JOINT VENTURES AND INDUSTRIALISATION IN BAHRAIN

by

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THIS WORK IS DEDICATED TO
MY PARENTS AND MY WIFE

ABSTRACT

The problems with which this investigation are concerned are the industrialisation process and the role of joint ventures - the main form of foreign direct investment - in the industrial development of Bahrain. This study has a two-fold purpose. The first is to discuss the relation between industrialisation and growth in the economy of Bahrain. We seek to identify various dimensions of growth based on aggregate data which could be utilised to characterise selected sub-periods in the development process. The second is to examine industrial and economic development based on disaggregated data. We have attempted to evaluate the extent to which industrial establishments in general and joint ventures in particular are helping to meet the following determinants of industrial and economic development in Bahrain: the appropriateness of an establishment's capital and skill intensity for the economy concerned, the choice of trade policy, the efficiency and potential for faster growth of an establishment and its ability to create jobs for Bahraini employees.

The analysis of the allocation of resources among economic sectors and its influence on the pattern of economic growth over the period under study (1973-1985) shows that the pattern of growth can be explained according to the supply side and the demand side of the economy and sectoral decomposition. The analysis of decomposition of GDP growth from the demand side shows that investment constituted the main source of growth in the entire period under study and its sub-periods.

The supply side analysis indicates that the sources of growth pattern can be explained more by the ratios of capital and labour to GDP growth than by their productivities. The analysis of sectoral decomposition shows that the contribution of oil to GDP growth was negative over the 1976-1985 period, although the oil sector is still the main source of income in the country. However, Bahrain is facing the very serious challenge of depleting oil by the end of the century. Being the first country within the Arabian Gulf to exploit its oil, Bahrain is also the first country to face the problem of stock depletion. As a result, one of the main challenges facing Bahrain at present is to expand and diversify the manufacturing sector by attracting private and foreign investors to joint venture-based industries.

The evaluation of the effects of joint ventures on development has been tested by two main methods. In the first, weighted mean ratios are used to examine the comparative contribution of joint ventures and locally owned establishments in five areas: profitability, capital intensity, skill intensity, choice of trade policy and Bahrainisation policy. The t-test of weighted mean ratios show that joint ventures demonstrate more positive developmental contributions than locally owned establishments with respect to chosen characteristics. The second method, discriminant analysis, shows that export orientation and wage rate are the most important variables which best discriminate between joint ventures and local establishments. An analysis of misclassified cases within the context of discriminant analysis proves to be a useful exercise in monitoring and assessing the performance of industrial establishments. Finally, the descriptive case studies shed further light on the experience of industrial joint ventures in Bahrain.

The study concludes that the analysis seems to support the importance of the government's new programme of industrial diversification, which incorporates a drive to encourage foreign investment and joint venture cooperation. The study argues in favour of several measures to make such a scheme successful and to encourage the behaviour of local establishments and joint ventures to be consistent with the requirements of industrial development in Bahrain.

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ABBREVIATION

ALBA = Aluminium Bahrain Smelter.

ARAMCO = Arabian-American Oil Company.

ARESCON = Arab Engineered System and Control Company.

AISCO = Arab Iron and Steel Company.

APICORP = Arab Petroleum Investments Corporation.

ASRY = Arab Shipbuilding and Repair Yard.

ASRYMAR = Asry Marketing Services.

BD = Bahraini Dinar (National Currency).

BALEXCO = Bahrain Aluminium Extrusion Company.

BAI = Bahrain Atomisers International.

BANAGAS = Bahrain National Gas Company.

BANOCO = Bahrain National Petroleum Company.

BAPCO = Bahrain Petroleum Company (Oil Refinery).

BASRIC = Bahrain Shiprepairing & Engineering Company.

b/d = barrels a day.

BTU = British Thermal Unit.

CIF = Cost, Insurance and Freight Value.

EI = Export-Oriented Industries.

g/d = Gallon per Day.

GDP = Gross Domestic Product.

GNP = Gross National Product.

GARMCO = Gulf Aluminium Rolling Mill.

GATT = General Agreement on Tariffs and Trade.

GCC = Gulf Cooperation Council.

GIC = Gulf Investment Corporation.

GOIC = Gulf Organisation for Industrial Consulting.

GPIC = Gulf Petrochemical Industries Company.

IS = Import Substituting Industries.

ICC = Industrial Cooperation Committee.

ISIC = International Standard Industrial Classification.

JVC = Joint Ventures.

Km = Kilometres.

LES = Locally Owned Establishment.

MW = Mega Watt.

MIDAL = Midal Cables Ltd.

MNES = Multinational Enterprises.

NIC = The Riyadh-based National Industrialisation Company.

OBUs = Offshore Banking Units.

OAPEC = Organisation of Arab Petroleum Exporting Countries.

OPEC = Organisation of Petroleum Exporting Countries.

QAFCO = Qatar Fertiliser Company.

QR = Qatari Riyal.

SABIC = Saudi Arabian Basic Industries Corporation.

SIDF = Saudi Industrial Development Fund.

SR = Saudi Riyals.

SOCAL = Standard Oil of California Company.

SCC = Strategic Choice Committee.

TFP = Total Factor Productivity.

UNCTC = United Nations Center on Transnational Corporation.

VLCC = Very Large Crude Carriers.

WOSS = Wholly Owned Subsidiaries.

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

The State of Bahrain was the first producer of oil in the Arabian Gulf region. But it was not until the quadrupling of oil prices over the period October 1973 to January 1974 - as a result of the action by the OPEC members to raise the price of oil - that substantial amounts of financial capital became available and provided the potential for rapid economic development. Bahrain's oil revenues rose in real terms (constant prices of 1980) from 71.7 million Bahraini Dinars (BD) in 1973 to BD 391.4 million in 1981. [1] The government enjoyed a virtual five-fold increase in its revenues over the period 1973-1981. The share of oil revenues in total public revenues increased from 65 percent in 1973 to a peak of 85 percent in 1974, but then decreased to 70 percent in 1978 and 1979 before rising again to 82 percent in 1980 and then decreased to about 70 percent in the early period of 1980s. [2]

A large part of oil earnings accrued to the government and increased its financial resources. These resources were used by the Bahrain public administration to launch an ambitious investment programme to provide the economy with a physical infrastructure and to embark upon industrialisation through joint ventures with foreign investors. This era of a booming economy coincided with a number of measures to encourage private foreign investment in the economy. As a consequence, the banking offshore industry expanded rapidly and by 1980 Bahrain had become an important financial centre in the region.

The acceleration of investment spending and continuous growth of various economic sectors led to a rapid inflow of foreign labour, which comprised more than half of the labour by 1981.

The State of Bahrain, however, is facing the serious challenge of depleting oil, which is the main source of income in the country. Not surprisingly, having been the first country within the Gulf to exploit oil, Bahrain is also the first country to experience the depletion of this basic economic resource. Therefore, the way Bahrain's government makes use of these oil revenues is a critical factor in the growth of gross domestic product in future years.

One of the main challenges facing Bahrain at present is the ability to expand and diversify the manufacturing sector by attracting private and foreign investors to invest in joint venture based industries. This challenge emerges primarily from the high degree of dependency on revenues derived from oil which is likely to deplete by the end of this century.

Joint venture based industries can not only satisfy the needs to diversify, but generate substantial benefits to the economy as a whole, for example by bringing in new technology, increasing exports and creating jobs for a local labour force of 80000, which is expected to double by the end of the century.

Not surprisingly, the issue of industrialisation has increasingly received special attention from decision makers. This can be seen through the active role of the government in the industrial process and the encouragement of foreign investment in joint venture based industries by an attractive package of incentives.

In the past few years, Bahrain and the other states of the Gulf Cooperation Council (GCC) have experienced slow economic growth due to the reduction and fluctuation of oil prices in the world market. As a result of this, these states are currently restructuring their economies to bring forth a more diversified economic base where crude oil revenues would form a declining source of income, while exports of petrochemicals, aluminium and other basic industries will continue rising. In 1985, the government of Bahrain formed the "Strategic Choices Committee", comprising senior officials and several ministers, to make an in-depth study of the possible areas for development and the role of government in the promotion of further economic growth. One of the major recommendations of the committee is that the manufacturing sector, although its share is smaller than the oil share in the gross domestic product, has the greatest potential for growth. The committee recognises that the oil and banking sectors have reached the limit of their growth and may even decline. Therefore, it is important that the manufacturing sector should become the spearhead of the new growth.

Consequently, the government has launched a new programme of industrial diversification which incorporates a drive to encourage foreign investment and joint ventures. An Industrial Development Centre has recently been formed in the Ministry of Industry and Development to take over the task of coordinating the foreign investment and joint ventures programme and to allocate some $2.6 billion for projects in various industrial sectors over the period 1990 to 1995 in order to diversify the country's economy away from oil.

1.2. THE OBJECTIVES OF THE STUDY

The purpose of this study is to examine the industrialisation process and the effects of joint ventures, the main form of foreign direct investment, on industrial development in Bahrain.

The first part of the study provides a macro-economic analysis which helps us to visualize the country's economic situation. Chapter two presents a general profile of Bahrain, the historical roots of industrialisation and various dimensions of growth in the economy. Chapter three discusses the size and nature of Bahrain's economy and its period's of faster growth and slower growth . A quantification of the sources of growth over the period under study is undertaken . The growth of gross domestic product is decomposed and studied in different sub-periods. The gross domestic product is studied according to supply side, demand and sectoral decomposition. Chapter four examines the size composition of industrial establishments during the 1973-1983 period. Focussing solely on the demand side, an analysis of import substitution and export expansion is presented.

The second part provides an analysis of joint ventures and industrialisation in Bahrain. Chapter Five begins with a discussion of a framework for evaluating the effects of industrial establishments on development. Chapter six presents a brief review of the literature on the determinants of the growth of joint ventures in manufacturing industry. An analysis of the motives of developing countries and multinational enterprises toward the promotion of joint ventures is attempted, followed by a discussion of the early and current experience of international joint ventures and regional joint ventures in Bahrain and other GCC states. Chapter seven provides a review of the official policy on foreign investment and joint ventures and an analysis of the protective and other incentive measures in the manufacturing sector. Chapter eight presents the sample size of industrial establishments used in the study, the definition of the original and derived variables, and the main features of the sample data. Chapter nine attempts to test the hypothesis that ownership of industrial establishments exert an independent influence on the development of the manufacturing sector in Bahrain. Using weighted mean ratios, the behaviour of joint ventures and local establishments is studied in terms of the following characteristics: the efficiency and potential for the faster growth of an establishment, the appropriateness of an establishment's capital and skill intensity, the choice of trade policy, and the Bahrainisation policy. Chapter ten focusses on determining whether joint ventures can be distinguished from local establishments. Using discriminant analysis, the best discriminating characteristics between joint ventures and local establishments are identified. Joint ventures misclassified as local establishments and local establishments misclassified as joint ventures are identified and examined. Chapter eleven is largely descriptive in nature, analysing the experience of joint ventures establishments in the manufacturing sector. Case studies are presented to examine the role of joint ventures in oil and natural gas, aluminium and shiprepairing. The case studies include historical background, the shareholding and the role of the foreign partner or regional partner in the formation of joint ventures, and analysis of the production process and technical know-how employed and of cost structures as an indicator of comparative advantage. Finally, chapter twelve presents an overall summary of the results of the study, followed by a discussion of policy implications and suggestions for further research.

Notes

[1] The deflator used is the unit value of imports by major petroleum importers. _Handbook of International Trade and Development Statistics_, UN Conference on Trade and Development, 1986 (Supplement) p 43.

[2] Ministry of Finance and National Economy, _Social and Economic Program (1982-1986)_ and Arab Fund for Social and Economic Development: _State of Bahrain (Statistics) (1971-1981)_, 1983.

PART I: INDUSTRIALISATION AND GROWTH IN BAHRAIN

The relationship between industrialisation and economic growth is still a controversial issue in economic thought. Historically, the increase of manufacturing share in aggregate output and employment as per capita income rises is one of the major documented generalisations about economic development. But, how does this transformation of the structure of the economy affect the rate of growth? and what has been the impact of policies designed to accelerate this or to change its composition? these questions are still in dispute.[Chenery, 1986]

Although neoclassical theory emphasises the significance of changes in factors of production and productivity, other empirical studies of developing countries show that changes in demand and trade are equally important to continued growth. Moreover, one can also argue that industrialisation is not only a response to changing demand and supply conditions but also an important means of providing the developing countries with modern production processes and technical know-how. Indeed, industrialisation, as described by Kuznets (1966), is not regarded only within the context of the allocation of resources, but as part of the general transformation that can be identified as "modern economic growth".

This study attempts to contribute empirically to the above discussion through studying the relation between industrialisation and growth in Bahrain and the role of foreign direct investment, namely joint ventures, in providing efficiency, modern production processes, technology and employment for industry of Bahrain in particular and its economy in general.

The first part of this study will focuss on the first issue, that is, the relation between industrialisation and growth in the economy of Bahrain. We seek to identify various dimensions of growth based on aggregate data which could be utilised to characterise selected sub-periods in the development. Chapter 2 discusses the historical perspective of industrialisation and various aspects of its growth in Bahrain. Chapter 3 examines the pattern of economic growth in Bahrain over the 1973-85 period. It attempts to quantify the sources of growth over the period understudy through supply-side, demand, and sectoral decomposition. Chapter 4 analyses growth in the Bahraini industrial sector through studying the role played by import-substitution and export expansion and the measurements of the effect of these two forces on the growth process.

CHAPTER TWO

AN OVERVIEW OF INDUSTRIALISATION
AND
THE BAHRAIN ECONOMY

2.1. INTRODUCTION

The state of Bahrain experienced, like other Gulf Cooperation Council states, changes in economic structure in the 1970s, especially after the increase of world oil prices in 1973-74. This chapter presents a general profile of the state, historical roots of industrialisation, and various dimensions of the growth in the economy.

2.2. SITE, AREA, AND POPULATION

The state of Bahrain is an archipelago of 33 small low lying islands located at the center of the Arabian Gulf, midway between Kuwait and United Arab Emirates. It is situated at about 25 Kilometers (Km) off the east coast of Saudi Arabia and slightly further from Qatar peninsula. For centuries, this position has given Bahrain a regional importance as a trade and transportation centre.

The total area of Bahrain is approximately 691.24 square Km; however, extensive land reclamation schemes continue to change the total area figures. The largest island is Bahrain, where the capital Manama is situated. Bahrain, from which the archipelago take its name, is about thirty miles long and about ten miles wide at its broadest part. It represents 85 percent of the total area of the state. Manama, which is on the northeastern coast of Bahrain island, is connected by causeway to Muharreq-the second largest island- and Sitra islands. Bahrain island is now connected by a 25-kilometer causeway to Saudi Arabia via Um-AlNasan island.

In comparison to most countries of the world, Bahrain is small in population and land mass. As of the 1981 census, the total population was 370,798 - 238,420 Bahrainis (68 percent) and 112,378 non-Bahrainis (32 percent) - which is roughly equal to that of Luxembourg (363,00) and Malta (347,000). However, Bahrain's land mass is about one fourth that of Luxembourg and about twice that of Malta.[1]

2.3. INDUSTRIALISATION IN BAHRAIN: HISTORICAL PERSPECTIVE

The modern manufacturing industry in Bahrain began with the establishment of an oil refinery off shore of Sitra on the eastern side of the country in 1936 with a capacity of 25,000 barrels a day (b/d), which grew into 250,000 b/d in the early 1970s. The oil refinery at Sitra was ranked second, after the Abadan plant in Iran, among the Middle East refinery plants. The entire oil production of Bahrain is processed at the refinery. Domestic oil, however, accounts now for less than 20 percent of the total crude feed-stock, the rest being supplied by Saudi Arabia via a 34 miles Arabia-Bahrain pipeline. When the 12 units pipe was first built in 1945, with 17 miles of the line submerged under water, it was the world's largest commercial submarine pipeline. During the last half century, the refining industry was the largest employer in the country and the oil refined products were exported to India, Pakistan, East Africa and the Far East. The discovery of oil and the establishment of oil refinery have played a major role in the Bahrain transformation from an economy dependent to a large extent on the pearl industry to an oil-based economy. Before the development of oil, there were about 2,000 boats every year fishing for pearls, which dropped to 500 afterwards, then 192 in 1945, 12 in 1953 and by the 1960s there were none. In addition, the number of boats build in Bahrain dropped from 100 in 1928 to 8 in 1936, and to even fewer in the following years. In Personal Columns, Charles Belgrave, a British personal advisor to the government of Bahrain in the 1926-1957 period, wrote in 1954:

> It is estimated that about half of the crews of the Bahrain boats were Omanis from the Trucial Coast. Bahrain Arabs now have so much well paid employment on land (in the oil market) that every year fewer of them go to the pearl banks; if they were in debt to (Nukhadas) they prefer to pay their installments rather than diving. When the present generation of divers has passed away, and not many of them are young men, there will be few men from Bahrain to carry on the work.[2]

Oil refining was not the only major industry in the manufacturing sector within the country. As early as 1954, Bahrain Slipway Company, a joint venture between a local private sector firm (Yateem family), owning 51 percent of the equity, and a British company (Gray Mackenzie) owning the remaining 49 percent, was set up to operate a ship-repairing yard. By 1961, there were 5 soft drink and beverage plants, 2 tile establishments, 6 establishments for manufacturing cement blocks, 3 for plastic manufacturing, and 21 industrial workshops. By 1965, the industrial establishments were joined by 2 more beverage plants, 3 additional tile-making factories, 9 block factories, and 12 other workshops. However, almost all of these industrial establishments were small-scale and owned by individuals.[3]

The Bahrain major wave of industrial expansion took place in the late 1960s. In 1967 the government established the Development Bureau with the objective of increasing employment opportunities, foreign exchange revenues and the level of private sector investment in the Bahrain economy. The prospects for industrial diversification depended to a large degree on the utilisation of the ready availability of oil and natural gas. On the other hand, the economy is constrained by the scarcity of labour and water and the small domestic market for products. Thus, the industrial development was directed toward promoting capital and energy intensive industries with a strong export orientation.

The period of industrial diversification began with the formation of the Bahrain Fishing Company in 1967. The company was a joint venture between Ross Group of the United Kingdom with a 40 percent interest and 1200 local shareholders with a 60 percent interest. The company was using a fleet of 15 modern shrimping vessels and the catch was exported mainly to Europe, Japan and the USA. Bahrain's commercial shrimping remained a monopoly of the company until 1978 when the government took over the company and started to sell the entire catch domestically.

The Development Bureau's greatest success was the establishment of Aluminium Bahrain (ALBA), a company whose original shareholders included Bahrain's government and some European companies. Aluminium production started in 1971 making this a pioneer step into the area of basic industries. The initial capacity of the smelter was 120,000 tons a year, which extended to 165,000 tons a year by 1981. The aluminium operation was the largest non-oil industry in the Arab Gulf States at that time. Since aluminium production is generally a capital and energy intensive process, the GCC region, which has a great comparative advantage in oil and natural gas-based industries, is regarded as an ideal location for primary aluminium production. Thus, after the mid-1970s every state in the GCC was seeking the construction of an aluminium smelter. Fortunately, a cooperative framework was introduced which limited the construction of competitive smelters. Saudi Arabia shelved its plan to build a smelter in Al-Jubail and opted instead to buy 20 percent of the equity in ALBA. Now, only two smelters exist in the region: Aluminium Bahrain (ALBA) in Bahrain and DUBAL in the United Arab Emirates (UAE). However, Qatar is studying the feasibility of building a new aluminium smelter in the coming years.

The 1980s saw an expansion in the manufacturing sector with the construction of three new plants: the Gulf Petrochemical Industries Company (GPIC), completed in 1985, produces 1000 tons a day of both methanol and ammonia, The Arab Iron and Steel Company (AISCO), completed in 1984, converts 4 million tons a year of iron ore into pellets for steelmaking, and the Gulf Aluminium Rolling Mill (GARMCO) was completed in 1985.

Whether for aluminium expansion, iron pelletising, or petrochemicals, the new and big boost in industrialisation consists basically of energy intensive industries and depends to a large extent on consuming the local natural gas.

2.4. PROFILE OF THE ECONOMY

2.4.1. Growth In Gross Domestic Product (GDP)

One of the most useful indicators of economic growth is the change in gross domestic product (GDP). Indeed, 'growth' is the term often used to mean growth of GDP. GDP measures the total final output of goods and services produced by an economy - that is, by residents and non-residents - regardless of the allocation to domestic and foreign claims. It is calculated without making deductions for depreciation. GDP by industrial origin, for most countries, is measured at producer prices (factor cost). Purchaser prices (market prices) series, however, are used in some countries. In general, GDP at producer prices is equal to GDP at purchaser values less import duties.

Our analysis here will deal with growth in gross domestic product (GDP) at market prices rather than net product or national product. The gross product is preferred over the net product because it is difficult to estimate depreciation accurately. In fact, this difficulty does not apply only to Bahrain or the GCC States, but even to the developed countries. Domestic product and national product differ by the amount of net factor payments abroad, which in Bahrain refers to the difference between factor payments to foreign companies, foreign investors, and foreign labour's remittances operating in Bahrain and income from government (including interests on official holdings of foreign reserves), and private investments abroad. It is doubtful, however, that net factor payments are possible to be estimated accurately and, thus, the published estimates of this item are unreliable. The other reason for preferring gross domestic product (GDP) rather than others is that

GDP is an appropriate measure of the effect of a country's economic development efforts.

Tables (2.1) and (2.2), which presents the relative shares of economic activities and their growth rates in selected years of the 1975-1985 period, yields The following observations:

(1) With the exception of mining and quarrying (oil sector), and trade and hotel and restaurants, all other sectors grew above or at about the same rate as the economy (GDP) as a whole. Although the oil sector contributed the largest share in all years throughout the period, its share declined from 24.9 percent in 1977 to 17.6 percent in 1985, with an average annual growth rate of (-0.52) percent and a cumulative growth rate of (-3.13) percent. The trade and hotel and restaurant sector showed a negative growth rate in the period 1977-1985, with a decline in its share from 15.7 percent in 1977 to 11.0 percent in 1985.

(2) The manufacturing sector grew at a moderate average annual growth rate of 4.36 percent and a cumulative growth of 6.81 percent during the period under study. The increase in the level of value added, however, was steady from one year to the next, with one exception in 1985. This increase can be attributed to a modest, yet steady growth in industrial capital formation and labour employment. Although the size of the manufacturing sector is currently small in relation to other sectors in the economy, such as oil and the banking and finance sectors, it should have greatest potential for growth. Oil and banking and finance have probably reached their growth limit and may even decline. In addition, there are a number

Table (2.1): GROSS DOMESTIC PRODUCT (GDP) BY INDUSTRY ORIGIN (BD MILLION) AT CONSTANT PRICES (1977 = 100)

Sector	1975	1977	1979	1981	1983	1985	Av Annual Growth Rate (1977-85) (a) %	Av Annual Growth Rate (1977-85) (b) %	Cumulative Annual Growth Rate (77-85) (c) %
Agriculture & Fishing		12.3	12.6	15.7	16.6	16.7	3.90	4.19	4.94
Mining & Quarrying		194.0	185.0	155.2	146.5	186.1	-0.52	-	-3.13
Manufacturing		86.1	96.8	126.2	129.1	121.1	4.36	-	6.81
Construction		81.4	112.5	110.7	129.3	135.9	6.62	5.33	9.67
Electricity & Water		3.2	6.4	7.5	10.1	10.6	16.15	8.47	20.7
Transport & Communication		65.1	86.2	88.0	116.2	123.9	8.38	8.54	9.60
Hotel & Trade & Restaurant		122.0	104.9	113.0	135.9	116.1	-0.62	-	-0.79
Finance and Insurance		60.9	50.8	93.2	130.6	92.0	5.29	-	8.94
Rent & Real Estate		48.3	64.7	77.4	87.2	77.2	6.04	-	10.28
Service		23.1	24.9	33.7	38.0	41.4	7.57	8.57	7.88
Government		80.8	89.6	101.2	110.2	133.0	6.43	6.26	5.91
Total		777.2	834.4	921.8	1049.7	1054.0	3.88	4.44	4.69

Source: National Accounts. Ministry of Finance and National Economy. Bahrain.

(1) blanks refer to insignificant time coefficieint in regression equation.

NOTES

Growth rates in table (2.1) have been computed by using three different methods. First, the growth rate, r, in column (a) is estimated using the following compound growth rate equation :

$$GDP_{1985} = GDP_{1977} (1 + r)^{8} \qquad (1)$$

Second, the least square growth rate, r, in column (b), is estimated using the regression equation which takes the form of :

$$\ln X_t = a + bt + e_t \qquad (2)$$

where this is equivalent to the logarithmic transformation of the compound growth rate equation

$$X = X_o \left(1 + r \right)^t$$

where X is the variable (GDP), t is time, a = ln Xo , b = ln (1 + r), and e is the error term. a and b are the parameters to be estimated. If b* is the least squares estimate of b, then the annual average growth rate, r, is obtained as [antilog (b*)]-1.

Finally, the cumulative annual growth rate, r, in column (c) is estimated using the following compound growth rate equation:

$$\sum_{t=1}^{n} X_t = X_o \sum_{t=1}^{n} (1 + a)^t$$

or

$$\sum_{t=1}^{n} X_t / X_o = (1+a) + \dots + (1+a)^t + \dots + (1+a)^n \qquad (3)$$

where n = number of years
a = annual growth rate

Table (2.2): Shares of Gross Domestic Product by Industry Origin at Constant Prices (BD MIllion) (1977=100)

Sector			1977	1979	1981	1983	1985
TRADEABLE							
1 Primary	1.	Agriculture & Fishing	1.6	1.5	1.7	1.6	1.6
	2.	Mining & Quarrying	24.9	22.17	16.8	14.0	17.6
II Manu-facturing	3.	Manufacturing	11.1	11.6	13.7	12.3	11.5
NON TRADEABLE							
III Social Overhead	4.	Construction	10.5	13.5	12.0	12.3	12.9
	5.	Electricity & Water	0.4	0.8	0.8	1.0	1.0
	6.	Transport & Communication	8.4	10.3	9.5	11.1	11.8
IV Services	7.	Trade & Hotel & Restaurant	15.7	12.6	12.3	12.9	11.0
	8.	Finance & Insurance Real Estates	14.0	13.8	18.5	20.7	16.0
	9.	Public Admini-stration and Other Services	13.3	13.7	14.7	14.1	16.5
TOTAL			100	100	100	100	100

Source: National Accounts, Ministry of Finance and Nationa Economy, Bahrain.

of new manufacturing projects about to come on-stream, such as the Gulf Petrochemical Industries Company (GPIC), the Arab and Iron Steel Company (AISCO), and the Gulf Aluminium Rolling Mill Company (GARMCO). These will significantly enlarge the size of the manufacturing sector in the economy.

(3) The two least important contributors to GDP were agriculture and fishing and electricity and water, their combined shares in 1985 being about 2.59 percent. On the other hand, the electricity and water sector registered the highest growth rate, i.e. about 8.47 percent, and a cumulative growth rate of 20.7 percent, in relation to other sectors throughout the period under study. The agriculture and fishing sector grew approximately at about the same rate as the economy (GDP) as a whole, that is, about 4.19 percent, with a cumulative growth rate of 4.94 percent.

(4) The relative size of finance and insurance, rent and real estate, and the government sector exhibited substantial increases during the period. The increase in the contribution of finance, insurance and the rent and real estate sectors to GDP was steady from one year to the next except of 1985. This increase can be attributed to government policy in the financial sector. In 1975 the government of Bahrain initiated a policy of licensing offshore banking units (OBUs) in Bahrain as part of a broader strategy to diversify the economy. By 1978, 48 banks had been licensed, and in 1984 this number had reached 76 banks. By the end of 1978, the assets of OBUs had risen to $23.4 billion, which was close to the figure for Singapore in the same year.[4] The substantial increases in the

contribution of the government sector to GDP can be attributed to the commitment of government to provide employment and upgrade social services such as health, education and other services.

2.4.2. Growth In Labour Force

Table (2.3) presents the relative shares and growth of labour employment in economic activities between the census years 1971 and 1981. The following observations can be made:

(1) With the exception of agriculture and fishing, and mining and quarrying, all sectors exhibit significant increase in the rates of growth. Despite contributing the largest share to GDP, the oil sector failed to exert the same influence on the employment side. The data show that the oil sector contributed a smaller share and recorded a lower growth rate than most of the other sectors in terms of employment in 1981. Although the value added of agriculture grew from 1.6 percent in 1977 to 1.7 percent in 1981, its employment share as a percentage of the total work force declined from 6.70 percent in 1971 to 2.68 percent in 1981.

(2) The actual labour employment figure in the manufacturing sector had almost trebled by 1981, but its relative size of employment in the economy had risen modestly from 6.83 percent in 1971 to 8.23 percent in 1981. The annual growth rate of labour employment in the manufacturing sector, however, recorded a substantial increase, i.e. 10.81 percent, in relation to labour employment in other sectors.

Table (2.3): Labour Force by Division of Economic Activity in Census Years 1971 and 1982

Economic Activity	1971 Number	1971 Percent	1981 Number	1981 Percent	Average Annual Rate of Growth %
Agriculture & Fishing	3990	6.70	3691	2.68	(-0.78)
Mining & Quarrying	4395	7.38	4772	3.46	.83
Manufacturing	4069	6.83	11,354	8.23	10.81
Construction	10,404	17.46	29,208	21.18	10.87
Electricity, Gas & Water	1705	2.86	2845	2.06	5.25
Wholesale and Retail Trade, Restaurants	7706	12.93	18,493	13.41	9.15
Transport, Storage and Communication	7743	12.99	13,157	9.54	5.44
Finance, Insurance Real Estate and Business Service	1084	1.82	4614	3.35	15.59
Community, Social & Personal Services	18,388	30.86	47,515	34.46	9.96
Activities not adequately defined	106	0.18	2243	1.63	-
Total Employment	59,590	100.00	137,892	100.00	8.75
Bahrainis	37,378	62.73	57,178	41.47	4.34
Non Bahrainis	22,212	37.27	80,714	58.53	13.77

Source: directorate of Social Affairs, Social Indicators for Bahrain, Ministry of Labour & Social Affairs, December 1982.

(3) The largest employer in the economy has always been the community, social and personal services sector, which consist of government services, education, health, and other social services. The government services and other social services sector employed about one third of the total working force in the economy. The growth rate of labour employment in the government sector is one percent above the growth rate of the total work force. In fact, labour employment growth rate in the government sector is usually compared with the growth rate of the Bahraini work force because Bahraini employees constitute more than 80 percent of total employment in the government sector. In addition, the Bahraini work force has long preferred working in the government sector rather than in blue collar jobs and other enterprises owned by the private sector.

(4) The construction and finance, insurance and real estate sectors registered substantial increases in their growth rates during the period under study, accounting for 10.8 percent and 15.59 percent respectively. The significant success of the finance sector in attracting new employees can be attributed to the government policy to transform Bahrain into an international financial (offshore banking) centre. The construction sector was the second largest employer after the government and other social services sector. However, labour employment in the construction sector was constituted mainly of non-Bahrainis and had been related to the construction boom in the mid-seventies. Moreover, the share and growth rate of labour employment in this sector is expected to decrease in relation to other sectors as construction activities are anticipated to decline into the 1990s. As to the breakdown of the flow

of the work force between sectors from 1971 to 1981, Table (2.3) shows that labour employment increased by about 78,302 employees throughout this period. As these new jobs were created, Bahrainis occupied about 25 percent of the jobs and non-Bahrainis the remaining 75 percent. Table (2.4) attempts to shed light on labour absorption in the manufacturing sector during the period 1971-1981. The data shows that only 2,072 persons of the 19,800 new Bahrainis were employed in the manufacturing sector, as opposed to 5,213 persons of the 58,502 new non-Bahrainis so employed. In other words, for every one hundred new jobs offered to Bahrainis and non-Bahrainis alike, throughout the period under study, only 28 Bahrainis, and 72 non-Bahrainis, chose to work in the manufacturing sector.

Table (2.5) shows a sectoral comparison between employment and the value added shares in 1981. Mining was the most labour saving sector in the economy, employing only 3.46 percent of the work force but contributing 26.9 percent to GDP. On the other hand, the public administration and other social services sector is the least saving labour sector in the economy, employing 36.09 percent of the work force but accounting for only 12.1 percent of GDP. In between, the manufacturing sector had a labour employment share of 8.23 percent and a value added share of 14.5 percent. By comparison, the manufacturing sector is less labour saving than the mining and finance sectors, but more labour saving than public administration and other social services, construction, agriculture, electricity and water, trade and hotel and restaurant, and transport and communication sectors. An interesting phenomenon shown by the table is the emergence of the finance and insurance sector, second to oil sector,

TABLE (2.4) LABOUR ABSORPTION IN THE MANUFACTURING SECTOR 1971 AND 1981

Year	Total Labour Force				Manufacturing Sector			
	Bahrainis		Non-Bahrainis		Bahrainis		Non-Bahrainis	
	No.	%	No.	%	No.	%	No.	%
1971	37,378	63	22,212	37	1,750	43	2,319	57
1981	57,178	41	80,714	59	3,822	34	7,532	66

Source: Statistical Bureau, Population Census 1971 and 1981, Bahrain

Table (2.5): Employment Shares and Contribution to GDP by Sector, 1981 (Current Prices)

Sector	Including Mining		Excluding Mining	
	Employment Share %	Relative Contributions to GDP %	Employment Share %	Relative Contributions to GDP %
Agriculture & Fishing	2.68	1.1	2.77	1.54
Mining & Quarry	3.46	26.9	-	-
Manufacturing	8.23	14.5	8.53	19.79
Construction	21.18	7.0	21.94	9.61
Electricity & Water	2.06	1.0	2.14	1.31
Trade, Hotel & Restuarant	13.41	10.30	13.89	14.11
Transport & Communication	9.54	8.50	9.88	11.63
Finance, Insurance Real Estate of Business Service	3.35	18.60	3.47	25.35
Public Administration & Other Services	36.09	12.10	37.38	16.66
TOTAL	100.00	100.00	100.00	100.00

Source: National Accounts, Ministry of Finance and National Economy. Directorate of Social Affairs Social Indicators for Bahrain, Ministry of Labour & Social Affairs, p. 76.

as an important labour saving activity. Thus, one can say here, that the policy of government in finance and insurance sectors, initiated since 1975, has been quite successful.

