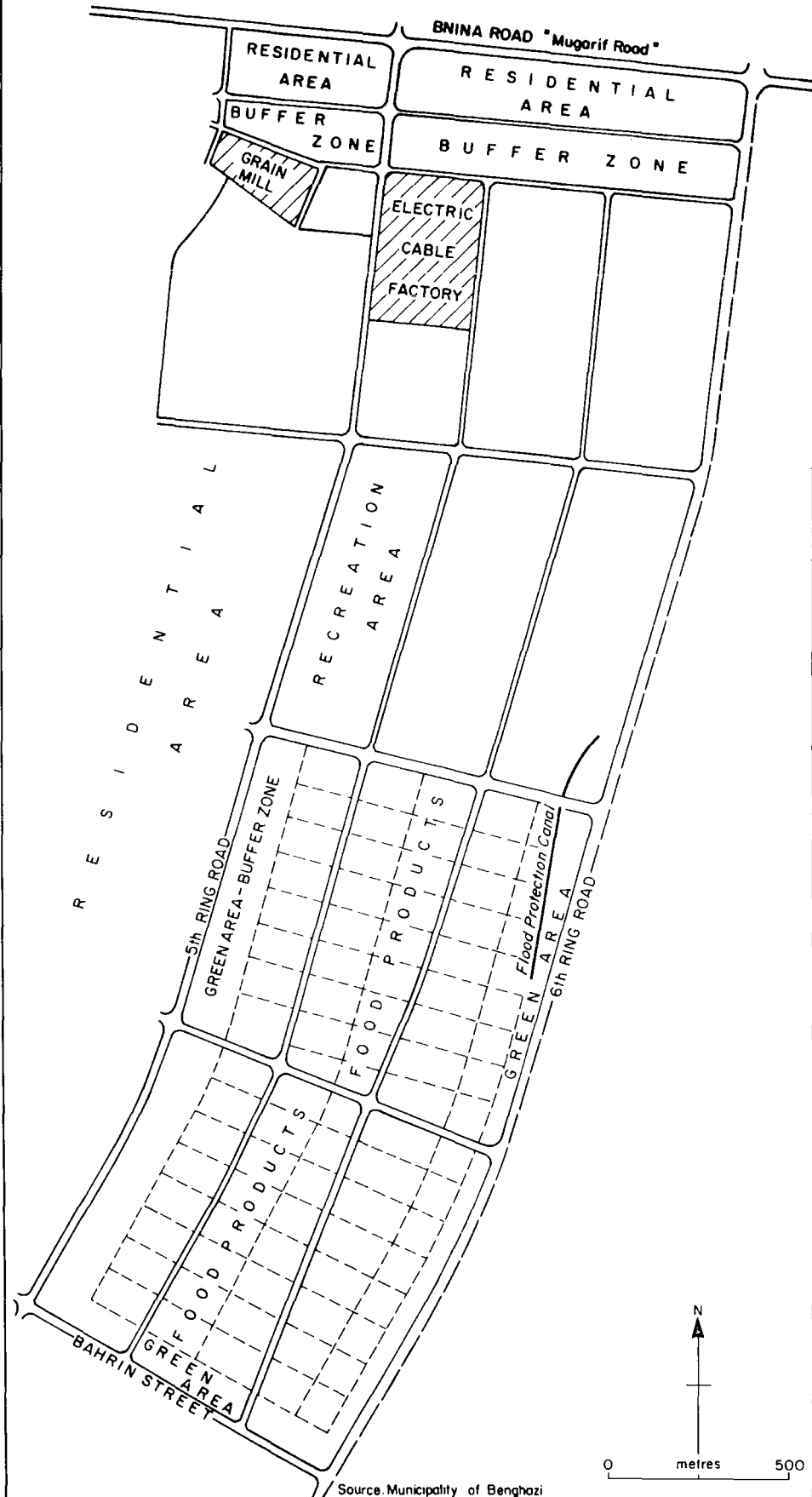


AFTER: BENGHAZI MASTER PLAN.

for example, Figure 8.12 shows that the sewerage pipes under construction or under study are far from the zone. Moreover, the land is still privately owned, and the municipality has given the owners no compensation (1973). The establishments existing here were established by the N.P.O.I. which solved this problem by paying a huge sum of money for special services, utilities and land. The zone has reasonable potential for industrial location, but it is inadequate at present and its future will depend on solving the problems outlined above.

The northern zone is located in the north-east of the city on El-Marg Road, and includes an area of about 300 hectares between Aruba Street in the south, the Fifth Ring Road in the east, Tobra Street in the north, and the Third Ring Road in the west. The zone was classified for workshops and for light industries such as carpentry, some building materials and chemical products. It has several advantages for industrial location, such as (a) the swampiness of the Sebka land which is unsuitable for agriculture and heavy buildings; (b) it is government-owned; (c) it is in the lee of the winds which blow over the city; and (d) it is sited along the main road to the Gebel Akhdar. In addition, the master plan also proposed that Benghazi's main power station be located at El-Manster, 3 Kilometres to the east, and suggests this as an ideal location for a new industrial harbour. ⁽¹⁵⁾ A steam power and desalination plant is now under construction. It is the largest plant in the eastern part of the country, with a capacity of about 182,000 K.W. and takes 48,000 square metres of fresh water from the sea. The first stage will be finished in June 1975, and the whole project will be completed by June 1976. So far, the main disadvantage of the zone is that it is largely swamp land without any sort of facilities. The municipality has stated that it will reclaim this land and sell it to entrepreneurs, but it has not yet done so. It took LD 50,000 from the Ministry of Industry to reclaim a large area on which it established its workshop. The rest of the

Fig 8-14 THE EASTERN INDUSTRIAL ZONE OF BENGHAZI

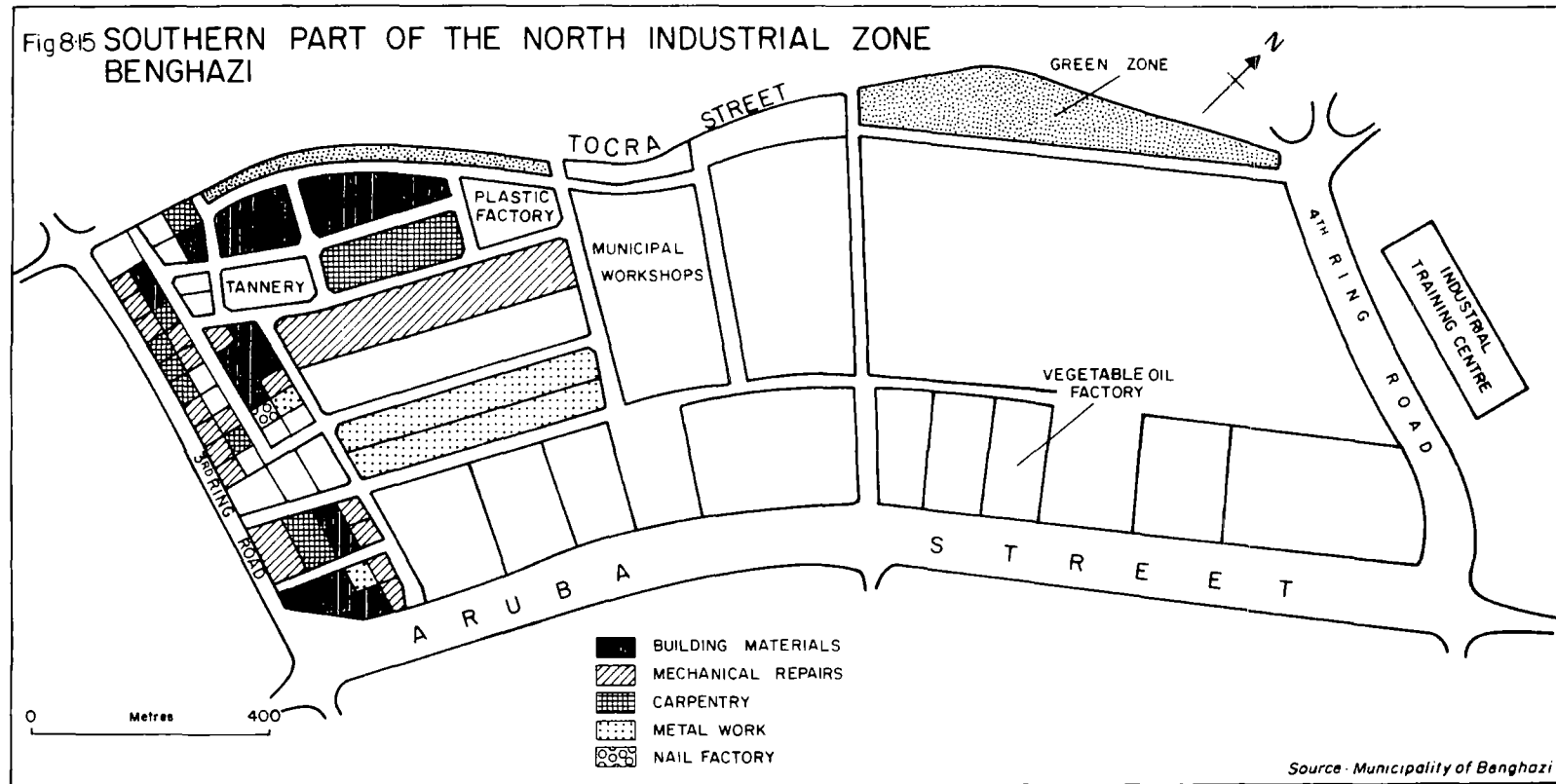


land was divided amongst the entrepreneurs. The southern part was divided into small areas of between 1,280 and 3,700 square metres, for metal work, carpentry etc., while the northern part was divided into large areas for light industries which require more space (Figure 8.15).

The rent asked is 10 Dirhams per square metre a month for only five years. No entrepreneurs can establish a firm there, because the municipality has refused to reclaim the land, sell it to the entrepreneurs, or arrange a rent agreement for a longer period. They cannot reclaim the land themselves because the cost of reclamation of an area of swamp with an average water level of between one and four metres would be prohibitive and impossible for small entrepreneurs, and because the rent contracts were for five years only, and it would be difficult for them to recoup their investments in such a short time. The public organization for electricity has refused to supply electricity to the zone until the land has been reclaimed. It is also interesting to note that although all the establishments to be located here are small-scale ones, which have the right to obtain loans from the R.E.I.B., the regulation of the industrial bank (see Chapter 5) does not allow loans under these rent conditions. Besides, the municipality has agreed to rent many parts of the zone to non-industrial companies.

Obviously, the municipality of Benghazi, like that in Tripoli, has forgotten its objectives and has been working as a commercial agency. To allocate swamp land for this purpose, and divide it between entrepreneurs, does not help. This zone will have no future for industrial expansion under these circumstances. It may be said that the shortcomings of the municipality may be explained by its inadequate budget and by its lack of co-ordination with other industrial development authorities. Furthermore, the development of these zones came only in the final stage of municipality plan. The new industrial policy concentrates on the rapid growth of industrialization, and the municipalities of Tripoli and Benghazi already have many other projects

Fig 815 SOUTHERN PART OF THE NORTH INDUSTRIAL ZONE
BENHAZI



to deal with. One may suggest that they should take further steps to coordinate with industrial departments. Otherwise, after the new industrial zones have been outlined, responsibility for them should be transferred to the Ministry of Industry, which is the specialized department and which may suggest changes to industrial estates.

D. Industrial Estates

In the previous section we studied the potential of the industrial zones in the two main cities, while this section will discuss the possibility of establishing an industrial estates system in these cities. The main distinction between industrial estates and zones is that the latter offer only improved sites, while the former feature standard factory buildings built in advance of demand and include a variety of services. Industrial estates are a useful tool for the development of industries, because they provide not only accommodation in workshops and factories equipped with basic utilities, but also common service facilities of various kinds. Furthermore, a whole group of industries at one site will help to overcome many of the initial difficulties facing industrialists and might induce a relatively high degree of worker mobility between them. They thus give favourable conditions for modernization of tools and machines, for improvement of skills and productivity, and for organizing the supply of raw materials on a cooperative basis.⁽¹⁶⁾ Industrial estates can be considered as subsystems of economic and industrial development planning. This dual relationship is shown in Figure 8.16.⁽¹⁷⁾

Industrial estates have proved in many countries that they are an effective instrument to attract industry and to regulate its location. In Malta, Cyprus and Turkey, industrial estates have been increasingly used in conjunction with other measures. In Kuwait, The Shuaiba Industrial Estate was started in 1964 in an area of about 7.5 square Kilometres adjacent to the sea, and was designed to create an area in which all necessary industrial

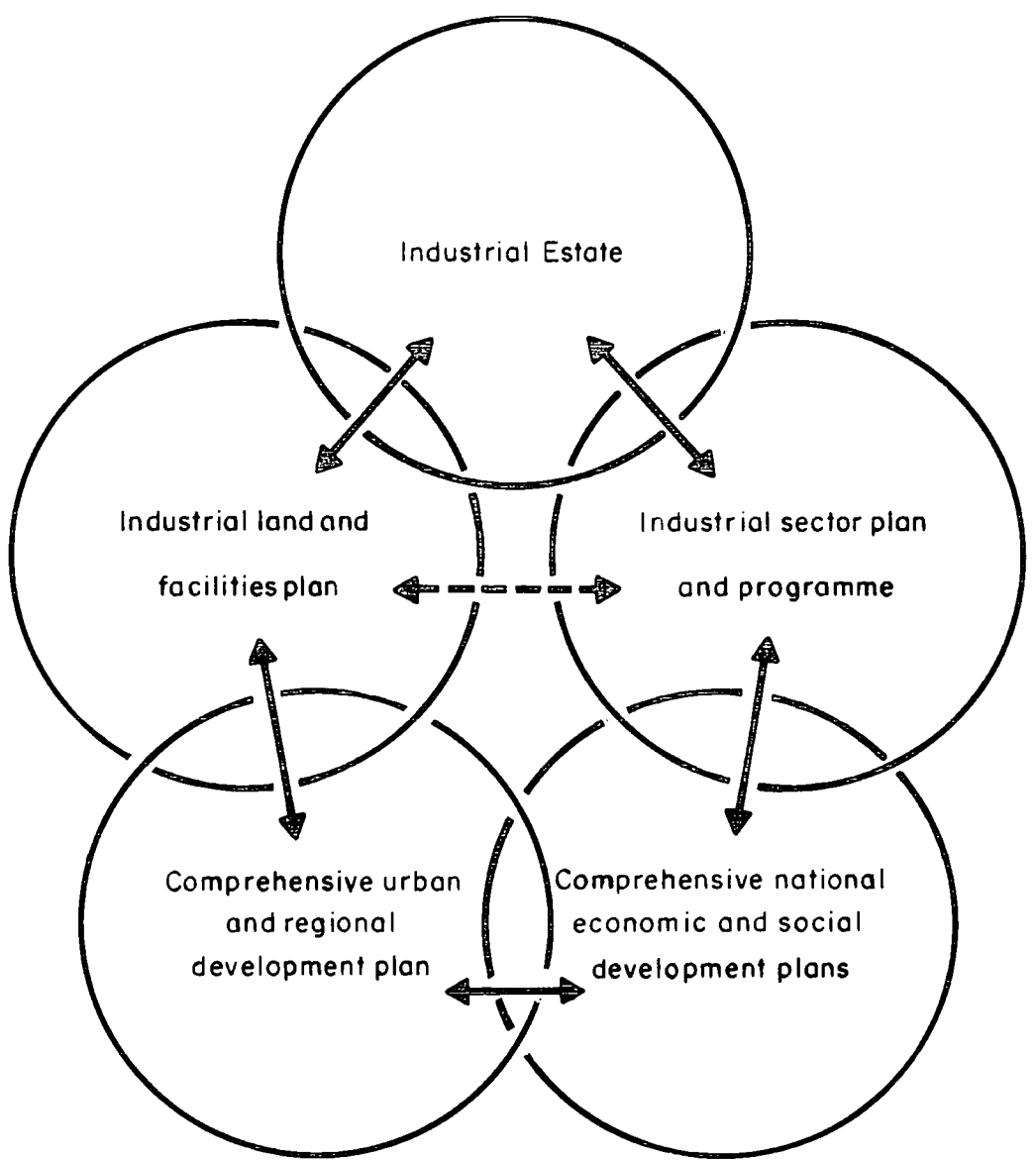
facilities can be found. The area is meant to serve medium- and large-size industries by leasing them land at a nominal rent for a period of 50 years and by supplying them with water, power and other facilities. (18)

The Indian second five-year plan provided for the construction of industrial estates in which small industries could obtain cheap gas, water, power and other services; arrangements were also made for the supply of improved tools, machines and raw materials at a reasonable rate. (19) In Nigeria, estates occupy about 2,500 acres and provide factories and industrial buildings which are leased to prospective industrialists for upwards of 99 years. (20)

In Libya, no plans or projects for industrial estates have yet been formulated. One might wonder why the authorities have omitted industrial estates from their development plans, since they are very important and useful for industrial growth, especially in its earlier stages. The question was put to some officers in the Ministry of Industry, who replied that such a scheme had been considered, and that a committee was set up for this purpose in 1972, but before the committee had completed its study and given the primary recommendation, it was disbanded by the Higher Planning Council. The reason given for this was that it was a Municipality responsibility.

Libya, which has been carrying out a planned programme of industrialization in recent years, should have industrial estates sooner or later to assist rapid industrial development. The authorities should realize that industrial estates are one of many elements and that, together with other measures such as a tariff policy, technical assistance, manpower development, financial help and many other incentives, the creation of these estates might have a great influence on industrial growth. Giving loans and tax exemptions to an establishment is not enough for industrial development in Libya. Again one might suggest that the Municipalities should either take their responsibilities seriously and act quickly, or should leave industrial control to the Ministry of Industry which has been successful in establishing industrial

Fig 8·16
Industrial estates as sub-systems of urban and regional planning
and of industrial and economic development



centres for the promotion of handicrafts in Benghazi, Misurata and Sebha.

The previous studies showed that most of the establishments in the country are concentrated in Tripoli and Benghazi, where there are good markets, power and other facilities, and where workers are available. Expansion is expected in these cities, so the growth of industry in these two conurbations should be watched and guided. In order to aid industrial growth, it seems justifiable, particularly in these towns, to establish industrial estates in suitable places where particular areas could concentrate industrial establishments, and where these could then be given enough floor space and a set of integrated services. This would solve some of the locational problems of industrial concentration within metropolitan centres.

Another consideration should be borne in mind during the choice of a site for an industrial estate, mainly whether the land is public or private property. The problem here is the amount to be invested, for if it is private property, the cost of buying private land accounts for a large part of the total investments in industrial estates. Other considerations are the distance from the site to the market, access to main roads, prospects for urban expansion in neighbouring areas, and the gradient of the ground - a slight slope might facilitate drainage - although the availability of utilities and services within a reasonable distance of course is also important, as is the availability of public transportation for workers at low cost. ⁽²¹⁾ One must consider the type of industries to be promoted and the number of establishments to be accommodated, and the space required for roads and parking. The direction of the prevailing winds must also play a very important part in the choice of the site, which should be on the lee side of residential areas. Furthermore, the prospects of an estate's growth should also be considered at the detailed planning stage - land for future development should be acquired at the same time as the basic area, since land values would rise

as the estate developed, a factor which might seriously affect the economy of the project at a later stage. (22)

The classification of industrial estates should give low priority to warehouses, workshops and administrative offices. The following are the typical percentages of land utilization in some industrial estates constructed with assistance from the United Nations. (23)

- Factory plots for standard custom-built factories	62.0%
- Land area under internal roads including pavement, footpath and verge	20.9%
- Land area of open space	3.3%
- Land area under administration buildings, gate houses and parking facilities	3.5%
- Land area under canteen, clinic, staff residence	3.8%
- Land area under warehouse	3.4%
- Land area under workshop	3.1%

In Tripoli, as in Kuwait city and Riyadh, one might suggest that planning should be directed towards the uncultivated land outside the conurbation and separated from it by parks and open space. Possibly several areas should be suggested for this proposal, such as Tajora, east of Tripoli, and Suani Ben-Uadim, south of the city. But it seems that the most suitable area that might be suggested is that beside the sea, adjacent to Jansur town, to the south-west of Tripoli. As a whole, it is undulating and parts of it consist of rough pits and are eroded so that levelling and dressing operations would be required to make the site suitable for construction, and a surfaced approach road would have to be built from the adjacent main road. Land for the construction of an industrial estate could easily be found between the road leading to El-Zawia and the sea shore.

The advantages of this location are as follows :

(1) The land is government-owned and unsuitable for agriculture. There is adequate space for factory premises and for residential areas for the staff and workers. The area is large and it could be extended in future.