Table (2.5) also shows the influence of the oil sector on the employment and value added shares of other sectors in 1981. The first two columns of the table show the employment and value added shares of the major nine sectors, while the other two columns exhibit the effect of excluding the oil sector on the remaining sectors. When the influence of the oil sector is excluded, the employment shares in the remaining sectors does not change significantly, but the value added shares changes to some extent across the board, with the exception of agriculture and fishing and the electricity and water sectors. The largest change in value added share was in finance and insurance sector, followed by the manufacturing sector, then by public administration and other social services sector.

NOTES

1. Directorate Of Statistics (1983) Bahrain Census Of Population & Housing-1981 trends and prospects, Bahrain, P3.

2. Fuad I. Khuri (1980) Tribe and State in Bahrain: The Transformation of Social and Political Authority in an Arab State (Chicago, University of Chicago Press) p 135. See also Charles Belgrave (1972) Personal Column (Beriut, Librarie du Liban)

3. Fred Lawson (1989) Bahrain: The Modernisation of Autocracy (US, West-view Press)

4. A.S. Gerakis and O. Roncesvalles (1983) "Bahrain's Offshore Banking Center", Economic Development and Culture Change, p 272.

CHAPTER THREE

THE MACROPERFORMANCE OF THE ECONOMY

3.1. INTRODUCTION

The process of industrialisation can best be analysed within the context of overall economic growth. This chapter examines the size and nature of Bahrain's economy, its periods of faster growth and slower growth over the 1973-85 period. It attempts to quantify the sources of growth over this period. The growth of gross domestic product is examined on the basis of factor, demand, and sectoral decomposition.

The factor decomposition approach aims to decompose gross domestic product (GDP) growth according to the factors of production, labour and capital. This approach gives an estimate of productivity change in the economy and the contribution of labour and capital to growth. The demand decomposition method decomposes gross domestic product (GDP) growth according to demand components: consumption, investment and trade. Finally, the sectoral decomposition method decomposes growth according to sectors such as agriculture, manufacturing and so on.

3.2. SOURCES OF GROWTH: A BRIEF SURVEY OF THE LITERATURE

Economic growth has been a field of considerable interest among economists for many decades. In studying economic growth, some economists, best represented by Simon Kuznets of Harvard and the World Bank's Hollis Chenery, have aimed to describe the normal pattern of growth in economic sectors through an analysis of data on the gross national product (GNP) and the structure of that product from several countries in the world and through time. Other economists, such as Robert Solow and Edward Denison, have tried to account for sources of economic growth with an assumption of the existence of an aggregate production function. Some, such as the economic historian Walt Rostow, have gone to a rather more extreme position to distinguish the stages for economic growth.

Nations can achieve growth either through an intensive or an extensive process. With extensive growth, countries increase the amount of inputs, while intensive growth implies an increase in the productivity of these inputs.

Growth, in terms of a simple mathematical definition, can be expressed as:

$$\Delta Y/Y = I/Y * \Delta Y/I \qquad (1A)$$

Where $\Delta Y/Y$ is growth rate of output or gross domestic product, I/Y is the ratio of investment to output, and $\Delta Y/I$ is the productivity of investment. Alternatively, growth can be represented in the following:

$$\Delta Y = Y(0)\Delta L/L(0) + L(1)\Delta(Y/L) \qquad (1B)$$

where $\Delta Y = Y(1) - Y(0)$, $\Delta L = L(1) - L(0)$, and $\Delta(Y/L) = (Y(1)/L(1)) - (Y(0)/L(0))$, $\Delta L/L$ is the rate of growth of labour and $\Delta(Y/L)$ is the change of output per unit of labour or labour productivity. Thus, growth can be expressed as either (1A) the product of a country's ratio of investment to output and the productivity of investment, or (1B) as the sum of the rate of growth of labour and the rate of growth of output per unit of labour, or labour productivity.[1]

An alternative method to the measurement of sources of growth is the production function approach. Indeed, the aggregate production function lies at the heart of economic growth models.

At the early stage of industrialisation, rapid growth can be pursued through accumulation of factor inputs. But after a period of time, the country will recognise that it is difficult to achieve more by accumulating more factor inputs, particularly labour inputs. Thus, improving productivity in the use of inputs will come up as the crucial production issue to policy makers in generating more growth in the gross domestic product (GDP). Furthermore, changes in demand and trade are equally important to a continued growth, especially in developing countries. There are mainly two views concerning the sources of growth. The neoclassical view emphasises the growth of capital stock, the growth of the labour force or population, and improvement in the quality of labour such as a rise in the level of education. The other view, known as the structural approach, focuses on the importance of structural variables such as the reallocation of labour and capital inputs, growth of exports, and the level of development.

One way to investigate the sources of growth of an economy is to focus on the supply side. Growth can be analysed in terms of increases in factors of production and technological change. One approach in discussing supply side sources of growth is the neoclassical growth approach.

Abramovitz (1956), Solow (1957), Kendrick (1961), and Denison (1962) established the basis of the neoclassical growth approach, which tries to measure capital inputs, labour inputs and total factor productivity (TFP). In this section, we will discuss Kendrick's arithmetic measure and Solow's geometric index. Later on, we will introduce major improvements in the measurement of capital and labour by type and weight them by their imputed returns (Griliches and Jorgenson, 1966). Furthermore, an estimation of the aggregate production function for the entire economy will be examined in detail in the next section as another neoclassical approach to measure the contribution of factor inputs to the growth process.

Productivity is often expressed as a ratio of output to inputs. There are as many indices of productivity as there are inputs of production. However, the best known indices are the productivity indices of labour and capital and the total factor productivity index.

The productivity index of labour is simply the average product of labour expressed as:

$$AP(L) = Y/L \qquad (2A)$$

where: Y is output (in value terms)

L is labour input

similarly, the productivity index of capital is the average product of capital expressed as:

$$AP(K) = Y/K \qquad (2B)$$

where: Y is output

K is capital input

Total factor productivity (TFP) is often known as the "residual" or the index of "technical progress". The total factor productivity indices most often used in empirical research are Kendrick's arithmetic index and Solow's geometric index.

The general aggregate production function, given constant returns to scale and the marginal theory of distribution, can be written as:

$$Y = A(t)\ F(K,L) \qquad (3)$$

where: Y is the net real output produced

K, L are the capital and labour inputs

t allows function to change over time

and $A(t)$ represents the Hicksian efficiency parameter and measures the cumulative effects of shifts over time, that is, all efforts that go into the determination of Y in addition to capital and labour.[2]

If the production function $F(K,L)$ exhibits constant returns to scale, then competitively determined factor payments will exactly suffice to exhaust total output, that is,

$$F(K,L) = WL + rK \qquad (4)$$

and hence, on substitution,

$$Y = A(t)\ (WL + rK) \qquad (5)$$

and Kendrick's arithmetic index of total factor productivity is

$$A(t)/A(0) = (Y(t)/Y(0))/[\alpha_L(L(t)/L(0)) + \alpha_K(K(t)/K(0))] \qquad (6)$$

where α_L is labour's share of output in the base period (or year 0), α_K is capital's share of output in the base period ($\alpha_L + \alpha_K = 1$), and the subscripts (0) and (t) refer to the value of variables in the base year and current year respectively. Kendrick's study of the American economy for the 1899-1953 period accounted for a rate of growth of total factor productivity of 1.7 percent per year.

Taking the total differential of (3) and dividing by Y gives:

$$\dot{Y}/Y = \dot{A}/A + \alpha_K \dot{K}/K + \alpha_L \dot{L}/L \qquad (7)$$

where $\dot{Y} = dY$, $\dot{A} = dA$, $\dot{K} = dK$ and $\dot{L} = dL$

furthermore, we can define:

$$\alpha_K = Y/\ K * K/Y \qquad (8)$$

and

$$\alpha_L = \partial Y/\partial L * L/Y \qquad (9)$$

as output elasticities of capital and labour respectively. The term (A/A) represents the shift in the production function and the expression $[\alpha_K \dot{K}/K + \alpha_L \dot{L}/L]$ indicates a movement along the function.

Equation (7) shows that the growth in real output consists of three components:

(1) the growth in total factor productivity

(2) the contribution of capital accumulation

(3) the contribution of the growth in employment

By assuming that the factor markets are in a competitive equilibrium, so that capital and labour are paid their marginal products, the output elasticity of each factor becomes its share in total output, that is:

$$\alpha_K = rK/Y \quad \text{and} \quad \alpha_L = wL/Y \qquad (10)$$

where r and w are the prices of capital and labour respectively.

From (7) the growth in technical progress or total factor productivity can be measurd as the difference between the growth in aggregate output and the contribution of the growth in total factor inputs:

$$\dot{A}/A = \dot{Y}/Y - \alpha_K \dot{K}/K - \alpha_L \dot{L}/L \qquad (11)$$

Assuming constant returns to scale, so that

$$\alpha_K + \alpha_L = 1 \qquad (12)$$

or

$$\alpha_K = 1 - \alpha_L \qquad (13)$$

and (11) can be written as:

$$\dot{A}/A = \dot{y}/y - \alpha_K \dot{k}/k \qquad (14)$$

where: $y = Y/L$ and $k = K/L$

using equation (14) and with time series data on output per man-hour, capital per man-hour, and the share of property in income ($\alpha_K = rK/Y$), Solow was able to estimate ($\dot{A}/A$) for each year of the period 1909-1949.

Treating $\dot{A}(t) = A(t) - A(t-1)$, setting $A(1909) = 100$ and using the fact that:

$$A(t) = A(t-1)\ (1+ \dot{A}(t)/\ A(t-1)) \qquad (15)$$

Solow produced an index of total factor productivity.

Solow found that total factor productivity was growing at the rate of 1.5 percent per year from 1909 to 1949 and that more than one-half of the growth in real output can be attributed to technical change rather than to growth in factor inputs.

It is important to point out here that Solow himself acknowledged that the large proportion of technical progress in his calculation is not the result of disembodied neutral technical progress but also of increasing returns to scale, redistributive effects as factor inputs shift to more productive sectors and an embodied type of technical change caused by improvements in the quality of capital and labour.[3] Solow's basic form (1957) has been the most common methodology used to estimate the sources of growth in the neoclassical approach.

Edward F Denison applied the neo-classical growth approach on a very detailed basis, and gave rise to growth accounting.[4] Denison (1962) adopted this approach in his pioneering work in explaining the sources of growth in United States total factor productivity. He divided his explanatory factors into two groups: first, the factors of production and, second, the residual factor which, in turn, was divided into subgroups. One major result of his study is that education in the United States during the period (1930-1960) accounted for as much as 23 percent of the annual growth rate, more than any other single source of growth, except the increase of the labour force itself.[5]

Since Denison's study, there have been numerous empirical studies to analyse the relationship between education and economic growth. Following the 1962 study, Denison (1967) applied the same methodology to a comparison of the post-war growth rates of eight European countries (Belgium, Germany, Netherlands, Norway, Denmark, France, Italy, and the United Kingdom). Denison found that over 50 percent of output growth in these countries cannot be explained by increases in inputs even after allowances for quality changes in capital and labour inputs. Denison's complete list of sources of growth runs to several factors. For measuring labour, he looked not only at the number of employees but also at the average number of hours worked and differences in the return on different types of workers according to age and sex. He also took account of education and training levels. To measure capital, Denison divided capital into four sub-categories: housing, industrial building and equipment, inventories and foreign investment. For the residual factor, Denison used four sub-categories: a general improvement in knowledge, a catching up movement relating to knowledge, better allocation of the physical factors of production, and economies of scale.

Griliches and Jorgenson (1966) have taken Denison one step further by arguing that technical progress can be explained properly by adjusting inputs and outputs to take account of measurement errors in their prices and quantities and also their aggregation. As a result of this, the residual is negligible in their approach. In other words, they argued that virtually the whole of the growth of output can be explained by movement along a linearly homogeneous aggregate production function.

Their method begins with the following fundamental national income identity that the value of output is equal to the value of inputs.

$$P_1Q_1 + P_2Q_2 + \ldots + P_mQ_m = C_1X_1 + C_2X_2 + \ldots + C_nX_n \qquad (16A)$$

or

$$\sum_{i=1}^{m} P_i Q_i = \sum_{j=1}^{n} C_j X_j \qquad i = 1,\ldots,m \quad j = 1,\ldots,n \qquad (16B)$$

Qi is the quantity of the ith output, pi is the price of the ith output, Xj is the quantity of the jth input, and Cj is the price of the jth input.

To define total factor productivity (TFP), we need to differentiate (16) with respect to time and divide both sides by the corresponding total values. The result is an identity between a weighted average of the sum of rates of growth of output prices and quantities and a weighted average of the sum of rates of growth of input prices and quantities, rearranging (16) we will have

$$\sum Wi\ [\dot{P}i/pi + \dot{Q}i/Qi] = \sum Vj\ [\dot{C}j/Cj + \dot{X}j/Xj] \qquad (17)$$

where $Wi = PiQi/\sum PiQi \qquad Vj = CjXj/\sum CjXj$

(Wi) is the value of relative share of the ith output in the value of total output and (Vj) is the value of jth input in the value of total input.

A useful index of the quantity of total output may be defined in terms of the weighted average of the ratio of the individual outputs. Thus, denoting Q as output, the rate of growth of this index is

$$\dot{Q}/Q = \sum Wi\ .\ \dot{Q}i/Qi \qquad (18)$$

Similarly, denoting total input as X, the rate of growth of this index is

$$\dot{X}/X = \sum Vj \,.\, \dot{X}j/Xj \qquad (19)$$

These indices are known as "divisia quantity indices". The corresponding divisia price indices for total output (P) and total input (C) have rates of growth:

$$\dot{P}/P = \sum Wi \,.\, \dot{P}i/Pi \qquad (20)$$

$$\dot{C}/C = \sum Vj \,.\, \dot{C}j/Cj \qquad (21)$$

An index of total factor productivity (A) is defined as TFP = Q/X. Therefore, the rate of growth of total factor productivity (TFP) will be:

$$\begin{aligned}\dot{A}/A &= \dot{Q}/Q - \dot{X}/X \\ &= \sum Wi \,.\, \dot{Q}i/Qi - \sum Vj \,.\, \dot{X}j/Xj \qquad (22)\end{aligned}$$

or, alternatively

$$\begin{aligned}\dot{S}/S &= \dot{C}/C - \dot{P}/P \\ &= \sum Vj \,.\, \dot{C}j/Cj - \sum Wi \,.\, \dot{P}i/Pi \qquad (23)\end{aligned}$$

In general, any index of total factor productivity can be computed either from indices of the quantity of total output and total input or from the corresponding price indices.

The result of all these adjustments is that the unexplained residual attributed to changes in total factor productivity in Griliches and Jorgensen's sample period (1948-1968) was estimated at only 0.1 percent per annum.

Summing up, one can argue that all the earlier results on the sources of growth in developed countries tended to indicate that a relatively small proportion of growth can be accounted for by the increase in capital and labour, which leaves a large residual. On the other hand, contrasting pattern of findings has emerged from recent empirical studies on the experience of growth in developing countries. Bruton (1967), in a study of five Latin American countries, indicated that total factor productivity (TFP) growth was lower than in the developed countries. Maddison (1970) and Nadiri (1970) reached a similar conclusion. Chenery (1986) reported the values of the total factor productivity for thirty nine countries. The developed countries showed little growth of labour input (1.1 percent), moderate growth of capital (5.2 percent) and a relatively high contribution of total factor productivity to aggregate growth (50 percent). The developing countries showed a high growth of labour input (3.3 percent), a higher growth of capital (4.3 percent) and a relatively small contribution of total factor productivity to aggregate growth (31 percent). The analysis of the centrally planned economies applied only to the manufacturing sector, in which both labour and capital growth have been higher than in the other sectors. However, the centrally planned economies have a relatively high growth of total factor inputs (5.7 percent) and a relatively small growth contribution of total factor productivity to aggregate growth (35 percent).

In conclusion, one can argue that the major source of growth in developing countries is the growth of factor inputs and that the growth of total factor productivity is of less importance as an explanation of growth in developing countries compared to developed countries.

3.3. SOURCES OF GROWTH: THE SUPPLY SIDE

We carry out our analysis of sources of growth in the Bahraini economy using a production function approach, with the hope that this would fill a gap that existed in the quantitative analysis of the economy. However, to apply this approach, given the unavailability of some of the required data, we need to adopt certain assumptions.

3.3.1. Measuring Capital Stock

Official capital stock series are not available for Bahrain. Official investment and depreciation series, however, are available. So, these data were used to generate a capital stock series for the period 1973-1985, using the methodology of Irma Adelman and Hollis B. Chenery (1966) in their study of the economic development of Greece. The first stage to generate a capital stock series is to estimate the incremental capital-output ratio (ICOR) for the period under study using the following formula:

$$ICOR = NI(t)/(Y(N)-Y(0)) \qquad (1)$$

where $NI(t)$ = net capital formation(investment) at time t

$Y(N)$ = gross domestic product at time N (the last year of the sample period)

$Y(0)$ = gross domestic product at time 0 (the first year of the sample period)

The major assumption is that the ICOR measure is equal to an average capital-output ratio over the sample period. Second, the value of capital stock for the first year of the period under study is estimated by multiplying the overall ICOR by the gross domestic product (GDP) for that year as follows:

$$K(0) = ICOR * Y(0) \qquad (2)$$

The values of capital stock for the rest of the study period can be obtained by accumulating net capital formation, i.e.

$$K(t) = K(t-1) + NI(t) \qquad (3)$$

where K(t-1) is capital stock in year (t-1)

Several researchers have used this measure of capital stock and used it to estimate an index of technical progress or total factor productivity. However, they did not pay attention to the limitation of this approach. Thus, we attempt here to shed some light on this method and its limitation.

The main underlying assumption of this approach is that the ICOR measure is equal to an average capital-output ratio. The only way this can occur is for the capital-output ratio to remain constant. So, if (K) represents capital and "Y" output, then the output elasticity of capital (α_K) can be written as:

$$\alpha_K = dY/dK * K/Y \qquad (4A)$$

or

$$K/Y = \alpha_K dK/dY \qquad (4B)$$

By assuming labour and technology constant, and (α_K) **less than unity,** then an avarage capital-output ratio must be smaller than the marginal capital-ouput ratio. Over time, however, the change in (Y) is caused by the change in capital (K), labour (L) and technology (A), that is

$$dY/Y = \alpha_L dL/L + \alpha_K dK/K + A \qquad (5)$$

where α_L, α_K and A refer to output elasticities of labour, capital and technology respectively. Multiplying equation (5) by K/dY we get:

$$K/Y = [\alpha_L(dL/L) + A\ ]\ (K/dY) + \alpha_K(dK/dY) \qquad (6)$$
$$= \{\ \alpha_K + [A + \alpha_L(dL/L)]/(dK/K)\}\ (dK/dY)$$

Therefore, K/Y = dK/dY can take place only if the first component in the right hand side of equation (6) is equal to unity or:

$$A = (1 - \alpha_K)\ (dK/K) - \alpha_L(dL/L)$$

or

$$A = (1 - \alpha_K)\ (dK/K - dL/L)$$

Where ($\alpha_L + \alpha_K = 1$). Thus, technical progress must exactly offset diminishing returns to capital ($\alpha_K < 1$) associated with an increase in the capital-labour ratio.

Summing up, we can argue that the above approach is based on either of the following two assumptions: (a) a constant capital-labour ratio and constant technology or (b) technical progress is always exactly the right amount to offset diminishing returns to capital associated with an increase in the capital-labour ratio. Furthermore, under these assumptions we do not need a measure of capital stock to calculate technical progress. When the incremental capital-output ratio is equal to the average capital output ratio, the growth rate of capital is equal to the growth rate of output. Assuming constant returns to scale ($\alpha_L + \alpha_K = 1$), technical progress is equal to the growth rate of output per worker times the output elasticity of labour, that is:[6]

$$A = \alpha_L (dY/Y - dL/L) \qquad (7)$$

3.3.2. Estimation of the Cobb-Douglas Production Function

Assuming that the Bahraini economy as a whole can be represented by an aggregate Cobb-Douglas production function, the aggregate production function used for estimation can be written:

$$Y = A\, K^{\alpha_K} L^{\alpha_L}\, e \qquad (8)$$

Where Y is output, K is capital input, L is Labour input, A is an efficiency parameter, is output elasticity of capital, is output elasticity of labour, and e is a multiplicative error term.

If we take the logarithm of equation (8) we obtain the following equation which is suitable for estimation:

$$\log Y = \log A + \alpha_K \log K + \alpha_L \log L + U \qquad (9)$$

The sum of α_K and α_L in equation (9) defines the degree of returns to scale: a sum more than one implies increasing returns, and a sum of less than one implies decreasing returns.

The alternative version of equation (8) is to divide both sides of the equation by L, we get:

$$Y/L = A\, K^{\alpha_K} L^{\alpha_L}\, L^{-1}$$

$$= A\, K^{\alpha_K} L^{\alpha_L} (L^{\alpha_K} / L^{\alpha_K})\, L^{-1}$$

Therefore,

$$Y/L = A\ (K/L)^{\alpha_K}\, L^{\alpha_K + \alpha_L - 1} \qquad (10)$$

Taking the logarithm of equation (10) we obtain:

$$\log\ (Y/L) = \log A + \alpha_K \log\ (K/L) + (\alpha_K + \alpha_L - 1) \log L \qquad (11)$$

The advantages of equation (11) are that the degree of returns to scale can be treated directly. The coefficient of (log L) equals the sum of the output elasticities of capital (α_K) and labour (α_L) minus one. Furthermore, the sign of the coefficient is an indication of increasing or decreasing returns to scale. On the other hand, when we use equation (9) the statistical significance of the sum of elasticities can only be tested indirectly.

The result of fitting the Bahraini economy's data to equation (9) and (11) are as follows:

$$\log Y = 1.6170 + 0.29083 \log K + 0.60524 \log L$$

(t ratio) (3.7337) (3.2955) (7.4793)

D.W = 1.6359 $\bar{R}^2 = 0.97$

No. of observations = 13 F = 212.7

$$\log Y/L = 1.6170 + 0.29083 \log (K/L) - 0.10393 \log L$$

(t ratio) (3.7337) (3.2955) (-2.3101)

D.W = 1.6359 $\bar{R}^2 = 0.69$

No. of observations = 13 F = 13.510

The estimation of equations (9) and (11) shows a good overall fit as revealed by the high $\bar{R}^2$ for (9) and an acceptable R for (11). Both equations show that the elasticity of GDP with respect to labour is (0.6) and with respect to that of capital is (0.3). Their sum (0.9) signifies decreasing returns to scale, as can be shown from the coefficient log L in the second equation. Furthermore, our results reflect that the marginal product of capital is lower than the marginal product of labour during the thirteen years period of observations (1973-1985). However, we can go one step further and argue that the low coefficient of capital is an indicator of the low productivity of investment. So a close look into the allocation efficiency of investment is needed.

3.3.3. Productivity of Investment

A conventional view is that the growth rate of an economy is a function of the investment to GDP ratio and the productivity of that investment. As a consequence, it is common among empirical researchers to apply the Harrod-Domar relationship to get some indication of the productivity of investment.

The underlying assumption of this relationship is that the output of an economy depends on the amount of capital invested in that economy. So, if we assume output (Y) and capital stock (K), then the relationship between output and capital stock can be:

$$Y = K/V \qquad (12)$$

where (V) is a constant called the capital-output ratio. Introducing increases in output and capital and dividing both sides of the equation by (Y) we get:

$$g = \Delta Y/Y = \Delta K/Y * 1/V \qquad (13)$$

where $\Delta Y/Y$ is the growth rate of output (g) and ΔK is the same as investment.

Thus, the rate of economic growth is a function of the ratio of investment to gross domestic product (GDP) and the productivity of investment, defined as the inverse of the capital-output ratio. However, it is important to point out that this over-simplified approach has severe shortcomings. For instance, this approach obscures the various causes of growth and subsumes all of these other causes in the capital-output ratio. Moreover, the assumption is being made that all increases in output are attributable to increases in capital, which is untrue.

Table (3.1) shows the average annual growth rate of GDP ratio during the period (1973-1985). For example, the economy achieved an average annual growth rate of 19.6 percent in 1976 with an investment/GDP ratio of 33.2 percent, whereas in 1980 it achieved an investment/GDP ratio of 42.0 percent to achieve a lower growth rate of 7.5 percent. These data should be carefully interpreted because it is possible for a considerable part of the growth of GDP to occur - independent of investment or capital stock - in response to exogeneous factors such as a rise in oil prices.

If GDP growth rate is divided by its investment/GDP ratio, the result shows an index of productivity of investment during the period under study. Column (4) of the same table shows productivity indices of investment during the period 1973-1985. The trend of figures for the productivity index of investment is deteriorating from positive figures

TABLE (31): PRODUCTIVITY OF INVESTMENT

Year (1)	Average Annual Rate of GDP % (2)*	Year (3)	Gross Domestic Investment as % of GDP (4)	Year (5)	Ratio of 2/4
1974	15.1	1973	5.2	1974	2.904
1975	13.9	1974	13.2	1975	1.053
1976	19.6	1975	33.2	1976	0.590
1977	14.4	1976	43.7	1977	0.330
1978	7.7	1977	30.7	1978	0.251
1979	-0.4	1978	29.3	1979	-0.014
1980	7.5	1979	42.0	1980	0.179
1981	2.8	1980	38.8	1981	0.072
1982	6.4	1981	32.4	1982	0.198
1983	7.0	1982	49.6	1983	0.141
1984	5.6	1983	53.3	1984	0.105
1985	-4.9	1984	54.7	1985	-0.090

* $\frac{\Delta Y}{Y(t)} = \frac{Y(t+1) - Y(t)}{Y(t)}$ $t = 1973, \ldots, 1985$

(2.904) in 1973 to negative (-0.09) in 1985. However, the figures look highly unstable, which indicates the influence of omitted factors.

One way of explaining the low figures for the productivity index of investment is through an analysis of the incremental capital-output ratio (ICOR).The incremental capital-output ratio is defined as the increase in capital necessary when an additional unit of output is produced. Thus, improving the productivity of investment is very closely related to a reduction in the incremental capital-output ratio for the whole economy. The ratio for the whole economy, however, is composed of such ratios for the individual sectors and subsectors.

Furthermore, any economy comprises sectors which by virtue of their inherent nature and the country's resource endowment have either high, medium or low incremental capital-output ratios. Therefore, the larger the share of investment in sectors with a high incremental capital-output ratio in total investment, the higher the incremental capital-output ratio for the economy as a whole, which means low productivity of investment.

During the period 1973-1985, the government's capital expenditure increased sharply following the increase in oil revenues in 1974-1975. Indeed, the increase in capital expenditure was much faster than that of oil revenues. Alkuwari (1978) reported that the investment of oil revenues in the public utilities has been a major concern of the government. Thus, top priority was given to the construction of power stations, sea distillation plants, gas pipelines, and the development of the means to distribute water and power. Over the period (1970-1985) the capital expenditure on electricity, water, and communication was estimated to be about 49 percent of total public investment. Table (3.2) shows that the electicity production budget claimed an average of 25 percent of public capital expenditure over 1971-1985. On the other hand, electricity production is by nature highly capital intensive and, hence, has a very high incremental capital-output ratio sector in comparison with other sectors.[7]

As a consequence, other things being equal, heavy investment in sectors such as electricity, sea distillation of water and other projects of infrastructure is likely to raise the overall incremental capital-output ratio and lower the productivity index of investment, which in turn results in a lower GDP growth rate than would occur if investment were concentrated in sectors with a low incremental capital-output ratio in which the country has a comparative advantage.

3.3.4. Sources of Growth: Solow's Measure

The standard aprroach to analyse the sources of growth of gross domestic product(GDP) is through the following equation:

$$Gy = \alpha_K Gk + \alpha_L Gl + GA \qquad (14)$$

Where G is the rate of growth of the variables output(Y), capital(K), and labour(L). (α_K) and (α_L) are the output elasticities of capital and labour respectively. According to this approach, the growth of output is decomposed into three components: the effect of the growth of labour, the effect of the growth of capital, and the effect of technological progress.

The main problem with this approach is the calculation of factor

Table(3.2): Electricity Production Expenditure as a Percentage of the Government's Investment Budget

Year	Percent
1971	14.49
1972	16.25
1973	61.32
1974	23.15
1975	29.43
1976	19.89
1977	19.55
1978	29.07
1979	31.50
1980	26.14
1981	25.80
1982	16.80
1983	23.00
1984	20.10
1985	15.60

Source: Dhafar A. Alumran, <u>A Predicted Model of the Oil Crisis in Bahrain and the Search for a New Development Strategy</u>, (Unpublished PhD Thesis), University of Southern California, April 1986, P. 154.

elasticities of output. Some economic researchers obtained elasticities by estimating a Cobb-Douglas production function. For example, Chen (1979) has used the estimated output elasticity of capital for the economy as a whole of both Korea and Taiwan obtained from a Cobb-Douglas estimation, as capital share in income in the calculation of the standard approach of sources of growth in these countries. But the residuals from the regression analysis are conceptually quite different from the residual in the standard approach to sources of growth. Regression residuals always sum to zero ($\sum e_i = 0$). Thus, this brings into question the unqualified use of estimated factor elasticities of output as factor shares in the standard approach (Solow-Denison) to sources of growth.

Another approach is through the assumption that the economy is in competitive equilibrium, that is, factors of production (capital and labour) are paid their marginal products. Thus, output elasticities become equivalent to the income shares of the respective factors of production in total income. In the calculation of sources of growth in the economy, we use equation (14) in which labour share (wages and salaries) in value added are used as equivalent to the ouput elasticity of labour. Assuming constant returns to scale ($\alpha_K + \alpha_L = 1$), we calculate the capital share in value added to be one minus the labour share ($\alpha_K = 1 - \alpha_L$).

The sources of growth of value added for the economy as a whole are presented in Table (3.3). Over the entire period (1975-1984) total factor productivity (TFP) accounted for a small proportion (4 percent) of the growth of GDP. On the other hand, the growth of total factor inputs accounted for most of the GDP growth (96 percent). The composition of total factor inputs (TFI) indicates that capital contribution to GDP

TABLE (3.3): THE SOURCES OF GROWTH OF GDP

(Average annual rates of growth)

	1975-1980	1980-1984	1975-1984
Length	5	4	9
α_L	0.275	0.267	0.275
GDP Growth(%)	10.60	5.40	8.20
Labour Growth(%)	11.60	4.70	8.50
Capital Growth(%)	7.20	8.00	7.60
Labour Input(%)	3.19	1.25	2.34
Capital Input(%)	5.22	5.86	5.51
TFI(%)	8.41	7.11	7.85
TFP*(%)	2.19	-1.71	0.35

Note: * $G_A = G_Y - (\alpha_L G_L + \alpha_K G_K)$

growth is higher than the contribution of labour, which is mainly due to a large weight used in calculating the percentage contribution of capital to GDP growth. Furthermore, the data show that the decline of TFP from a positive contribution in the first period to a negative contribution in the second period was accompanied by a large decrease in labour growth and output growth.

To sum up, our growth accounting exercise applied to the economy as a whole has revealed that, irrespective of the rate of growth of output, the sources of growth patterns are best explained by the contribution of factors to GDP growth.

3.3.5. Employment, Productivity and Technological Progress

Another approach is to decompose GDP growth into two parts: growth of employment and the change in labour productivity, that is:[8]

$$Y(1) - Y(0) = Y(0)/L(0)[L(1) - L(0)] + L(0)[Y(1)/L(1) - Y(0)/L(0)] \quad (15)$$

Equation (15), however, can be written in the following different form:

$$Y(1) - Y(0) = Y(1)/L(1)[L(1) - L(0)] + L(0)\ [Y(1)/L(1) - Y(0)/L(0)] \quad (16)$$

Taking the average of both equations (15) and (16), we get the following:

$$Y(1) - Y(0) = 1/2[(Y(0)/L(0) + Y(1)/L(1)][L(1) - L(0)] + 1/2[L(0) + L(1)]\ [Y(1)/L(1) - Y(0)/L(0)] \quad (17)$$

We apply these three methods to analyse the growth of GDP during the 1973-1984 period. Table (3.4) shows the decomposition of the growth of GDP in the two subperiods. Applying equation (15-17) to decompose GDP over the two periods, we took the average of two years for end periods to decompose GDP over the other two subperiods. In the analysis of the growth of GDP, however, we follow the compromise method of equation (17). This shows that the growth in the first oil shock period 1973-1977 was due to the first component and the contribution of the second component was negative. Over the second oil shock period 1978-1984, the first component contributed 69 percent, while the second component contributed 31 percent.

The first component on the right hand side of equation (17) represents the effect on output of the growth of employment (L(1) - L(0)) assuming that the productivity of labour is constant. However, this is different from the growth of output that would have resulted from the growth of employment, assuming all other factors constant as in the standard approach to the sources of growth. But for the productivity of labour with given technology to be constant, the growth of employment must be associated with a proportionate growth of capital. Thus, this component represents the joint effect of the growth of employment and the associated growth of capital. The rapid growth of employment, particularly foreign labour, can be explained partly by the increase of oil revenues which led to higher levels of investment. Furthermore, a large part of the growth of employment can be due to the increase in demand for goods and services, especially in construction, finance and trade and the communication sectors.

The second component on the right hand side of equation (17)

TABLE (3.4): COMPONENTS OF GROWTH: 1973-1984*

(at BD Million in 1977 Constant Prices)

Period	Growth of GDP	Based on Growth of Employment	Based on Growth of Lab. Prod.
Based on Eq(15)[1]			
1973-1977	262.0	352.817	-90.817
1978-1984	243.1	160.847	82.253
Based on Eq(16)[2]			
1973-1977	262.0	313.704	-51.704
1978-1984	243.1	174.121	68.979
Based on Eq(17)[3]			
1973-1977	262.0	333.261	-71.261
1978-1984	243.1	167.484	75.616

[1] $Y_1 - Y_0 = \frac{Y_0}{L_0}(L_1 - L_0) + L_1\left(\frac{Y_1}{L_1} - \frac{Y_0}{L_0}\right)$

[2] $Y_1 - Y_0 = \frac{Y_1}{L_1}(L_1 - L_0) + L_0\left(\frac{Y_1}{L_1} - \frac{Y_0}{L_0}\right)$

[3] $Y_1 - Y_0 = 1/2\left(\frac{Y_0}{L_0} + \frac{Y_1}{L_1}\right)(L_1 - L_0) + 1/2(L_0 + L_1)\left(\frac{Y_1}{L_1} - \frac{Y_0}{L_0}\right)$

* We took an average of two years for end periods to decompose GDP growth over the two periods.

represents the effect on output of the growth of labour productivity assuming employment is constant. The growth of labour productivity is usually decomposed into two parts. Part of the increase in labour productivity is due to increases in capial per worker. The other part is attributed to the improvement of organisation, skills and so on. However, it is difficult to separate these two parts. Thus, as most of the rise in labour productivity is accompanied with an increase in capital per worker, we can assume that there is a strong relationship between the entire growth of labour productivity and the increase in capital per worker. This relationship (γ) can be measured by the incremental output-capital ratio per worker, that is:

$$\gamma = (Y(1)/L(1) - Y(0)/L(0))/(K(1)/L(1) - K(0)/L(0)) \qquad (18)$$

An increase in the (γ) ratio, compared to some base period, may be seen as a rough indicators of technological progress since that period. This ratio was calculated for the two periods 1973-1977 and 1978-1984. Applying formula (18) to estimate the parameter (γ) over the two periods, we took an average of two years for end periods to remove random influence in individual years. Since the value of labour productivity growth was negative in the first period 1973-1977, we expect neither an increase of capital per worker nor of technological progress. In fact, this situation was brought about by the high rates of labour force growth particularly foreign labour, after the first oil shock period (1973-1974). As a consequence, the value of (γ) was 0.068. The corresponding value for the second period 1978-1984 was 0.116, indicating an important improvement in capital efficiency in this period. Thus, we expect most of the growth of labour productivity was due to the increase of capital per worker brought about by lower rates of foreign labour growth than in the previous period and substantial amounts of investment. Furthermore, growth of labour productivity can be decomposed further into two parts. The first part which would have occurred in the period 1978-1984 if technological progress had occurred at the same rate as in the base period, and the second part which was due to technological progress occurring at a faster rate. But since the growth of labour productivity was negative in the base period 1973-1977, it became difficult to quantify technological progress in the period 1978-1984. There was also a significant contribution from the growth of employment and the associated growth of capital in the latter period.

3.4. SOURCES OF GROWTH: DEMAND SIDE

The analysis of the preceding section dealt solely with the supply side sources of growth. Yet another way to examine the sources of growth is to focuss on the demand side. Following the approach of McCarthy, Hanson and Kwon on the sources of growth in Columbia and Burney's study on the sources of growth in Pakistan (1986), gross domestic product (GDP) growth can be decomposed according to factor demand which, in turn, shows the contribution of each component in overall GDP growth.

The national income identity assumes that the total value of output produced in an economy, in a particular year, is either consumed, saved(invested), or exported that is:

$$Y(t) = C(t) + I(t) + (X(t) - M(t)) \qquad (1)$$

where: $Y(t)$ is total value of ouput produced in year t

$C(t)$, $I(t)$ are total consumption and total investment in year t

$X(t)$, $M(t)$ are exports and imports in year t

Taking first order difference equation (1) can be rewritten as follows:

$$\Delta Y(t) = \Delta C(t) + \Delta I(t) + \Delta X(t) - \Delta M(t) \qquad (2)$$

Where $\Delta Y(t) = Y(t+1) - Y(t)$, $\Delta C(t) = C(t+1) - C(t)$,

$\Delta I = I(t+1) - I(t)$, $\Delta X(t) = X(t+1) - X(t)$,

$\Delta M(t) = M(t+1) - M(t)$.

Dividing both sides of equation (2) by $Y(t)$, we get:

$$\Delta Y(t)/Y(t) = \Delta C(t)/Y(t) + \Delta I(t)/Y(t) + \Delta X(t)/Y(t) - \Delta M(t)/Y(t) \qquad (3)$$

Equation (3) can be rewritten as follows:

$$\Delta Y(t)/Y(t) = \delta_1 C(t)/C(t) + \delta_2 I(t)/I(t) + \delta_3 X(t)/X(t) - \delta_4 M(t)/M(t) \qquad (4)$$

Where: δ_1 represents the share of consumption in total GDP in period t

δ_2 represents the share of investment in total GDP in period t

δ_3 represents the share of exports in total GDP in period t

δ_4 represents the share of imports in total GDP in period t

Equation (4) states that the growth in GDP over a period is the weighted sum of the growth of its components.The weights in this equation are the shares of each component in total GDP in the previous year.

All the data used to decompose demand into its components are obtained from various issues of National Accounts published by the Ministry of Finance and National Economy. Figures for 1973 and 1974 are obtained from the World Bank report on Bahrain's Current Economic Position and Prospects in 1978.

The gross domestic product (GDP) is decomposed for each year into the main components of consumption, investment and trade. Furthermore, consumption is divided into private and public components, investment into private, public and change in stock, and trade into exports and imports. The contribution of each major component and subcomponent, demand component inputs, the growth rate of demand components, and factor shares of demand components are reported in tables (3.5), (3.6), (3.7), and (3.8) respectively. In addition, the gross domestic product (GDP) are decomposed over the entire period 1975-1985, and two subperiods 1975-1980 and 1980-1985. applying equation (4) to decompose GDP over the entire period, we took an average of three years for end periods to remove random influences in individual years. Thus, we get the following equation:

$$\Delta\bar{Y}(t)/\bar{Y}(t) = \sum(\bar{Y}(it)/\bar{Y}(t))[(\bar{Y}(it+10) - \bar{Y}(it))/\bar{Y}(it)] \quad (5)$$

Where: $\bar{Y}(t+10) = 1/3[(Y(t+8) + Y(t+9) + Y(t+10)]$,

$\bar{Y}(t) = 1/3[(Y(t) + Y(t+1) + Y(t+2)]$,

$\Delta\bar{Y}(t) = Y(t+10) - Y(t)$

$\bar{Y}(it+10) = 1/3[(Y(it+8) + Y(it+9) + Y(it+10)]$, Table(3.5): Demand Decomposition of Gross Domestic Product (GDP) Growth

Percentage

Component	1975-1985	1975-1980	1980-1985
GDP Growth	58.62	38.75	18.89
Consumption	30.63	16.54	9.66
Private	23.42	13.03	7.22
Public	7.21	3.51	2.44
Investment	34.38	17.07	11.73
Private	36.80	8.66	18.88
Public	5.97	6.92	0.84
Change in Stock	-8.39	1.49	-7.98
Trade (ex-Imp)	-6.39	5.14	-2.50
Exports	7.35	19.40	-5.56
Imports	13.74	14.27	-3.06
Percentage Distribution of GDP Growth			
Consumption	52.25	42.68	51.14
Private	39.95	33.63	38.22
Public	12.30	9.06	12.92
Investment	58.65	44.05	62.10
Private	62.78	22.35	99.95
Public	10.18	17.86	4.45
Change in Stock	-14.31	3.85	-42.24
Trade	-10.90	13.26	-13.23
Exports	12.54	50.06	-29.43
Imports	23.44	36.83	-16.20
	100.00	100.00	100.00

Note: The contribution of each component to GDP growth in the period 1975-1985 is calculated according to the following formula:

$$Yi\ contribution = (\bar{Y}it/\bar{Y}t) * (\bar{Y}it+10-\bar{Y}it/\bar{Y}it)$$

where $\bar{Y}it+10 = 1/3(Yit+8 + Yit+9 + Yit+10)$,
$\bar{Y}it = 1/3(Yit + Yit+1 + Yit+2)$,
$\bar{Y}t = 1/3(Yt + Yt+1 + Yt+2)$

and where Y = GDP, Yi = demand component, eg consumption. Similarly, we took an average of two years for end periods to decompose GDP growth over the other two sub-periods 1975-1980 and 1980-1985.

Table(3.6): Demand Component Inputs

(percentage)

Demand Component	1973	1974	1975	1976	1977	1978	1979
Consumption		(27.81)	(9.54)	15.77	5.68	2.87	(2.47
Private		(20.80)	(12.63)	13.99	5.08	1.71	(2.50)
Public		(7.15)	3.21	1.78	1.04	0.77	0.02
Investment		9.96	24.63	19.01	(8.61)	0.89	12.55
Private		-	-	9.73	8.11	0.03	(4.80)
Public		-	-	15.40	(0.74)	1.52	(0.61)
Change in Stock		-	-	(6.12)	(15.98)	(0.66)	17.96
Trade (Exp-Imp)		33.02	(1.38)	(15.17)	17.30	3.98	(10.44)
Exports		57.74	(30.10)	3.47	30.31	(0.90)	(12.74)
Imports		24.72	(28.72)	18.64	13.01	(4.88)	(2.31)

Demand Component	1980	1981	1982	1983	1984	1985	1986
Consumption	4.36	6.44	4.88	0.33	0.96	0.12	
Private	3.51	5.01	4.10	0.17	1.25	(3.59)	
Public	0.85	1.44	0.78	0.15	(1.29)	3.71	
Investment	(0.24)	(5.52)	20.43	7.38	4.43	(31.72)	
Private	2.71	7.50	3.32	12.57	7.69	(17.43)	
Public	(0.55)	(1.84)	2.12	3.60	0.30	(7.58)	
Change in Stock	(2.40)	(11.18)	14.99	(8.79)	(3.55)	(6.70)	
Trade(Exp-Imp)	3.37	1.85	(18.87)	(0.72)	0.19	26.71	
Exports	4.53	13.65	(23.73)	2.03	1.03	13.76	
Import	1.16	11.80	(4.86)	2.75	0.84	(12.95)	

Note: The contribution of each component to GDP growth in each year is calculated according to the following formula:

$$Yi\ Contribution = (Yit/Yt) * (\Delta Yit/Yit)$$

where $\Delta Y_{it} = Y_{it+1} - Y_{it}$

Yi = demand component
t = 1973,...,1985
Yt = GDP

Table(3.7): Growth Rate of Demand Components

(Percentage)

Demand Component	1973	1974	1975	1976	1977	1978	1979
Consumption		(26.49)	(14.23)	31.22	10.25	5.37	(4.73)
Private		(25.52)	(23.94)	39.71	12.33	4.23	(6.38)
Public		(30.45)	22.60	11.64	7.33	5.77	0.18
Investment		190.31	186.49	57.20	(19.71)	2.90	42.86
Private		-	-	60.84	37.69	0.10	(19.95)
Public		-	-	132.98	(3.26)	7.96	(3.19)
Change in Stock		-	-	(108.41)	4022.22	4.58	(129.21)
Trade (Exp-Imp)		(326.20)	(6.95)	(93.29)	1896.77	24.96	(56.50)
Exports		41.69	(17.55)	2.81	28.59	(0.76)	(11.60)
Imports		16.63	(19.06)	17.41	12.38	(4.72)	(2.52)
GDP		15.06	13.87	19.61	14.36	7.75	(0.36)

Demand Component	1980	1981	1982	1983	1984	1985
Consumption	8.73	12.75	8.81	0.58	1.81	0.23
Private	9.56	13.37	9.93	0.41	5.62	(8.97)
Public	6.44	11.00	5.53	1.09	(9.72)	32.78
Investment	(0.57)	(14.21)	63.02	14.86	8.31	(58.00)
Private	14.01	36.60	12.18	43.75	19.92	(39.77)
Public	(2.97)	(10.97)	14.56	23.01	1.64	(43.80)
Change in Stock	(52.82)	(716.43)	(160.14)	(166.09)	108.75	103.77
Trade (Exp-Imp)	41.75	17.40	(155.27)	11.47	(2.90)	(441.79)
Exports	4.65	14.39	(22.48)	2.64	1.39	19.43
Imports	1.30	14.01	(5.20)	3.31	1.04	(16.84)
GDP	7.49	2.78	6.44	6.98	5.58	(4.90)

Note: Growth rates are calculated for each component in each year according to the following formula:

$$Y_i \text{ Growth} = (\Delta Y_{it}/Y_{it}) * 100 \qquad t = 1973,\ldots,1985$$

where $\Delta Y_{it} = Y_{it+1} - Y_{it}$ $\qquad Y_i$ = demand component

TABLE (3.8): FACTOR SHARES OF DEMAND COMPONENTS

Demand Component	1973	1974	1975	1976	1977	1978
Consumption	1.05	0.67	0.505	0.554	0.534	0.522
Private	0.81	0.53	0.352	0.412	0.404	0.391
Public	0.23	0.14	0.153	0.143	0.134	0.131
Investment	0.05	0.13	0.332	0.437	0.307	0.293
Private	–	–	0.160	0.215	0.259	0.241
Public	–	–	0.116	0.226	0.191	0.191
Change in Stock	–	–	0.056	(0.004)	(0.143)	(0.139)
Trade (Exp-Imp)	(0.10)	0.20	0.163	0.009	0.159	0.185
Exports	1.38	1.71	1.233	1.060	1.192	1.098
Imports	1.49	1.51	1.071	1.051	1.033	0.913

Demand Component	1979	1980	1981	1982	1983	1984
Consumption	0.500	0.505	0.554	0.567	0.533	0.514
Private	0.367	0.375	0.413	0.427	0.401	0.401
Public	0.132	0.131	0.141	0.140	0.132	0.113
Investment	0.420	0.388	0.324	0.496	0.533	0.547
Private	0.193	0.205	0.273	0.287	0.386	0.547
Public	0.186	0.168	0.145	0.156	0.180	0.173
Change in Stock	0.041	0.016	(0.094)	0.053	(0.033)	(0.065)
Trade (Exp-Imp)	0.081	0.106	0.122	(0.063)	(0,066)	(0,060)1
Exports	0.974	0.948	1.056	0.769	0.738	0.708
Imports	0.893	0.842	0.934	0.832	0.803	0.769

Note: The share of each component in GDP is calculated according to the following formula:

$$Yi\ Share = Yit/Yt$$

where Yi = demand component
Y = GDP
t = 1973,...,1984

$$\bar{Y}(it) = 1/3[(Y(it) + Y(it+1) + Y(it+2]),$$

$$\text{and } \Delta Y(it) = Y(it+10) - Y(it)$$

similarly we took an average of two years for end periods to decompose GDP over the other two subperiods.

Investment constituted the main source of growth in the entire period and in all subperiods, accounting for 58.65 percent of GDP growth. Excluding the influence of "change in stock", investment contributed about 73 percent. In theory, the "change in stock" item is part of gross investment. In reality, the "change in stock" item is often utilised as a balancing factor in computing gross domestic product from the demand side in some developing countries. We have been told that this procedure is applied to the computation of the "change in stock" item in Bahrain. Following the conventional practice, we computed "change in stock" as part of gross investment.

Most investment in the country , private as well as public, goes into construction and infrastructure related activities. Almost all government investment has been in social overhead projects (electricity and water, highways, hospitals, and schools). The total allocation of investment expenditure into various sectors shows that out of $3.02 billion spent between 1970 and 1985, 36.81 percent, the largest share, was spent on electricity and water, followed by housing, which absorbed 25.75 percent. Transportation, storage and communication absorbed 12.35 percent. [9] On the other hand, the share of petroleum, manufacturing, and agriculture, together, absorbed just 5 percent. Indeed, this pattern of public allocation of investment expenditure is applicable to the other members of the Gulf Cooperation Council. the pattern of private allocation of investment expenditure is no different. Most of the capital went into villas and apartment houses and so on. Government investment policy enhances the productive capacity of the economy and endows the economy with a physical infrastructure to serve as a base for its economic diversification policy and, hence, will contribute to the growth of GDP in future years. However, the extent to which such investment expenditure leads to future growth of GDP depends on the productivity of such investment, particularly on the capital intensity of the sectors to which it is allocated, as discussed in the preceding section of supply sources of growth. Therefore, one can argue about the importance of giving attention to the investment criteria in the allocation of resources to avoid the inefficient use of capital. Indeed, the World Bank report pointed out that the acceleration of development spending coupled with the lack of a rigorous investment criteria caused apprehension among concerned policy makers about the possibility of a major error in the selection of individual projects or over committing the whole programme.[10] Furthermore, the attempt to imitate the pattern of investment expenditure of the other oil rich members of the Gulf Cooperation Council will not result in accelerating growth rates of GDP. This is not to say that constructing a highway, a school, or a hospital is not productive, particularly in the long run, but we are arguing that substantial portions of investment should go into sectors that can produce goods in which the country has a comparative advantage such as small and medium scale industries and services, particularly those that can reduce consumer goods or help in transferring technology. In addition, the government is required to encourage the private sector to change its traditional investment behaviour in favour of new opportunities in the producing sectors and by creating joint ventures in manufacturing with foreign or GCC partners, instead of limiting itself to trading and construction related activities.

The second major source of growth was consumption, which accounted for 52.25 percent over the whole period. The share of private consumption was 76 percent of total consumption during the period understudy. Over all the sub-periods, private consumption was not less than 75 percent. On the other hand, the contribution of public consumption did not exceed 25 percent in the whole period and over all subperiods.

The change in the private consumption pattern in Bahrain can be investigated through the analysis of average annual expenditure for Bharainis and non-Bahrainis in the period 1974/75 - 1983/84, as reported in Table (3.9). The table shows that the average annual expenditure per person had jumped from BD 291.2 in 1974/1975 to BD 1,680.9 in 1983/1984, with an annual growth rate of 21.5 percent at current prices and 11.7 percent at constant prices from 1975. Indeed, this growth rate of average annual expenditure is considered high compared to other countries in the world. The same table allows some interesting remarks about the distribution of the growth rate of average annual expenditure by groups of commodities and services between the mid-1970s and the mid-1980s. The average annual expenditure on furniture and carpets recorded the highest growth rate, followed by cultural entertainment and recreation, and services requirements and personal care. The other commodities and services that had substantial growth are medical services, education services, transportation, and housing expenses. In short, the rapid increase in oil revenues in the period under study resulted in a higher growth rate

TABLE (3.9): AVERAGE ANNUAL EXPENDITURE PER BAHRAINI & NON-BAHRAINI PERSONS BY GROUP OF COMMODITIES & SERVICES (BD)

Group of Commodities and Services	74/75 BD	83/84 Bahraini & Non-Bahraini BD	83/84 Bahraini BD	Av. Annual Growth Rate %
Cereal and Cereal Products	24.12	73.9	76.2	13.2
Meat	21.01	75.7	71.1	15.3
Fish and Sea Products	18.00	54.1	56.3	13.0
Milk and Dairy Products	10.10	46.1	41.6	18.4
Eggs	-	13.4	12.9	
Oil and Fats	4.17	17.8	16.9	17.5
Fruits	16.09	77.7	79.8	19.1
Vegetables	9.03	50.1	45.6	21.0
Dry Legumes	3.01	6.7	6.6	9.3
Spices	2.80	15.0	15.6	20.5
Nuts	-	13.5	12.6	
Sugar and Sugar Products	4.84	23.0	22.3	18.9
Tea, Coffee and Cocoa	3.05	11.3	9.7	15.7
Beverages	6.21	28.8	23.0	18.6
Tobacco and Tobacco Products	3.80	16.2	14.0	17.5
Other Food	10.31	49.2	45.1	19.0

continued/...

TABLE (3.9) (Continued): AVERAGE ANNUAL EXPENDITURE PER BAHRAINI AND NON BAHRAINI PERSONS BY GROUP OF COMMODITIES & SERVICES (BD)

Group of Commodities and Services	74/75 BD	83/84 Bahraini & Non-Bahraini BD	83/84 Bahraini BD	Av. Annual Growth Rate %
Ready Made Clothes	10.26	50.1	47.0	19.3
Clothing and Tailoring Expense	12.27	29.2	29.3	10.1
Footwear	4.21	18.2	17.5	17.7
Housing & Related Expense	43.05	352.1	296.5	26.3
Fuel, Light and Water Expenses	9.34	36.6	35.1	16.4
Furniture and Carpets	6.41	81.6	86.9	32.7
Household Equipment	9.86	62.5	66.2	22.8
Household Utensils and Appliances	2.34	7.2	6.6	13.3
Cleaning Materials Expenses	4.48	12.3	11.9	11.9
Transportation Expenses	16.36	141.9	137.2	27.1
Educational Expenses	4.05	38.7	20.9	28.5
Medical Services and Healthcare	3.73	38.1	41.2	29.5
Services Requirements and Personal Care	5.17	59.8	50.1	31.3
Cultural Entertainment and Recreation	9.29	105.9	77.9	31.0
Other Expenses	13.81	74.2	52.3	20.5
Total	291.17	1680.9	1525.9	21.5%
Total (Constant Price 1975)	291.17	786.6	714.0	11.7%

Source: Bahrain Centre for Studies and Research of average annual expenditure as well as encouraging more expenditure on luxury consumption.

The rapid increase in private consumption can be expected to be accompanied by an increase in imports, particularly of consumer goods. Not surprisingly, imports contributed 23 percent to GDP growth over the entire period. Imports exceeded the contribution of exports during the same period and, thus, resulted in a negative contribution from trade to GDP growth. Is the high growth of imports a blessing for a small country like Bahrain?. To answer this question, we need to have a close look into the composition of imports. Due to the data constraint, we limit ourselves to the period 1979-1986. For the sake of analysis, imports are divided into three categories: intermediate goods, capital goods, and consumer goods. Consumer goods are divided into durable consumer goods and non-durable consumer goods. Table (3.10) reports the distibution of imports by category from 1979 to 1986. Expenditure on consumer goods represented more than one-third of the total expenditure on imports. In addition, consumer goods had the highest average annual growth rate (4.86) compared to intermediate and capital goods, which was mainly attributed to the growth of consumer non-durable goods.

The large expenditure and rapid growth of imports of consumer goods can be seen as a sign of the underdevelopment of import-substitution industries in Bahrain. Furthermore, expenditure on imports of goods and services for private consumption will have no effect on the growth increase of GDP. Indeed, the liberal import policy of the government, the strong lobby of the trading sector in the society and the absence of a comprehensive strategy for industry, particularly for import-

TABLE (3.10): DISTRIBUTION OF IMPORTS BY CATEGORY (1979-1986)

At current prices (million BD)

Year	1979	1980	1981	1982	1983	1984	1985	1986	Average Share in the Period 1979-1986 %	Average Annual Growth Rate %
1. Intermediate Goods	167.16	196.14	229.59	294.45	239.53	251.67	257.90	211.12	39.5	3.39
2. Capital Goods	86.52	112.05	110.76	139.67	209.74	191.98	140.15	101.05	23.35	2.24
3. Consumer Goods	157.88	193.24	211.16	233.15	240.93	246.31	234.76	220.12	37.15	4.86
4. Non-Durable Consumer Goods	106.88	137.27	13.36	146.62	155.77	163.80	159.72	155.47	22.21	5.51
5. Durable Consumer Goods	51.00	55.97	77.80	86.53	85.15	82.52	75.04	64.65	12.37	3.45
Total (1+2+3)	411.56	501.43	551.50	667.28	690.20	689.96	632.82	532.29	100.00	3.74

Source: Bahrain Centre for Studies and Research.

substitution, are responsible to a large extent for the growth pattern of imports. In an era of declining oil revenues the government faces a difficult situation. It will have either to face the problem of cutting down imports and, hence, reduce the current level of living standards or go on borrowing and increase its foreign debt. An appropriate strategy would be to develop domestic and export industries to a sufficient extent to meet and finance the high growth of consumption.

On the other hand, intermediate goods and capital goods constituted 40 percent and 23 percent of the total imports over the period 1979-1986. This was due to the expansion of the manufacturing sector especially in the early years of the period. The import of capital goods leads not only to the increase of the growth of GDP, but also to improving technology to the extent that it is embodied in the imported capital goods.

Table (3.5) shows that exports provided a moderate contribution to GDP over the whole period, accounting for 13 percent. However, in the first period 1975-1980, exports contributed a higher share (50 percent), but they declined sharply (-29 percent) in the early eighties.

The fluctuation in the contribution of exports to GDP is related to the nature of their composition. Oil exports dominated the total exports of Bahrain. For example, oil and refined products represented 88 percent of total exports over the 1979-1986 period. Not surprisingly, the price of oil is the determining factor, to a large degree, of the exports contribution to GDP growth. Remaining exports can be divided into two categories: intermediate goods and final goods. Table (3.11) shows that intermediate goods represented 79 percent - while final goods

TABLE (3.11): EXPORTS OF NON-OIL GOODS BY CATEGORY (million BD)

Year	1979	1980	1981	1982	1983	1984	1985	1986	Average Share %	Average Annual Growth Rate %
Intermediate Goods	74.18	56.74	78.45	117.55	126.91	113.89	95.22	114.00	78.93	6.3
Final Goods	42.81	30.43	31.63	25.61	22.19	18.57	22.51	13.63	21.07	-15.1
Total	116.99	87.17	110.08	143.16	149.10	132.46	117.73	127.63	100.00	1.3

Source: Bahrain Centre for Studies and Research.

represented 21 percent. The large share of intermediate goods can be seen as a sign of existing opportunities for industrial expansion. Ineed, industry in Bahrain is especially characterised by import-substitution industries producing final goods and export industries producing intermediate goods. It is important to mention here that the markets for intermediate goods are very limited and depend to a large degree on the level of demand in industrial economies.

The same Table (3.11) shows that the share of intermediate goods is growing more than the share of final goods. The average annual growth rate for intermediate goods was 6.3 percent, while the growth of final goods was negative, at -15.1 percent.

The rapid growth of GDP of the 1970s has given way to much lower growth rates in the early 1980s. The slow-down of growth in Bahrain and the other Arab Gulf states has been the outcome of external and internal changes: first, the decline in oil revenues; second, the Iran-Iraq war; and finally Al-Manakh stock market crisis in Kuwait.

3.5. SOURCES OF GROWTH: SECTORAL SIDE

The total value of output produced in an economy, in a particular year, is also the sum of value added in each economic sector such as agriculture, manufacturing and other economic sectors. Following the same procedure as in demand decomposition, growth in GDP over a period can also be expressed as follows:

$$\Delta Y/Y(t) = \sum Y(it)/Y(t)((Y(it+1) - Y(it))/Y(it)) \qquad (1)$$

Where the subscript i refers to the sector i in the economy.

Formula (1) indicates that the growth in GDP over a period can be expressed as a weighted sum of growth in each sector. The weights in this formula are the shares of each sector in total GDP in the period (t). This approach is helpful in explaining the overall growth of the economy, because a sector's contribution to overall growth depends not only on its growth rate but also on its relative size. Thus, a small fast-growing sector may not contribute much to overall growth relative to a large slow-growing sector.

Applying formula (1) to decompose GDP over the entire period 1976-1985, we took an average of three years for end periods to remove random influences in individual years. Similarly, we took an average of two years for end periods to decompose GDP over the two subperiods.

Results for the sectoral contribution in the gross domestic (GDP) are given in Table (3.12). Economic sectoral inputs, growth rates of economic sectors, and factor shares of economic sectors are reported in Tables (3.13),(3.14), and (3.15) respectively.

The oil sector faced major problems in Bahrain. Its contribution during the first period (1976-1981) was negative, but improved in the early eighties. The oil sector, still the main source of income in the country, accounted for over 80 percent of total revenues in the 1970s and about 70 percent in the 1980s. However, Bahrain oil production peaked in 1970, reaching a maximium production of 27.8 million barrels. Afterwards production declined at a rate of about 5 percent per year. Indeed, Bahrain can anticipate a very serious crisis of depleting oil by the end of this century. The first country within the Arabian Gulf area to have oil will be the first country to face the depletion of oil.

TABLE (3.12): SECTORAL DECOMPOSITION OF GDP GROWTH

Percentage

Component	1976-1985	1976-1980	1980-1985
GDP Growth	40.01	24.84	18.89
Agriculture	0.68	0.51	0.22
Mining & Quarrying	-3.21	-2.80	0.91
Mining	-3.48	2.84	0.76
Quarrying	0.27	0.03	0.15
Manufacturing	5.53	6.06	0.13
Electricity & Water	1.01	0.69	0.39
Electricity	0.92	0.65	0.34
Water	0.09	0.03	0.05
Building & Construction	6.08	4.16	4.23
Communication	8.02	4.00	4.92
Trade & Hotel & Restaurant	2.03	0.21	0.15
Trade	1.35	-0.47	0.11
Hotel	0.37	0.64	-0.21
Restaurant	0.31	0.03	0.25
Services	2.13	1.13	1.02
Banking & Insurance	7.53	4.21	2.19
Local Banks	2.72	0.76	1.73
Offshore Banks	3.39	2.08	0.47
Insurance	1.42	1.38	-0.01
Estate & Rents	4.64	3.69	1.48
Government	5.58	2.98	3.26

continued/...

Percentage

Component	1976-1985	1976-1980	1980-1985
	Percentage		
Agriculture	1.70	2.05	1.16
Mining & Quarrying	-8.02	-11.27	4.84
Mining	-8.70	-11.43	4.02
Quarrying	0.67	0.12	0.79
Manufacturing	13.82	24.40	0.69
Electricity & Water	2.52	2.78	2.06
Electricity	2.30	2.62	1.80
Water	0.22	0.12	0.26
Building & Construction	15.20	16.75	22.39
Communication	20.04	16.10	26.05
Trade & Hotel & Restaurant	5.07	0.85	0.79
Trade	3.37	-1.89	0.58
Hotel	0.92	2.58	-1.11
Restaurant	0.77	0.12	1.32
Services	5.32	4.55	5.40
Banking & Insurance	18.82	16.95	11.59
Local Banks	6.80	3.06	9.16
Offshore Banks	8.47	8.37	2.49
Insurance	3.55	5.56	-0.05
Estate & Rent	11.60	14.85	7.83
Government	13.95	12.00	17.26
	100.00	100.00	100.00

Note: The contribution of each sector to GDP growth in the period 1976-1985 is calculated according to the following formula:

$$Yi \text{ contribution} = (\bar{Y}it/\bar{Y}t) * (\bar{Y}it+9-\bar{Y}it)/\bar{Y}it$$

where: $\bar{Y}it+9 = 1/3(Yit+7 + Yit+8 + Yit+9)$,
$\bar{Y}it = 1/3(Yit + Yit+1 + Yit+2)$,
$\bar{Y}t = 1/3(Yt + Yt+1 + Yt+2)$

and where Y = GDP Yi = economic sector
Similarly, we took an average of two years for end periods to decompose GDP growth over the other two sub-periods 1976-1980 and 1980-1985.