(2) The area is relatively rich in ground water. It seems that underground water is much more easily available here than in any other area around the city. It has the nearest big well to the city and water can be drawn at a rate of about 4 cubic metres per hour. (24)

(3) The location is on the main road which connects the city with the western part of the country. It is near the densely populated and cultivated region, and therefore the improvement of transportation facilities to the latter region would not be very expensive.

(4) It is close to the major market in the country. According to the 1973 census, Tripoli and El-Zawia Muhafadat have 42.3 percent of the total population of the country. El-Zawia city, about 20 Kilometres west of the location, will become of greater importance as a market after the completion of the oil industrial complex.

(5) The proximity to El-Zawia Refinery which is under construction. An industrial estate site here could get enough power and suitable quantities of good quality raw materials easily and cheaply after developing the oil complex and establishing some petrochemical industries.

(6) The location beside the sea gives the establishments the advantage of draining their effluent into the sea. Besides, sea water might be desalinated, as in Benghazi, or used for cooling, as in the Shuaiba Industrial Estate. Also it might be useful in the future to establish a small artificial industrial harbour. This might serve those establishments which receive their raw materials from abroad, and would enable the finished products to be transported to the eastern part of the country or exported abroad in future.

It may be for these reasons that two N.P.O.I. establishments have recently been set up in this area, and the location of I.R.C. here might reduce the cost of some facilities already introduced by the organization. The obvious disadvantage is the longer distance from the residential area for the workers, but this problem might be solved by having workers from Jansur town, or by improving the public bus services, and using private transportation for each establishment. Another suggestion is that some establishments should be compelled to site themselves in the industrial estate because of their bulky raw materials. An example would be the cement industry, which uses bulky raw materials like gypsum, limestone and cement clinker, so it might be better to locate it close to its raw materials and far from the city; the recent location for the cement factory in Benghazi, for example, is suitable.

In Benghazi, two of the new industrial zones (northern and eastern) which have been outlined for industrial location seem to be suitable for the establishment of industrial estates, but the success of any such scheme would depend on the ability of the authorities to solve the problem of building an industrial estate with all the necessary facilities.

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PART THREE

Industrial Problems

9. Industrial Problems And Obstacles

10. The Conclusion

CHAPTER 9

Industrial Problems In Libya

Industrial location and industrial development strategy require much experience, skill and above all overall industrial planning and policies. Otherwise, they may produce more frustrations and disappointments than positive and desirable results.

Libya has, as have many other underdeveloped countries, many serious industrial problems. During the previous discussion of the distribution, structure and basic characteristics of the various industries in the country, several problems have been mentioned. This chapter will attempt to organize and discuss these problems in a manner relating them more directly to the factors of production and to the considerations necessary to industrial development in the country, in both public and private sectors. Consequently, this chapter will exclude the oil industry.

Despite the efforts made by the government in its plans to industrialize the country, and the successes achieved so far, the industrial sector still faces basic hurdles, some of which tend to keep down the pace of industrial development. Table 9.1 itemizes the major problems and the results which were obtained from answers to question No. 63 which was concerned with the problems of industry. But we shall now discuss the problems related both to existing industry and to developing the industrial potential of the country. It is emphasized that the discussion is to throw light on problems in order that this may prove helpful in improving the path of industrial development in the future. It should be noted that the problems discussed in this chapter are neither identical for each group of industries, nor of the same importance. The problems will be discussed under three categories : planning, economic and administrative problems.

Table 9.1 The Main Industrial Problems Stated By The Respondents

Type of Obstacles	No. of Establishments	% of total
Labour supply, movement and absence	37	59.6
Efficiency of Utilities	27	43.5
Raw Materials	26	41.9
Administrative routine	16	25.8
Markets and Marketing	9	14.5
Transportation	9	14.5
Government restriction	8	12.9
Capital	5	3.0
Others	4	6.4

Source : Answers to questionnaire, 1973.

1. Planning Problems

A. Concentration And Agglomeration

In Libya, as in many developing countries, especially in Africa, planners are faced with the concentration of industry in one city or one area which affects their choice of industrial location. The problem has not yet received sufficient attention from the development planners. Libya in particular has the problem that the degree of concentration in manufacturing is increasing, and the movement of manufacturing has been mainly to the peripheries of the existing industrial areas. The previous studies showed that Tripoli and Benghazi registered more than 75 percent of the total increase in the number of workers between 1964-1971. Excluding the new public establishments, all modern industries have been established in or near the main cities in these muhafadat, which have enormous advantages, both economically (roads, utilities), and socially (health, schools). This may be explained

by the unequal distribution in the economic development of the regions and also by the large amount of single-function planning in such fields as housing, water supply and motorway construction. (1)

The concentration of establishments in one city has its advantages which in combination presumably make larger urban centres more efficient and more suitable as sites for industry than smaller towns. Moreover in an agglomeration region, establishments are inter-dependent in some facilities.

The disadvantages of industrial concentration fall into two categories, locally within the area or region itself, and also at national level. Locally, the biggest single result in Tripoli and Benghazi is a large-scale movement from the rural to the urban areas, resulting from the economic "pull" of better opportunities of life in these two cities, and the "push" of the less developed and more neglected rural regions. The uncontrolled and uncoordinated movement from rural areas, and the lack of preparation of the cities for the increase in population, leads to the worst features of urbanization, with lack of housing and therefore overcrowding in slums and shanty areas created around the cities. Other costs, economic and social, also rise above a tolerable level, such as land prices and transport costs, which increase along with the problem of traffic congestion.

At the national level there is an unequal distribution of economic activities and productive forces throughout the regions. Thus, instead of becoming reciprocal partners with the more advanced areas, neglected areas generate problems which will continue to act as a drag on the national economy as a whole. (2) Moreover, these problems might give rise to conditions of political instability and disintegration. (3)

However, leaving the location of new establishments without plans and control might increase the concentration and the problems would then become even more difficult. It is true that most regions in Libya are sparsely populated and the costs of infrastructure in these regions are not

only high in themselves, but very much more so in relation to the population they are serving. But distribution of the establishments, especially the public ones, is important in developing the remote areas. Despite recent action by the government in locating publicly-owned industries, it should stress this more strongly in future, including also the private sector. It might be economically sound to restrict industrial expansion to Tripoli and Benghazi cities, but industrial development at other key points in the country may be both economically sound and socially desirable, as the success of the cement factory in Homes demonstrates. Libya should follow a policy aimed at discouraging industrial location in large cities and encouraging decentralization in order to stimulate balanced industrial development in all regions of the country, especially the coastal zone, as suggested by Vardjan, an industrial adviser,

"Now the job of the planners should be to create such favourable conditions of industrial growth in other regions as well. In future years the task is not easy because of many limiting factors which will be met in these regions. In future years the concentration of industries in the coastal area will certainly continue, still the planners should foster the creation of as many agglomerations along the coast as they will consider feasible". (4)

Many proposals of this sort have been made in general terms. Arthur Lewis suggests, for example,

"That all attempts for development in towns whose population already exceeds 500,000 should be restricted and that for any one city so restricted some four or five others (5) under 100,000 should be selected for special development".

If such a proposal were to be implemented in Libya, some second-rank cities such as Misurata, Homes, Derna and El-Marg would be developed as industrial centres in coastal regions.

Imbalance will not be solved by industrial development alone, because to develop industry in some regions requires that other sectors which are necessary for industry are also developed. So special committees should

be formed from the different departments and bodies to give advice in this matter.

B. The Choice Of Production Technique

In spite of the growing complexity in production techniques which have evolved from techniques which used a large number of workers to ones needing few, Libya still uses less developed techniques in many processing industries. It is true that production may prosper at various levels of technology, but there is quite a difference in quality and quantity of production, the number of workers, and amount of capital investment required, as well as in output/worker, capital/worker, and output/capital ratios.

The problem of choice of production technique is closely related to the two main factors of production, capital and labour. The national reconciliation of these two factors will ultimately shape the level of economic and social development in any country, as well as influence the structure of the industrial growth. ⁽⁶⁾ Libya has an acute labour shortage and rising labour costs, while there is an abundance of capital, so capital-intensive production techniques are obviously suitable. The shift of the whole industrial sector towards greater capital intensity and new techniques of production would not only solve the problem, but it develops skill and the quality of adaptability among the labour force, and so increases labour productivity. ⁽⁷⁾ The growth of productivity in the chemical industries during 1964-1971 is a good example.

C. Choice Of Type Of Industries

Generally speaking, there are three basic groups of industry producing (a) consumer goods, (b) capital goods, and (c) intermediate goods. Which of these types does Libya choose? In a country where there is a shortage of labour, the problem involves more than the ability to invest in

industry. The type of industry depends on the availability of skilled workers and managers. These two factors form one of the main tools used by Hirschman to attack the balanced growth theory which proposes that developing countries push forward simultaneously on all fronts, agriculture, consumer goods, and capital goods, without taking into consideration the lack of skills required for progress in these various sectors. (8)

Recent circumstances in the level of education and economic development in general and industrial growth in particular do not appear to warrant the encouragement of capital goods industries. It seems that the problem is not acute from this point of view because most of the existing industries, both private and public, are of consumer and intermediate goods. In the case of consumer goods, the problem has another side. Which kinds of processes should be selected? Should Libya concentrate on basic goods, such as food and clothing, or on non-basic consumer goods, such as fridges and electric machines?

With Libyan circumstances in mind, it may be suggested that the planners should develop the basic consumer goods first, and then, along with increases in income, some non-basic consumer goods industries, such as electric machines, could develop as well. Priority should be given to industries which are largely shaped by the joint influence of some or all of the following factors (a) the availability of raw materials, (b) the need to produce goods easily by less complicated production processes requiring less technical skill, (c) the needs of the domestic market, and (d) industries making the largest net contribution to national income.

In the case of intermediate goods, the encouragement of petrochemical and chemical industries appears to be the most sound proposition. First, huge amounts of raw materials are available. Secondly, it is a heavily capital-intensive undertaking. Thirdly, the recent trend in Libyan industry has involved the rapid growth of chemical industries. Fourthly,

the country can benefit from the backlog of research and experience amassed by the established producers. Fifthly, the industry has a core of returns to scale; it could be expanded threefold, and the costs required might increase by only 20 to 45 percent of their original level. ⁽⁹⁾ Finally, the economic benefits to workers resulting from an expansion of the petrochemical and chemical industries would be greater than in other industries.

In the short term some consumer durable goods, such as cars and washing machines, are not suitable for many years to come because they need more technical and managerial experience, more skilled labour and large markets, besides specialized raw materials. However, in the long term, these must be taken into consideration for industrial development.

2. Economic Problems

A. The Limited Market

Libya has a small population and high purchasing power, annual income per head being estimated at \$ 1450 in 1971. ⁽¹⁰⁾ The annual income per head increased at an annual rate of 23 percent from 1962 to 1969, while the annual rate of population increase for the same period was more than 4 percent. So Libya has a problem arising from the size of its population, not from its purchasing power. However, some considerations are very important in this case, such as the income distribution and the picture of the average Libyan's life.

The average annual income per head is far from the actual income for each inhabitant. According to a study in 1968 of family budgeting, Tripoli and Benghazi showed the average monthly income of a household was about \$ 260.4 in Tripoli and \$ 305.2 in Benghazi. The average income per person was \$ 42.0 and \$ 49.5 respectively. The income distribution sample showed that in Tripoli 32 percent of the households in the lower income group

got about 10 percent of the total income, while 5 percent of the households in the high group got 22 percent; in Benghazi the figures were sharper, 34 percent got 8.1 percent, and 7.5 percent got 28.8 percent respectively. ⁽¹¹⁾ Attiga also estimated that in 1969 about 70 percent of the total income was distributed between 20 percent of the population, ⁽¹²⁾ and that the difference in the actual annual income between a poor family and a rich one was about LD 60 to LD 10,000. ⁽¹³⁾ The above figures demonstrate that the range of income between the poor and wealthy people in Libya is relatively great, especially between urban and rural areas, bearing in mind that these figures represented the largest urban centres.

Although there is maldistribution of this income, it is spent mainly on basic essentials, particularly food, clothes and housing. Table 9.2 reveals that family expenditure on food, housing and services (education, medical care etc), was about 77 percent in both cities. Keeping in mind that as incomes rise there is a shift from the lower to higher degree of industrial processing, accompanied by a proportional increase in outlays for clothes and industrial goods, it must be noted that in Libya most of the expenditure was for essential items, owing to the rise in the cost of living. Wages and salaries in general rose many times, but they were depreciated by creeping inflation. During the period 1956-1969 the price level rose by 8-10 percent yearly. ⁽¹⁴⁾

Another consideration is the geographical distribution of the market. Libya is considered as one of those under-populated countries with a small population living in a large area. The market is concentrated in two major cities, which has created many negative results for industry, such as the small size and fragmented production of the establishments. According to the 1971 industrial census, despite the new large establishments, the overwhelming majority of establishments are too small. Establishments of ten workers and more constitute less than six percent of the total. The small

Table 9.2 Consumption Expenditure By Main Groups In Tripoli And Benghazi
In 1971 (In LD, '000)

Items	Tripoli		Benghazi	
	Total amount	%	Total amount	%
Food	31,565	37.2	29,820	41.7
Other consumer goods	2,776	3.3	2,596	3.6
Fuel and Electricity	2,698	3.2	2,739	3.8
Housing	19,420	22.8	14,673	20.5
Household equipment	6,896	8.1	6,041	8.4
Clothing	6,368	7.5	4,884	6.8
Services and personal expenditure	15,218	17.9	10,778	15.2
Total	84,941	100.0	71,531	100.0

Source : Census and Statistical Dept., Statistical Abstract 1971, Tripoli, 1973.

size of the establishments tends to fragment production, which is not able to meet the competition of imported goods, in either quantity or quality. Small-scale industry might provide small savings and have less perilous repercussions on the economy of the country as a whole, ⁽¹⁵⁾ but for many items the market is bound to be limited, and this does make the major part of such operations inefficient and uneconomical. ⁽¹⁶⁾ The answers to question No. 58 showed that 33 establishments interviewed were operating under capacity and seven of them indicated that the small market was the main reason.

Another aspect of the problem is that there is no regulation in the public departments to buy local products. For example, the director of the Libyan El-Fares Factory stated during interview that his application to supply the Police Force with ties for 1973 was rejected and the contract was given to another merchant who imported them at a higher price.

Increasing the Libyan market is no easy matter, but it might be enlarged by redistributing income fairly, and by developing the rural areas. Also one might suggest that the government should set itself the target of buying its requirements from the local production. Public sector and semi-government agencies also should buy many items in large quantities by giving contracts to the factories. It might be reasonable to establish special public organizations to pursue this objective. In Turkey, for example, the purchases of many ministries and departments are centralized in a purchase office called the Devlet **Malzeme** Ofise (D.M.O.). Contacts with the D.M.O. disclosed that it buys many manufactured items from small-scale firms. (17)

However, the ultimate solution obviously lies in the extension of the market to other countries. Participation in the Arab Market, especially in joint production projects, besides creating export opportunities for industries, would bring export potential in the future by providing trade agreements with other countries in Africa and the Middle East.

B. Limited Raw Materials

Of the establishments interviewed, 26 were faced with the problem of limited raw materials, and 15 of them were consequently operating under capacity, as, for example, tomato canning, date packing (68 percent of the total capacity), and fruit canning (45 percent of the total). Only in some agricultural and building materials industries are raw materials produced locally for industry. Industry in general depends mostly on imported raw materials, as stated earlier, and so this affects its growth and its share of increased national income, because the high cost of imported raw materials raises the total cost of production. Even in agricultural industries, raw material production is not adequate, but the difference is not very large in some cases (wheat, barley); in others, raw materials like wood, are totally imported. Table 9.3 reveals that the difference is clearer in 1971, especially

for wheat and barley, which provided less than 13 percent of industrial requirements. This is due partly to the decrease in the production of these items from 1968 to 1971, wheat by about 77.5 and barley by 96.5 percent * and partly to increased industrial requirements.

It seems that except for oil and gas, Libya has few raw materials, and since the majority of Libyan establishments are of small size, this problem affects them more acutely. In spite of that, Libya is potentially rich in some kinds of raw materials, but unfortunately the quantity of natural resources available for industry is still unknown. The preliminary studies

Table 9.3 Some Agricultural Productions And Industrial Requirements In 1971, In Quintals

Type Of Production	Local Production (1)	Industrial requirement (2)	% of (1) - (2)
Wheat	177,262	1,406,260	12.6
Barley	32,127	366,358	8.8
Maize	9,510	16,788	56.6
Olives	50,000	77,000	64.9

Sources : (1) Computed by author from data in I.R.C. Industrial Census 1971, Tripoli, 1973.

(2) Census and Statistical Dept., Statistical Abstract, 1971, Tripoli, 1973.

which have been made on some of the mineral resources indicate that resources are insufficient to be utilized for industry; an example is phosphate. More

* During this period the production of wheat decreased from about 520 to 117 thousand quintals and barley from 984 to 32 thousand quintals.

exploration work is needed to prove the extent and quality of the resources, but the work of the Industrial Research Centre (I.R.C.) in this field is still in progress, though encouraging.

So far as the agricultural and fishing resources are concerned, not much has been achieved. Agriculture has been kept at a low level of output. It can be seen from Table 9.4 that the value of agricultural production over a period of ten years showed no significant increase. This might be explained briefly as the result of the difficulties caused by dividing the land into small units, the land tenure system and the inefficient and traditional agricultural techniques connected with the tribal system, as well as by the absence of effective agriculture extension services and the lack of a development scheme in the 1960s. Moreover, the migration of the rural population to urban areas has to be taken into account. The lack of agricultural raw materials might also have been caused by the restriction in the price of some agricultural products. For example, the director of El-Fellah Factory, which produces canned tomatoes, stated to the author that the production in 1973 was affected by the shift of farmers to cultivate other crops

Table 9.4 The Value Of Agricultural Production From 1958-1968 In LD

Million In 1964 Price

1958	1962	1967	1968
20.0	17.3	21.0	21.7

Source : Ministry Of Planning, Census Departments.

after the local authorities had fixed the price of tomatoes at 16 Dirhams per Kg. * Obviously, these factors have held back both the quality and

* 1 Libyan Pound = 1,000 Dirhams.

quantity of agricultural and animal products. But the new government policy towards agriculture includes large projects which are under construction in various places in the country, and this part of the problem may well be solved in due course.

Another raw material consideration is the delay in delivery and the lack of information concerning non-availability of the required quality of imported raw materials at the right time and at a reasonable price. This could increase the cost of production and the factories might have to use low quality raw materials which naturally affect the quality of industrial production, hence their competitive status in the market. (18)

Since most Libyan industries are on a small scale, they are unable to buy and store a sufficient quantity of raw materials to ensure against fluctuations in supply. One can go further and suggest that all entrepreneurs should be compulsory members of a local Chamber of Industry and Commerce which might help them in this respect, especially by providing information. It might be more successful if public organizations or private co-operatives were formed in order to procure the new materials required at acceptable prices, and distribute them fairly between entrepreneurs. This might save time and solve the problem. The organization should be free from restrictions on importing from specified countries, otherwise the problem would again be serious.

C. Utilities And Services

Power, water supplies and many types of services are difficult problems for industrial development in Libya. Table 9.1 shows that the inefficiency of utilities is the second most important problem which faced the factories interviewed. Electricity is the main power of Libyan industry, as mentioned earlier. In spite of the new plants and the improvement of the electricity system, it is still insufficient, especially outside the main

cities, where most industries admitted that their power adds a great deal to their production costs, as in the cement factory at Homes, olive oil processing in Garaboli and metal working in El-Gawarsha. In El-Abiar the animal fodder factory closed for more than a year as a result of insufficient power, until the N.P.O.I. installed a special electricity plant. To give an example, on 5.10.72 the N.P.O.I. applied to the Public Organization of Electricity (P.O.E.) to conduct electricity to its industrial factories in El-Gawarsha and after the positive reply that the line would be ready in January 1973, it paid the required fees of LD 6,278. But the P.O.E. had not laid the line by September 1973, the time of interview with the director of N.P.O.I. Benghazi branch, hence stopping work in these factories. Even in the main cities, the problem still arises and many factories interviewed commented on the lack of electricity from time to time. A building material factory, for example, stated that it lost more than 100 bags of cement due to the absence of the electricity on 19.3.73.

It is clear that the problem is acute, particularly in the rural areas. To help solve the problem, the government cut down the electricity price by 50 percent for industrial purposes, but the problem will not be solved by reducing the price, because this may increase the total consumption. Instead, the system must be improved.