Table(3.13): Economic Sector Inputs

(Percentage)

Economic Sector	1973	1974	1975	1976	1977	1978	1979
Agriculture & Fishing					0.34	0.03	0.01
Mining & Quarrying							
Mining					2.31	0.30	(1.31)
Quarrying					0.03	(0.06)	0.02
Manufacturing					1.99	0.87	0.47
Electricity & Water					0.25	0.12	0.27
Electricity					0.26	0.10	0.26
Water					(0.01)	0.01	0.01
Building & Construction					(0.01)	5.93	(1.79)
Communication					3.41	1.93	0.73
Trade & Hotel & Restaurant					1.27	(3.47)	1.18
Trade					1.60	(3.71)	1.17
Hotel					(0.16)	0.18	0.00
Restaurant					(0.18)	0.05	0.01
Services					0.09	0.14	0.08
Banking & Insurance					2.62	(0.23)	(0.99)
Local Banks					0.68	(0.54)	0.61
Offshore Bank Units					1.91	0.077	(1.73)
Insurance					0.03	0.23	0.13
Real Estate & Rents					0.71	1.69	0.39
Government					1.37	0.51	0.57

Table(3.13): Economic Sector Input (Contd)

(Percentage)

Economic Sector	1980	1981	1982	1983	1984	1985	1986
Agriculture & Fishing	0.18	0.18	0.22	(0.11)	0.05	(0.04)	
Mining & Quarrying							
Mining	(1.11)	(2.34)	(1.52)	0.31	1.53	2.22	
Quarrying	0.05	0.01	0.14	0.10	(0.09)	(0.02)	
Manufacturing	2.88	0.60	(0.43)	0.70	(0.09)	(0.64)	
Electricity & Water	0.10	0.03	0.09	0.18	0.10	(0.05)	
Electricity	0.10	0.01	0.05	0.18	0.08	(0.009)	
Water	0.00	0.02	0.03	0.00	0.03	(0.05)	
Building & Construction	0.04	(0.23)	0.52	1.41	3.36	(2.59)	
Communication	(1.07)	1.19	1.48	1.49	1.40	(0.63)	
Trade & Hotel & Restaurant	2.46	(1.38)	1.49	0.94	(1.04)	(0.80)	
Trade	2.04	(1.53)	1.42	0.98	(1.01)	(0.77)	
Hotel	0.40	0.11	0.00	(0.11)	(0.10)	(0.05)	
Restaurant	0.02	0.03	0.07	0.07	0.08	0.01	
Services	0.42	0.59	0.04	0.40	0.12	0.19	
Banking & Ins.	2.56	2.34	2.82	1.16	(1.66)	(1.91)	
Local Banks	0.37	(0.18)	1.38	0.06	0.39	(0.15)	
Offshore Banking Units	1.56	2.13	1.19	1.06	(1.88)	(1.26)	
Insurance	0.64	0.39	0.25	0.04	(0.17)	(0.50)	
Real Estate & Rents	0.41	1.04	0.74	0.31	0.76	(1.62)	
Government	0.59	0.75	0.87	1.10	1.11	1.00	

Note: The contribution of each sector to GDP growth in each year is calculated according to the following formula:

$$Yi\ Contribution = (Yit/Yt) * (\Delta Yit/Yit)$$

where $\Delta Yi(t) = Yi(t+1) - Yi(t)$

Yi = economic sector
t = 1976,....,1985
Y = GDP

TABLE (3.14): GROWTH RATES OF ECONOMIC SECTORS

(Percentage)

	1973	1974	1975	1976	1977	1978	1979
Agriculture & Fishing					23.00	1.63	0.80
Mining & Quarrying					8.93	0.93	(5.52)
Mining					8.86	1.19	(5.63)
Quarrying					25.00	(50.00)	40.00
Manufacturing					18.60	7.90	4.20
Electricity & Water					113.33	28.12	56.10
Electricity					138.46	25.81	56.41
Water					(50.00)	100.00	50.00
Building & Construction					(0.12)	56.63	(11.76)
Communication					55.37	23.04	7.62
Trade & Hotel & Restaurant					7.58	(22.13)	10.42
Trade					10.94	(26.06)	12.00
Hotel					(10.68)	15.22	0.00
Restaurant					(34.29)	17.39	3.70
Services					2.67	4.76	2.89
Banking & Ins.					41.30	(2.96)	(14.04)
Local Banks					23.96	(17.65)	26.02
Offshore Banking Units					57.27	1.68	(39.94)
Insurance					16.67	128.57	34.38
Real Estate & Rent					11.03	27.12	5.37
Government					13.01	4.95	5.67

Table(3.14): Growth Rates of Economic Sectors (Contd)

(Percentage)

	1980	1981	1982	1983	1984	1985	1986
Agriculture & Fishing	11.90	11.35	12.74	(6.21)	3.01	(2.34)	
Mining & Quarrying	(4.81)	(11.87)	(8.18)	2.81	10.38	15.09	
Mining	(5.05)	(12.00)	(9.09)	2.14	11.26	15.46	
Quarrying	57.14	9.09	108.33	40.00	(25.71)	(7.69)	
Manufacturing	24.79	4.47	(3.17)	5.65	(0.70)	(5.54)	
Electricity & Water	12.50	4.17	10.67	21.69	10.89	(5.36)	
Electricity	13.11	1.45	7.14	24.00	8.60	(0.99)	
Water	0.00	66.67	60.00	0.00	37.50	(45.45)	
Building & Construction	0.27	(1.86)	4.34	11.95	27.30	(17.44)	
Communication	(10.32)	13.84	15.45	14.37	12.65	(5.35)	
Trade & Hotel & Restaurant	19.54	(9.89)	12.12	7.26	(8.02)	(7.12)	
Trade	18.58	(12.63)	13.82	8.90	(9.02)	(7.95)	
Hotel	31.13	7.19	0.00	(7.38)	(7.97)	(3.94)	
Restaurant	7.14	10.00	18.18	17.95	17.39	1.85	
Services	14.06	18.66	1.19	11.44	3.42	5.34	
Banking & Ins.	42.13	29.09	27.90	9.56	(13.32)	(18.73)	
Local Banks	12.55	(5.76)	48.47	1.54	10.38	(3.90)	
Offshore Banking Units	59.63	54.89	20.41	16.02	(26.16)	(25.48)	
Insurance	123.26	36.46	17.56	2.60	(11.39)	(39.29)	
Real Estate & Rents	5.26	13.66	8.79	3.56	9.17	(18.91)	
Government	5.47	7.09	7.91	0.92	10.62	9.11	

Note: Growth rates are calculated for each sector in each year according to the following formula:

$$Yi\ Growth = (\Delta Y_{it}/Y_{it}) * 100$$

where $\Delta Y_{it} = Y_{it+1} - Y_{it}$

Yi = economic sector

t = 1976,....,1985

Table(3.15): Factor Shares of Economic Sectors

	1976	1977	1978
Agriculture & Fishing	0.01	0.02	0.01
Mining & Quarrying	0.262	0.250	0.234
Mining	0.26	0.25	0.23
Quarrying	0.001	0.001	0.001
Manufacturing	0.11	0.11	0.11
Electricity & Water	0.002	0.004	0.005
Electricity	0.002	0.004	0.005
Water	0.000	0.000	0.000
Building & Construction	0.120	0.105	0.152
Communication	0.062	0.084	0.096
Trade & Hotel & Restaurant	0.167	0.157	0.113
Trade	0.147	0.142	0.098
Hotel	0.015	0.012	0.013
Restaurant	0.005	0.003	0.003
Services	0.033	0.030	0.029
Banking & Ins.	0.063	0.078	0.071
Local Banks	0.028	0.031	0.023
Offshore Banking Units	0.033	0.046	0.043
Insurance	0.002	0.002	0.004
Real Estate & Rent	0.064	0.062	0.073
Government	0.105	0.104	0.101

Note: The share of each sector in GDP is calculated according to the following formula:

Yi Share = Yit/Yt

where Yi = economic sector
Y = GDP
t = 1976,....,1984

TABLE (3-15): FACTOR SHARES OF ECONOMIC SECTORS (Contd)

	1979	1980	1981	1982	1983	1984
Agriculture & Fishing	0.02	0.02	0.02	0.02	0.02	0.02
Mining & Quarrying	0.222	0.196	0.168	0.145	0.140	0.146
Mining	0.22	0.20	0.17	0.14	0.14	0.14
Quarrying	0.001	0.001	0.001	0.003	0.003	0.002
Manufacturing	0.12	0.13	0.14	0.12	0.12	0.12
Electricity & Water	0.008	0.008	0.008	0.008	0.101	0.010
Electricity	0.007	0.008	0.008	0.008	0.009	0.009
Water	0.000	0.000	0.001	0.001	0.001	0.001
Building & Construction	0.135	0.126	0.120	0.118	0.123	0.149
Communication	0.103	0.086	0.095	0.104	0.111	0.118
Trade & Hotel & Restaurant	0.126	0.140	0.123	0.129	0.129	0.113
Trade	0.110	0.121	0.103	0.110	0.112	0.096
Hotel	0.013	0.016	0.016	0.015	0.013	0.011
Restaurant	0.003	0.003	0.004	0.004	0.004	0.005
Services	0.030	0.032	0.037	0.035	0.36	0.035
Banking & Ins.	0.061	0.081	0.101	0.121	0.124	0.102
Local Banks	0.030	0.031	0.028	0.040	0.038	0.039
Offshore Banking Units	0.026	0.039	0.058	0.066	0.072	0.050
Insurance	0.005	0.011	0.014	0.016	0.015	0.013
Real Estate & Rents	0.078	0.076	0.084	0.086	0.083	0.086
Government	0.107	0.105	0.110	0.111	0.105	0.110

Manufacturing, banking and insurance, construction and communication provided the main sources of growth in the 1976-1981 period. Indeed, most of the economic sectors made a good contribution in this period except oil and the trade and hotel and restaurant sectors. The contribution of manufacturing to overall growth was the largest over the 1976-1980 period. Much of the growth in this sector was associated with high amounts of imports of raw materials and intermediate goods. The expansion of the manufacturing and construction sectors may also explained by the rising share of investment in GDP.

In the early eighties, communication, construction and government constituted the main sources of growth. The contribution of government increased steadily over the period under study, accounting for 12 percent and 17 percent respectively. Indeed, the expansion of the public administration sector led directly to some growth of GDP as measured in the National Accounts. This is due to the fact that the contribution to GDP of the public administration sector is valued at its cost to the government rather than in terms of its output. Therefore, even if the expansion of public sector was to make no difference to the level of production in the economy, it leads directly to the growth of GDP in real terms. The expansion of this sector can be attributed to the increase of oil revenues which accrued primarily to the government. Furthermore, the increase of expenditure in the government sector may lead to the growth of GDP in the future if the expansion of this sector improves the productive capacity of the economy.

3.6. CONCLUSION

In this chapter, we have studied the recent experiences of the Bahraini economy by analysing the pattern and sources of economic growth over the 1973-1985 period. The increase of oil export earnings after 1973/1974 and an improvement in the financial position of the government led to economic growth. However, when oil prices declined after 1981 and the government budget ran into deficit, the growth rate of gross domestic product fell. This supports the common belief that foreign exchange and public revenues are two of the most severe constraints on the economic growth process of developing countries. However, our analysis has shed some light on different aspects of the relationship between the increase of oil revenues and economic growth.

The supply analysis of sources of growth shows that the increase of oil revenues led to the rise of investment which, in turn, resulted in an increase of the volume of capital stock in the economy. Indeed, investment constituted the main source of growth in GDP during the period under study. Apart from the amount of investment associated with the growth of employment, the volume of investment contribution to the increase of capital per worker was small. In addition, the productivity of investment after 1973/1974 was relatively low. This can be explained by the allocation of large share of investment to a few sectors with high incremental capital-output ratios such as electricity sector.

The increase in financial resources after 1973/1974 led to a rapid inflow of foreign labour, which comprised more than half of the labour force by 1981. Our results of the Cobb-Douglas estimation and the decomposition of GDP growth into the growth of labour force and labour productivity show that growth of employment provided a significant contribution to overall growth. On the other hand, labour productivity growth was negative in the 1973-1977 period, but became significant in the second period 1978-1984. However, an application of Solow's measure showed that total factor inputs growth contributed more than total factor productivity growth to the growth of GDP.

The rapid growth of employment, particulary of foreign labour can be explained partly by the increase of oil revenues, which led to higher levels of investment. However, a large part of the growth of the labour force can be attributed to the increase in demand for goods and services, especially in construction, finance and trade, and communication sectors.

The increase in oil revenues also contributed to economic growth through the expansion of the public administration sector, which contributed 12.0 percent and 17.3 percent in the second half of the 1970s and the early eighties respectively. The expansion of this sector directly contributed to the measured growth of GDP because the cost of public administration is treated as its output. But the expansion of this sector can contribute to future GDP growth if government consumption expenditure was to be directed at improvements in the productive capacity of the economy. To date, a large part of the expansion has only been in the form of increased employment of and/or higher wages for public sector employees.

A third way in which the increase of oil revenues contributed indirectly to economic growth was through the increased import of intermediate goods and capital goods. Over the 1979-1986 period, intermediate goods and capital goods constituted 40 percent and 23 percent of total imports in consequence of manufacturing sector growth, especially in the early years.

Conversely, the increase of oil revenues retarded economic growth by encouraging an increased import of consumer goods. Over the 1979-1986 period, consumer goods recorded the highest average annual growth rate (5 percent), compared to intermediate goods (3 percent), and capital goods (2 percent). An appropriate response by the government would be to introduce measures to curb runaway growth in consumer goods in order to avoid the difficulties associated with declining oil revenues and, hence, budget deficits.

Finally, the sectoral side analysis decomposed growth according to economic sectors. The main finding is that the contribution of the oil sector was negative during the first period, 1976-1981, but improved in the early eighties. However, Bahrain faces a very serious problem of depleting oil by the end of this century. As a consequence, the government has launched an ambitious industrial diversification programme which aims to reduce the country's dependence on oil. This new drive consists of attracting foreign investment and joint ventures which can be useful in bringing in new technologies, increasing exports and creating jobs for a local labour force of 80,000, which is expected to double by the end of the century.

NOTES

[1] A.P. Thirwall, Growth and Development with Special Reference to Developing Economies, Third Edition, Hong Kongp, 61.

[2] Productivity change can also be labour saving or capital saving. There are three definitions of productivity or technical change:

(1) Hicksian, which measures bias along a constant capital-labour ratio.

(2) Harrodian, which measures bias along a constant capital-output ratio.

(3) Solow's which measures bias along a constant labour-output ratio.

[3] A.L. Thomas (1985) Introductory Econometrics: Theory and Application, Longman Group Ltd, p 237.

[4] Herman Van Der Wee (1987) Prosperity and Upheaval: The World Economy 1945-1980 England, p 138.

[5] Mark Blaug (1970) Economics of Education England, p 89.

[6] D.T.Nguyen (1988) "Measuring Capital Stock and Technical Progress: A New Approach", Lancaster university.

[7] V.G. Bhatia (1988) "Asian and Pacific Developing Economies: Performance and Issues", Asian Development Review, NO.1 Vol.6. For example,

the ICOR ratios of the various sectors of the Indian economy during the period 1970/71 - 1980/81 were as follows: electricity (22.36), mining and quarrying (16.02), railways (8.79), manufacturing (8.46), communication (5.64), other transport (5.18), public administration and defence (3.49), trade, hotels and restaurants (3.39), agriculture (2.92), construction (1.68), banking and insurance (0.52), forestry and fishery (0.43), and the economy as a whole (5.97).

[8] R.M. Sundrum, "Indonesia's Rapid Economic Growth 1968-1981", Bulletin of Indonesian Economic Studies, Vol. 22, No. 3, December 1988.

[9] Abdul Rahman Ulfat, (no date) A Review of Planning Experiences in GCC Countries and Some Future Challenges, p 5.

[10] Cited in Dhafar A. Alumran, A Predicted Model of the Oil Crisis in Bahrain and the Search for a New Development Strategy, (Unpublished PhD Thesis), University of Southern California, April 1986.

CHAPTER FOUR

EXPORT EXPANSION AND IMPORT-SUBSTITUTION AS SOURCES OF INDUSTRIAL GROWTH

4.1. INTRODUCTION

In analysing growth in the Bahraini industrial sector an important issue relates to the role played by import-substitution and export expansion and the measurement of the effects of these two aspects in the growth process. In this chapter we begin by discussing the size composition of industrial establishments, followed by a presentation of a method for the measurement of import-substitution and export expansion as contributing factors to industrial growth. We will then use this method in analysing industrial growth during the 1973-1983 period. The remaining chapter will identify the kinds of export-oriented and import-substituting industries which exist in Bahrain.

4.2. SIZE COMPOSITION OF INDUSTRIAL ESTABLISHMENTS

The pattern of industrial development determines the extent and magnitude of employment in the various establishments of the manufacturing sector. For example, the setting up of upstream non-agricultural industrial establishments - basically energy and capital intensive based industries - does not allow substantial industrial employment, whereas development of downstream operations, and an extension of the industrial lines of production to include the latter, leads to a higher level of industrial employment, while reinforcing the labour share of manufacturing in the economy as a whole.

The development of industrial employment in Bahrain reflects the above structural characteristics. Table (4.1) shows the distribution of employees among major divisions of the manufacturing sector over the 1973-1983 period. The data show that the major part of industrial employment is concentrated in three major divisions of manufacturing, namely, chemicals, basic metals, and fabricated metals. Added together, these divisions accounted for 86.7 percent, 86 percent and 79.5 percent of the total manufacturing employment in 1973, 1977 and 1983 respectively. Large establishments - with more than 200 employees - which are concentrated in these divisions, account for the major part of manufacturing employment in Bahrain.

The oil refinery, BAPCO, classified under chemicals, has historically been the major employer in the country. During the mid fifties, around 40 percent of the labour force in Bahrain were employed at BAPCO. The total number of BAPCO employees increased from 3,708 in 1973 to 3,948 in 1977 and 4,226 in 1983, but the percentage of Bahrainis in its employment fell from 89 percent in 1973 to 84 percent in 1977 and 81 percent in 1983. Although BAPCO employment has stagnated - the compound annual growth rate of total employment was only minus one percent over the 1973-1983 period - and the share of Bahraini employees has declined, BAPCO maintained its position as the leading employer in the manufacturing sector. The second major employer, Aluminium Bahrain Smelter (ALBA), classified under basic metal industries, increased its number of

Table(4.1): Industrial Establishments by Type of Activity and Persons Employed

Industry	No. of Establish-ments	No. of Employees No.	%	Establishments with Employee Numbers 10	11-50	51-200	200+
1973							
31 Food and Beverage	21	448	4.8	10	8	3	-
32 Wearing Apparel and Leather	-	-	-	-	-	-	-
33 Wood Products	64	221	2.4	60	4	-	-
34 Paper Products	6	194	2.1	1	4	1	-
35 Chemicals	11	4097	43.6	4	4	2	1
36 Building Materials & Glass	22	379	4.0	8	13	1	-
37 Basic Metal Industries	1	1810	19.3	-	-	-	1
38 Fabricated Metals	36	2236	23.8	24	8	1	3
39 Others	1	4	0.04	1	-	-	-
3 Manufacturing	162	9389		108	41	8	5
1977							
31 Food and Beverage	28	587	4.5	16	9	3	-
32 Wearing Apparel and Leather	-	-	-	-	-	-	-
33 Wood Products	80	370	2.8	72	8	-	-
34 Paper Products	10	194	1.5	5	4	1	-
35 Chemicals	14	4154	32	6	6	1	1

Table(4.1): (Continued)

Industry	No. of Establish-ments	No. of Employees No.	%	Establishments with Employee Numbers 10	11-50	51-200	200+
36 Building Materials & Glass	58	584	4.5	36	19	3	
37 Basic Metal	4	3142	24.2	-	2	1	1
38 Fabricated Metal and Machinery	119	3876	29.8	71	39	4	5
39 Other Manufacturing	7	94	0.7	2	5	-	-
3 Manufacturing	320	13,001		208	92	13	7
1983							
31 Food and Beverage	17	1029	8.1	3	9	4	1
32 Wearing Apparel and Leather	12	297	2.3	3	8	1	-
33 Wood Products	15	107	0.8	11	4	-	-
34 Paper Products	5	360	2.8	-	2	3	-
35 Chemicals	15	5453	43.1	2	8	2	3
36 Building Materials & Glass	16	758	6.0	1	9	6	-
37 Basic Metal	1	1943	15.4	-	-	-	1
38 Fabricated Metal and Machinery	28	2654	21.0	5	10	9	4
39 Other Manufacturing	5	41	0.3	4	1	-	-
3 Manufacturing	114	12,642		29	51	25	9

Source: UNIDO. Domestic Economic Growth and the Move to a Sub-Regional Industrial Structure in Bahrain, p 23. Bahrain Centre for Studies and Research, Industrial Survey 1983.

employees from 1810 in 1971 to 2776 in 1977 and then decreased to 1943 in 1983, the percentage of Bahraini employees rose from 65 percent in 1977 to 77 percent in 1983.

Added together, BAPCO and ALBA employed some 5518 employees (59 percent) of the 9389 employees in the manufacturing sector in 1973, and 6724 employees (52 percent) and 6169 (49 percent) of total manufacturing employment in 1977 and 1983 respectively. This means that the combined employment in the oil refinery and aluminium smelter declined over the 1973-1983 period, but they are still predominant employers of labour.

Ship-repairing establishments were responsible for a substantial part of the industrial labour force employed in the fabricated metal and machinery major division, employing 1929 in 1973 out of 2236 employed in the metal industries. This accounted for 21 percent of the labour force in the manufacturing sector as a whole, compared with 2380 employees, nearly 18 percent, in 1977. In 1983 all metal industries, including ship-repairing, employed 2654 employees, nearly 21 percent of industrial labour. The three largest ship-repairing establishments, namely the Arab Shipbuilding and Repair Yard (ASRY), the Bahrain Shiprepairing and Engineering Company (BASRIC), and the Bahrain Slipway Company employed 954, 296 and 224 employees respectively in 1983. Together, the three ship-repairing establishments employed some 1474 employees, 56 percent of employment in metals and 12 percent of the total employment in manufacturing.

With the exception of the food and beverages industries, almost all the other industrial establishments experienced only a limited increase of their employees. The food and beverages sector boosted its share from

4.8 percent in 1973 to 8.1 percent in 1983 in consequence of investment in public sector-owned establishments and joint ventures (composed of private sector, GCC and foreign investors) in such as fresh dairy products, flour milling, dried dates and poultry. In addition, paper products' share of employees declined from 2.1 percent in 1973 to 1.5 percent in 1977, increasing to 2.8 percent in 1983.

Summing up, one can argue that the manufacturing sector is composed mainly of a few big export-oriented producers and a large number of small establishments which are mainly import-substitution industries. Unlike the pattern in most developing countries the employment share of the import-substitution industries (such as food and beverages, and wearing apparel) was small compared to that of export-oriented industries. Indeed, the largest contribution to the manufacturing sector in terms of employment and output can be attributed to the large industrial establishments.

4.3. SOURCES OF INDUSTRIAL GROWTH: CHENERY'S APPROACH

One way to analyse sources of industrial growth is to focus on the demand side. Following Hollis Chenery (1960), the growth of industrial output between two periods can be decomposed into demand components. In this approach increases in industrial output are decomposed into: the growth in domestic demand, under an assumption that a constant proportion of total supply is imported; the growth of exports; and the growth of import- substitution. Formally

$$\Delta X(t) = (X(t)/Z(t))^{*} \Delta D(t) + (X(t)/Z(t))^{*} \Delta E(t) + (X(t+1)/Z(t+1) - X(t)/Z(t))^{*} Z(t+1) \qquad (1)$$

Where X is total production, Z is total supply; D is total domestic consumption; and E is exports.[1]

The first and second terms on the right hand side of (1) attribute to total domestic consumption growth and to export expansion, while the third term represents a measure of import substitution. According to equation (1), import-substitution occurs in an industry only when the domestic output to total available supply ratio increases, that is:

$$X(t+1)/Z(t+1) > X(t)/Z(t) \qquad (2)$$

or conversely when the ratio of imports to total available supply falls, that is :

$$M(t+1)/Z(t+1) < M(t)/Z(t) \qquad (3)$$

thus, one can define import-substitution either as :

$$(X(t+1)/Z(t+1) - X(t)/Z(t))*Z(t+1) \qquad (4A)$$

or as

$$(M(t)/Z(t) - M(t+1)/Z(t+1))*Z(t+1) \qquad (4B)$$

Therefore, the magnitude of import-substitution depends on the difference between the ratio of imports and the amounts of total available supply at the end of period.

The sources of industrial growth can be calculated by dividing equation (1) by ΔX, that is;[2]

$$1 = (X(t)/Z(t))(\Delta D/\Delta X) + (X(t)/Z(t))(\Delta E/\Delta X) + (X(t+1)/Z(t+1) - X(t)/Z(t))(Z(t+1)/\Delta X)$$

This method of measuring the demand side contributions to industrial growth has been applied to the states of the Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudia Arabia, United Arab Emirates). Its application just to Bahrain is not possible due to the absence of data on domestic consumption of industrial goods and industrial domestic production. The National Accounts provide aggregate data for domestic demand for both industrial goods and services. Table (4.2) shows data of industrial domestic production, domestic demand, exports and imports of the Gulf Cooperation Council countries in 1975 and 1980. These data are collected and published by the Gulf Organisation for Industrial Consulting.

Total domestic consumption provided the main sources of growth in industrial production over the period 1975-1980. It accounted for 100.3 percent of growth in industrial production. For the period under study, the contribution of export expansion to growth, mainly in oil refined products, petrochemicals and aluminium, was 20.1 percent. The import-substitution components of demand growth during the period under study was negative (-20.3 percent). This was due to the fact that the import to total supply ratio inceased from 0.457 in 1975 to 0.520 in 1980. Furthermore, the negative contribution of import-substitution to the growth of industrial output is a clear sign of the under-development of import-substitution industries. Export expansion, however, has offset the negative influence of import-subsitution.

The domestic demand for goods and services in Bahrain is estimated

TABLE 4.2: OUTPUT AND DEMAND COMPONENTS IN THE PERIOD 1975-1980

GCC Countries	1975	1980
Industrial Domestic Total Output	12812.8	35500.0
Oil Products	10890.9	30175.0
Non Oil Products	1921.9	5325.0
Imports of Industrial Goods	10803.0	38434.0
Exports of Industrial Goods	3455.9	11842.5
Domestic Consumption of Industrial Goods	20159.9	62091.5

Source: Gulf Organisation for Industrial Consulting to have been about BD 2310.3 million at constant prices (1977 = 100) in 1984. This represented 208.5 percent of gross domestic product in the same year. The annual growth rate of domestic demand over the period of 1977-1984 was 6.6 percent higher than the growth rate of GDP(5.2 percent). Table (4.3) shows domestic demand of goods and services and its components in the periods 1977-1984. Table (4.4) reports the supply and demand sides for goods and services over the same period. Imports represented 54.5 percent of domestic demand in 1977. Its share, however, declined to 36.9 percent in 1984.

The demand for intermediate goods was the main component of domestic demand in both 1977 and 1984. It accounted for 55.6 percent and 49.1 percent in 1977 and 1984 respectively. Consumption, with the second largest share in 1977, accounted for 28.2 percent, while the share of investment was 16.2 percent. Furthermore, private consumption had the largest proportion of total consumption (21.3 percent). In 1984, investment became the second largest source of domestic demand. Its share represented 26.2 percent of domestic demand, while the share of consumption was 24.6 percent.

4.4. INDUSTRIAL STRUCTURE

The growth pattern of the industrial structure in Bahrain reveals, as in most other developing countries, two main types of industries: export-oriented industries (EI) and import-substituting industries (IS), or more precisely industries emerging in response to rising domestic demand. Almost all export-oriented industries have been undertaken on a joint venture basis between the government or the private sector or both

Table(4.3): Domestic Demand for Goods and Services at Constant Prices (1977=100)

BD Million

Element	1977	%	1984	%	Annual Growth Rate %
Intermediate goods	819.4	55.6	1135.0	49. 1	4.8
Final Consumption	415.2	28.2	569.3	24. 6	4.6
Private Consumption	314.2	21.3	443.9	19.2	5.1
Public Consumption	101.0	7.1	125.4	5.4	2.7
Investment	238.3	16.2	606.0	26.2	14.3
Private Investment	201.3	13.7	485.8	21.0	13.4
Public Invesment	148.3	10.1	191.8	8.3	3.7
Change in Stock	(111.3)	(7.6)	(71.6)	(3.1)	(6.1)
Domestic Demand	1472.9	100%	2310.3	100%	6.6

Source: National Accounts, Ministry of Finance and National Economy (1977-1984)

Table(4.4): AG. Supply and AG. Demand in the Period 1977-1984, at Constant Prices (1977=100)

BD Millions

Year	Ag. Supply		Ag. Demand						GDP
	Output	Imports	Inter-mediate Goods	Private Consump-tion	Public Consump-tion	Total invest-ment	Change in stock	Exports	
1977	1596.6	802.7	819.4	314.2	101.0	349.6	(111.3)	926.5	777.2
1984	2243.3	852.0	1135.0	443.9	125.4	677.6	(71.6)	785.0	1108.3

Source: National Accounts, Ministry of Finance and National Economy (1977, 1984) with other governments or private sectors from the Gulf Cooperation Council, other Arab countries, or other foreign countries. But it is important to note that the participation of the private sector in the ownership of EI industries thus far has been limited. The export-oriented industries in Bahrain consist of large scale capital-intensive ventures: some of them have been directed toward oil and gas based industries, such as oil refining, gas liquefaction, and petrochemical industries, and others toward energy-intensive industries, such as the aluminium smelter (ALBA), the iron and steel plant (AISCO), and aluminium downstream industries, such as the Bahrain Atomisers International and the Midal Cables Companies. These EI industries are primarily aimed at export markets, which means that their expansion is conditioned on external factors and, hence, is vulnerable to the instability of international prices of their products. However, the aluminium industry has been successful in creating linkages with the domestic market in the form of downstream industries such as the Gulf Aluminium Rolling Company, which converts aluminium ingots into rolled products for final use or further downstream processing, the Bahrain Aluminium Extrusion Company (BALEXCO), which produces extruded aluminium sections, Bahrain Atomisers Internatinal which produces atomised powder, the Midal Cables which builds insulated aluminium conductors, and many aluminium fabrication establishments.

The second group consists of import-substituting industries. The term import-substituting industries (IS) is often used in developmental literature to refer to industries producing goods for the domestic market under the protection of tariff levels or import controls on the same goods. In Bahrain and other GCC states it refers to something different. Historically, most industries in Bahrain and the Gulf region grew up in response to rising domestic demand. In other words, as government oil revenue increased, gevernment expenditure also increased, particularly in physical infrastructure, which stimulated the growth in the glass and building materials industries. The construction boom of the mid-seventies in Bahrain brought in a large flux of foreign labour, which, in addition to the local population, stimulated the growth of consumer goods industries such as food and beverages.

A comparison of export-orientd industries (EI) and import-substituting industries (IS) in 1983 is reported in Table (4.5). The data show that EI industries employed 7769 employees or about 61.5 percent of the labour force, yet it contributed about 82 percent of the value-added of the manufacturing sector. On the other hand, IS industries employed 4873 employees or about 38.5 percent of the labour force, but accounted for only 18 percent of the value-added of the sector. Therefore, EI industies have a higher employment share and value added than IS. These characteristics are entirely different from the growth pattern of the industrial sector in most other developing countries, where IS industries appear to have a higher employment share and contribute more to gross domestic product than EI industries.

As to the nationality breakdown of employment into EI and IS industries of the manufacturing sector, Bahrainis in EI accounted for 88.6 percent of total employment in the manufacturing sector, with the remaining 11.4 percent in IS. In other words, for every one hundred jobs in the manufacturing sector offered to Bahrainis only 11 Bahrainis joined EI industries. The attraction of EI industies to Bahrainis is

Table(4.5): EI and IS Industries in the Manufacturing Sector in Bahrain (1983)

Indicator	Import Substitutes (IS) %	Export-Oriented (EI) %	Total
Establishment	94	20	114
Total Labour Force	38.5	61.5	12,642
Bahraini Emp.	11.4	88.6	6,524
Total Value Added (BD'000)	18.0	82.0	170,669.7
Total Energy Used (BD '000)	15.8	84.2	12,283.4
Invested Capital (BD'000)	25.3	74.7	400,353.0
Total Gross Fixed Assets (BD'000)	16.2	83.8	320,868.0

Source: Bahrain Centre for Studies and Research, Industrial Survey 1983.

due to the fact that EI industries are characterised by their intensive utilisation of capital and modern technology, and, hence, offer high skill jobs. The same table shows that EI industries are larger than IS industries in terms of invested capital and fixed assets, with EI accounting for 74.7 percent and 83.8 percent of invested capital and fixed assets repectively. Further, EI consume more energy - 84.2 percent of energy used in the manufacturing sector - than IS. Almost all EI industries are energy-intensive or energy-related industries. Indeed, the competitiveness of manufactured exports of EI industries, such as ALBA, GPIC, AISCO, can be attributed mainly to their accessibility to cheap gas.

From the above analysis, one can conclude that EI industries have provided and contributed much more than the IS industries in terms of job creation, opportunities for Bahrainis, and value added. However, it is important to point out, at this stage, that the favourable position of EI industries in the manufacturing sector is derived from the industrial policy adopted in the last two decades.

4.4.1. Exported-Oriented Industries

Export-oriented industries are concentrated in chemicals (such as the oil refinery BAPCO) and gas liquefaction (BANAGAS), aluminium metals (such as the primary aluminium company ALBA, the aluminium atomised powder company BAI, and the aluminium insulated cables company MIDAL), and fabricated metals, particularly the ship repairing companies, ASRY and BASRIC. Table (4.6) shows the production structure of EI industries in 1983. Oil refining made the highest contributor to the total value added of the whole group (55.4 percent), yet it was the lowest among the group, with exception of ASRY, in the ratio of value added to the value of production (10.0 percent), which was due mainly to the high price of imported crude oil from Saudi Arabia. In descending order of importance in terms of value added are the Bahrain Aluminium Smelter (ALBA) and gas liquefaction (BANAGAS), accounting for 22.8 percent and 18.9 percent respectively. ASRY reported negative value added in 1983, which was an indicator of losses incurred by the establishment due to the weakness of the ship-repairing business in 1983 created by the Iraq-Iran conflict.

On the other hand, gas liquefaction (BANAGAS) had the highest ratio of value added to production, accounting for 97 percent in 1983, which was attributed to the low consumption of raw materials. In fact, BANAGAS was the lowest consumer of raw materials in the whole group. Because the gas liquefaction project utilises waste natural gases, BANAGAS's data show that the natural gas price is assumed to equal zero.

When all export-oriented industries are combined, we can observe that intermediate inputs constituted the main component of production. The total intermediate input and value added accounted for 84 percent and 16 percent of the value of EI production in 1983. Furthermore, raw materials represented the lion's share (97.3 percent) of total intermediate inputs, while energy costs and other expenses were 1.4 percent and 1.3 percent respectively. Indeed, Bahrain's small land mass and paucity of raw materials except oil and natural gas have necessitated the import of all the required raw materials, including crude oil, to promote industrial development.

TABLE (4.6): STRUCTURE OF PRODUCTION IN EI INDUSTRIES, 1983

BD ('000)

Industry	Raw Materials (1)	Total Energy use (2)	Other Expenses (3)	Total inter-mediate (4)=1+2+3	Value Added (5)	Value of output (6)=4+5
Chemicals	690804.3	4791.5	3901.0	699,496.8	103,882.1	803,378.9
%	(98.8)[a]	(0.7)[a]	(0.6)[a]	(87.1)[b]	(12.9)[b]	(100.0)
BAPCO	690,502.0	4,449.2	3745.8	698,697.0	77,487.9	776,184.9
%	(98.8)	(0.6)	(0.5)	(90.0)	(10.0)	(100.0)
BANAGAS	302.3	342.3	155.2	799.8	26,394.2	27,194.0
%	(37.8)	(42.8)	(19.4)	(2.9)	(97.1)	(100.0)
Basic Metal	41,303.3	4858.6	5349.7	51,511.6	34,433.1	85,944.7
%	(80.2)	(9.4)	(10.4)	(59.9)	(40.1)	(100.0)
ALBA	33,467.9	4685.6	5203.2	43,356.7	31,936.8	75,293.5
%	(77.2)	(10.8)	(12.0)	(57.6)	(42.4)	(100.0)
BAI	1700.1	34.1	8.9	1743.1	325.2	2068.3
%	(97.5)	(2.0)	(0.5)	(84.3)	(15.7)	(100.0)
MIDAL	6135.3	138.9	137.6	6411.8	2171.1	8582.9
%	(95.7)	(2.2)	(2.1)	(74.7)	(25.3)	(100.0)
Ship repairing	812.9	686.5	432.2	1931.6	1574.3	3505.9
%	(42.1)	(35.5.)	(22.4)	(55.1)	(44.9)	(100.0)
ASRY	408.9	626.5	293.2	1328.6	-506.7	821.9
%	(30.8)	(47.2)	(22.1)	(161.6)	(-61.6)	(100.0)
BASRIC	404.0	60.0	139.0	603.0	2081.0	2684.0
%	(67.0)	(10.)	(23.1)	(22.5)	(77.50)	(100.0)
TOTAL	732,920.5	10336.6	9682.9	752,940.0	139,889.5	892,892.5
%	(97.3)	(1.4)	(1.3)	(84.3)	(15.7)	(100.0)

a. (1), (2) and (3) are calculated as percentage of (4).
b. (4) and (5) are calculated as percentage of (6).

Source Bahrain Centre for Studies and Research, Industrial Survey 1983.

4.4.2. Import-Substituting Industries

Although import-substituting industries represented 94 percent of industrial establishments, they contributed only 18 percent and 39 percent of total value added and total employment respectively for the whole manufacturing sector. These industries have grown up as the result of increasing government expenditure and a rising consumer market.