Industry in Libya is now facing a lack of water supply. The problem is more acute in the cities where water consumption rises as the population expands, and the demand also grows as living standards rise. Most of the establishments, especially the large ones owned by N.P.O.I., face this problem. For example, in the Ready-Wear Suit Factory in Derna, the N.P.O.I. applied for water supply by a four inch pipeline in 11.12.71, but the municipality in Derna laid only a two inch pipeline in 23.8.72, which made it necessary for the N.P.O.I. to bring the water through private contract by trucks. Another example in Benghazi; in El-Gawarsha factories the municipality agreed to

supply water, but later it changed its decision and refused, while the construction was actually going on. After negotiation, it agreed again to supply the factories by a four inch pipeline instead of an eight inch pipeline, but it connected just a two inch pipeline and supplied other companies from the same pipeline. ⁽¹⁹⁾ Since most of the establishments depend on the public water supply because it is expensive to drill wells, and there is a lack of water in some areas, the government should have a strong policy to improve water supply. Otherwise the problem will become more difficult as the number of establishments increases. In particular, it should not give a licence to any factory until it is sure about the water supply required.

D. Capital Resource

As indicated earlier, Libya has been more favourably endowed with capital supplies for development than many other developing countries. The problem here is not lack of capital, but the unwillingness to use it in the creation of a suitable environment to attract the capital of local and foreign entrepreneurs towards industry. From the local capital point of view, Table 9.5 shows that most of the private capital investment is directed towards trade and real estate rather than to industry where returns are slower and unsure. It is clear in spite of the government's efforts in establishing the industrial bank, with its loan facilities and other services and exemptions, that the entrepreneurs still prefer to invest in other business. This problem takes away a part of the local capital from investment in industry, and industrial development will depend on government finance. Since there is private investment in other sectors, the government should have an attractive plan to divert it towards industry, as mentioned previously. However, it is clear that the significant reorganization of the industrial bank is essential and that the bank should receive authorization to follow a clear industrial policy and to establish more joint-company projects.

Table 9.5 Number Of Companies Registered In Business In Libya, 1963-1969

Year	Commerce	Industry	Mixed business	Construction	Agriculture	Total
1963-1965	736	179	107	-	-	1,022
1966	84	38	143	-	-	265
1967	107	69	35	-	-	211
1968	106	18	54	-	-	178
1969	128	68	70	50	6	322

Source : Census and Statistical Dept., Statistical Abstract 1971, Tripoli, 1973.

E. The Limited Labour Force

At present the shortage of both skilled and unskilled labour is a critical problem facing industrial development as well as some other economic sectors. The problem has many aspects, as can be seen from the answers to question No. 29 in Table 9.6. The lack of skilled and unskilled workers is regarded as the main labour problem, and has occurred in most of the establishments which employ a relatively large number of workers. Also, in the case of unskilled labour, the answers to question No. 27 (Table 9.7) reveal that establishments depended heavily on foreign unskilled labour, which accounted for more than 17 percent of the total unskilled labour, and 40 percent of the total foreigners. The employment of foreign skilled workers no doubt is inevitable in the early stages of development, but it has its own drawbacks and burdens. Foreign skilled labour demands higher rewards abroad than it would accept at home; the standard of skill obtained is often not the highest, and work is often interrupted either by ordinary leaves or illness, or inability to fit in with local conditions. ⁽²⁰⁾ However, there are, of course many factors contributing to the shortage of labour. Some of the most

Table 9.6 Libyan Industrial Labour Problems

Problem encountered	Frequency of response
1. Lack of skilled and unskilled labour	35
2. High turnover	13
3. Absenteeism	29
4. Official and unofficial strikes	2

Source : Answers to Questionnaire

Table 9.7 The Number Of Libyan And Foreign Workers, According to Occupations,
In Establishments Surveyed

Occupations	Libyan	Foreign	Total	% Foreign
Officers and administrative staff	172	102	274	37.2
Skilled	293	434	727	59.7
Semi-skilled	727	85	812	10.5
Unskilled	1,942	410	2,352	17.4
Total	3,134	1,031	4,165	24.8

Source : Answers to questionnaire.

important factors are the following :

1. Historical Reasons. It is known that before Independence, the Italians largely reserved entrepreneurship and management to their own nationals. Before the Second World War Italian workers supplied most of the skilled workers in Libya, and this situation has tended to perpetuate itself. (21) Moreover, they did not give adequate chances to the Libyans to obtain the

needed skills and training and neglected their education. The Economist in 1965 stated that,

"Libya lacks planners, administrators and technicians; the government is forced to compete with wealthy oil companies and other foreign firms for the limited supply of trained people. Though a crash educational programme is being implemented, it will be years before Libya can make good the appalling neglect of education by former Italian colonial administration." (20)

Farley also pointed out that,

"The critical situation was the visible consequence of the hundreds of years of failure to invest in the development of high-talent manpower." (23)

2. The Government Employment Policy. Up to 1970, the employment policy diminished the available labour force in the country. It encouraged the policy of appointing large numbers in government and public agency offices, which made many departments overcrowded. This policy gave large numbers of non-productive jobs, and many skilled people were employed even where there was no post to fill. Salaries and grants were given to some people and to tribal leaders in the form of social assistance, and through the local government advisory system, and this reduced personal incentive and discouraged work, so that phenomenon of "disguised unemployment" exist in Libya.

3. Social And Cultural Attitudes Of Libyan Society

(a) The backwardness of the country. Industrialization in Libya in general means the introduction of a modern sector into an area which, until recently, was dependent for its livelihood on agriculture and handicrafts and had high rates of illiteracy. It had no experience of mechanized industrial process. It makes it very difficult for such people to understand and adapt easily to the industrial method of work.

(b) The traditionalists oppose women working outside the home. Women have been employed so far only in exceptional cases, such as in tobacco,

textiles and some soft drinks factories. The 1968 data reveal that the percentage of Libyan females in the labour force was very low; only 4.3 percent of the total female population were working. The answers to question No. 29 indicated the same result, that women as labour account for only 5 percent of the total labour force, and 20 percent of them are employed in offices as secretaries. This percentage is very low compared with the rate in neighbouring countries such as Tunisia, and is obviously much lower than in European countries where it is in general more than 20 percent. (24) This Libyan custom has left almost half of the labour force unproductive and unutilized.

(c) The attitude of the people to manual labour. Students prefer to go to universities for white collar jobs rather than to technical institutions, because they believe that it is beneath them to work with their hands. It is abundantly clear, due to the sociological dualism, that there is a great amount of prestige in getting a university degree.

4. The Shortage Of Industrial Education. Technical education provided by the government has so far been on a very limited scale, compared to ordinary education. Table 9.8 indicates that the present educational system is inadequate to produce the number and types of skilled workers required not only in industry but in all the economic sectors. This critical shortage of highly skilled manpower obviously threatened to hinder the advance of the Libyan economy. The limited expansion in technical education has led some departments to establish their own training centres and vocational training to provide the skilled workers they required.

In terms of the industrial sector, the ministry and its agencies have carried out two types of industrial training : (a) on the job it trained about 1,100 workers in various industries during the period 1963-1968; and (b) vocational training in five centres in Tripoli, Benghazi, Derna,

Misurata and Sebha. However, comparing the estimate of the skilled workers required by the industrial sector for the three years 1972-1975, which is 5,374, at a yearly average of about 1,791, ⁽²⁵⁾ with the number of trainees in 1971-72 (738, as shown in Table 9.9), even if one assumes that the number

Table 9.8 Supply And Demand Of Libyan Labour, 1963-1969

Educational level	The Demand			The Supply including Students abroad	The Shortage
	Public	Private	Total		
University Graduates	2,514	2,540	5,054	1,841	3,213
High School	10,459	3,893	14,352	7,171	7,181
Less than High School					
1. Skilled	8,325	5,484	13,809	2,210	11,599
2. Unskilled	3,934	-	3,934	enough	-
Total	25,232	11,917	37,149	11,222*	21,993

* Does not include the unskilled workers.

Source : Ministry Of Labour And Public Work. Survey Of Libyan Need of Labour force, During Period 1963-1969, Oct 1964.

under training will complete their training the gap is still seen to be large, and despite the recent efforts of these centres they are unable to provide the number of workers required. It is quite apparent that the training facilities now operating in the country could be multiplied several times over and still be inadequate to meet demand, and it is impossible for the present technical education system to meet these needs for a long time to come. Two notable factors indicate this. Firstly, it is clear from Table 9.9 that large numbers of trainees do not stay to complete their training. The best year recorded was in 1963-64 when just 16.7 percent of the number under training completed it.

Table 9.9 Number Of Trainees Under And Having Completed Training From
1964-1972 In The Training Centres

Year	Under Training	Completed Training	% completed
1963-64	204	34	16.7
1964-65	327	46	14.0
1965-66	326	43	13.2
1966-67	314	46	14.6
1967-68	204	34	16.7
1968-69	320	37	11.6
1969-70	423	43	10.0
1970-71	971	38	3.9
1971-72	738	58	7.8

Source : Ministry Of Industry Industrial Education In Libya, April 1973,
unpublished.

In the last three years, the percentage was less than ten. This may be attributed to three reasons : (a) there is the instability of the training centres, which moved from one site to another. For example, Naser El-Din Ghami was moved to three different sites, up to 1961 in Tripoli, 1961-66 in Sabratha, 1966-1971 in Tripoli again, and from 1971 in Jansur. Tobruk centre was moved to three different sites also; up to 1971 in Benghazi, 1971-73 in Tobruk and from 1973 in Beda. These moves reduced the number of trainees, who refused to leave their homes and the large cities, (b) the amount of the grants which were given to trainees in these centres was too low compared with other programmes controlled by other bodies, including the oil companies, which attract the trainees to them. For example, trainees in the P.O.E. were getting grants of LD 45 monthly, while trainees in industrial centres

were getting between LD 12 and 33 monthly, (c) the lack of coordination between these centres and the rest of the educational system makes it impossible for outstanding trainees to go on to further education elsewhere.

Secondly, the present educational system is drawn up by the Ministry of Education, without any attempts being made to devise a national development plan or even an overall educational plan with coordination between its branches. In other words, there is no coordination between the education system and the development plan. As shown in Table 9.10, technical education for all branches (commerce, agriculture, industry) had only about 0.7 percent of the total number of students registered in 1970-71. The lowest absolute expansion was recorded in technical schools, where the number of students increased from 1,190 in 1964 to 3,202 in 1971. In the same period the number of technical schools decreased by 10 percent, while the number of general schools doubled. (26)

Yet despite an apparently growing and expanding school system, Libya is taking the "promotionalism" system in education, that is, a system which is designed to get students to the next grade and eventually to a college degree. (27) Students drop out from school in the general education stage, usually become unskilled workers, and then need more time to develop special skills.

Finally, it is worth noting that another factor has its importance in this respect, namely, the withdrawal of most of the old men from the labour supply, as well as the shifting of young children from the labour force due to the expansion of schooling.

It may be concluded that the educational problem will become more acute. It might be suggested that the government, in terms of industry, should include a comprehensive training programme with a keen consciousness of the needs of industry after a careful estimation of requirements for various industries. This might not be practical until it induces a strong and comprehensive system for technical education, and changes its present philosophy

of education. This must include also all bodies and companies which have training programmes. Also any attempt to alter the situation, with respect to female labour, and release a large number of staff from government departments and transfer them to more productive occupations in industry will be beneficial. But the latter should be assessed carefully, due to the fact that they are unskilled and they are used to high salaries with low productivity.

Table 9.10 Student Registration In The Year 1970-71 According To
Educational Classification

Classification	Number	% of total
Less than University level	393,678	97.1
University level	5,198	1.3
Teacher education	3,666	0.9
Technical education	3,088	0.7
Total	405,630	100.0

Source : Ministry Of Planning, Education Development And Its Relation
With The Development Plan, Tripoli, April 1973.

Finally, to turn to absenteeism and labour turnover, the first has been stated to be a problem in 29 establishments and the latter in 17. Only six establishments complained of both. There is no significant correlation between them and any particular region or type of industry, except in Benghazi (8 establishments), where turnover is higher than in any other parts because of its proximity to the main oil terminals, and the attractiveness of the high wages paid by the oil companies.

The problem of absenteeism, which is found everywhere, might be attributed partly to government routine which means that it takes a day or

two for workers to pay bills or get any official certificate (one of the respondents stated that to pay the electricity bill takes almost a day). This extraordinary situation was even criticised by the government itself during the cultural revolution. The situation may also be attributed partly to the social insurance law which allows workers to have three days sick-leave on full pay. It is too easy to obtain sick-leave more than once a month. Strikes have not been a major problem, possibly because there is no strong labour union, and there is a large number of foreign workers. Besides, most of the establishments are new, and entrepreneurs offer relatively high wages to avoid this problem.

3. Administrative Problems

A. Poor Management

Industrial development in Libya is facing the scarcity of skilled management which is a serious obstacle to the progress of industry. Answers to questions No. 8 and 9 show that 37 establishments have the system of owner manager, while six establishments were joint stock companies which have many shareholders. Only eight establishments have a foreign manager. This means that most of the entrepreneurs themselves combine all the responsibilities and functions of the factory management. The average small entrepreneur is uninformed about the right choice of industry or product lines, the amount of capital needed, the economic size of the establishment, the best equipment and materials, and the most efficient production processes. ⁽²⁸⁾ So establishments tend to operate below their rated capacity and with a high production cost. Therefore it is clear that management techniques have not made their way into industry except in very rare cases. It is attributable to the smallness of establishments and to the fact that industrial management is a very neglected discipline in the educational institutions available to trainees.

It may not be a great problem at the present time in Libya, when most of the factories are on a small scale, but it represents a serious obstacle to their future growth and expansion. In an interview with the manager of Misurata shoe factory, he indicated that this problem is now the basic dilemma confronting the public establishments. As Harbison and Myers clearly stated :

"As latecomers to industrial development, these countries are strongly compelled to use modern machinery and process. In technology, it is possible for them to jump from the primitive to the most advanced stages in the space of few years. The required managerial resources will not suddenly appear out of thin air; they will be forthcoming only as a result of meticulous planning, wise investment in education, and concerted efforts to use human resource skills effectively." (29)

Since proper management would know of the important factors in industrial development, they would be able to meet the ever-growing complexity that present-day operations involve. The improvement and increased efficiency of management should be an important concern in developing industry.

Managerial training programmes, evening and night courses, should be provided free or for acceptable fees for managers, as well as providing solutions through advisory help. In India, for example, the National Productivity Council (N.P.C.) undertakes development programmes designed to develop knowledge of general principles, practices and techniques of management; and India is not alone in this. The Korean Productivity Centre offers training courses in management and short-term special courses related to practical problems which arise from the actual management situation. (30)

The University Faculties of Economics and Engineering should provide more courses in the field of industrial management. Practical studies of some establishments from time to time by these colleges, and criticism of their management systems, might be helpful in this respect.

B. The Lack Of Co-Ordination Between Authorities

Industrial development and the choice of location usually commands assistance from many departments and agencies, and to have beneficial effects they should coordinate their regulations. This study has shown clearly that there is no strong coordination between most of the bodies which deal with industry. These bodies sometimes have incompatible regulations, as in the case of loans from the Industrial Bank and regulations concerning the renting of land in the Municipality of Benghazi. The problems are also clear in the time lag between the decision to establish a project and the start of it. In many cases it took more than a year, due to inadequate cooperation between the different departments, such as electricity, water, the municipalities and N.P.O.I. For example, according to an official letter sent by the N.P.O.I. branch in Benghazi on 20.3.73, a sardine factory was to be constructed, but the municipality had still not provided a suitable site in September 1973. In Derna, the municipality changed its decision about the location of the ready made suit factory after Reko company had already carried out all the studies and investigations of the physical site, a change which cost about LD 100,000, besides more than six months delay. There can be no doubt that these circumstances call for an effective system of communication and co-ordination at all levels. Furthermore, special coordinating devices may save considerable time and money in establishing a project and in showing the problem of poor coordination.

C. Undervaluation Of Research And Information

As indicated in Chapter five, even after establishing the Industrial Research Centre, there is no sound method for providing feasibility studies for the private sector. In terms of information, in spite of the large number of libraries which are established everywhere in each of the government departments, the author found that none of these tackles the whole

spectrum of industrial information sources required for the comprehensive preparation of an industrial project. Limitations are set by inadequate documentation in a wide range of relevant literature, lack of in-depth descriptions and unavailability of qualified or trained staff in the field of industrial information services. For example, the annual industrial survey of large establishments contains no information on industrial location and the distribution of variables among regions. The Industrial Census and Industrial Establishments Census of 1971 has many deficiencies (see Chapter I). There is also no information as detailed as that for 1964. In the absence of this information, one finds it difficult to determine indicators for industrial growth or location movement by the combination of two or more variables. It is clear from the data used throughout this research that it is impossible in the case of Libya to find satisfactory statistics for a detailed study. Therefore the I.R.C. should have a special library, including all industrial information to be provided to anyone who needs it. A further step is to send officers abroad for advanced training, especially in orientation and the collection and classification of industrial information.

D. Existing Government Routine

Government routine, rules and procedures are one of the most severe obstacles in a country anxious to develop its industrial sector quickly by using development funds. Sixteen of the establishments interviewed stated that the existing routines, such as those in the ports, and in labour and immigration offices, make any immediate action impossible. Six establishments stressed that the Labour Office with its complicated procedures is the main target. Others stressed the complication of exemption procedures. An N.P.O.I. officer stated that to get information, details, or any help from other departments, takes months, and in many cases letters do not even receive a reply. The author himself had this problem. This situation can stop entrepreneurs from going into industry, besides which it can be used as an

excuse for any delay in action as well as for any hasty decision, especially in the case of the public sector. The responsibility for decisions and measures taken is as a rule collective and shared by many authorities which makes it difficult to be traced. ⁽³¹⁾ A simplification and liberalization of the existing administrative routine would have an additional advantage for promoting industry.

Lastly, it is perhaps necessary to point to other important aspects of the industrial problem, including physical, social and psychological problems. The most important is psychological, namely the lack of industrial mentality. The people still believe in foreign industrial items. A good example is the tobacco industry : in spite of the fact that Libyan cigarette production is of good quality and more than thirty percent cheaper than the imported products, a large number of Libyans still smoke the latter. The author found during his field work that many officers in different industrial departments still smoke imported cigarettes.

Before the close of this chapter one might ask in what way Libya is similar to other developing countries in this respect. Certainly the problems are not particularly unusual. Mountjoy, analysing Egyptian industrial development in 1952, noted that drawbacks to growth included a small home market, limited raw materials, shortages of technicians and skilled labour, the poor quality of available unskilled labour, and a dearth of capital for investment, ⁽³²⁾ most of which are drawbacks today in Libya.

The above study makes it clear that the country's rush into rapid industrialization without giving close attention to these problems may lead to undesirable, even disastrous effects. Certainly industrial growth will be very difficult to achieve without massive subsidies.

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CHAPTER TEN

CONCLUSION

A. The Present

It is obvious from this study that industrial development in Libya has been handicapped by the general economic backwardness of the country up to the early 1960s. The lack of capital, technology, market and entrepreneurs hindered the rise of industry. By 1959 the discovery and development of Libya's oil resources began, and numerous oilfields were discovered, providing huge quantities of oil. Oil production, which has been almost totally exported in crude form, recorded more than 950 million barrels, with a value about LD 957 millions in 1971. The direct impact of the oil industry takes the form of providing the country with a large revenue for development as well as cheap energy and raw materials.

Although Chapter Four shows that manufacturing industries expanded between 1964-1971, and the number of workers increased by 81 percent in this period, the government did not play a major role in industrial development before 1970, leaving its development in the hands of private investors and entrepreneurs in a difficult industrial development climate. But since the change of regime in 1969 the new government has become more and directly involved with industry, and its actions appear in the strong industrial policy, the establishment of N.P.O.I. and of many factories. The new policy puts the greatest possible stress on expanding industrial programmes, especially in less developed areas.

Chapter Six makes it clear that the general patterns of industrial distribution are generally the same as those found in many developing countries. A large proportion of the industries are in the food, soft drinks and tobacco, wood and furniture and building materials

groups. In other words, present industry in Libya is essentially concerned with consumer goods for which demand is widespread across the country. Consequently, industries in Libya comprise a large number of small traditional establishments with simple equipment and a small number of medium and large establishments with advanced techniques.

The establishments are mainly in the large urban regions. Tripoli and Benghazi Municipalities contain the bulk of the industries, while industry is absent from some municipalities. A major characteristic is the location of several large employment industries in Tripoli, and a large proportion of the industries are entirely localized in Tripoli and Benghazi. In most towns employment is in small establishments serving a local market, and within only some of the industrial groups are individual establishments serving large areas or most of the national market.

In Chapter Seven the study presents many factors that influence the industry in Libya, namely city amenities and services, market, transport, and raw materials. City amenities and services have dominated the majority of industrial locations followed by the influence of the market. Population distribution among the muhafadat shows a high correlation with the distribution of industrial workers and is highly concentrated in Tripoli and Benghazi. Moreover, the transport network is most dense in the north, especially in the north-west. Many industries appear to have been located especially because of raw materials. The study also shows that power, labour, government influence, personal choice and historical inertia have also played a very large part in the distribution of the industries during recent years.