Table (4.7) presents the production structure of IS in 1983. The construction and glass industries group was the highest contibutor to the value added of IS. In descending order of importance are chemicals, fabricated metal, and food and beverages. However, in terms of value of production, food and beverages ranks second after construction and glass materials. The low contribution of foods and beverages to the total IS value added compared to its value of production can be attributed to the share of intermediate inputs, particularly raw materials. Indeed, the contribution of intermediate input to the value of production in the food and beverages industries was the highest among IS industries. By and large, intermediate inputs, particularly raw materials, constitute the dominant component in the production stucture of IS.

The second fundamental constraint facing the development of import-substituting industries in Bahrain is the tendency of IS industrial establishments to produce similar products. According to the recent review of indusrial establishments and their products undertaken in 1985, the construction and glass group, which comprised 81 percent of IS industrial establishment, consisted of 27 block producing establishments, 16 block and tile producing establishments, two marble producing establishments, two marble and tile producing establishments, and six

TABLE (4.7): STRUCTURE OF PRODUCTION IN IS INDUSTRIES IN 1983

BD ('000)

Industry	Raw Materials 1	Total Energy 2	Other Expenses 3	Total Inter- 4=(1+2+3)	Value Added 5	Output Value 6=(4+5)
31 Food & Beverage	8918.8	486.0	592.1	9996.9	4662.4	14659.3
%	(89.2)[a]	(4.9)[a]	(5.9)[a]	(68.2)[b]	(31.8)[b]	(100.0)
32 Wearing Apparel & leather	192.5	29.6	48.9	271.0	835.9	1106.9
%	(71.0)	(10.9)	(18.0)	(24.5)	(75.5)	(100.0)
33 Wood Products	245.4	13.0	14.2	272.6	515.9	788.5
%	(90.0)	(4.8)	(5.2)	(34.6)	(65.4)	(100.0)
34 Paper Products & Printing & Publishing	1324.1	41.7	80.4	1446.2	2390.5	3836.7
%	(91.6)	(2.9)	(5.6)	(37.7)	(62.3)	(100.0)
35 Chemicals	2946.4	699.8	569.5	4215.7	7075.4	11291.1
%	(69.9)	(16.6)	(13.5)	(37.3)	(62.7)	(100.0)
36 Construction & glass	11818.3	487.4	1168.5	13474.2	9249.3	22723.5
%	(87.7)	(3.6)	(8.7)	(59.3)	(40.7)	(100.0)
38 Metals	3571.4	182.9	349.3	4103.6	5366.5	9470.1
%	(87.0)	(4.5)	(8.5)	(43.3)	(56.7)	(100.0)
39 Others	1356.1	6.4	66.2	1428.7	684.3	2113.0
%	(94.9)	(0.4)	(4.6)	(67.6)	(32.4)	(100.0
3 Manu-facturing	30373.0	1946.8	2889.1	35208.9	30780.2	65989.1
%	(86.3)	(5.5)	(8.2)	(53.4)	(46.6)	(100.0)

a. (1), (2) and (3) are in percentage of (4)
b. (4) and (5) are in percentage of (6)

Source Bahrain Centre for Studies and Research, Industrial Survey 1983.

establishments producing various kinds of cement products. On the other hand, imports of construction and glass materials reached BD 38.8 million in 1983. In addition, there were 15 establishments working in the glass industry, but none of these specialise in manufacturing glass in spite of the local availability of raw materials and a local demand.

In metal industries the majority of industrial establishments were in aluminium cutting (45 establishments); five establishments were working in fabricated iron products, seven in electrical equipment, and three in ship-repairing. On the other hand, metal imports represented 60.8 percent of total industrial imports in 1983.

In the food and beverage group, industrial establishments produce more diversified products. However, most of these establishments (26) produce minor products,i.e. ice-cream, chips, sugar, confectionary and so on. In addition, there were 10 establishments producing iceblocks, 13 producing distilled and mineral water, five producing soft drinks, two producing animal feed and seven producing dairy products. However, it is important to mention that there is no industrial establishment specialising in local fisheries products.

The third constraint of import-substituting industries is that they are fragmented and lack forward and backward linkages among themselves or with export-oriented industries, with the exception of aluminium industries, and depend to a large extent on foreign markets for raw materials and employees. Table (4.8) shows the distribution of raw materials in IS industries in 1983. Total raw materials are divided into three groups: locally purchased, imports from GCC states, and imports from other countries. When all IS industries are combined together, 77 percent of raw materials were imported from foreign markets, while three percent came from GCC countries and 20 percent from the domestic market. The chemicals group was the highest user of locally purchased materials (49 percent), which was mainly attributed to the contribution of the local refining industry. Thus, one can state that the refining industry, though still basically export-oriented, has relatively extended its ties with the rest of the economy. However, the gap is still large between the economy's modest absorptive capacity and the refined oil production. This is reflected in the decline of the refining to production ratio which began in the 1970s. Metals ranked second in locally purchased materials (41.7 percent), followed by construction materials (16.8) and food and beverages (12.4 percent).

4.5. CONCLUSION

The application of the Chenery's method of growth accountancy to the economies of the GCC states indicated that domestic demand was the most important source of growth during the 1975-1980 period. Indeed, the contribution of import substitution was negative during the period under study. The study of domestic demand and its components in Bahrain shows that the intermediate demand had the largest share of total domestic demand. Furthermore, the analysis of industrial structure in Bahrain shows that export-oriented industries contributed more to development than import-substituting industries in terms of employment and output.

TABLE (4.8): SOURCES OF RAW MATERIALS IN IS INDUSTRIES BY INDUSTRY, 1983

BD ('000)

	Industry		Locally Raw Materials	Raw Materials purchased from GCC	Raw Materials purchased from other countries	Total purchased Raw Materials
31	Food & Beverage		1105.9	145.3	7648.3	8899.5
		%	(12.4)	(1.6)	(85.9)	(100.0)
32	Wearing Apparel & Leather		0.0	0.0	227.1	227.1
		%			(100.0)	(100.0)
33	Wood Products		25.0	0.4	220.0	245.4
		%	(10.2)	(0.2)	(89.6)	(100.0)
34	Paper Products & Printing & Publishing		0.0	1.0	1421.6	1422.6
		%		(0.1)	(99.9)	(100.0)
35	Chemicals		1561.2	31.9	1595.8	3188.9
		%	(49.0)	(1.0)	(50.0)	(100.0)
36	Non-metallic minerals		2015.5	704.3	9273.5	11993.3
		%	(16.8)	(5.9)	(77.3)	(100.0)
37	Basic Metal		-	-	-	-
38	Fabricated Metal		1463.7	42.4	2001.4	3507.5
		%	(41.7)	(1.2)	(57.1)	(100.0)
39	Others		0.0	0.0	1356.1	1356.1
		%			(100.0)	(100.0)
3	Manufacturing		6171.3	925.3	23743.8	30840.4
		%	(20.0)	(3.0)	(77.0)	(100.0)

Source: Bahrain Centre for Studies and Research, Industrial Survey 1983.

NOTES

1. Equation (1) can be derived as follows:

$$\text{Since, } Z(t) = X(t) + M(t) = D(t) + E(t) \qquad (1A)$$

$$\text{Then, } \Delta Z(t) = \Delta D(t) + \Delta E(t) \qquad (1B)$$

Where: $\Delta Z(t) = Z(t+1) - Z(t)$, $\Delta D(t) = D(t+1) - D(t)$, and

$$\Delta E = E(t+1) + E(t)$$

multiplying both sides of the equation (1B) by $X(t)/Z(t)$, we get the following:

$$X(t)(\Delta Z(t)/Z(t)) = X(t)/Z(t)(\Delta D(t) + \Delta E(t)) \qquad (1C)$$

adding $[\Delta X(t)-X(t)(\Delta Z(t)/Z(t))]$ to both sides of (1C), gives:

$$\begin{aligned}
\Delta X(t) &= X(t)/Z(t)\Delta D(t)+ X(t)/Z(t)\Delta E(t)+ X(t)- \\
&\quad X(t)(\Delta Z(t)/Z(t)) \\
&= X(t)/Z(t)\Delta D(t)+ X(t)/Z(t)\Delta E(t)+ X(t+1)- \\
&\quad X(t)- X(t)(\Delta Z(t)/Z(t) \\
&= X(t)/Z(t)\Delta D(t)+ X(t)/Z(t)\Delta E(t)+ X(t+1)- \\
&\quad X(t)(1+\Delta Z(t)/Z(t)) \\
&= X(t)/Z(t)\Delta D(t)+ X(t)/Z(t)\Delta E(t)+ X(t+1)- \\
&\quad X(t)(Z(t+1)/Z(t))
\end{aligned}$$

Hence,

$$\Delta X(t) = X(t)/Z(t)\Delta D(t) + X(t)/Z(t)\Delta E(t) + (X(t+1)/Z(t+1) - X(t)/Z(t))Z(t+1)$$

$$2.\Delta X(t) = X(t)/Z(t)\Delta D(t) + X(t)/Z(t)\Delta E(t) + [(X(t+1) - X(t))/Z(t+1) - Z(t)]Z(t+1)$$

$$22687.2 = 12812.8/23615.8 * 41931.4 + 12812.8/23615.8 * 8386.6 + 35500/73934 - 12812.8/23615.8$$

$$22687.2 = 22750.0 + 4550.2 + 4613.0$$

Dividing the estimate of the three right-hand side expressions by the change in output, we obtained the respective contribution of domestic demand growth (D), export expansion (E), and import substitution ((IS), that is,

$$1 = 1.003 + 0.201 - 0.203$$

Therefore,

Domestic demand growth (D) = 100.3 percent

Export expansion (E) = 20.1 percent

Import substitution (IS) = -20.3 percent

PART II: JOINT VENTURES AND INDUSTRIALISATION IN BAHRAIN

The first part of this study argued that the growth process in the industry and economy of Bahrain can best be examined as part of the overall transformation of the structure of the economy. This interdependence can be seen in both directions: income growth increases - which has been mainly due to increases in oil revenue - has caused changes in the composition of domestic demand and production. Conversely, rising investment levels and the growth of the labour force - mainly through the importation of foreign labour - has tended to increase overall output growth. The nature and extent of this transformation is also affected by the size of the economy, its natural resources and the choice of development policy.

In the second part of this study, we will examine the industrial and economic development experience of Bahrain from a different perspective by attempting to identify the determinants of industrial development beyond the usual addition of the stock of capital and technology. We then study the extent to which industrial establishments help to meet the requirements of industrial and economic development. These determinants can be identified as follows: the appropriateness of an establishment's capital intensity for the economy of Bahrain, the appropriateness of skill intensity, the choice of trade policy, the potential establishments for faster growth and their ability to create jobs for Bahraini employees. Since the industrial establishments in Bahrain consist mainly of joint ventures(JVS) and locally owned establishments(LES), we then inquire into the extent to which joint ventures - as the main form of foreign direct investment in Bahrain - contribute to economic development. To determine whether joint ventures promote or frustrate industrial development more than domestic establishments, we test for the significance of the difference between joint ventures and locally owned establishments with respect to the above characteristics. Furthermore, we attempt to identify the set of variables which best discriminate between joint ventures and local establishments through the use of discriminant analysis, which also provides a method of classification analysis that allows us to identify the specific local establishments which behave as joint ventures and joint ventures which behave as local establishments. Thus, it attempts to answer two questions in particular. First, in so far as some local establishments have the desirable characteristics of joint ventures, should policy makers not adopt measures to encourage and induce other local establishments to become more like them?; second, should joint ventures which behave like local establishments be discouraged, in so far as they have the disadvantage of joint ventures (e.g. leakages of income overseas via repatriated dividends, tax concessions, etc.) but only the performance of local establishments?.

Chapter 5 lays down the framework for evaluating the role of joint ventures, as the main form of foreign direct investment in manufacturing sector, in the development of Bahrain. Chapter 6 provides a theoretical background to joint ventures. It analyses the motives of developing countries and foreign firms for entering into joint ventures and reviews the past and present experience of joint ventures in Bahrain and other GCC states. Chapter 7 focuses solely on industrial policy in Bahrain. It reviews the official policy on foreign investment and joint ventures and discusses the protective and incentive measures adopted by the government of Bahrain in its drive to promote industrial development. Chapter 8 discusses the sample size of industrial establishments used in the evaluation. It defines the original and derived variables and describes the main features of the data. Chapter 9 presents a statistical evaluation of the determinants, as discussed above, of industrial development. This evaluation is carried out through the analysis of the comparative behaviour of JVS and LES regarding the following characteristics: the potential for the faster growth of an establishment, the choice of trade policy, the appropriateness of capital intensity, the appropiateness of skill intensity and the contribution to employment, and Bahrainisation policy. Chapter 10 adopts discriminant analysis to identify and discuss the characteristics best discriminating between JVS and LES, and to identify JVS misclassified as LES and JVS misclassified as LES. Chapter 11 applies a case study approach to study the experience of joint ventures in the manufacturing sector. This chapter, which is mainly descriptive, discusses the historical background, shareholding and cost structure of joint ventures in oil and natural gas, aluminium, and shiprepairing.

CHAPTER 5

JOINT VENTURES AND INDUSTRIALISATION: A FRAMEWORK FOR EVALUATION

5.1. INTRODUCTION

The objective of this part of the study is to evaluate the effect of industrial establishments, particularly joint ventures, on industrial and economic development in Bahrain. The effect of industrial establishments' activities in the manufacturing sector in particular and economy in general can be divided into internal and external aspects. This chapter seeks to lay down a framework for evaluation by identifying the main elements of these effects.

5.2. THE EFFECT OF INDUSTRIAL ESTABLISHMENTS ON DEVELOPMENT: INTERNAL ASPECTS

Internal effects are related to the internal growth and performance process of industrial establishments and consequently have an indirect influence on the manufacturing sector and the economy which is often not easy to determine.One key element of the internal growth process is efficiency which, in turn, implies generating the greatest profits with the lowest cost and consequently results in increasing the growth potential of establishments. The efficiency of establishments can be measured by profitability indices such as the return on fixed assets, the return on equity, and the return on sales. But since industrial establishments, particularly JVS, may manipulate their reported profits, the average value added per employee has been used in conjunction with profitability measures.

Another element which can also enhance the internal growth process is innovation, that is to say the commercial introduction of new and improved products and processes. Innovation can significantly improve the market positions of firms through increases in the margins of profits and output. Indeed, one notable characteristic of the growth of the modern industrial establishment is the ability to change the range and nature of their products as they grow.[1] Joseph Schumpeter was among the early scholars who emphasised the central role of innovation in the market position of firms.

> It is still competition within a rigid pattern of invariant conditions, methods of production and forms of industrial organisation in particular that practically monopolises attention. But in capitalist reality as distinguished from its textbook picture, it is not that kind of competition which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organisation...competition... which strikes not at the margins of the profits and the outputs of the existing firms, but at their foundations and their very lives.[2] (1945,p.84)

Innovation can be captured through the analysis of choice of technique and other related variables, such as capital intensity and skill intensity.

5.3. THE EFFECT OF INDUSTRIAL ESTABLISHMENTS ON DEVELOPMENT: EXTERNAL ASPECTS

The second type of effect of industrial establishments activities on industrial and economic development relates to externalities or spillover. These effects have been subjected to extensive empirical studies through the study of the role of multinational corporations in the economic development of developing countries.

Perhaps the most important contribution of industrial establishments to an economy is employment generation. An increase in the number of employees in industrial establishments may allow the creation of a pool of highly skilled labour and entrepreneurs. However, the main constraint facing the expansion and growth of industrial establishments in Bahrain and other Arab Gulf countries is the shortage of domestic skilled labour, which results in the importation of foreign labour. The employment of skilled foreign labour by industrial establishments is more attractive than to undertake the cost of training local employees where there are positive externalities. Establishments, particularly private sector, then become reluctant to engage in training activity unless their costs are subsidised.[3] This behaviour can be attributed to the absence of guarantees that skilled employees will stay with the industrial establishments that paid the cost of training. Thus, there is a tendency to hire those who already possess the required skills from abroad, which acts as a constraint on the implementation of the government's desire to raise the employment and skill levels of Bahrain employees. This constraint may have been reinforced by the domestic labour laws which limit the freedom of mobility of foreign employees in the local labour market. The policy of limiting foreign labour to its original industrial establishment tends to increase the need for imported labour since it limits the possibility of releasing manpower to higher productivity employment.[4] This freedom, However, was later granted to citizens of the Gulf Cooperation Council countries.[5]

Employment generation and Bahrainisation policy can be captured by the average wage rate, the average wage rate per production employee, the share of Bahraini employees in total employment, and the share of Bahraini wages in total wages.

Another important effect which can influence economic development is trade performance. The share of imported raw materials in total raw materials used by an establishment measures its contribution to foreign exchange saving in the economy. By the same token, the share of exports in total sales reveals a firm's ability to generate foreign exchange. The net evaluation of import and export performance will indicate an establishment's net contribution to foreign exchange and the balance of payments of the economy.

5.4. LIMITATIONS OF THE EVALUATION

This part of the study seeks to identify the main elements of these effects and subject them to empirical tests as one way of studying the influence of JVS compared to LES on industrial development in Bahrain. Chapter 8 defines the sample size of industrial establishments, original variables and derived variables, and the main characteristics of the data. Chapter 9 attempts to distinguish between the internal and external effects of industrial establishments on the performance of the manufacturing sector. Using "weighted" ratios, we standardise the establishment variables for profitability, capital intensity and other variables. Chapter 10 uses discriminant analysis to identify and discuss the set of characteristics that best discriminate between joint ventures and local establishments and to identify JVS misclassified as LES and LES misclassified as JVS.

The empirical evaluation, as discussed above, has several limitations which need discussing. First, the sample size chosen for this analysis has an unequal number of observations in each group of ownership; locally owned establishments (LES) are represented more than joint ventures (JVS) in our sample size. In the ideal situation, the grouping of industrial establishments should be based on criterion that the sample of establisments in the two groups be similar with respect to product produced, product heterogeneity, size, and the environment and the market structure in which they operate, and differ only with respect to the factor we wish to study. Since we need to have sufficient number of observations to permit a meaningful statistical test of our hypotheses, we have grouped our sample into several disaggregated and aggregated groups. Nonetheless, it is possible for these chosen groups of aggregation to influence the quality of our results. For example, a group with high profitability and another group with low profitability could yield an estimate of profitability which is close to their overall average. Such an estimate could be misleading. Hence, caution should be exercised in making a firm judgement about the hypothesis we wish to study. Second, our chosen data is only for 1983. This static or "snapshot" feature of our sample size, which may change with time, should be taken into account when we make our interpretation of the results.

Finally, our empirical analysis is the first of its kind carried out on the relationship between joint ventures and locally owned establishments in Bahrain in particular and the Arab Gulf States in general. Thus, we do not expect to provide a final assessment of this issue. This analysis, instead, tries to open up a debate over this increasingly important issue and to build an objective understanding about the impact of joint ventures on the industrial development of Bahrain and the region as a whole.

NOTES

1. Edith Tilton Penrose (1956) "Foreign investment and the growth of the firm", Economic Journal, P 226.

2. Cited in Peter Johnson (1985) British Industry: An Economic Introduction, Oxford: Basil Blackwell, P 153.

3. James C Ahiakpor (1981) The Role of Foreign Investment in Manufacturing Industry Development: The Case of Ghana, Unpublished PhD dissertation (university of Toronto) P 16.

4. Ragaei ElMallakh (1985) Qatar: Energy & Development, London: Croom Helm, P 9.

5. Bahrain Centre For Studies and Research (1985) Employee Turnover Rate in the Private Sector in Bahrain, Bahrain.

CHAPTER SIX

DETERMINANTS OF GROWTH OF JOINT VENTURES IN THE BAHRAINI MANUFACTURING SECTOR

6.1. INTRODUCTION

Joint ventures have in recent years enjoyed such popularity world-wide that more joint ventures and cooperative arrangements have been announced since 1981 than in all previous years. Even the US based multinationals, long noted for their preference for wholly-owned subsidiaries rather than joint ventures have recently become willing to consider joint ventures when entering a new business.[1] Indeed, for US multinationals, all cooperative arrangments (including such things as licences and local equity participation) outnumber wholly-owned subsidiaries by a ratio of four to one.[2] Some researchers go so far as to state that joint ventures are the wave of the future for reasons such as heightened global competition, increased risk, ever larger projects, and the fast pace of progress.[3]

In developing countries, joint ventures rather than wholly-owned subsidiaries are the dominant form of business organisation for multinational enterprises.[4] Not surprisingly, the role of joint ventures in the economic development of the developing countries has in recent years received the focus of attention. The benefits of joint ventures to the developing countries vary according to the particular joint venture arrangements and the concessions given by the developing countries' governments to the multinationals based in developed countries. More and more developing countries have implemented measures to encourage the establishment of joint ventures rather than wholly owned foreign subsidiaries. The number of joint ventures between the multinationals based in developed countries and partners in developing countries has been increasing steadily. Many economists have maintained that the multinationals' activities benefit the economies of the developing countries because they contribute effectively to technology transfer, employment generation, local resource development and economic growth in general.[5] Others have stressed that only through the multinationals can most developing countries gain reasonable access to the consumer markets in developed countries and to sources of specialised raw materials; without such an access developing countries would find it very difficult to raise their export earnings from manufactures. Some economists, however, argue the opposite, that the multinationals induce inappropriate capital-intensive technologies, and cause unemployment and dependency by retarding indigenous development of productive forces.[6] UN (1971) suggested that many conflicts of interest between multinationals and developing countries can be resolved by joint ventures.[7]

This chapter analyses the distinguishing features of joint ventures, discusses the motives of the developing countries and foreign firms for entering into joint ventures, and reviews the past and recent trends in joint ventures in Bahraini manufacturing industry in particular and other GCC states in general.

6.2. THE THEORY OF JOINT VENTURES: BRIEF REVIEW OF THE LITERATURE

6.2.1. Joint Ventures Defined

The definition of joint venture is unclear, Stuckey defines it as:

> The organisational and legal entity created when two or more seperate groups jointly participate as co-owners of a producing organisation. I must further emphasise that each joint venturer continues to exist as a going concern independent of the joint venture firm. Thus mergers and acquisitions are not joint ventures.[8]

Thus the emphasis in Stuckey's definition is on organisational structure and the legal affairs of the joint venture firm. Joseph Bradly - an academic lawyer - adds the characteristic of continuity:

> The joint venture exists through a series of transaction usually for a significant period of time.[9]

Tomlinson, however, emphasises the commitment of resources by both entities for more than a short duration of time:

> A joint venture is one where there is the commitment for more than a short duration of funds, facilities, and services by two or more legally seperate intersets, to an enterprise for their mutual benefit.[10]

The level of shared equity is stressed by Beamish:

> Joint ventures were defined as share-equity undertakings between two or more parties, each of whom held at least five percent of the equity.[11]

In this study, a joint venture is one which at least one partner is from Bahrain and the others are from Gulf Cooperation States, Arab countries, or foreign countries.

Joint ventures usually take advantage of two broadly defined categories in the business environment that are similar in principle across national legal systems: partnership and incorporation. Partnership implies that one partner may be responsible for all its debt if the other partner cannot pay his share. Incoporation, however, includes a limited liability to a third party and indefinite life.[12]

Furthermore, joint ventures come in several forms. One variety, which has received special attention, is the international joint venture. This type of joint ventures refers to any joint undertaking between a government, company, group, or individual from a developing country and multinationals. International joint ventures between multinationals and host government play a significant role in the international business scene. our research is also concerned with joint ventures between the government or a company, group or individual from Bahrain with a similar entity in the Gulf Cooperation Council States or other Arab countries. This type of joint ventures will be referred to in this study as a regional joint venture.

6.2.2. The Motivation for Joint Ventures: Developing Countries

It is now widely recognised that to raise or maintain a relatively high rate of economic growth, developing countries have to diversify their exports from primary commodities, for which demand is income and price inelastic and for which production is subject to diminishing returns, to manufactures, for which demand is income and price elastic and whose production is characterised by increasing returns to scale and expected to benefit from a high rate of technological transfer from abroad.

It has often been stated that the effort of domestic firms in developing countries to export manufactures is thwarted by the shortage of skill, enterprise and capital. In fact, even those developing countries which have an abundant supply of skilled manpower and entrepreneurs and perfect access to international capital markets (via their governments) may still find it difficult, if not impossible, to supply manufactured products of the required standards to the consumers of developed countries without the collaboration of the MNE. This arises because of their lack of access to: (a) international markets; (b) sources of specialised raw materials and intermediate inputs; (c) management know-how, (d) trade names and (e) proprietary technology.

Indeed, of the barriers to developing countries' exports of manufactures, it is impossible to exaggerate the importance of the lack of access to foreign-consumer markets, since a large proportion of final goods exported to developed countries are sold in chains of large departmental stores and supermarkets. To get access to these market outlets, firms in developing countries must not only supply products of the right design, consistently high quality and in sufficiently large quantities, but also spend heavily on advertising and promotion to establish their own brands or enter into agreements with the supermarkets to sell their products under the supermarkets' own brand label. Hence, without the participation of the MNE's, few firms in developing countries can expect to break into the world markets for manufactures, even if they potentially possess all the best local conditions to produce these products cheaply.

Consequently, the governments of many developing countries have for some time now encouraged the multinationals enterprises (MNEs) to establish foreign wholly owned subsidiaries(WOSs) and joint ventures (JVS) by offering incentives packages which include various concessions such as: duty free imports of machinery and raw materials; low or zero personal and corporate tax; little or no restrictions on capital, profits, and royalties repatriation; duty free access to local markets; and subsidised domestic inputs. Such concessions have implications for tax revenue, foreign exchange earnings, local employment and local enterprises' share in JVS profits.

The aim of such concessions is, of course, to encourage the establishment of new joint ventures and the expansion of existing ones. However, beyond a point, the greater are such concessions, the smaller are the developing countries' incremental benefits from joint ventures. In practice, it may be difficult to determine the optimal level of concessions.

Recently, developing countries have adopted policies, e.g. indigenisation programmes, to induce the MNEs to adopt joint ventures. For example, India passed a foreign exchange act in 1973 which placed a 40 percent ceiling on foreign equity participation. Malaysia, by its industrial coordination act of 1975, requires all manufacturers to apply for a licence to continue or start operations, with the objective of bringing at least 70 percent of the economy under the control of Malaysians by 1990. Nigeria, by its Enterprises Promotion Decree of 1977, requires all enterprises with foreign equity either to divest completely or to reduce their equity to between 40 percent and 60 percent, depending on the sector.[13] Further, the 1980s witnessed a global liberalisation in the attitude of host governments toward foreign investors regarding the level of foreign ownership allowed in local enterprises and a relaxation of the rules and bureaucratic machinery implemented in the 1970s. In other words, although national ownership continues to be an important objective, according to United Nations Center on Transnational Corporation (UNCTC), many countries have increased the allowable level of foreign ownership in one or more sectors, shortened the application process, and created more liberal attitudes for small and medium-size foreign investors.[14] Consequently, the percentage of MNE operations in the mode of joint ventures has been growing at a fast rate.

The preference of developing countries for joint ventures to wholly-owned subsidiaries may stem from the belief that this would give indigenous businessmen more control over domestic industrial activity and a larger share of profits than otherwise. However, the actual relationship between equity ownership of the various parties to the joint ventures and their shares of the joint ventures' profits may be considerably weaker than expected. Ultimately, the bargaining power of each party to the joint venture, rather than its institutional share, determines its share in total profits. The bargaining power of the local partners to a joint venture depends on many factors other than their equity shares in the joint ventures. For example, if the share-ownership is widely diffused among the indigenous people, then even a 51 percent local share ownership may not give the local shareholders much real bargaining power. Furthermore, as long as the partners can bargain over the transfer price of inputs, the net profit to each party would probably not reflect significantly its institutional share.

The developing countries' preference for joint ventures may also arises from the belief that in joint ventures the developing countries' governments have greater influence on the factor mix and a greater capacity for taxing profits. In so far as they refrain from taxing the inputs supplied by the MNEs, say, because of the adverse distortion effects of such a tax, and rely mainly on a profits tax, the actual tax revenue they can raise may well be small, because the MNEs and their local partners most probably have a common interest in fixing transfer prices so as to minimise the profits tax paid to the government. Ultimately, how much tax revenue a government can raise and how many local workers it can induce the joint ventures to employ depend on its bargaining power. The developing countries' governments can increase local employment by subsidising labour costs but this would reduce net tax receipts.

An attempt to increase simultaneously tax revenue, employment and the local partners' share of profits could squeeze the MNE's profits. However, there is a limit below which the profits of the MNEs cannot fall even in the short run without causing a loss in the developing countries' national goals. In the long run, it may pay individual developing countries to allow the MNE to earn considerably more than this minimum. Thus, the benefit to the developing countries depends largely on their bargaining power which in turn depends on how keen on the joint ventures the MNEs are. To the extent that MNEs prefer wholly-owned subsidiaries to joint ventures, the developing countries' bargaining power and their total potential benefits derived from joint ventures would correspondingly be less. However, there are good reasons for believing that there are circumstances in which the MNEs may prefer joint ventures to wholly-owned subsidiaries.

6.2.3. The Motivation For Joint Ventures: Multinational Enterprises (MNEs)

While the MNEs can provide firm-specific advantage in the form of ready access to technology, specialised raw materials, capital and markets, the local firms can provide location-specific knowledge regarding the host country's markets, infrastructure, politics and culture and current business practices. According to the internalisation theory, it would be cheaper for the MNE to gain access to the location-specific knowledge of local firms via the establishment of wholly-owned subsidiaries than via joint ventures. For example, the costs associated with protecting their firm-specific assets from exploitation by local partners can be significant. Therefore, this theory suggests that a rational profit maximising MNEs would tend to prefer wholly- owned subsidiaries to joint ventures.

However, the above view presupposes that none of Williamson's transaction disabilities - opportunism, bounded rationality, uncertainty, and small numbers - can be dealt with efficiently within a joint venture.[15] This assumption need not always hold in practice. Thus,

> under particular arrangements the potential threats posed by opportunism, a small number condition and uncertainty can be reduced to a point where joint ventures become a more efficient means of dealing with environmental uncertainty and

maximising the profit potential for the MNE's firm-specific assets than wholly-owned subsidiaries, even in the face of bounded rationality.[16]

Beamish also found that in many cases in real life, joint ventures were more efficient than wholly-owned subsidiaries.[17]

Stuckey (1983) found that the main reason for firms to create joint ventures (in the aluminium industry) was that technical know-how and management expertise are more easily exchanged in joint ventures than wholly-owned subsidiaries and that nation-specific knowledge, which is typically required when investing in a country where there is limited previous experience, is more satisfactorily (to both parties) acquired via joint ventures.

To justify the utilisation of international joint ventures within the internalisation framework, it is not enough to argue that the MNE must possess a rent-yielding asset which would allow it to be competitive in a foreign market. It is also necessary to show that some joint venture arrangements are superior to other means for appropriating rents from the sale of this asset in the foreign market.[18] The attractiveness of joint ventures to MNEs depends on the revenue-increasing and cost-reducing opportunities they provide for the MNEs. However, according to internalisation theory in its present form, firms would always have a strong economic incentive to avoid joint venture arrangements since these are regarded as being inferior to wholly-owned subsidiaries in allowing the firms to maximise the returns available on its ownership-specific asset. Yet this solution to the problem of imperfect markets in intermediate inputs and intangible assets (which usually lead to vertical and horizontal integration respectively) assume that management has the ability to organise an internal market and that a joint venture cannot be structured in such a way as to maintain both the bargaining and maladaptation costs inherent in such arrangements at acceptable levels.

Indeed, some joint venture arrangements can actually provide a better solution to the problems of opportunism, the small numbers dilemma and uncertainty in the face of bounded rationality than wholly-owned subsidiaries. The additional costs involved in the enforcement of price agreements and restrictions on the use of the MNE's intangible assets can be more than offset by the higher revenue potential of their assets resulting from the formation of the joint ventures. Rents can exceed those available through wholly-owned subsidiaries in so far as the joint ventures are a more efficient means of combining the MNEs assets with those of the local partners.

In joint ventures which are established in a spirit of mutual trust and commitment to its long-term commercial success, opportunism is unlikely to emerge. Agents may on a reciprocal basis deliberately pass up short term advantages.[19] If such a cooperative spirit is furthermore supported by some efficient mechanisms for dividing profits and making joint decisions, especially concerning the reward and control system, the incentives to engage in self- seeking pre-emptive behaviour could greatly be reduced.[20] The attention of the partners could then be directed toward long-term joint profit maximisation since there would be no need to make preemptive claims on profit streams.

6.3. JOINT VENTURES IN BAHRAIN AND OTHER GCC STATES

6.3.1. Introduction

The concept of joint venture in the Arab Gulf region can be traced to the period of oil participation negotiations between oil multinational companies and oil exporting countries in the late 1960s and early 1970s. During that period, the Minister of Petroleum and Mineral Resources - Sheikh Ahmed Zaki Yamani - introduced the idea of participation as a substitute for nationalisation in the political economy of the region. In an interview with Jeffrey Robinson, Yamani explained the concept of participation as follows:

> I meant by that (participation) we would have technological and marketing assistance, Plus access downstream from the other party. That's the type of participation I always felt we had to have. As far as I was concerned, I never varied my position. I always move towards the point where we would own the assets and we would control the oil in the ground.[21]

In the Middle East, particularly the Arab Gulf region, there is a history of political domination by foreign firms that have had monopoly power in available expertise in petroleum exploration, extraction and marketing.[22] This experience is so recent that full foreign ownership can be put aside as untenable. Thus, a joint venture gives an Arab Gulf state the possibility of maintaining control whilst obtaining from the foreign partner the proper management, technology and access to markets deemed essential for success in industrial projects.

There are two main forms of joint ventures in the GCC states: international joint ventures and regional joint ventures. The following sections of this chapter will discuss these two forms of industrial organisations.

6.3.2. International Joint Ventures

An international joint venture, in GCC countries today, can be defined as a negotiated arrangement between a foreign partner with technical and commercial expertise and experience and a local partner that does not have these skills relative to the product or service, but does have local knowledge and general commercial strengths to help create and maintain a business in its own market area.[23]

In the GCC countries, equity participation by foreign investors up to a maximum of 49 percent - sometimes with exceptions, as in Bahrain - is encouraged rather than a straight forward management contract. This is because it is believed that a foreign joint venture partner who is prepared to stake his own financial capital in a project is, in effect, locked in and hence will be more likely to exert every effort to ensure the profitability and consequently the success of the project.[24]

6.3.2.1. Early Experience

At the outset, foreign joint venture partners were reluctant to be involved in joint ventures in the region. In Saudia Arabia, the steel joint venture with West Germany's Korf Stahl AG took a long time to be finalised. Korf wanted only a management contract, whereas the Saudi Arabian Basic Industries Corporation (SABIC) wanted the firm to take 49 percent of the equity. The foreign joint venture partner eventually agreed after the Saudi-West Germany Joint Economic Commission devised a scheme to guarantee private West German investment in Saudi Arabia. By the same token, a Saudi ethylene joint venture with Japanese companies experienced several difficulties before it became finalised. The project was initially between SABIC and Mitsubishi, then between SABIC and Japanese companies which came to be known as the Saudi Petrochmicals Development Company, a consortium led by Mitsubishi and including 54 Japanese companies. in addition, the Japanese Ministry of International Trade and Industry has offered some form of guarantee to the Japanese investors.[25]

In Bahrain, the Bahrain Aluminium Smelter (ALBA) was started in 1971 as a joint venture in which six international corporations retained 81 percent of the equity (US Kaiser Aluminium 17 percent, US General Cable Corporation 17 percent, West Germany Breton Investment 9.5 percent, UK British Metal Corporation 17 percent, Swedish Electrokoppar 12 percent, and Western Metals 8.5 percent). The remaining 19 percent was owned by the Bahraini government. The Bahrain smelter was initially poorly constructed in the late 1960s through a combination of inexperienced contractors, workers and investors.[26] As a result, ALBA remained unprofitable until 1979. The persistent losses during that period caused four of the original investors to withdraw, which left Bahrain's government with 77.9 percent of the equity, with Kaiser holding 17 percent, and Breton Investment holding the remainder. Later on, Saudi Arabia - SABIC - agreed to buy 20 percent of the equity in ALBA from the government of Bahrain.

The Bahrain Fishing Company - a joint venture between the British Ross Group (40 percent) and the private sector (60 percent)- was established in 1967, and by the mid-1970s operated fifteen modern steel trawlers for shrimp fishing in Bahrain waters and off the nearby Saudi Arabian coast. The company had shore facilities to process, package, and freeze shrimp for export to the USA, Europe and Japan, making shrimp fishing the largest non-oil export item after aluminium. The company catch was believed to be 600 tonnes annually. In 1977, the company's gross sale amounted to BD 2.9 million.[27] However, the Bahrain Fishing Company, which monopolised Bahrain's commercial shrimping, was dissolved in 1978 and the government took over the industry and started to sell the output domestically. The collapse of the fishing industry in Bahrain in the late 1970s may be attributed to the absence of marine research to determine the orderly exploitation of shrimp resources without ecological harm.

In Qatar, one of the early oil-based industrial projects is a fertiliser plant managed by the Qatar Fertiliser Company (QAFCO), QAFCO, set up in 1969 as a joint venture with an original capital of Qatari Riyal (QR) 57 million, subscribed to by Qatar (70 percent) and foreign partners (30 percent). The foreign partners include Norway's Norsk Hydro (25 percent) and the United Kingdom's Hambros Bank (2 percent). Construction started in 1969, commercial production began in late 1973 and exporting in 1974. The Norwegian partner managed plant operations and marketing. Production figures are unavailable, but observers believe that the plant had start-up problems which kept production below the rated capacity of 1,000 tons of urea and 900 tons of ammonia a day through 1975. Even with these problems and the belief that there is little likelihood that the plant will be run at more than 80 percent capacity for some years, by 1976 work had begun in order to double capacity by late 1978 at a cost of $250 millions.[28]

Summing up, one can state that in the first phase of industrialisation during the late 1960s and early 1970s, Gulf Cooperation Council states have experienced some difficulties in convincing foreign investors - who would prefer management contracts - to participate in industrial joint ventures in the region. However, the countries that succeeded in creating joint ventures with foreign partners have suffered from the problem of inexperience, resulting in the poor performance of those projects.

6.3.2.2. Current Experience

Since the 1973-1974 period, industrial investment through joint ventures has grown substantially in the manufacturing sector in Bahrain and other GCC states.

In Saudi Arabia at the end of 1986 there were 1900 industrial projects in production, with an estimated capital investment of Saudi Riyals (SR) 60 billion. Nearly 400 of these projects were joint ventures with foreign partners with a total invested capital of about SR 30 billion. This contrasts with the number of industrial plant in 1975, which stood at just 461 with an invested capital of only SR 9 billion. Of the 66 loans approved by the Saudi Industrial Development Fund (SIDF) in 1986, 17 projects with an investment of SR 239 million were enterprises with a foreign partners. By the year end a total of 311 joint venture projects had been funded by the Saudi Industrial Development Fund with a commitment of SR 5.5 billion, representing 39 percent of the fund's total loan approval. The foreign capital in these projects amounted to SR 1.6 billion. Foreign investment in Saudi Arabia is concentrated in the chemical industry, including petrochemicals and fertilisers, building materials and metal industries, together accounting for more than 92 percent of total foreign investment in non-oil manufacturing. The chemical industry has the largest share, with 71.1 percent of total foreign investment.[29]

In Bahrain, the government has played an active role in the financing of large scale international joint ventures. The government participates in the equity capital of large aluminium enterprises, oil refining, and gas liquefaction projects. For instance, the government holds the largest share in the Bahrain Aluminium Smelter (57.9), the Bahrain Oil Refinery (60 percent), and Bahrain National Gas (75 percent). The private sector has succeeded in establishing joint ventures with other foreign private investors in food and beverages, chemicals, shiprepairing and aluminium fabrication industries. Recently, Bahrain has also become the centre for American-Arab Pan joint venture in high technology, namely the Arab Engineered System and Controls Company (ARESCON). ARESCON is a joint venture between US technology partner Combustion Engineering, Arab Petroleum Investments Corporation (APICORP) in Saudi Arabia, the Arab Investment Company of Baghdad and the Riyadh-based National Industrialisation Company. The venture, capitalised at $40 million, is expected to begin production of digital products for use in the regional oil industry.[30] Recently the government has launched a new programme of industrial diversification which incorporates the foreign investment and joint ventures' drive. The Industrial Development Centre, which is established within the Ministry of Development and Industry, has taken over the task of coordinating the foreign investment and joint ventures programme and of allocating some $2.6 billion for projects in various industrial sectors over the next five years in order to diversify the economy away fom oil.

In the other GCC states - with the exception of Kuwait - the public sector has entered into partnership with foreign partners in establishing joint ventures in heavy industry and more particulary in oil refinery, fertilisers, gas liquifaction, and petrochemicals. Although welcoming the participation of the GCC and other Arab countries, Kuwait has favoured technical agreements with multinationals over foreign equity participation in local industries. However, Kuwait appears to favour entering into joint ventures with foreign partners overseas.[31]

The popular argument about the reasons that induce foreign investors to invest in a GCC state is that foreign companies can expect higher profits in Gulf markets than in their home markets or other world markets. Although it is accepted that profits have generally been high in the Gulf region in the 1970s, rates of return have since assumed levels similar to what one would expect elswhere in the world. Other reasons are probably more decisive:

(1) Having a foreign investment brings the advantage of gathering information on a particular area and its neighbouring states. Historically, the oil discovery in Bahrain in the early 1930s by US oil multiatiónals led those multinationals to the discovery of vast oil reserves in Saudi Arabia. In recent times, Danish comanies, for example, have become involved in consumer goods sectors (all dairy products and fruit juice projects) in Bahrain and Saudi Arabia.

(2) Another advantage would be to broaden their market to new geo-

graphic

areas. In other words, a foreign partner in one industrial establishment may also have an opportunity for involvement with other Gulf projects. There are several instances that support this argument; the US Aluminium Kaiser Company, which is a foreign partner in Aluminium Smelter, has succeeded in obtaining a management contract for a new regional joint venture in aluminium (GARMCO); US CALTEX, a foreign partner in the oil refinery (BAPCO), holds 27 percent of the equity in the Bahrain National Oil Company (BANOCO); and the Japanese Kobe Steel Company, which was awarded the establishment of the Arab Iron and Steel Company's pelletising plant on a turnkey basis in 1981, has also been responsible for the construction of the Gulf Aluminium Rolling Mill (GARMCO) plant on a turnkey contract and the training of personnel and the supply of the necessary process and product technology.

(3) A foreign investor may have excess capacity in machinery, personnel or funds and, perhaps, would like to sell part of their machinery to generate liquidity. Thus, investing in a joint venture overseas would then prove to be convenient for both foreign and local companies.

(4) A foreign investor from a developed country may transfer technology and earn royalties, which in the home country may not be classified as hightech, yet in the Gulf region would be considered to be new technology. This transfer would extend the technology life cycle and, hence, the benefits which had been reaped earlier in the home country.[32]

6.3.2.3. Joint Ventures and Offset Investment Programmes

Some Gulf Cooperation Council states have used an "offset investment programme" in defence deals to entice western companies to transfer technical know-how to their economies through joint ventures. In Saudi Arabia the government has added further weight to the development of joint ventures by making it mandatory upon contractors bidding for defence contracts to set up proposals to offset part (35 percent) of the cost to Saudi government by investing in high technology joint ventures. This policy was first put into practice with agreements on the $3.5 billion "peace shield air defence programme". The main contractors, Boeing and General Electric, came up with nine potential projects with a combined investment of $600 million, four of which are operating now. These four joint ventures have been organised by the Boeing Industrial Technology Group (BITG), a consortium of American and Saudi firms, in partnership with various Saudi companies. A second major offset agreement is being concluded with the UK for 35 percent of the value of a $7.6 billion Al Yamamah defence deal. Unlike the American programme, which has been entirely organised by the Peace Shield Defence System contractors, the British initiative is being coordinated by the British government. The principal reason for this is that "offset investment" would have to be made by a far wider range of British companies than those involved purely in defence and aviation. Further, France has been awarded a defence contract which will also involve a commitment to joint ventures.[33]

Though it is much smaller than its counterpart in Saudi Arabia, Bahrain has contemplated the adoption of the "offset investment programme" in its defence deals but no joint venture has yet been realised from this programme.

The main criticism of the offset programme is that it is merely a cover for investment which would have been made in any case. Thus, the GCC countries need to evaluate and monitor these investments thoroughly and ensure that they fall within the priorities of their development plans and contribute to the transfer of technology to their economies.

6.3.3. Regional Joint Ventures

Regional joint ventures in Bahrain and other GCC states can be defined as an association of two or more parties from GCC countries or Arab states to undertake an economic project and to share in its risks and profits. In general, the often cited arguments against foreign direct investment are rarely used in the context of regional joint ventures. Indeed, these investments are viewed as important instruments for the achievement of the generally accepted ideal of Arab economic integration. However, until the early 1970s, regional joint ventures were virtually non-existence in spite of the many multilateral agreements signed under the auspices of the Arab States League for the purpose of creating regional joint ventures. This inactivity was vitalised by the four-fold increase in oil prices during 1973-1974. The first sectors to benefit in this new era were financial institutions - development funds, investment and commercial banks - and the oil industry. The establishment of regional joint ventures in the oil industry was possible because all the GCC states (except Oman) and other Arab States had succeeded in establishing the Organisation of Arab Petroleum Exporting

Countries (OAPEC). One main objective of OAPEC is:

> To coordinate and utilise the members' resources and common potentialities in establishing joint projects in various phases of the petroleum industry.[34]

Among OAPEC's joint projects is the Arab Shipbuilding and Repair Company (ASRY), which was formally incorporated in Bahrain in 1974, with equity capital of BD 128 million, to repair and service ships.

The establishment of the Gulf Cooperation Council (GCC) in 1981 has provided another framework for the setting up of regional and international joint ventures aiming at integrated development. The Unified Economic Agreement concluded in 1981 refers to the need to establish joint ventures in the region. It states that:

> Within the framework of their coordinating activities, the member states shall pay special attention to the establishment of joint ventures in the fields of industries, agriculture and services, and shall support them with public, private or mixed capital in order to achieve integration, productive and common development on a sound economic basis.[35]

The implementation of these main objectives was left to the Industrial Cooperation Committee (ICC), which made a plan for a two-phase framework. The first phase is to establish regional institutions which will carry out the tasks of the GCC industrial integration. The second phase is to coordinate industrial plans for the members, increase cooperation among the existing operational industries and establish joint ventures.[36] One of the early decisions of the Gulf Cooperation Council States was the establishment of the Gulf Investment Corporation (GIC) - the GIC was approved by the GCC leaders at a November 1982 sum-mit meeting. The corporation is owned equally by the six governments of the GCC states, and its legal domicile is in Kuwait. The authorised and subscribed capital of GIC is $2.1 billion and the paid up capital is $540 million. The GIC is expected to play a leading role in promoting new ventures in the various sectors of the GCC states, and act as a promoter of these ventures. Further, GIC is willing to subscribe to equity and enter into partnerships with private and public sector enterprises of the GCC and foreign firms in promoting new economic activities. Recently, among GIC projects have been two international joint ventures in Saudi Arabia. The first is an aircraft modification centre at Riyadh's King Khaled International Airport, worth an estimated $127 million. Together with Saudia Airlines, the Riyadh National Industrialisation Company (NIC) and Boeing Industrial Technological Group, GIC will take a 10 percent stake and possibly become a lender. The second is an engine overhaul operation at the same airport, worth some $150-160 million, in cooperation with Saudia Airlines, NIC, and the United States' General Electric Company.[37]

A pioneering role has been played by the Gulf Organisation for Industrial Consulting (GOIC) - set up in 1976 and financed by the GCC states and Iraq, with Saudi Arabia, Iraq, Kuwait, Qatar And the United Arab Emirates each providing 17 percent of the annual budget, and Bahrain and Oman providing a 7.5 percent share of the funding. Its purpose is the identification of potential joint ventures and to promote industrial and technical cooperation among its member countries. The most important success of the GOIC in joint ventures has been the realisation at the beginning of 1986 of the Gulf Aluminium Rolling Mill Company (GARMCO) project in Bahrain. The project, with an initial capacity of 40,000 tonnes of aluminium sheet and coil a year, was built under a $100 million turnkey contract by the Kobe Steel Company of Japan. All members states of the GOIC except the United Arab Emirates are participating with Bahrain, with Saudi Arabia, Kuwait and Iraq each taking a 20 percent share and Qatar and Oman a 10 percent share each.[38]

In the early 1980s, there were about 93 regional joint ventures - some of them included the participation of foreign partners - in manufacturing in the GCC states divided as follows: 37 establishments in Saudi Arabia, 28 establishments in the United Arab Emirates, 11 establishments in Bahrain, 8 establishments in Oman, 6 establishments in Kuwait and 3 establishments in Qatar.[39]

The regional joint ventures have two main characteristics. First, most regional joint ventures have a clear governmental character. Indeed, Arab governments often participates in them either directly or through public sector organisations. This is due to two main reasons, namely, many joint ventures have been sponsored by inter-governmental Arab organisations whose objective is confined to the establishment of projects among member states; and the prominence of the public sector in the economies of most of the Arab States. However, member governments in joint ventures reserve for themselves the right to sell part of their share to their nationals. The second characteristic is that most regional joint ventures built their plants on a turnkey basis and contracted the required technical assistance from multinationals. Reliance on technical know-how from multinationals is inevitable in most regional joint ventures as advanced technology is usually lacking on the part of all partners. This draws atentions to the importance of including partners from developed countries in regional joint ventures.

6.4. CONCLUSION

The brief review of literature reveals that joint ventures are the dominant form of business organisation for multinational enterprises in developing countries. Indeed, some researchers argue that the joint venture will be the dominate mode of the future for reasons such as increased international competition, ever-larger invested capital, increased risk and the fast progress of technological change. In Bahrain and other GCC states, joint ventures enjoyed a surge of popularity after 1973-1974 as a means of overcoming difficulties in the marketing of new industrial products in the developed markets and increasing technology transfer to their economies. However, the discussion of foreign direct investment in Bahrain and other GCC states shows that there are two main forms of joint venture, namely: international joint ventures and regional joint ventures. The first type, which refers to joint ventures with foreign partners outside GCC or Arab States, initially faced difficulties due to the concern of multinationals about the risk associated with their investments in the Gulf region. However, the dramatic oil increase in 1973-74, the establishment of economic commision between GCC states and various developed countries, and offset investment programmes have all contributed to encouraging multinational enterprises to commit their resources to joint ventures in the GCC states. The second type, which refers to joint ventures with other GCC or Arab states, depends to a large degree on contracting the required technological assistance from multinationals. This implies the importance of involving the technology-suppliers' partners in regional joint ventures in order to ensure their commitment and, hence, the success of regional joint ventures.

NOTES

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15. These concepts introduced by Williamson are useful in comparing joint ventures to wholly-owned subsidiaries because they have precise meanings. Opportunism is a human condition manifested by the strategic manipulation of information or the misrepresentation of intentions, including self-interest seeking behaviour, with guile; bounded rationality is another human condition characterised by a limited capacity in terms of knowledge, foresight and skill which places limits on the individual's ability to comprehend complexity; uncertainty is an environmental condition where specification of the full decision tree is not feasible; small numbers is an environmental condition where only one or two market agents are available to perform the required condition in which the underlying circumstances relevant to the transaction, or

related set of transaction, are known to one or more parties but cannot be costlessly discerned or displayed for others. See Oliver E Williamson (1975) Markets and Hierarchies: Analysis and Antitrust Implications - a Study in the Economics of Internal Organisations, Free Press.

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CHAPTER SEVEN

INDUSTRIAL POLICY
IN BAHRAIN

7.1. INTRODUCTION

The low level of Bahrain's oil reserve has meant that one of the main challenges facing the government has been the ability to expand and diversify the manufacturing sector, whether by installing capital and energy intensive industries or through the provision of packaged incentives to encourage private and foreign investors to invest in manufacturing industry. This chapter reviews the official policy on foreign investment and joint ventures and examines the protective and other incentives measures adopted by the government, in comparison with the other GCC countries, in its drive toward the creation of an industrial base on which to build industrial and economic progress.

7.2. INDUSTRIAL INSTITUTIONAL DEVELOPMENT

Most governments in developing countries have established a number of regulatory authorities to carry out industrial policy objectives. In Bahrain, the experience of industrial regulation and planning is short and limited. The responsibility for implementing industrial regulation lies with several bodies and ministries. Most important are the Ministry of Finance and National Economy, the Ministry of Development and Industry, the Ministry of Commerce and Agriculture, and the Oil Superior Council. On the other hand, industrial planning had been project, mainly large scale industry, rather than policy oriented. In other words, a formal industrial sector policy or plan does not yet exist in the country. However, the general official industrial policy is aimed to accelerate the development of economic sectors by diversifying sources of income and expanding the production base. A major role is attributed to the Ministry of Development and Industry in promoting and boasting the industrial sector. Four departments within the Ministry are concerned with industrial activity; the Directorate of Industrial Estates, the Directorate of the Petroleum Sector, the Directorate of Civil Aviation and the Directorate of Industry.

Since the early 1980s, a more active approach toward industrialisation has been adopted in Bahrain. In 1983, the government formed the "Strategic Choice Committee"(SCC), comprising senior officials of several ministries, to make a study of the possible areas of development and the role of government in the diversification of the economy. On the institutional aspect, the Committee recommended that the government should sponsor a holding company, funded partly by the government and other public sector organisations, but managed in the private sector on market principles, with the responsibilities of identifiying profitable investment opportunities and providing the required technical expertise to new and existing industrial establishments. This proposal had been the recommendation of World Bank mission in its report of economic prospects in Bahrain in 1978. In the report, the mission recorded its favour for the formation of a development corporation with the following objectives: (1) to set up industrial estates and to plan services such as roads, electricity, water, sewerage; (2) to promote the setting up of industries on industrial estates including assistance in obtaining finance; (3) to administer the industrial estates; and (4) to give advice on managerial and technical matters to small industries. The mission indicated that the corporation should become self-financing, drawing income from renting or selling industrial plots, and should not engage in setting up industries itself.[1]

In 1987 the Industrial Development Centre was established within the Ministry of Development and Industry to take the responsibility for industrial promotion and coordinating the foreign investment and joint venture programme. However, the idea of forming an industrial promotion centre was first recommended by the Motor Columbus Consulting Engineering Inc., from Switzerland, in its report (1975) on industrial investment opportunities in Bahrain. In the report, the mission outlined the following tasks for the industrial promotion centre: (1) planning of new schemes in small and medium scale development, (2) providing technical assistance for project preparation, execution, and negotiations with foreign promoters, (3) providing, through coordination with other ministries, adequate infrastructure services, possibly including the establishment of industrial estates, (4) supervision of financing and proposals for public capital participation, (5) training staff and managers, (6) sales promotion and quality control for exports, (7) protection of new industries in accordance with Gulf trade policy, (8) coordination with immigration authority to provide the necessary foreign-skilled labour for medium and small industries in the case of local labour shortage.[2]

It is not yet clear if the formation of the Industrial Development Centre is a substitute for the development corporation as recommended by the World Bank mission, or an initial scheme with an intention to promote it into an independent board in the future. However, the experience of some newly industrialised developing countries shows that their governments have chosen to assign the responsibilities of industrial promotion to special boards with semi-independent status as a means to increase efficiency and avoid bureaucracyy and administrative routine.

Since the formation of the Industrial Development Centre, within the Ministry of Development and Industry, a more active approach in promoting new industries and providing technical assistance for project preparation and execution has been adopted. In 1988 the centre launched a new programme called the "Task Force Programme for Industrial Development" to train a core of Bahraini nationals drawn from about 200 companies for roles as industrialists who could advise others on the setting up of new industries. The training programme has been designed and taught by an Irish team which has launched similar programmes in Thailand and Indonesia.[3] In addition, the centre has identified and promoted several projects in regional import substitutes and inter-industry linkages with existing big industries in the region producing such as : petroleum coke for aluminium smelter anodes, triple super phosphate fertiliser manufacture, single cell protein, aluminium flouride, and synthetic cryloite, air conditioners and refrigerators, synthetic detergents, edible oil, steel pipes, steel rod and structural steel, insulation panels, salt (fine technical grade), precipitated calcium carbonate, and gypsum boards.[4]

A new law of industrial registry and licences has been introduced in the past few years, which called for the formal licensing of all industrial establishments in the country. Before the introduction of this law, once a licence has been issued by the Ministry of Development and Industry, an industrial establishment needs only to be registered with the commercial registry at the Ministry of Commerce and Agriculture as another Bahraini Company without providing details of products or scale of operation. The new law requires all industrial projects to provide the Ministry with basic information, such as capital structure, employment, production and marketing operations. New industrial projects, which obtain the licence, have to start up within one year or at least show real signs of going ahead. The new projects must also provide a list of the capital goods to be imported, which is then passed on to the customs at Mina Sulman port to allow duty exemptions on their imports. This procedure is also stated to prevent industrial establishments from importing capital goods and starting up production without a licence. The main purpose of the new law is to ensure that there is no over-duplication in industrial activities, a task which has been difficult to achieve under the previous registration procedures. Furthermore, the new law could also help the Ministry to design and monitor the development of the manufacturing sector in the economy.

In the past, The Ministry of Development and Industry used to rely on the Bahraini investors to judge whether or not projects were viable rather than adhere strictly to the pre-feasibility study before permission was granted. The lack of sound pre-feasibility studies and the insufficient attention paid to this matter by the official departments were underlined by the following remarks made by the Bahraini Minister of Development and Industry:

> It is no wonder that industries along the Gulf have met and are meeting great difficulties. The only two advantages - cheap energy and the availability of financial funds - are eroded by the severe climate and the high costs of labour based on low productivity. Plans were initiated either by bankers with little idea of engineering, or by engineering firms with little idea of marketing.[5]

During the boom years in the 1970s many industrial projects in Bahrain and other Arab Gulf States, especially in the private sector, were established on over-optimistic economic assumptions. Dr Abdulla Al-Moajil, Secretary General of the Gulf Organisation for Industrial Consulting (GOIC) recorded that experience:

> The decisions were often speculative rather than based on long term economic viability. Insufficient care was paid to the need for thorough feasibility studies before committing investment funds. In many cases a feasibility study was carried out in haste to meet the maximum requirements stipulated by the relevant government agency in order to obtain the necessary permit or licence.[6]

7.3. OFFICIAL POLICY TOWARD FOREIGN INVESTMENT AND JOINT VENTURES

The government of Bahrain actively encourages foreign investment. At the present time, foreign business activity can be classified into two categories: (1) onshore activity and (2) offshore activity.

7.3.1. Onshore Activity

Onshore activity refers to the traditional sector in which business is regulated by the government with guidelines similar to the other Arab

Gulf States. The Commercial Companies Law, legislated as Amiri Decree No. 28 of 1975, codifies and regulates the way individuals or companies may structure their business operations in the country.[7] Excluding sole ownership, several forms of corporate structure are provided for:(see Appendix B)

(1) Partnership under a collective name (joint liability company)

(2) Simple commandite partnership (limited partnership)

(3) Association of participation

(4) Joint stock company

(5) Mixed shareholding company

(6) Commandite company by share

(7) Limited liability company

There is no foreign direct investment law in the manufacturing sector as in the GCC states. However, Part (XI) of the Commercial Companies Law of 1975 regulates the foreign companies, their branches and agencies. The law has empowered the Minister of Commerce and Agriculture, after securing the approval of the Council of Ministers, to exempt the companies established into Bahrain whose whole capital or major part is foreign and which has been brought into Bahrain to invest in the economic development of her projects from the requirement of all or part of the Bahraini percentage in the capital. However, foreign companies established outside Bahrain may operate in the country through branches or agencies or offices after obtaining the approval of the Minister of

Commerce and Agriculture for the establishment of its branch or office or agency with an agent who shall be a Bahraini merchant, whether an individual or a company as a sponsor of the said company.

7.3.2. Offshore Activity

Offshore activity refers to foreign businesses having their main offices in Bahrain but whose object is to engage in operations outside the country. Article 279 of the Commercial Companies Law and its amendment in the Legislative Decree No. 23 of 1981 empowered the Minister of Commerce and Agriculture to grant permits for the incorporation of closed joint stock companies provided the head offices of such companies are situated in Bahrain and they carry out their business activities outside the country. Furthermore, Bahraini nationals may, with permission from the Minister of Commerce and Agriculture, subscribe to shares of such companies provided that such shareholding shall not exceed 20 percent of the said shares. Until recently, offshore activity was restricted to banking and investment establishments. As a result of the growing success of the offshore financial institutions, the government has allowed foreign firms in other business sectors, such as insurance, to open on an offshore basis.

Table 7.1 shows the distribution of industrial establishments by corporate form in 1986. The data point out that sole ownership, limited liability and partnership are the most frequent corporate form of industrial establishment permitted under the commercial law, accounting for 126, 60 and 27 establishments respectively. Joint ventures are considered commercial companies rather than legal entities, and usually

Table(7.1): Distribution of Industrial Establishments by Corporate Form (1986)

	Sole Ownership	Partnership	Limited Liability Company	Public Joint Stock Co.	Closed Joint Stock Co.	Foreign Company	Total
2- Mining and Quarrying Crude Petroleum and Natural Gas Petroleum					2		2
Stone quarrying, clay and sand pits	6	4	3	-	-	-	13
3- Manufacturing Food and Beverage							
Food	17	4	8	3	-	1	33
Beverage	5	2	6	-	-	-	13
32- Textile, weaving apparel and leather industries							
Textile	3	-	1	-	-	-	4
Footwear	-	-	1	-	-	-	1
33- Wood and Wood products, including furniture							
Furniture	1	-	-	1	-	-	1
Wood & Cork Products		2	-	-	-	-	2
Saw Mills	*	-	-	-	-	-	-
34- Paper products; printing and publishing							
Paper products Printing, Publishing and allied industries	3	1	2	-	-	-	6

	Sole Ownership	Partnership	Limited Liability Company	Public Joint Stock Co.	Closed Joint Stock Co.	Foreign Company	Total
35- Chemicals and of chemical, petroleum and plastic products							
Petroleum Refineries and Gas liquiefaction and petrochemicals	-	-	-	-	3	-	3
Basic industrial chemicals	2	-	1	-	-	-	3
Other chemical and plastic products	6	3	6	-	-	-	15
36- Non-metallic mineral products							
Bricks, tiles, marbles, ready mixed concrete	37	4	9	-	-	-	50
Pottery, china and earthware	5	-	-	-	-	-	5
Glass products	4	2	4	-	-	-	10
37- Basic Metal Ind.							
Iron Basic Industries	-	-	-	1	-	-	1
Aluminium Basic Ind.		-	-	-	3	-	3
38- Fabricated metal products, machinery and equipment							
Aluminium Fabrication	30	6	11	-	-	-	47
Other metal products	2	-	7	-	-	-	9
Ship repairing	-	-	1	1	1	-	3

	Sole Owner-ship	Partner-ship	Limited Liability Company	Public Joint Stock Co.	Closed Joint Stock Co.	Foreign Company	Total
39- Other mnfrg sector							
Jewellry & Related articles							
Musical Instruments	1	-	-	-	-	-	1
Fishing Equipments	2	1	-	-	-	-	3
Total	126	27	60	6	9	1	228

* The number of sawmills is not available.

Source: Survey of working establishments in the industrial sector by industrial activity, 1986. Bahrain Centre for Studies and Research entered in the commercial registrar under a closed joint stock company, a limited liability company or a partnership.

Summing up, one can notice the absence of specific foreign or joint venture investment laws that reflect the government's policy of priorities and goals in industrial development in Bahrain. Indeed, many developing countries have introduced specific foreign investment legislation to promote foreign investment in specific sectors of the economy besides the introduction of special clauses with respect to the employment of nationals, transfer pricing and so forth. One reason for the absence of foreign investment legislation in Bahrain is the lack of any sort of industrial planning which can specify the objectives, the areas (sectors), and the means to achieve a desirable industrial development. Furthermore, the minimum level of 51 percent of ownership for Bahrainis and GCC nationals across the whole manufacturing sector, limits the flow of foreign investment in the manufacturing sector and consequently the level of transferred know-how which the domestic industry is in urgent need of. Some developing countries adopt a more flexible equity policy toward foreign direct investment. For instance, they permit foreign investors to hold more than 49 percent in some sectors which are viewed as crucial for industrial development, such as high technology or export sectors. Finally, Bahrain and the other GCC states are still tax-free regions which means that there are no restrictions on the repatriation of profits, on foreign currency transactions, or on personal income taxes on expatriate staff. Although the GCC states have official tax systems on foreign corporation profits - which usually enjoy a ten-year tax holiday - Bahrain has yet to introduce one.

7.4. CUSTOM TARIFF POLICY

7.4.1. Historical Background

The first custom tariff system in Bahrain was introduced in 1933 as a means to increase government revenues rather than protection. Income from custom duties was the main source of revenue before the receipt of oil royalties started in 1935.[8] However, tariff rates were low in order to safeguard entrepot and re-export trade, which is regarded as an important economic activity in Bahrain. Long before the discovery of oil in 1932, Bahrain was an important centre for re-export trade, which was financed through the pearl trade, in which the local merchants were involved in importing large quantities of foodstuff and other commodities which found their way into mainland Saudi Arabia and other neighbouring countries. The re-export trade, which provided few employment opportunities, was nevertheless important in that custom duties on imports were the main source of state revenue. In 1923, which saw the new organisation of the custom administration, two third of imports - which were reported to be worth 2,454,571 - were retranshipped to the mainland, Saudi Arabia. At that time, Bahrain's customs tariffs system was as follows:[9]

1. Custom duty: All imports into Bahrain were charged a 5 percent ad valorem duty, with the exception of certain imported goods shown as " exemptions".

2. Re-export duty: goods which were marked re-export(RE) before arrival and which were re-exported after arrival at the port within 20 days to mainland ports were charged at 2 percent ad valorem

only. If the period of 20 days was exceeded the full 5 percent import duty was levied.

3. Transhipment at sea: cargo transhipped at sea was free of charge.

4. Tobacco tax: there was a municipal tax of 2 percent on tobacco and cigarettes.

5. Contraband: the following imported goods were forbidden:

   (a) arms and ammunition

   (b) liquor, except for personal consumption by Europeans and Americans

   (c) obscene literature and pictures

   (d) artificial and cultured pearls

The share of custom revenues in the annual budget rose from 54 percent in 1925-6 to 71 percent in 1926-7. Custom revenues, however, fell dramatically in 1931-2 due to the world wide trade depression, which in turn resulted in the decline in the price of pearls, dates and other commodities. As a result, the Khanchia - a fee collected every ten days on imported goods whose owners wanted to store in customs warehouses - was raised to one anna per maund on all bag cargo as a new measure to raise extra revenue.[10]

On May 6, 1932 the duty on luxuries was raised from 5 percent to 7.5 percent and then to 10 percent on December 31 of the same year. The duty on liquor and tobacco was also increased to 15 percent.

In 1934-5 customs revenue showed an improvement owing mainly to the general expansion of trade following the discovery of oil in 1932 and the establishment of the petroleum company (BAPCO). The local employees in the refinery, on which work began in early 1936 and was completed in December 1937, reached 3,474 in 1936, and the relatively highly paid Europeans and Asians created a market for a variety of imported goods. In March-April 1935, the transit duty on cargo for Saudi Arabia was reduced from 2 percent to 1.75 percent ad valorem.[11]

From 1935 the goverment began to receive oil royalties from BAPCO. In 1936, income from the oil industry superseded customs receipts as the chief source of the state budget.[12] Thus, within four years of the discovery of oil, revenues from oil was more than twice as much as receipts from the traditional source of state income, custom duties.

7.4.2. Current Custom Tariff Policy

The present custom tariff system in Bahain is based on duties applied to imported finished goods. Capital goods, machinery and raw materials required by industrial establishments for production are exempted from custom duties, as are products of countries which have preferential trading agreements with Bahrain. These are the Gulf Cooperation Council states, Jordan, Iraq and Tunisia,[13]

Custom duties in Bahrain are assessed at ad valorem on the cost, insurance and freight value (CIF), and in most cases are levied in the range from 5 percent to 10 percent, normally in accordance with the respective product classification of "essential" and "non-essential" goods. Details of duty application are contained within the Bahrain customs ordinance of 1950, but discretion also lies, in the case of non-stipulated items, with the Customs and Ports Department.