In Chapter Eight it is clear that industrial location in Tripoli and Benghazi are different in both structure and location. In Tripoli industry tends to be concentrated in certain areas, while in Benghazi it is dispersed over the city. The industrial location in these towns is

based on a conceptualization of urban industrial location factors, mainly the availability of land, transportation and service facilities. In Tripoli itself, Suani Road area is the main industrial location, largely because of the availability of the relatively cheap land.

Finally in this study, some general categories of economic planning and administrative problems influencing the industrial sector have been examined. There has been a lack of sufficient attention, investment, or effort to adequately solve these problems for an aggressive and planned development of the sector. It is believed that if these key improvements were achieved, Libya's rate of industrial development would be greatly increased.

B. The Future

It is impossible to predict with confidence the specific direction of the country's industrial growth, even if we recognize that industry achieved a moderate growth between 1964 and 1971. The growth of industry in the future is the important question here. Will the rate of growth of industry change? The present problems of attracting industry into the country no doubt affect the continued growth of industry at a fast rate, but it may be that industry has a better chance in the future, with a high growth rate, but the level of that rate depends on the solution to present problems.

The chance is clear, firstly from the increased level of the economic development in the country, particularly due of course to the positive attitude of the recent government in the development of industrialization. The industrial sector's share in the three year plan, 1973-1975, is about LD 228 million, double the amount budgeted in the 1969-1973 plans. The result is an industrial programme which is not only bigger than the previous one, but also different in its form, as shown in Table 10.1.

Ideally, this development programme should be spelled out in terms of the number of new establishments. This would mean stating in advance that various establishments will exist in the near future. This remarkable investment will be followed by a large increase in industrial production in the near future when the new projects begin operation.

Furthermore, attempts to develop the agricultural sector will affect the industrial future. In spite of the limited agricultural land, Libya is witnessing remarkable concern with agricultural development, which

Table 10.1 Public Sector Allocation In the 1973-75 Industrial Plan

Industry	LD, 000	%
Food, soft drinks and tobacco	28,989	22.2
Textiles and clothes	14,833	11.3
Wood and Furniture	8,000	6.1
Chemicals	15,240	11.6
Building Materials	40,807	31.2
Metal engineering and electricity production	22,966	17.6
Total	130,835	100.0

Source : Ministry of Planning Development Plan of 1973-75 Report,
Tripoli, 1973.

is clear from the allocation of LD 278 million to agricultural development in the 1973-75 plan, and which is taking place in various parts of the country. This is considered to be only the first phase of a ten year agricultural plan, which has allocated LD 701 million for this sector during the period 1973-83. These figures illustrate the strong commitment

of the government to the development of the agricultural sector, which may enhance the expansion of industry. For example, the agricultural sector provides an important market for certain producer goods, not merely a market for consumer goods. As soon as agricultural production begins to be influenced by new techniques and new products, then a whole new range of opportunities will open up for industrial production. For instance, the use of fertilizer and pesticides for agriculture encourages expanding chemical industries. The introduction of new irrigation and agricultural methods will open a market for machines such as mechanical cultivators, pipelines, sprayers and pumps. Improvement of livestock makes possible the development of animal fodder production. The relationship is also clear in some complementary industrial or semi-industrial projects such as spinning and washing wool, grading and packing dried fruit in fruit-packing factories. Agricultural output will also play a crucial role by providing raw materials for food industries, and many food industries which now operate on a small scale owing to lack of raw materials will be expanded.

The oil industry may provide a very good opportunity for the supply of cheap energy as well as raw materials and secure the market for industry. Already natural gas and oil are being supplied as power to a number of projects, especially power stations and some industrial establishments. Utilization of natural gas and oil will both have major effects on developing industry, especially petrochemicals where the greatest industrial potential of the Libyan economy lies. Some industries (see p.65) which depend on natural gas and crude oil have a good future in Libya, and the petrochemical industry can provide other industries such as chemical industries with raw materials.

Rapid expansion could take place in certain industries such as foodstuffs, because the demand for them is spread over all the regions.

Chemical industries and petrochemicals have an almost unlimited potential, but their growth depends on the availability of skilled technical workers. Manufacture of iron and steel in a large factory at Misurata will be the basis of the metal industries and engineering equipment. The increased demand for building materials and the availability of local raw materials such as calcium carbonate, limestone and clay, strongly indicate that the building materials industry, especially cement production, should have a successful future.

As regards the broad regional possibilities of industrial development in the future, in recent years increased attention has been focussed by the government on more decentralization of location of some public industrial establishments by locating new establishments in less-developed regions. Techno-economic factors were no longer the main influences upon the final decision of some of the public factories. Social considerations began to play an important role too. The strength of this policy and the success of those agricultural projects which were located in various regions means that new industrial roles will rapidly develop; El-Zawia, Gharian, Derna, Misurata, Homes and El-Marg are expected to see more industrial growth in the near future. El-Zawia, for example, is likely to benefit from the current development of the refinery and the Jeffra agricultural plain project. In Misurata, some metal work and engineering equipment industries are expected to result from current expansion of the old harbour and the proposed large iron and steel establishment there. The future industrialization of the south, especially Kufra, will depend on the future extent of transportation.

A strong industrial development makes sense for an undeveloped country which has a serious balance of payments problem to produce domestic products which cost more than the equivalent imports simply because the country does not possess the foreign exchange to pay for imports, (1)

but this is not relevant to the case of Libya which every year since 1962 has earned much more foreign exchange than the amount needed to spend on imports, and some imported industrial goods sometimes cost less than similar ones produced locally. But, even so, it is not a wise policy to ignore industrialization, which is important in Libya for many reasons.

Firstly, it is unacceptable for Libya to depend solely on oil, because in the short run the price is not stable and so cannot insure the market against the possibility of crisis, or if a substitute for oil is found. The world witnesses great technological development in the utilization of atomic energy which could make the position of oil as a source of energy very weak. This is indicated by the fact that atomic energy has already been utilized in the operation of submarines and power-generating plants. Therefore, the day may come when the oil degenerates to a secondary position as a source of power, as happened to coal. Mayer pointed out that

"Oil ministries feel that they must press oil companies for more per barrel without upsetting the balance of the market forces which have kept the price of crude oil remarkably free from wild fluctuation over the past two and half decades. Huge tax-paid-cost per barrel increases could conceivably face western nations with no alternative but to go 'flat out' in developing substitutes. While the latter path would be costly indeed for industrial oil consuming nations, it could be disastrous for big one crop economy oil exporters. " (2)

It is obvious that the country needs economic diversification, and to find other substitute sectors which will help the country to diversify its economy and save itself from the gamble of dependence on one source. It seems that industrialization is feasible, especially since the agricultural sector can absorb only a limited amount of investment, and Libyan agricultural development is limited by the peculiar Libyan circumstance of lack of water resources.

Therefore industrialization is the acceptable way to diversify the economy, while the high concentration on the industrial sector will develop and improve the agricultural sector through the processing of agricultural

products. To neglect agricultural development, therefore could be as serious as neglecting industrialization.

Industrial development is in some ways more important than agriculture, where the output per worker is always lower. The development of industry is usually more rapid than agriculture because the possibility of import substitution is greater in industrial products, and demand grows more quickly for manufactures than for foodstuffs. ⁽³⁾ Consequently, a developed industry might be a source of saving and stop the leakage of purchasing power out of the country.

Investment in the industrial sector also indirectly contributes to economic development. It leads to more investment in other activities such as transportation, commerce and utilities. It also has an effect on the general level of education of skills, way of life, inventive-ness, habits, and role of modern technology, and it creates new demand. ⁽⁴⁾

All this means that there is no reason for Libya to delay industrial development, but it can not be left to accident and ad-hoc decisions or some resolution. The government has no excuse to make the mistake of developing industries which are unsuitable, economically and socially unprofitable for the country. Industry should be planned and located carefully according to the country's circumstances and requirements.

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Appendix I-1. Lay-Out Of The Questionnaire Used For The Study, 1973

1. Name of the establishment?
2. Date when established :
3. Establishment's average area : (sq.m.)
4. Address of the establishment :
5. Since opening, have your premises been : A. Expanded?
B. Moved?
6. If the answer was "A", why?
" " " " "B", A. Where was the first location?
B. Why did you move?
7. Do you want to move your establishment from its present location?
If yes, why?
8. Does the owner(s) manage the establishment by himself? Yes,
No,
9. If not, is your manager : 1. Libyan?
2. Foreign?
10. Is the building : A. Personal property?
B. Rented?
11. Is the land : A. Personal property?
B. Rented?
12. If "B", do you rent it : A. From the government?
B. Privately?
13. How much is the rent per square metre (rough estimate)?
14. Was the building built specially for the establishment? A. Yes
B. No
15. Has the establishment obtained any loan from the following sources ?
A. Industrial Bank
B. Commercial Bank
C. Government source
D. Elsewhere

16. Have you provided any facilities for your labourers? A. Yes

B. No

17. If "Yes", what are they?

18. What is the main product of the establishment?

19. Where do you dispose of your waste materials?

20. Do you deal with the commercial banks? A. Daily

B. Weekly

C. Monthly

21. Does the establishment sell the final product through wholesalers?

A. Yes

B. No

22. What fuel is used?

A. Electricity

B. Oil

C. Coal

D. Gas

E. Wood

F. Others

23. What is the annual consumption of fuel?

24. In the case of electricity, where do you obtain your power? From :

A. Public station

B. Private station

C. Both

25. In other cases, how do you obtain your fuel?

26. Is there any warehouse for the fuel?

27. How many workers are employed?

A. Official Staff

B. Skilled

C. Semi-Skilled

D. Unskilled

1. Libyan

1. Libyan

1. Libyan

1. Libyan

2. Foreign

2. Foreign

2. Foreign

2. Foreign

28. In case of seasonal production, when is the best season?

29. Which of the following problems have been encountered to a significant degree in the labour force?

- A. Lack of skilled labour
 - B. Lack of operational experience
 - C. High turnover of labour
 - D. Absenteeism
 - E. Strikes
 - F. Official vacation
 - G. Others
30. Which of the following do you pay labourers in addition to their salaries or wages ?
- A. Social security
 - B. Insurance
 - C. Retirement and savings fund
 - D. Medical services
 - E. Rent or houses
 - F. Others
31. Can you give a rough estimate of proportions travelling to work?
- A. Less than one Km. Number
 - B. Between one and five Kms.
 - C. More than five Kms.
32. How much of your Libyan labour has been trained in the following places?
- A. In Libya
 - B. Outside Libya
33. What percentage of the raw material which you use in your establishment is from the following sources ?
- A. From local derivation
 - B. From Elsewhere in Libya
 - C. From abroad
34. Of the machinery you use, how much is derived as follows?
- A. Of Libyan origin
 - B. From abroad
35. What is the source of the imported raw materials?
36. Can you indicate the sort of raw materials which you use?
- A. From Libya
 - B. From abroad
37. Do you use materials manufactured by other factories in Libya?
- A. Yes
 - B. No