Goods exempted from custom duty include printed materials, especially for educational purposes, fish, poultry and untanned hides. The import duty on building materials, cotton, foodstuff, hardware and paper is levied at 5 percent, but luxury goods - including household furniture, perfumes, electrical domestic equipments, automobiles and photogaphic equipments are subject to a 10 percent duty. In February 1983, import duty on automobiles was increased to 20 percent. The import duty on all tobacco products was raised on July 1, 1981 to 30 percent, to 35 percent in February 1983, and increased to 50 percent in the last few years. The import duty on alcoholic beverages was raised in February 1983 from 70 percent to 100 percent, and later increased to 125 percent.[14]

The discussion of the custom tariff system in Bahrain thus far reveals that:

(1) The custom tariff policy in Bahrain was initially directed towards increasing government revenues rather than protection. However, the tariff stucture rates were low in order to protect its traditional activity of entrepot and re-export trade. Recently, the government abolished fees attached to re-export trade as an incentive to retain and encourage this traditional economic activity in Bahrain. On the other hand, quantitative restriction as a means of protection has never been particularly important. Apart from total prohibition on imports from certain countries for political reasons (e.g. Isreal and South Africa) and the prohibition of certain goods

(e.g. firearms and narcotics) for purposes of national security and consumer safety, very few quantitative restriction have been applied.

(2) Exemption for capital goods, machinery and raw materials put imported capital investment and part, at least, of production costs in accord with international prices and consequently should help local industries to be competitive in world market. The exemption for capital goods, machinery and raw materials eliminated the considerable burden on industrial establishments of the administrative routine associated with import procedures.

(3) High tariffs on tobacoo and alcoholic beverages are meant primarily to penalise their consumption and to raise revenues for the government, rather than to protect local industries. In any case, there are no local industries for these products to protect, nor will there be in the foreseeable future, especially for alcoholic beverages because of religious reasons.

7.4.3. Industrial Protectionist Policy

Industrial protection is a new concept in this part of the world. The development of the industrial sector in 1970s and 1980s has forced a change in the economic policies followed in Bahrain and the Arab Gulf States. The argument for adopting a protectionist policy in the region as a whole - including Bahrain - was mainly based on two reasons:

1. Protection in the infancy stage

Most developing countries have used the infant industry argument, which is accepted by GATT as an exception to its general rules, to impose tariff on their imports. The infant industry argument points out that a country may be able to change its comparative cost structure by providing temporary protection to industries which are at present unable to compete in international markets. As a result, a country has the opportunity to change a potential into an actual comparative cost advantage.[15]

In Bahrain and the other GCC countries, the cost of establishing infant manufacturing plants is higher than for similar plants in the developed countries. The high production cost in the Gulf region is due to the distance and harsh physical environment, which add a significant factor to initial plant construction costs. In addition, local labour shortage tends to put up production costs and distance can add a factor to transportation costs. Table 7.2 shows the cost difference of establishing a petrochemical plant in the Arab Gulf States compared to the United States.

2. Dumping GCC markets

The second argument for protective measures in the Gulf region is that there is an urgent need to stop dumping, either by countries in need of foreign currencies or by some foreign firms to relieve excess capacity and maintain sales volumes in a specfic market. Dumped products are manufactured essentially for huge domestic markets and any export revenue is clear profit, and thus their prices are cheaper than can be

Table(7.2): Comparative Cost Structure of a Petrochemical Project (at cost of $100 million) in GCC States and the United States at 1979 Prices ($ million)

Cost Component	GCC States	United States
Machinery & Equipment at Site	68 - 78	52
Installation & Buildings Construction	38 - 65	38
Engineering Expenses	7 - 24	6
Other Expenses	6 - 28	4
Immediate Cost	119 - 195	100
Contingencies (Price Increases)	12 - 35	10
Interest Payments	5 - 32	9
Total Project Cost	136 - 262	119

Source: Mohammed Abdul-Munaim Umran "Industrial Projects in Kuwait - Costs and Incentives", paper submitted to an international conference on "Industrial Strategies and Policies in Kuwait", held in Kuwait in March 1980.

produced by small scale manufacturing establishments in the Gulf. In Bahrain, the problem of dumping was the second main problem facing industrial estabishments, according to a survey covering 128 industrial establishments conducted by the Bahrain Centre for Studies and Research in 1984. 27 percent of the selected sample complained about the problem of dumping.[16]

The industrial protection first law (law 11) was promulgated by Amiri Decree on May 5, 1985 under the title of "Protection and Encouragement of National Industries". The legislation states that a permanent committee, to be called the Protection and Encouragement of National Industries Committee, shall be set up by a resolution from the Prime Minister and be composed of the following members:

(1) A representative from the Ministry of Development and Industry

(2) A representative from the Ministry of Finance and National Economy

(3) A representative from the Ministry of Commerce and Agriculture

Protective measures will be provided for existing projects only if the following conditions are fulfilled:

1. The Bahraini and the GCC participation must not be less than 51 percent of the capital.

2. The domestic content must not be less than 20 percent during the first three years, and to be more than 40 percent after the fifth year.

3. A complete calender year must have passed since the start of actual

production.

4. The quality of the product must have approached an acceptable level.

5. The output level of the product which seeks protection must represent a reasonable share of the local consumption as determined by the committee.

6. The industrial establishment shall use its productive factors (e.g. raw materials and labour) in an efficient way.

7. The owners of an industrial establishment shall have the obligation to submit the required information needed by the Committee and to allow the authorised personnel of the Committee to enter all parts of an industrial project for technical and industrial inspection in order to check on the submitted information and the extent of efficiency in the use of factors of production.

For new industrial projects, the following conditions should be fulfilled in order to qualify for protection:

1. The Bahraini and GCC participation must not be less than 51 percent.

2. Submission of a feasibility study which meets the approval of the Ministry of Development and Industry.

3. The Provision of employment opportunities for the Bahraini work force.

4. Contribute to industrial development, especially in relation to

import-substitution and/or exports and the use of local production factors.

The law also states that the Committee shall recommend to the Council of Ministers the measures which it deems are suitable for the protection of local products. The measures taken to protect local production are as follows:

1. Limits on the volume of foreign imports that are similar to local products.

2. Raising custom duties on foreign imports that resemble local products.

3. Products intended for exports may be exempted from export duties.

4. Exemption from custom duty of imported machines and capital goods for new or expanding industrial establishments.

5. Exemption from custom duty of imported primary and raw materials and semi-processed raw materials destined for industrial establishments.

6. Giving preference to local producers in government purchases, provided that such products be comparable with products of foreign manufacture in quality. The law conferred, however, a 10 percent premium in prices to local products over imports; that is, local products' prices may rise up to 10 percent over imports and still be purchased by the government in preference to imports.

In March 1987, the custom duties of 20 percent was levied on foreign imports that were similar to local products of three industrial establishments. On September 15, 1987, the same rate of custom duties imposed on foreign imports similar to other two industrial establishments. Table (7.3) shows the types of exemptions and protection in the manufacturing sector.

An examination of the conditions and measures imposed by the new protective system in Bahrain yields the following observation:[17]

1. Some of the conditions required for protection are general, such as the quality of products, the efficient use of production factors, the creation of employment opportunities, contributions to industrial development and a sound feasibility study. Since there is a shortage of professional Bahraini staff to monitor and evaluate project development, there is likely to be a lack of capabilities to implement these conditions.

2. The present system of protection is applied on an establishment or project and not on a sector or product basis. The following observations can be made regarding this criteria:

(a) The application of protective measures at the project level in Bahrain is due to the lack of an overall economic strategy and industrial planning. Most developing countries adopt some type of economic and industrial strategy which specifies their main objectives and priorities for the development of their economies. Their industrial protective measures and incentives are designed to achieve those objectives and priorities and thus are usually applied on product or sector level.

Table(7.3): Types of Exemptions and Protection in the Manufacturing Sector

Type of Exemptions and Protections	Establishments	Range of Products under Exemption and	Protection or Exemption	Beginnin Date
1. Exemption of machinery and capital goods required by new factory or to increase production capacity from custom duties	ALL industrial establishments	ALL machinery and capital goods required for production	100%	
2. Exemption of raw materials and semi-finished goods required by establishment from custom duties	ALL industrial establishments	ALL raw materials and semi-finished goods required for production	100%	
3. Exemption exports from exports duties	ALL industrial establishments	ALL exported goods	100%	
4. Protective tariff on imported industrial products (based on committee's decisions)	1. Maskati factories	Facial tissues, toilet tissues, industrial sanitary napkins, paper and polythene grocery and shopping bags	20%	1/3/1978
	2. Al Bourshaid industries	Disposable sterilised plastic moulded medical products	20%	1/3/1978
	3. Gulf Acid industries	Sulphuric acid technical grade (98% concentrated); distilled water for batteries, sulphuric acid grade (36% concentrated)	20%	1/3/1987
	4. The Bahrain Bedding factory	Box springs, divans, mattresses, headboards, furniture	20%	15/9/197

Type of Exemptions and Protections	Establishments	Range of Products under Exemption and	Protection or Exemption	Beginning Date
	5. Bahrain Aluminium Extrusion Company	Extruded aluminium sections, technical and architectural systems, AS-200 curtain walling system, powder coated aluminium	20%	15/9/197[illegible]

Source: Ministry of Development and Industry

(b) The present protective system, which is project-oriented, could improve the performance of protected establishments but will fail to encourage investment in specific industrial sectors or products. This can be achieved only through protection on a product or sector basis.

(c) Decisions to provide protection to industrial establishments are based on the evaluation of their main products. However, once protection is approved, even products, including secondary products, below an acceptable quality will be qualified for protection.

3. The present protective system is based on nominal protection and not on effective protection. Nominal protection rates, which refer to tariffs on imports, affect consumers' decisions, but effective protection rates, which are defined as the percentage excess of value added, influence producers' decisions. The former affects the prices consumers pay for final goods and consequently consumer demand tends to shift from products with high nominal protection rates to those with low rates. On the other hand, the effective protection rate influences the cost of inputs borne by the producers, and consequently resources tend to be drawn into activities with high effective protection rates away from those with low rates. Thus, the effective protection rates influence resource allocation and production efficiency.[18]

The effective protection rates are usually estimated from input-output tables or the consensus of manufacturing industry. The effective protection provided to a particular activity j, can be stated as:

$$ej = (Vj^* - Vj)/ Vj \qquad (1)$$

Where ej = effective protection to activity j, Vj* = value added in j at tariff-distorted prices, and Vj = value added in j at world prices. Consider the parameters on the right hand side of this equation further:

$$Vj = Pj(1-Zij) \qquad (2)$$

$$Vj^* = Pj[(1+tj) - Zij(1+ti)] \qquad (3)$$

Where Pj = free trade price of commodity j, Zij = share of inputs in the production process of j, tj = nominal rate of tariff on imports of j (final good), and ti = nominal rate of tariff on imports of i (intermediate inputs). If we substitute (2) and (3) into (1) and simplify, we can write[19]

$$ej = (tj - Zij^*ti)/(1 - Zij) \qquad (4)$$

Since there is no tariff on imported inputs in Bahrain, formula (4) can be rewritten as follows:

$$ej = tj/(1-Zij) \qquad (5)$$

Using the formula (5), the effective protective rates have been calculated for the four industrial establishments - covered by the new industrial protection law - which are presented with their nominal protection rates in table 7.4. Although all the industrial establishments are subject to the same nominal protection rate (20 percent), there is wide dispersion of effective protection rates. This dispersion suggests that some industries are favoured at the expense of others.

Table(7.4): Nominal and Effective Rates of Protection in Bahrain (Based on 1983s Data

Name of Establishment	Range of Products under Protection	Nominal Tariff Rate on Final Commodity %	Effective Rate of Protection %
1. Maskati Factories	Facial tissues, toilet tissues, industrial sanitary napkins, paper and poly-thene grocery and shopping bags	20	321.6
2. Gulf Acid Industries	Sulphuric acid, technical grade (98% concentrated) distilled water for batteries, sulphuric acid grade (36% concentrated)	20	23.7
3. Bahrain Bedding Factory	Box springs, divans, mattresses, headboards, furniture	20	28.4
4. Bahrain Aluminium Extrusion Co.	Extruded aluminium sections, technical and architectural systems, AS-200 curtain walling system, powder coated aluminium	20	59.8

7.5. INDUSTRIAL INCENTIVES

7.5.1. Industrial Estates

The government provides industrial enterprises with industrial estates and the associated basic infrastructure elements, namely roads, electricity, water and other related services. The industrial plots in these industrial estates are provided to industrial investors after the approval of their projects by the Ministry of Industry and Development. These industrial estates are leased to industrialists for long terms at a nominal rent. The annual rent for a plot of land in the industrial estate is in the range of BD 0.10 to BD 1.00 per square metre. For instance, the rent charges in the Al-Ghasarat industrial area starts from BD 0.10 per sqm, while in the north of Sitra the rent is BD 1.200 per sqm in the first five years and BD 1.800 in following years.[20]

The allocation of industrial plots is carried out by the Directorate of Industrial Estates within the Ministry of Industry and Development. The Directorate is entrusted with the responsibility of renting the existing plots to industrial investors and inspecting the use of land according to the lease.

There are nine industrial estates in Bahrain, namely, Mina Sulman, North of Refinery, South of ALBA, AL Maameer and Al Nuaidrat, Al Ghasarat, Arad, the shipbuilding and repairing area, North of Sitra, South of Al-hidd. Table (7.5) shows the names of industrial estates, area in hectares, the number of plots and year of development.

Table (7.5): Distribution of Industrial Estates in Bahrain

Name of Industrial Estate	Area in Hectares	Number of Plots	Year of Development
1. Mina Sulman	49	95	early 1960s
2. North of Refinery	31	75	1975
3. South of Alba	56	59	1975
4. Al Maameer & Al Nuaidrat	85	165	1975
5. Al Ghasarat	34	-	-
6. Arad	4	75	1980
7. Shipbuilding & Repairing area	-	13	-
8. North of Sitra	248	211	1979
9. South of Al-Hidd	170	-	1980

Source: (1) Ismail Al-Madani, The Management of Domestic and Industrial Solid Waste in Bahrain (in Arabic), Journal of Gulf and Arabian Peninsula Studies, No. 53.

(2) A Proposed Strategy for Industrial Development in Bahrain (in Arabic), Bahrain Centre for Studies and Research, June 1985.

(1) Mina Sulman

The first indusrial estate - Mina Sulman - was developed in the early 1960s and consists of 95 industrial plots. The main industries located in this area are: air-conditions assembly, flour milling, nails and metal windows, marine steel reinforcements, aluminium fabrication, plastic products, fibreglass, marine paints, and paper products. The Mina Sulman industrial area is also designed as a free zone and, hence, equipped with storage facilities for the re-export trade.

(2) North of Refinery

This area consists of 75 plots which are occupied by small repairing workshops. In 1982-1983, storage facilities were installed in the area at a total cost of BD 367,000.

(3) South of ALBA

South of ALBA estate consists of 59 plots which are allocated for aluminium industries, paper products, furniture and clay products, such as bricks and tiles. The ALBA smelter and Midal Cables are located outside the industrial area.

(4) Al Maameer & AL Nuaidrat

This area consists of 165 plots which are allocated to the construction industry, namely, bricks, marble, and asphalt and cement products. In addition, it is equipped with storage facilities for machinery and other industrial equipment.

(5) Al Ghasarat

The Al Ghasarat industrial estate is situated in the Al Havira area near Askar village and has been allocated to quarrying activities.

(6) Arad

The Arad area is situated in Muharraq city and consists of 75 plots which are occupied by repairing workshops.

(7) Shipbuilding and Repairing Area

This area is situated near the central market in Manama and consists of 13 plots which are allocated mainly for building and repairing traditional boats.

(8) North of Sitra

This area, which is divided into two sites, consists of 211 plots. The first site is a free zone area and equipped with storage facilities for re-export trade, while the second one has been allocated to industrial projects.

(9) South of AlHidd

The Ministry of Industry and Development is studying the possibility of developing the South area of Al-Hidd, near the Arab Shipbuilding and Repairing dry dock, into a new industrial estate.

95 percent of the existing industrial estates are fully occupied by a variety of industrial activities. In addition, there is growing demand from new investors for more industrial plots. In response, the Director-

ate of Industrial Estates, in cooperation with the Natural Planning Directorate within the Ministry of Housing, is embarking upon a new scheme to increase the number of industrial estates in the coming years.

In conclusion, one can note that the industrial estates have multiplied in Bahrain since the first industrial estate was developed in Mina Sulman port in the early 1960s. Their basic purpose is to take advantage of external economies of large scale production and to control the harmful effects of pollution. The provision of industrial plots at nominal rates has, of course, encouraged investors because the price of land for commercial use is relatively high in Bahrain.

7.5.2. Subsidies to Essential Commodities, Electricity, Water and Gas Services

The government of Bahrain runs a system of direct and indirect subsidies, similar to other GCC countries, on utilities, services and some essential goods, and there is official control of prices of some other specific items. The price controls, covering items like baby foods, milk, cheese, tea, bread, cigarettes and cement, aim to stop the mark up of these goods from increasing in response to sudden changes in international prices and for equity reasons. We use the term subsidy, in this section, to indicate that prices of goods or services in consumption are lower than the cost of poduction or that prices of certain goods which are sold to domestic consumers are lower than their market prices.

Direct subsidies or recurrent budget subsidies, in general, can take two forms of assistance. The first form is a payment made by the government to hold or reduce the price of certain products to domestic consumers, thus ensuring that the consumers maintain their consumption. The second form is a payment made by the government to industrial establishments, as an alternative to a protective tariff, to strengthen their competitive capabilities in domestic and international markets. In Bahrain, direct subsidies are given on basic products such as rice, flour, sugar and meat. The usual mechanism is to distribute price-controlled foods through the state-owned establishment, National Company fo Export and Import, and to absorb losses in food distribution through budgetary transfers to this establishment. Table (7.6) shows the amount of subsidy and the share of subsidy given for each product during the 1978-1982 period. The data shows that the government was working toward the gradual reduction of the subsidy bill during that period. The cost of subsidy rose from BD 2.9 million in 1978 to BD 8.1 million in 1981 and then fell to BD 6.4 million in 1982 - at current prices - mainly due to the rise in the import price of sugar. The amount of subsidy on sugar was introduced in 1980 and increased from 11.5 percent of the total subsidy bill to 24.3 percent. On the other hand, the falling import prices of rice and barley during the 1978-1982 period enabled the government to earn net profits on these two items. However, subsidies were terminated for frozen fish in 1978, for eggs in 1979 and for shrimps in 1980. As a proportion of the total current expenditure, the direct subsidy bill constituted approximately 2 percent per year over the 1978-1982 period, with the exception of 3 percent in 1981.[21]

It is noteworthy that direct subsidy in Bahrain is given mainly to subsidise consumption and not production - production subsidies did not exceed 13 percent of total subsidies per year in the 1978-1979 period, or 7 percent in 1980 and 16 percent per year in the 1981-1982 period. In

Table (7.6): Government Food Subsidies: 1978-82, (in thousands of Bahrain dinors)

Year	Total Subsidy Bill	Distribution of Total Subsidy by Product										
		Rice	Sugar	Ghee	Wheat & Bran	Barley	Meat	Chilled & Frozen meat	Shrimp & Fish	Eggs	Production Subsidy Feed	Production Subsidy Other cost
1978	2890.1	(19.0) 548.9	-	(5.6) 162.5	(29.5) 853.1	(0.5) 13.7	(23.1) 666.2	(5.2) 149.9	(0.4) 12.6	(4.0) 116.8	(5.6) 162.1	(7.1) 204.3
1979	3291.2	-	-	(5.0) 164.2	(38.0) 1248.0	(0.3) 11.5	(40.3) 1325.1	(4.4.) 145.1	(0.1) 3.2	-	(7.6) 250.0	(4.4) 144.1
1980	6319.8	(0.3) 17.0	(11.5) 724.6	(2.1) 131.0	(32.5) 2052.0	(0.2) 11.5	(44.9) 2838.5	(2.1) 130.0	-	- -	(5.0) 314.2	(1.6) 101.0
1981	8078.8	(-0.3) -241.0	(24.3) 1960.5	(1.2) 95.0	(27.9) 2253.0	(0.2) 18.8	(34.1) 2757.5	(0.6) 45.2	-	- -	(9.0) 726.4	(5.7) 463.4
1982	(2.2) 6426.8	(-5.0) -323.5	(7.4) 475.5	(0.3) 20.7	(30.3) 1946.4	(-0.04) -2.6	(51.0) 3280.3	-	-	-	(5.5) 355.7	(10.5) 674.4
1983	4159.1	N/A										
1984	4628.2	N/A										
1985	4110.8	N/A										
1986	2728.4	N/A										
1987	2431.8	N/A										

Source: Ministry of Commerce and Agriculture, cited in IMF Bahrain: Recent Economic Developments, July 11, 1983 p 21. Subsidies were terminated for frozen fish in 1978, for eggs in 1979 and for shrimps in 1980.

addition, all subsidised products are food products and most of them are imported from abroad.

The indirect subsidy, which is usually passed on in the form of low prices, is provided for gasoline, electricity and water. The gasoline subsidy bill fell from BD 20 million in 1981 to BD 17 million in 1982, at current prices. In April 1983, however, the price of premium and regular gasoline was increased from 60 fils to 90 fils and from 40 fils to 70 fils per litre, repectively.[22]

The financial subsidy on electricity rose from BD 5.8 million to BD 8 million in 1982. However, the economic subsidy on electricity, considering the cost of capital and the natural gas used in electricity production was BD 35 million. The subsidised prices of a unit of electricity is 8 fils/kwh for residential consumer, but 12 fils/kwh when consumption exceeds 1500kw, 14 fils/kwh for commercial consumers, and 16 fils/kwh for industrial consumers. On the other hand, the operating cost was estimated at 18 fils/kwh and economic costs at 38 fils/kwh.[23] Despite the massive capital spending for electricity generation, which made power projects the most significant receiver of public funds in the 1982-1985 period, the demand for power is still rising. The total generating capacity in 1989 was 980 MW, compared to the peak of 704 MW reached on July 31 of the same year. Demand, however, has been expected to grow by 4 percent a year, with an additional 20 MW projected for future industrial projects. As a result, additional capacity will be required in the near future.[24]

The subsidy on water rose from BD 6.8 million in 1981 to BD 8.3 million in 1982.[25] To reduce the cost of the subsidy and to control demand for water, a new tariff structure has been introduced in the recent period. For metred homes and non domestic users, the rate per gallon rises as water consumption increases. For non-metred residential units, the monthly fee rises with the size of the connecting pipe. The basic idea of the new system is to allow consumers essential supplies of water at a subsidised rate and then to charge close to the actual cost. The water situation is a serious problem facing the government. Consumption is restricted by supply to 60 million g/d, of which 25 million g/d is extracted from the ground. However, water officials says that ground water extraction should have been reduced to 8 million g/d from 1978 to avoid depletion of the fresh water aquifers. [26] As a result, the government now going regards desalination as the answer to the water crisis.

The main indirect subsidy given to industrial establishments is provided given to energy and specially natural gas. Because the subsidy for energy is given per unit, the higher the consumption of energy the larger the subsidy received. In other words, the subsidy increases with economies of scale. As a result, foreign investment, through joint ventures, is encouraged into large scale energy intensive industries. In Bahrain, the main beneficiaries of the subsidised natural gas are: the Aluminium Bahrain Smelter (ALBA), the Bahrain Petroleum Company (BAPCO), and Bahrain Nationa Gas (BANAGAS). Table (7.7) shows natural gas production and utilisation in the 1978-1982 period. The data indicate that ALBA was the major user of natural gas, which can be attributed to its expansion. ALBA increased its consumption from 26 percent in 1980 to 30 percent in 1982. The power stations and oil fields show an increased consumption of gas from 13 percent and 20 percent in 1978 to 24 percent

Table(7.7): Natural Gas Production and Utilisation, 1978-198
(in Millions of cubic feet)

	1978	1979	1980	1981	1982	1983	1985
Production	165,082	176,568	155,697	155,155	173,431	185,900	223,600
ALBA	42,047 (25,5%)	43,072 (24,4%)	39,618 (25,4%)	37,451 (24,5%)	51,656 (29,8%)	(27,5%)	52,800 (23,6%)
Oil Field Injection	32,857 (19,9%)	33,124 (18,8%)	40,915 (26,3%)	46,468 (30,0%)	46,586 (26,9%)	(28,2%)	59,000 (26,4%)
Power Station	21,134 (12,8%)	28,898 (16,4%)	33,192 (21,3%)	36,115 (23,3%)	38,714 (22,3%)	(25,2%)	54,000 (24,2%)
Refinery	25,586 (15,5%)	25,616 (14,5%)	29,672 (19,1%)	28,571 (18,4%)	29,405 (17,0%)	(15,1%)	31,000 (13,9%)
BANAGAS	-	1,322 (0,7%)	12,230 (7,9%)	6,050 (3,9%)	6,894 (4,0%)	(4,0%)	26,000 (11,9%)
Others	9,827 (6,0%)	10,436 (5,9%)	70 (0,4%)	-	95 (0,05%)		
Flared	33,635 (20,4%)	34,100 (19,3%)	-	-	81 (0,05%)		

Source: IMF Bahrain, Recent Economic Development, July 22, 1983 p 9, Bahrain Monetary Agency, 1985, and Bahrain Centre for Studies and Research.

and 26 percent in 1985 respectively.

The gas prices for two principal users, BAPCO and ALBA, are fixed by contract. ALBA is contracted at a price of US $0.25 per million British Thermal units (BTU) until 1989. In the case of BAPCO the price of natural gas is rising according to a schedule (US $0.325 per million (BTU) in 1982 and US $ 0.425 per million (BTU) in 1983 and 1984). On the other hand, the Directorate of electricity is receiving natural gas at a charge of US $0.312 per million (BTU). However, for the new industrial ventures, such as GPIC and AISCO, the minimum price for natural gas is expected to be US $0.50 per million BTU.

The world Bank has warned that, at such prices, the demand for natural gas could exhaust Bahrain's supplies in about 20 years.[27] As a result, gas pricing policy should be set to optimise the use of natural gas. Another critical factor is that Bahrain has to keep pace with other GCC countries in offering subsidies for energy to attract foreign investment in large scale energy intensive projects. Table (7.8), which shows the subsidised prices of gas, electricity, and water in the GCC countries, reveals that some GCC countries are offering higher subsidies than Bahrain. To eliminate this counterproduct phenomenon, agreement should be reached within the Gulf Coopertion Council framework in the unification of subsidies given for new industries, or else GCC countries should be willing collectively to pay for higher subsidies to states (e.g. Bahrain)) with lower subsidies. Furthermore, it is worth studying the feasibility of building a pipeline to supply gas for large scale energy intensive projects from neighbouring GCC states.

Table(7.8): Prices of Electricity, Water and Natural Gas in GCC States

State	Electricity Cents/Kwh	Water $/cu m	Natural Gas Cents/000 cu ft
Bahrain	4.24	1.164	50 - 70 *
United Arab Emirates	1.93	0.420	200
Saudi Arabia	1.46	0.600 - 0.863	50
Oman	5.78	1.910	293
Qatar	1.10 - 1.65	0.603	21.3
Kuwait	0.35 - 0.70	0.192	5.6

Source: Gulf Organisation for Industrial Consulting, cited in Sami Zreigat, Incentives for Industrial Development in Bahrain (in Arabic) Bahrain Centre for Studies and Research, May 1985, p 22.

* 50-70 for projects in which government is participating. There is no specific gas charge for the private sector.

7.5.3.Other Financial Incentives

With the exception of Bahrain, all other GCC states have developed mechanisms for providing new industrial projects with financial assistance in the form of soft loans to encourage the private sector to invest in manufacturing industry. Again with the exception of Bahrain, all GCC states have established special institutions for lending to private investors at a token charge. In Bahrain, the only way for financing private-owned projects is through commercial banks, which is expensive. In fact, a high interest loan is usually undesirable for new projects since it places a prior claim on revenues and, hence, increases the risk of bankruptcy in the early period. However, one way to overcome this problem is to establish a new institution, such as Development Bank.

Export promotional techniques, which can be critical incentives to help medium and small firms seeking export markets, are not available in Bahrain. Although, export promotion incentives, which are forms of government intervention that distort market prices, are subject to the same criticism that is raised against protection for import competing industries. One can use the argument of "infant industry" or "infant exporter" to justify export subsidies, particularly in developing countries.[28] Excluding oil and aluminium, the export of industrial goods is a new phenomenon in Bahrain and other GCC states. The success of the diversification strategy depends to a large extent on an increase in the non-oil export contribution to gross domestic product (GDP). Thus, it is necessary to support local firms to enable them to enter foreign markets with the aid of well-defined export incentives. There are many forms of export incentives which can be adopted by the government to support local industry. For instance, an export finance guarantee is regarded as one of the principal export incentives to protect local exporters against default of payments, as has clearly been pointed out by a local industrialist in Bahrain:

> A Japanese or European exporter would not ship out of his country unless he obtained insurance from the government or semi-government parties against default of payments. Unfortunately, such gurarantee are not available to us, which limit our exports to third world countries which are politically unstable.[29]

7.6. CONCLUSION AND RECOMMENDATIONS

Our discussion of industrial policy in Bahrain thus far reveals various important characteristics. Firstly, the experience of industrial planning is very short and limited. Indeed, industrial planning is largely limited to the consideration of individuals, mainly state-owned large-scale projects. A formal industrial sector plan does not yet exist. Secondly, while some GCC states have introduced foreign investment legislations which include a package of incentives (e.g. Saudi Arabia), Bahrain has yet to devise a similar one. In addition, the minimum level of 51 percent of local ownership as a pre-requisite for obtaining protection, across the whole manufacturing sector serves to limit the flow of foreign know-how into domestic industry. Thirdly, at the present time, the subsidised prices for electricity, water and gas in Bahrain are still higher than in some GCC states. Fourthly, unlike their counterparts in the GCC states, medium and small-scale industrial investors in Bahrain do not have access to soft industrial loans, only to expensive loans from commercial banks. Fifthly, the absence of export finance guarantees and specialised trading companies for exporters discourage domestic industrialists from becoming involved in export-oriented industries.

To counteract these difficulties facing the industrial sector in Bahrain, the following recommendations are feasible:

1. The setting up of a comprehensive strategic outlook for industrial development.

2. The introduction of unified GCC states policies, subsidies and tariffs.

3. The introduction of foreign investment legislation with a flexible attitude toward encouraging joint ventures, and the setting up an industrial body with semi-state status to carry out the task of implementing such legislation.

4. Encouraging trading companies to assume part of the marketing responsibilities so far assumed by the industrial units.

5. Setting up a specialised development fund to finance small and medium scale companies in the production and marketing of local and exportable industrial products.

NOTES

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8. Al-Tajir, Mahdi Abdulla (1987) Bahrain 1920-1945: Britain, the Shaikh, and the Administration, London: Croom Helm, p 180.

9. Ibid., p 181.

10. Anna is a former copper coin in India, a sixteenth of a rupee, and maund is indian unit of weight, 82.28 pounds. See ibid., p 187.

11. Ibid., pp 190- 191.

12. Ibid., p 192.

13. The preferential trading agreements between Bahrain and other countries are as follows: GCC, according to the Unified agreement of Gulf Cooperation Council signed on June 8, 1981 and started in March, 1983; Jordan, based on the Commercial Agreement signed on December 22, 1975 and amended on July 11, 1985; Iraq, according to the Commercial Agreement signed on December 2, 1975 and amended on November 1, 1982; and Tunisia, based on the Commercial Agreement signed on October 24, 1975.

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18. M. Arif and H hill (1985) Export-Oriented Industrialisation: The ASEAN Experience, London: Allen and Unwin, p 78.

19. David Greenway (1983) International Trade Policy: From Tariffs to the New Protectionism, pp 66-67.

20. Sami Zreigat (1985) Industrial Development Incentives in Bahrain (in Arabic) Bahrain Centre for Studies and Research, p 21.

21. IMF (1983) Recent Economic Development: Bahrain. July 22, P 20

22. Ibid.

23. IMF (1983) Recent Economic Development: Bahrain, July 22, and G. Freijiah, Demand for Electricity in Bahrain (in Arabic) Bahrain Centre for Studies and Research. P 8.

24. Middle East Economic Digest (MEED) (1989) October 27, P 17-18

25. IMF (1983) Recent Economic Development: Bahrain, July 22, P 20

26. Middle East Economic Digest (MEED) (1982) September, P 57.

27. The Manufacturing Sector: Current Problems and Future Prospects. Sub-committee for Trade and Industry - Strategic Choices. P9

28. M. Arif and H. Hill (1985) Export-Oriented Industrialisation: the ASEAN Experience London: Allen and Unwin, P 67.

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CHAPTER EIGHT

THE STRUCTURE OF THE MANUFACTURING SECTOR : LOCAL, JOINT VENTURES, AND FOREIGN ESTABLISHMENTS

8.1. INTRODUCTION

Industrial growth is a recent phenomenon in Bahrain. Some of the factors that have engendered growth in the manufacturing sector since the early seventies include the establishment of joint venture-based industries. Notably, the industrial growth in aluminium production, refined oil products, chemicals and petrochemicals, and shiprepairing was achieved by joint ventures with either a foreign investor, a GCC state or an Arab government or company. This trend, which can be explained by the necessity to overcome both resources and market limitations, has been maintained through the current phase of industrialisation into the 1990s.

This chapter discusses the sample size of industrial establishments used in this study, the definition of the original and derived variables, and the main characteristics of the data.

8.2. SAMPLE SIZE

All of the data used in this part of a study are drawn from a 1983 survey of working establishments in the industrial sector of Bahrain conducted by the Bahrain Centre for Studies and Research. This survey is first industrial survey in Bahrain in terms of its size and data.

The sample of survey was chosen to satisfy the following main criteria:

1. Full representation of all divisions of the extractive and manufacturing sector.

2. Full representation of the major and important industrial establishments.

3. A high representation of medium-scale establishments.

4. A fair representation of small-scale establishments.

The degree of importance and classification of establishments into large-scale, medium-scale and small-scale was based on criteria that included the contribution of establishments to the gross domestic product (GDP) or the number of employees. In some cases where there was a lack of specific data, the selection procedure was based on the research team's evaluation of the importance of the selected establishments.