38. Does the raw material lose greatly in weight in manufacturing?
A. Yes B. No
39. Do you use water, and for what purpose? A. For cleaning
B. For Process as raw material
C. For both
40. What is the annual consumption of water?
41. From where does the establishment obtain the water?
A. From public sources B. Private C. Others
42. What kind of machinery do you use and what is the capacity?
A. Steam Engine No. Capacity
B. Oil No. Capacity
C. Electricity No. Capacity
D. Wind No. Capacity
E. Gas No. Capacity
43. How do you repair your machines?
44. How do you obtain the spare parts? A. From local markets
B. From abroad
45. In which Muhafada do you market the production?
46. What was the reason for your establishment's location? Please arrange the following factors in the list below in order of importance.
A. Convenient Transport B. Labour supply
C. The cost of land and building. D. City amenities and services
E. Availability of the market F. Personal choice
G. Agglomeration H. Availability of raw materials
I. Power J. Others
47. Are the owner(s) of the factory from the same region? A. Yes
B. No
48. Do you think you would get the same benefit if the factory was established in other towns, and why? A. Yes B. No

49. What was the reason in choosing this site in this region?
50. Do the limited facilities of electricity and water supply affect your establishment site?
51. By what means is the raw material transported to the establishment from abroad? A. By road B. By sea C. By air
52. Which of the following do you use for transporting the finished product?
- A. Lorries B. Vans C. Carts
- D. Bicycles E. Buses F. Porter
53. Who is responsible for transporting the finished product?
- A. The factory B. The Wholesaler or consumers
54. Has the distance **of** transport of the product to the market affected its price? A. Yes B. No.
55. Is the sale price of the product the same in all Libyan towns?
56. By what means do workers travel to work?
- A. Public transportation B. Private transportation
- C. Establishment's " D. Other means
57. What is the destination of the product?
- A. Other factories B. Wholesalers
- C. Retailers D. Export
58. Does the establishment work at full capacity? A. Yes
- B. No
- If not, why not?
59. Does the establishment use the shift system? A. Yes
- B. No
60. Is there any limited time for using electricity?
61. Does the establishment obtain from the government any of the following?
- A. Exemption from tax
- B. " " " duty on raw materials and machinery
- C. Building D. Land E. Advice in Management F. Others

62. Does the establishment provide any training for the labourer?
63. What are the problems which the factory previously faced, and what are the problems now?
64. What is your suggestion to solve these problems?

Appendix 3.1 The Distribution Of The Concessions Among The Owners.

Owner	Concessions No.
Esso Standard	3, 4, 5, 6, 7
Arab Gulf	65
Mobil Oil	9, 10, 11, 12, 13, 14, 15, 50, 57, 62, 72, 124, 125, 126
Esso Sirt e	16, 17, 20
Oasis	25, 27, 28, 29, 31, 32, 33, 59, 71
B.P. (Arab Gulf)	80, 81
Amoseas	42, 43, 44, 45, 46, 47, 51, 73, 83, 131, 132, 133
Omoco	76, 93, 94, 95
Elwerath	78, 96, 97, 99
Cori	82
Libyan Atlantic	88, 89, 136
Agip	100
Occidental	102, 103
Aquitaine Auxirap	104, 105, 137
Union	106, 107, 108, 109
Sirtical Shell	114
Scholven Cheme	115, 116, 117
American Mining	118
Libyan Clark	119, 120
Bosco	134, 135
N.O.C./Aquitaine	LP1, LP2, LP3
N.O.C./Agip	LP4
N.O.C.	LP5, LP6, LP8 to LP24
N.O.C./Sirtical Shell	LP7

Source : N.O.C. Libyan Oil 1954-1971, Tripoli, 1973

Appendix 3.2 The Oil Pipeline System And Its Lengths in Libya .

	From	To	Length in km	Size in inches
<u>Group I</u>				
Esso Company	G.69	Zelten	7.9	8
	Gebel	„	33.7	4
	Zelten	M. El-Brega	172.0	36
	Raguba	Km.110 (Zelten line)	87.6	20
	Zelten South 1	Zelten	7.9	8
	„ „ 2	„	6.3	20
	„ „ 3	„	6.8	20
	Arshad	Pipeline 36 inch	16.0	4
	Lehib	„ „	12.2	6
	Total		350.4	
<u>Group II</u>				
Oasis Company	Gialo	Waha	151.7	30
	Defa	„	33.2	30
	Waha	Samah	159.7	30.24
	Zaggut	El-Sidra	269.7	24
	Samah	Qatar	112.4	32
	Qatar	Dahra	71.8	32
	Dahra	El-Sidra	210.2	30
	Bahi	Dahra Pipeline 30	45.7	20
	Total		1054.4	
<u>Group III</u>				
1. Occidental Company	103.A	Zuwaytinah	212	40
	102.D	103.A	66.5	24
	103.D	103.A	24	40
	103.G	103.A	7	16
	103.A	103.D	23.4	40
	103.A	Zuwaytinah	225	20
	103.D	103.A	23.7	10
	103.A	103.D	23.7	10
	Total		605.3	
2. Agip Company	Concession 100	Concession 103	132.3	30
	Total		132.3	
3. Omoco Company	Shabi D	Occidental Line	4.8	14
	Total		4.8	
<u>Group IV</u>				
1. Amoseas Company Group	Nafoora	Amal	52	20
	Kotla	Beda	22	10
	Nafoora	Amal	52	32
	Dor	Kotla	29	6
	Beda	Ora Line	27.3	14
	Total		182.3	

	From	To	Length in km	Size in inches
<u>Group IV (Contd.)</u>				
2. Mobil Company	Beda Line Connection	Sida Connection	135.6	24
	El-Hofra	„ „	57.2	24
	Sida Conn- ection	Ras-Lanuf	87.5	30
	Amal	„	273.0	30
	Second line of Amal	„	227.0	36
Total			780.3	
3. Aquitaine Company	Mansour	Khuff	23	8
	Khuff	Beda	29.3	8
	Magid	Nafoora	104.0	14
Total			156.3	
<u>Group V</u>				
B.P. (Arab Gulf)	El-Sarir from wells around	Tobruk	513.7	34
		to Sarir	96.3	
Total			610.0	

Source : N.O.C. Libyan Oil, 1954-1971, Tripoli, 1973, pp. 68-70.

Appendix 5.1 Functions Of The National Public Organization For
Industrialization.

- (1) To assemble data on industrial production and about requirements of the local market from industrial products.
- (2) To give the green light for industrial projects.
- (3) To take part with competent circles in selecting industrial sites.
- (4) To work out engineering designs for industrial projects and lay down their specifications whether by itself or in collaboration with industrial research centres or Arab and foreign competent bodies.
- (5) To conclude contracts for the implementation of projects included in industrial development schemes.
- (6) To carry out industrial projects with or without other firms and individuals.
- (7) To provide human skills for the management of projects and give proper training to national elements whether inside or outside the country.
- (8) To implement provisions of technical cooperation agreements concluded between L.A.R. and other states.
- (9) To purchase or sell factories.
- (10) To give the Green light for industrial projects.

Source : L.A.R. The Third Anniversary Of The First Of September Revolution ; government printing press.

Appendix 5.2Factories Transferred to N.P.O.I. From Other Ministries .

<u>Factory</u>	<u>Location</u>	<u>Ministry</u>
1. Fruit processing factory	Tripoli	Agriculture
2. Date packing ,,	Derg	
3. Gypsum ,,	Tripoli	
4. Tannery ,,	Tripoli	
5. ,, ,,	Benghazi	
6. Cement ,,	Benghazi	Semi-government
7. ,, ,,	Homes	,, ,,
8. Tobacco ,,	Tripoli	Finance
9. Salt ,,	Tripoli	,,

Source : Fieldwork, Summer 1973.

Appendix 5.3

The Distribution Of Trainees In Each Establishment By The Places Of Training.

Type of Establishment	Location	England	W. Germany	Switzerland	Yugoslavia	France	Italy	Tunisia	Algeria	Egypt	In the location of the project	Total
Textile	Jansur	7	3	13	-	-	-	-	94	162	37	316
Dyeing wool	El-Marg	-	-	-	-	-	3	-	-	2	20	25
Ready made clothes	Derna	-	-	-	-	-	-	-	-	22	35	57
Cables	Benghazi	-	-	-	-	-	-	-	-	52	45	97
Scrap iron	Tripoli	-	-	-	57	-	-	-	-	-	-	57
Dry batteries	Tripoli	-	-	-	-	-	-	-	-	-	18	18
Glass	Azizia	1	-	-	-	3	-	1	-	54	41	100
Shoes	Misurata	-	-	-	-	-	-	21	-	-	201	222
Tanning	Tripoli	-	3	-	-	-	-	-	-	55	32	90
Cereal milling	Tripoli	-	-	-	-	-	-	-	-	-	33	33
Dairy	Tripoli	-	-	-	-	-	-	-	-	-	39	39
Sanitary ware	Gharian	-	-	-	-	-	-	-	-	42	-	42
Spirally welded pipes	Benghazi	-	-	-	-	-	-	-	36	-	-	36
Sardines	Jansur	-	-	-	-	-	-	-	-	-	-	-
Tuna	Jansur	-	-	-	-	-	-	-	-	-	13	13
Sardines	Zuara	-	-	-	-	-	-	-	-	-	11	11
"	Homes	-	-	-	-	-	-	-	-	-	10	10
"	Benghazi	-	-	-	-	-	-	-	-	-	7	7
Animal fodder	Tripoli	-	-	-	-	-	-	-	-	5	-	5
Dairy	Benghazi	-	-	-	-	-	-	-	-	-	31	31
Total		8	6	13	57	3	3	22	130	394	573	1,209

Source : N.P.O.I. Statistical Information About Skilled Labour Required Until 30.6.73, Unpublished.

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Fig 3-1 THE LIBYAN OIL INDUSTRY LOCATION, 1972