The definition of "establishment" and the industrial classification are based on the International Standard Industrial Classification of all economic activities (ISIC). An "establishment" is defined as :

> an economic unit which engages, under a single ownership or control, that is, under a single legal entity, in one, or predominantly one, kind of economic activity at a single physical location, e.g., an individual farm, mine, factory, workshop, store, or office" (UN, 1968).

Companies conducting more than one enterprise in the same area are counted as two or more separate establishments.

The survey counted 128 establishments in the extractive and manufacturing sector operating during the calendar year 1983. Examination of the distribution of establishments in the 1983 survey discloses that two establishments were operating in the extractive sector: one in mining and the other in quarrying. 126 were operating in manufacturing. However, 12 establishments are excluded because they either employed non-paid workers (one establishment), employed non-machinery (one establishment), manual bakeries (five establishments), or were not available to the researcher during collection (five establishments).

Table (8.1) shows the distribution of our sample of 114 establishments in manufacturing according to the international standard industrial classification of all economic activities (ISIC).

Our sample of 114 establishments accounted for more than total employment in manufacturing in 1981. Our comparison with 1981 is due to the fact that the latest official census took place and then because of the absence of reliable official records on total employment in the manufacturing sector in 1983. These units are accounted for 92 percent of total output in manufacturing in 1983.

8.3. VARIABLES IN THE RECORD

From 24 questions recorded in the questionnaire for each establishment we shall list and describe 41 variables which were used in one way or another in this part of the study.

TABLE (8.1) : DISTRIBUTION OF MANUFACTURING INDUSTRIES BY ISIC IN 1983.

ISIC	INDUSTRY	NO. OF EST.
31	Manufacture of food and beverages	17
32	Manufacture of wearing apparel and leather	12
33	Manufacture of wood products	15
34	Manufacture of paper products and printing	5
35	Manufacture of chemicals, and of chemical petroleum and plastic products	13
36	Manufacture of non-metallic mineral products except coal and petroleum products	18
37	Basic Metal Industries (Aluminium)	1
38	Manufacture of fabricated metal products, machinery and equipment	28
39	Other manufacturing industries (Jewellery)	5
3	Manufacturing	114

The Statistical Package for the Social Sciences Extended, (SPSS-X), was used to analyse our survey data. To run the selected SPSS-X, survey data were transferred into a code book and then the data was entered from the code book into the data file. The usual SPSS-X consists of three main parts: data definition, data transformation and procedure specifications. The data definition provides information about the variables and their locations in the data file. The data transformation commands are used to create new variables and modify existing variables. The procedure specifications part refers to requests for certain analyses to be carried out on the data.

This section will focuss mainly on data definition. Data transformation will be discussed in the next section.

The variables which are recorded in the data file are shown below with our explanation for each :

CASEID : Case (establishment) identification number.

This is the number of the establishment. Our sample consists of 114 establishments or observations.

INDUS : Type of Industry

This refers to the categories used in the classification of the "Major Division 3: Manufacturing". These categories were coded as follows:

1. for the manufacture of food and beverages.

2. for the manufacture of wearing apparrel and leather.

3. for the manufacture of wood products.

4. for the manufacture of paper products and printing.

5. for the manufacture of chemicals, petroleum and plastic products.

6. for the manufacture of non-metallic mineral products except for petroleum.

7. for the manufacture of basic metals (aluminium).

8. for the manufacture of fabricated metal products, machinery and equipment.

9. Other manufacturing industries (jewellery).

OWN : Type of Ownership

This code refers to the type of ownership. We divided the ownership of establishments into the following three broad categories :

1. Full Bahraini Ownership

2. Joint Ventures

3. Fully Foreign Ownership

The full Bahraini ownership category consists of establishments owned by private, government or public organisations from Bahrain. Joint ventures refer to establishments owned by either Bahraini and other investors from GCC states, or other countries. However, full foreign ownership refers to establishments owned by investors from GCC states or other countries.

ADEMP : Number of sales and administrative employees

PRODEMP : Number of production employees

UNSKEMP : Number of unskilled employees

TOTBEMP : Number of total Bahraini employees

TOTNBEMP : Number of total non-Bahraini employees

TOTEMP : Number of total employees

These numbers are monthly averages of the number of employees working during 1983. Employees in the questionnaire were divided into the following three main categories :

(1) Sales and administrative employees (ADEMP)

This category refers to managers, engineers, accountants, salesmen, clerks, typists, storekeepers and others working in this group.

(2) Production employees (PRODEMP)

This refers to engineers, workers, quality control staff, supervisors, drivers and so on.

(3) Unskilled employees (UNSKEMP)

Which refers to office boys, house-keepers, and other unskilled workers.

As one can see, the definition of "unskilled employees" is narrow and not well defined. The establishments vary in their interpretation of this item. For example, one establishment included under this heading new trainees (492 trainees) besides other unskilled employees. Another company reported only one unskilled employee, even though it is regarded as a major establishment in terms of employment.

The sum of these three categories is recorded in a separate field as total employees. Since the non-Bahraini labour force is an important factor in the labour market, we recorded total Bahraini employees and total non-Bahraini employees in separate fields. The following identity can be established :

ADEMP + PRODEMP + UNSKEMP = TOTBEMP + TOTNBEMP = TOTEMP

ADWAG : Wages of sales and administrative employees in <BD'000>

PRODWAG : Wages of production employees in <BD'000>

UNSKWAG : Wages of unskilled employees in <BD'000>

TOTBWAG : Wages of Bahraini employees in <BD'000>

TOTNBWAG : Wages of non-Bahraini employees in <BD'000>

TOTWAG : Wages of total employees in <BD'000>

Wages refer to total salaries, wages and compensations made by the employer during 1983 to all sales and administrative employees, production workers and unskilled employees. The sum of these three categories is recorded in a separate field. Total Bahraini wages and total non-Bahraini wages are recorded into separate fields. Thus, we get the following identity:

ADWAG + PRODWAG + UNSKWAG = TOTBWAG + TOTNBWAG = TOTWAG

LOCSAL : Sales in the domestic market in <BD'000>

GCCSAL : Exports to the Gulf Cooperation Council States (GCC) in <BD'000>

OTHSAL : Exports to other countries in <BD'000>

TOTSAL : Total sales in <BD'000>

PRODVAL : Value of total production in <BD'000>

Value of sales means the price of goods sold at the place of production including production duties minus any government subsidies. The value of sales were divided into three main groups : Sales in the domestic market, exports to GCC states and exports to other countries. The sum of these three groups is recorded as total sales, that is :

TOTSAL = LOCSAL + GCCSAL + OTHSAL

The value of total production (PRODVAL) is equal to the total sales plus closing stock, less opening stock, that is

PRODVAL = [(Inventory at end of 1983) - (inventory at beginning of 1983)] + TOTSAL during 1983

OTHINCE : Other sources of income in <BD'000>

INDSV : Industrial services in <BD'000>

Other sources of income (OTHINCE) refers to the sum of the following revenues : industrial services, (INDSV), income from commercial operations, and government subsidies. There are four establishments receiving subsidies in our sample : two in food industries, one in chemicals and one in ship repairing. Industrial services (INDSV) consist of technical services, maintenance and the leasing of machinery to others. This item is recorded as a separate variable because it will enter into the calculation of total value added.

MLOCPUR : Materials purchased from the domestic market in <BD'000>

MGCCPUR : Materials imported from GCC States in <BD'000>

MOTHPUR : Materials imported from other countries in <BD'000>

MTOTPUR : Total materials purchased in <BD'000>

MTOTUSD : Total materials used in production during 1983 in <BD'000>

The value of materials means the price of materials purchased including transportation costs and import duties. The value of materials were divided into three main categories : locally purchased materials (MLOCPUR), materials imported from GCC States (MGCCPUR), and materials imported from others (MOTHPUR). The sum of these three categories is recorded as total purchases, that is

MTOTPUR = MLOCPUR + MGCCPUR + MOTHPUR

The value of total materials used for production during 1983 is equal to total purchases plus opening stock, less closing stock, that is

MTOTUSD = MTOTPUR + [(stock at beginning of 1983) - (stock at end of 1983)]

TOTENG : Total value of energy used for production in <BD'000>

RENT : Rents incurred during 1983 in <BD'000>

INTPDOLN : Interests paid on loans in <BD'000>

Total value of energy used (TOTENG) means the sum of costs of the following items : water, electricity, natural gas, gasoline, kerosine, diesel, fuel oil and lubricants. Concerning interest paid on loans (INTPDOLN), we found that the establishments which disclosed data about interest paid on loans were more than the number of establishments that took up loans. Therefore, we assume that some establishments did not provide us with informations about their loans.

TOTINP : Total value of inputs during 1983 in <BD'000>.

Total value of inputs is calculated as follows :

TOTINP = MTOTUSD + TOTENG + Other services

The other services item is equal to the sum of costs of the following items: repair and maintenance of buildings and machinery, stationery, telex/mail/telephone, and rent.

TGFIXAST : total gross fixed assets in <BD'000>

MGVAL : gross value of machinery in <BD'000>

DEP : depreciation during 1983 in <BD'000>

Total gross fixed assets refer to the book value of fixed assets in December 1983. These assets consist of the following items: land, buildings, machinery, vehicles, office furniture and other fixed assets. In addition, the book value of machinery in December 1983 (MGVAL) was recorded in a separate field. On the other hand, the "DEP" item refers to the total value of depreciation for the fixed assets during 1983.

DWH : Daily working hours

WDY : Working days in the year 1983

CP : Current production capacity

"DWH" and "WDY" refer to daily working hours of the establishment (from one to twenty four hours), and working days in the year 1983 (from 1 to 365 days) respectively. Current production capacity was recorded as a percentage of the normal production capacity for the establishment. However, not all the establishments provided information concerning these items. As a consequence, we assigned the missing value (99) for daily working hours, (999) for working days in the year 1983, and (999) for current production capacity.

PDCAP : Paid up capital in <BD'000>

LOCOWN : Local ownership in percentage form

Paid up capital is part of authorised capital. The authorised capital, sometimes referred to as nominal capital, is the amount up to which a company may issue shares. Therefore, paid up capital is the amount of issued capital or issued shares actually paid. Our questionnaire requested establishments to provide information about their loans. However, only 16 out of 114 establishments supplied data under the heading of loans. As a consequence, we added loans to paid up capital. In fact, this can be called "invested capital". In addition, the percentage of local ownership in the total paid up capital was recorded in a separate field.

AGE : Age of establishment

NAIGM : Nationality of general manager

"AGE" refers to the age of an establishment from its first year of production. The nationality of the general manager variable (NAIGM) was divided into the following three categories:

1. Bahraini

2. Non-Bahraini

3. Mutual management

The term mutual management refers to the participation of both Bahraini and non-Bahraini in the daily management of an establishment.

RECID : Record Number

Record refers to the number of lines for each case (establishment). We have six records for each establishment.
The code book of our data file is reported in table 8.2.

8.4. DERIVED VARIABLES

The following variables are calculated from the variables in our data file which were discussed in the preceding section.

1. Value Added

This term is defined as the value of gross output less the value of intermediate inputs, i.e.

Value Added (TVA) = Gross Output - Intermediate Inputs

TABLE (8.2)

CODE BOOK FOR MANUFACTURING INDUSTRY IN BAHRAIN IN 1983

VARIABLE NUMBER	VARIABLE LOCATION (COLUMNS)	VARIABLE NAME	DESCRIPTION
1	1-3	CASEID	Case Identification Number from 1-114
2	5	INDUS	Type of industry: 1 = manufacture of food & beverage, 2 = wearing apparel & leather, 3 = wood products, 4 = paper products & printing, 5 = chemicals & chemical, petroleum, rubber, and plastic products, 6= non-metallic mineral products except of petroleum, 7 = basic metal, 8 = fabricated metal products, machinery and equipment, 9 = jewellery
3	7	OWN	Type of ownership: 1 = full-Bahraini ownership, 2 = joint venture, 3 = full foreign ownership.
4	9-16	ADEMP	Sales and administrative employees.
5	18-25	ADWAG	Sales and administrative wages in (BD'000)
6	27-34	PRODEMP	Production Employees
7	36-43	PRODWAG	Production Wages in (BD'000)
8	45-52	UNSKEMP	Unskilled Employees
9	54-61	UNSKWAG	Unskilled Wages in (BD'000)
10	63-70	TOTBEMP	Total Bahraini Employees
11	72	RECID1	Record Number 1

VARIABLE NUMBER	VARIABLE LOCATION (COLUMNS)	VARIABLE NAME	DESCRIPTION
12	1-3	CASEID	Case Identification Number from 1-114.
13	9-16	TOTBWAG	Total Bahraini Employees Wages in (BD'000)
14	18-25	TOTNBEMP	Total Non-Bahraini Employees
15	27-34	TOTNBWAG	Total Non-Bahraini Employees Wages (BD'000)
16	36-43	TOTEMP	Total Employees
17	45-52	TOTWAG	Total Emplyees Wages in (BD'000)
18	54-61	LOCSAL	Local Sales in (BD'000)
19	63-70	GCCSAL	Exports to GCC States in (BD'000)
20	72	RECID2	Record Number 2
21	1-3	CASEID	Case Idendification Number from 1-114.
22	9-16	OTHSAL	Exports to other countries in (BD'000)
23	18-25	TOTSAL	Total Sales during 1983 in (BD'000) [TOTSAL = LOCSAL + GCCSAL + OTHSAL]
24	27-34	PRODVAL	Value of total production in (BD'000)
25	36-43	MLOCPUR	Locally purchased materials in (BD'000)
26	45-52	MGCCPUR	Materials imported from GCC States in (BD'000)
27	54-61	MOTHPUR	Materials imported from other countries in (BD'000)

VARIABLE NUMBER	VARIABLE LOCATION (COLUMNS)	VARIABLE NAME	DESCRIPTION
28	63-70	MTOTPUR	Total materials purchased in (BD'000) [MTOTPUR = MLCCPUR + M GCCPUR + MOTHPUR]
30	72	RECID3	Record Number 3
31	1-3	CASEID	Case Identification Number from 1-114
32	9-16	MTOTUSD	Total Materials used in (BD'000)
33	18-25	TOTENG	Total value of energy used [water, electricity, natural gas gasoline, kerosine, diesel, fuel oil, lubricants] in (BD'000)
34	27-34	TOTINP	Total value of inputs in (BD'000) (TOTINP = MTOTUSD + TOTENG + other services)
35	36-43	TGFIXAST	Total Gross Fixed Assets in BD'000
36	45-52	MGVAL	Gross Value of Machinery in <BD'00>
37	60-61	DWH	Daily Working Hours from 1 to 24 Missing Value = 99
38	68-70	WDY	Working Days in the year from 1 to 365. Missing Value = 999
39	72	RECID4	Record Number 4
40	1-3	CASEID	Case Identification Number from 1-114.
41	14-16	CPC	Current Production Capacity in Percentage. Missing Value = 999
42	18-25	PDCAP	Paid up capital in (BD'000), including loans.

VARIABLE NUMBER	VARIABLE LOCATION (COLUMNS)	VARIABLE NAME	DESCRIPTION
43	27-34	OTHINCE	Other Sources of Income (BD'000)
44	36-43	INTPDOLN	Interests Paid on Loans in (BD'000)
45	45-52	DEP	Depreciation in (BD'000) during 1983
46	54-61	Rent	Rent in (BD'000)
47	65-70	INDSV	Industrial Services in (BD'000)
48	72	RECID5	Record Number 5
49	1-3	CASEID	Case Identification Number from 1-114
50	9-16	LANDB	Gross value of land and buildings in (BD'000)
51	24-25	AGE	Age of establishment
52	34	NATGM	Nationality of general manager: 1 = Bahraini 2 = Non-Bahraini 3 = Mutual
53	36-43	LOCOWN	Value of local (Bahraini) ownership of total paid up capital in percentage
54	72	RECID6	Record Number 6

The value of gross output comprises the value of production (PROD-VAL) and industrial services rendered to others (INDSV). The value of intermediate inputs consist of : the value of total materials used (MTO-TUSD), the value of total energy used (TOTENGY), the cost of repair and maintenance of building and machinery, and other expenses such as stationery, telex, mail and telephone charges. Since the variable of total value of inputs (TOTINP) includes MTOTUSD, TOTENG, RENT, and other expenses, the equation of value added is calculated as follows :

TVA = (PRODVAL + INDSV) - (TOTINP - RENT)

2. Performance Indicators

2.1. Profitability Ratios

The conventional indicators of performance of an establishment are the size of profits and profitability ratios. We define profit in this study as the non-wage value added. The profitability ratios used in our analysis consist of the following derived variables:

2.1.1. PROFRT = Return on total fixed assets = the ratio of total profit to total fixed assets

2.1.2. PUCRT = Return on paid-up capital = the ratio of total profit to total paid-up capital

2.1.3. PROFMG = Profit margin on total sales = the ratio of total profit to total sales

2.2 Employment Ratios

The most widely studied characteristics of industrial establishments that are related to employment are as follows :

2.2.1. AVA = Value added per employee

2.2.2. WGRT = Wage rate

2.2.3. WGPRT = Wage rate for production employees

Furthermore, the Bahrainisation policy, which refers to the concern of government to encourage employers to recruit more Bahraini employees in their establishments, is an important issue in the labour market. We attempt in this study to shed some light on the issue through the analysis of the following variables :

2.2.4. BEMPRT = Share of Bahrain employees in total employment

2.2.5. BWAGRT = Share of Bahraini wages in total wages

2.3 Trade Ratios

The ability of establishment to compete in international market and the role of imported materials in production can be examined by using the following variables :

2.3.1. MIMPRTR = Imported raw materials per unit of total materials used

2.3.2. IMPRTRT = Imported raw materials per unit of output

2.3.3. EXPRTRT = Share of exports in total sales

2.3.4. EXPPDRT = Exports per unit of output

3. Technology Indicators

3.1. Capital Intensity

This is usually measured by the following variables :

3.1.1. CAPLABRT = Ratio of fixed assets to total employees

3.1.2. TCAPLABRT = Ratio of the value of land, buildings and machinery to production employees

3.2 Skill Intensity

This indicator can be estimated through

3.2.1. ADEMPRT = Share of sales and administrative employees in total employment

3.2.2. ADWAGRT = Share of sales and administrative wages in total wages

Other derived variables which can provide us with information about the technology adopted in establishment are as follows :

3.3.1. CPOUTRT = Total fixed assets per unit of output

3.3.2. PUCSR = Paid-up capital per unit of output

3.3.3. MPUSRT = Materials used per unit of output

3.3.4. TENGSR = Energy used per unit of output

3.3.5. DEPRATE = Depreciation per unit of fixed assets

4. Other Indicators

This category consists of the following variables :

4.1. RNTSART = Rent per unit of output

4.2. OTHINSR = Other income per unit of output

4.3. LANDBRT = Ratio of land and building to total fixed assets

4.4. PRODMRT = Ratio of production employees to total employment

The code book of our derived variables is presented in table 8.3.

8.5 MAIN FEATURES OF THE DATA SAMPLE

In analysing the manufacturing structure in Bahrain, we made use of 1983 data sample discussed in the preceding section. The sample covers 114 industrial establishments which can be divided by ownership into three main types: locally-owned establishments (88 establishments), joint ventures (19 establishments), and foreign-owned establishments (7 establishments).

Joint ventures, in our sample, consist of two main sub-sets, namely; international joint ventures and regional joint ventures. The international joint venture is the one in which at least one partner is

Table (8.3): Derived Variables

Variable No.	Variable Name	Formula	Description
1.1	TVA	(PRODVAL + INSV - (TOTINP - RENT)	Total Value Added
1.2	PROFIT	TVA - TOTWAG	Profit
2.1.1	PROFRT	PROFIT/TGFIXAST	Return on total fixed assets (Profit Rate)
2.1.2	PUCRT	PROFIT/PDCAP	Return on paid up capital
2.1.3	PROFMG	PROFIT/TOTSAL	Profit margin on total sales
2.2.1	AVA	TVA/TOTEMP	Valued added per employee
2.2.2	WGRT	TOTWAG/TOTEMP	Average wage rate per employee
2.2.3	WGPRT	PRODWAG/PRODEMP	Average wage rate per production employee
2.2.4	BEMPRT	TOTBEMP/TOTEMP	Share of Bahraini employees in total employees
2.2.5	BWAGRT	TOTBWAG/TOTWAG	Share of Bahraini wages in total wages
2.3.1	MIMPRTR	IMPORT/MTOTUSD	Imported raw materials per unit of total materials used
2.3.2	IMPRTRT	IMPORT/PRODVAL	Imported raw materials per unit of output
2.3.3	EXPRTRT	EXPORT/TOTSAL	Share of exports in total sales
2.3.4	EXPPDRT	EXPORT/PRODVAL	Exports per unit of output
3.1.1	CAPLABRT	TGFIXAST/TOTEMP	Ratio of fixed assets to total employees

Variable No.	Variable Name	Formula	Description
3.1.2	TCAPLABRT	LANDBM/PRODEMP	Ratio of value of land, building and machinery to production employees
3.2.1	ADEMPRT	ADEMP/TOTEMP	Share of sales and administrative employees in total employment
3.2.2	ADWAGRT	ADWAG/TOTWAG	Share of sales and administrative wages in total wages
3.3.1	CPOUTRT	TGFIXAST/PRODVAL	Total fixed assets per unit of output
3.3.2	PUCSR	PDCAP/PRODVAL	Paid up capital per unit of output
3.3.3	MPUSRT	MTOTUSD/PRODVAL	Materials used per unit of output
3.3.4	TENGSR	TOTENG/PRODVAL	Total energy used per unit of output
3.3.5	DEPRATE	DEP/TGFIXAST	Depreciation per unit of fixed assets
4.1	RNTSART	RENT/PRODVAL	Rent per unit of output
4.2	OTHINSR	OTHINCE/PRODVAL	Other income per unit of output
4.3	LANDBRT	LANB/TGFIXAST	Ratio of land and buildings to fixed assets
4.4	PRODMRT	PRODEM/TOTEMP	Ratio of production employees to total employment

from Bahrain and the other partners are from foreign countries excluding the Gulf Cooperation Council members and Arab Countries. The local partner may be an individual investor, a company or a public sector, while the foreign partner may be an individual investor or a company. The second category is the regional joint venture in which at least one partner is from Bahrain and the other partners are individual investors, companies or a government from GCC or Arab States. In our data, the group of joint ventures consist of 4 regional joint ventures and 15 international joint ventures.

The second group of ownership is locally-owned establishments which comprise the following categories : government-owned establishments, private sector-owned establishments and mixed public and private-owned establishments. The private sector-owned establishments are concentrated in the traditional sectors such as construction materials, wood products and wearing apparel. Government-owned establishments are of strategic value and aim to give the country a measure of economic independence, for example the Commerce and Agriculture Ministry, dairy product enterprises that produce fresh dairy products, and a factory producing dried dates. The government has participated with the private sector in establishing several joint ventures and mixed public-private projects in order to encourage the private sector to invest in industrial projects, such as the Bahrain Danish Dairy establishment which produces milk, ice cream and fruit juice, and the Bahrain Flour Mills establishment involved in grain milling.

The third group of ownership is foreign-owned establishments which are owned by foreign investors. The main industrial enterprise in this group is a cement plant with paid up capital of BD 50 million which is run by the South Korean-Hyundai Engineering and Construction corporation. The other industrial establishments in the group are owned by foreign expatriates who have been living in Bahrain for a long period of time.

The distribution of 114 establishments by ownership is reported in Table 8.4. The data show that most joint ventures are concentrated in three industries, namely; food and beverages, chemicals and fabricated metal products. The first and second group of industries consist of four joint ventures each, while fabricated metal products consist of eight joint ventures. The industries of wood products, paper products and printing have one joint venture each. The basic metal industries contain only one industrial establishment, a joint venture in aluminium production.

The locally-owned establishments, which constitutes the highest number of enterprises, are distributed among food and beverages (13 establishments), wearing apparel and leather (10 establishments), wood products (13 establishments), paper products and printing (4 establishments), chemicals (9 establishments), construction materials (17 establishments), fabricated metal products (20 establishments), and jewellery (2 establishments). Finally, foreign-owned establishments are spread among wearing apparel (2 establishments), wood products (1 establishment), construction materials (1 establishment) and jewellery (3 establishments).

An examination of the structure of the manufacturing sectors' 1983 sample at the International Standard Industrial Classification (ISIC)

Table (8.4): Distribution of Manufacturing Industries by ISIC and Ownership in Bahrain: 1983

ISIC	Industry	Locally-Owned Est.	Joint Venture	Foreign-Owned Est.	Total
31	Manufacture of food and beverage	13	4	-	17
32	Manufacture of wearing apparel and leather	10	-	2	12
33	Manufacture of wood products	13	1	1	15
34	Manufacture of paper products and printing	4	1	-	5
35	Manufacture of chemicals, chemical petroleum and plastic products	9	4	-	13
36	Manufacture of non-metallic mineral products except coal and petroleum products (construction material	17	-	1	18
37	Basic metals (aluminium)	-	1	-	1
38	Manufacture of fabricated metal products, machinery and equipment	20	8	-	28
39	Other manufacturing industries Jewellery	2	-	3	5
3	Manufacturing	88	19	7	114

2-digit level - as shown in Appendix - yields the following observations:

1. Joint ventures were non-existent in some industries such as apparel and leather, construction materials and jewellery. On the other hand, foreign-owned establishments existed only in wearing apparel and leathers, wood products, construction and jewellery.

2. In terms of number, locally-owned establishments stand out as the dominant group in all industries except basic metals (aluminium). However, joint ventures are the largest employer, accounting for 68 percent, while local establishments account only for 30.5 percent. In addition, the contribution of joint ventures to manufacturing's value added and total sales is also the largest, accounting for 85.5 percent and 95.0 percent respectively.

3. The total capital invested by all establishments in our sample, distributed by ownership, are as follows : 10.2 percent by locally-owned establishments, 76.9 percent by joint ventures, and 12.9 percent by foreign-owned establishments.

Foreign-owned establishments, which represent only seven establishments, had invested more in manufacturing than domestic firms represented by 88 establishments. But the high share of capital invested by foreign-owned establishments is attributed mainly to a South Korean company.

The temporal growth of industrial establishments in our sample up to 1983 is reported in Table 8.5. The data show that most locally owned establishments and joint ventures have been established since 1970, accounting for 61.4 percent and 79.0 percent respectively. Moreover, the largest share of joint ventures was established in the latest period from 1980 to 1983, accounting for 31.6 percent. Our sample does not include four new major joint ventures which started production after 1983, namely; the Gulf Petrochemical Industries Company (GPIC) formed in December 1979 as Bahrain's first venture into petrochemicals on an equal partnership basis between the governments of Bahrain, Saudi Arabia and Kuwait; the Arab Iron and Steel Company (AISCO) with shareholders from Bahrain, Kuwait, Jordan and the United Arab Emirates (UAE); the Gulf Aluminium Rolling Mill Company (GARMCO) with shareholders from members of GCC States and Iraq; and the Arab Engineered System and Control company (ARESCON), with equity capital of $40 million shared between an American partner, the Combusion Engineering Company, and an Arab partners, the Riyad-based Arab Petroleum Investment Corporation (APICORP), the Baghdad-based Arab Investment Company and the Riyad-based National Industrialisation Company. Finally, the data in the Table 8.5 show that the majority of foreign establishments were established before 1970 - accounting for 71.4 percent - and mainly by foreign expatriate who settled in Bahrain before independence.

The discussion of the structure of manufacturing sector thus far reveals that industrial joint ventures are of major significance and have contributed to the increase of the manufacturing sector's share in the economy.

Table (8.5): Distribution of Establishment by Age and Ownership in Manufacturing Sector in Bahrain, 1983

Age and Ownership	Full Bahraini %	Joint Venture %	Full Foreign %
1-4 years	18.2	31.6	-
5-9 years	23.9	21.1	14.3
10-14 years	19.3	26.3	14.3
15-24 years	25.0	15.8	14.3
More than 24 years	13.6	5.3	57.1
Total	88	19	7

Notes: (1) 1-4 years refers to 1980 to 1983
(2) 5-9 years refers to 1975 to 1979
(3) 10-14 years refers to 1970 t0 1974
(4) 15-24 years refers to 1960 to 1969
(5) more than 24 years refers to before 1960

CHAPTER NINE

A COMPARISON OF THE BEHAVIOUR OF JOINT VENTURES AND LOCAL ESTABLISHMENTS: STATISTICAL ANALYSIS

9.1. INTRODUCTION

In chapter 5 a framework was developed for evaluating the effect of industrial establishments, particularly joint ventures, on development in Bahrain. The objective of this chapter is to test whether ownership groups of industrial establishments exert an influence on the development of the manufacturing sector and possibly the economy as a whole. Economic researchers have implicitly recognised the hypothesis that ownership can be a strong structural variable affecting aspects of firm behaviour in developing countries (Newfarmer, 1981). The hypotheses, for example, that foreign firms are more efficient or that they employ relatively more capital intensive techniques than local firms have been subjected to extensive empirical analysis. Yet there have been few empirical studies of the behaviour of joint ventures (JVS) and their role in industrial development in developing countries.

This chapter seeks to expand the hypothesis that the ownership of establishments exert an independent influence on industrial development by studying the role of JVS in the manufacturing sector in Bahrain. We examine the behaviour of JVS and local establishments (LES) with respect to the following characteristics: efficiency or the potential for the faster growth of the establishment, the appropriateness of an establishment's capital intensity, the appropriateness of skill intensity, the choice of trade policy, and the policy of Bahrainisation. Access to an unexploited data set has allowed us to test more rigorously important hypotheses regarding establishments' conduct and performance.

One could imagine two ideal contrasting situations when comparing JVS and LES in the manufacturing sector in Bahrain. In one situation, JVS respond to market conditions in the same way as LES. That is to say, they would make the same choice of technique, and the same output and marketing and other decisions as LES. If JVS behave exactly the same way as local establishments, then it could be viewed that their influence on industrial development is minimal. Obviously, behaviour is rarely similar if for no other reason than that the foreign partner in JVS usually repatriates profits abroad. In the second situation, JVS behave quite differently from LES in a whole range of choices other than the profit remittance behaviour of the foreign partner. Our hypothesis is that JVS behave differently from LES because of the presence of foreign partner.

9.2. METHODOLOGY

9.2.1. A Test of the Difference Between the Means/ Variances of Two Normal Populations

The difference between the means or the variances of two normal population are well discussed in most statistical textbooks, eg. Newbold and Paul (1984); Anderson, David and Dennis Sweeny and Thomas Williams

(1987). However, some of their aspects are still unsatisfactory and require further discussion.

9.2.1.1. Reporting t-statistics of P-value

Consider, for example, the test for the difference between two population means. Until recently, it is customary to present the t-statistics and then to indicate whether it is significant at the 1 percent or the 5 percent. The choice of a 1 percent or 5 percent level of significance is totally arbitrary and has been made only as a matter of convenience - otherwise, for each level of significance (1 percent, 2 percent or n percent) we would require a seperate table for the t-distribution. However, current computer software for statistical analysis (eg. SPSSX) often provides an estimate of the risk of error type 1, p, associated with the observed sample statistics. The test can be said to be significant exactly at the 'p' level in the sense that if the level of significance is set equal to p then the null hypothesis can just be rejected. Surely, the statement that a result is significant at a specific level of significance, say 2 percent, is more precise than the statement that it is not sigificant at 1 percent but is significant at 5 percent. Once the p-value is reported, it is up to the user of the research results to reject or accept the null hypothesis. In short, given that the p-value is readily available, it makes little sense to continue reporting its inferior substitute, the t-statistics.

9.2.1.2. The Choice of the Level of Significance

In choosing a low level of significance, say 5 percent, researchers in effect reveal their reluctance to reject the null hypothesis. But the reason for this reluctance is not always clear. Strictly speaking, unless the cost associated with making the error of wrongly rejecting a true null hypothesis (i.e. error type 1) can be shown to be very large relative to that of wrongly accepting a false null hypothesis (i.e. error type 11) and/or there is good extraneous information (a-priori reasoning and/or prior statistical findings) to support the null hypothesis, its special status (or the low level of significance) is neither warranted nor appropriate (Newbold, 1984, p 386).

9.2.1.3. Practical Significance Versus Statistical Significance

The difference between sample means can be numerically and proportionately very large but statistically not significant. This is so when the sample size is small and/or the sample variances are relatively large. It can also be statistically significant, but numerically and proportionately very small, when the sample size is large and/or the sample variances are relatively small. Thus, statistical significance does not imply practical significance and vice versa. Researchers, in wishing to verify their theories or models, tend to be over-occupied with statistical significance and so overlook the importance of practical significance. For example, a 1 percent difference in the average profit rates of two groups of firms, even if this is statistically significant, may arouse little interest to decision makers in practice; whereas a 100 percent difference may cause them serious concern, even if it is not statistically significant.

9.2.1.4. A Test of the Difference Between Two Population Variances

We are interested in carrying out this test not only for its own sake but also because of its implication for the (valid) test between two population means. The test for the difference between the two population means becomes more complicated and less satisfactory if the population variances are unequal. Therefore, statisticians are unwilling to reject the assumption of equality between the population variances when testing for the difference between the population means without strong evidence (a priori reasoning, prior empirical results and/or sample information) casting doubt on this assumption.

Since the variances of each sample are unknown, before selecting the appropriate t-test statistic for the difference of the two means, a test of the hypothesis of equal variance was considered. The test statistic is :

$$F^* = S^2(1) / S^2(2) = (\text{Larger variance})/(\text{smaller variance})$$

where $S^2(1)$ and $S^2(2)$ are sample variances of n(1) and n(2) observations from population (1) and (2) respectively. The estimates of the sample variances can be calculated as follows :

$$S^2(1) = \sum_{j}^{n_1} (X(1j) - \bar{X}(1))^2 / (n(1) - 1)$$

and

$$S^2(2) = \sum_{j}^{n_2} (X(2j) - \bar{X}(2))^2 / (n(2) - 1)$$

Where X(1j) = Observations for the first sample

$X(2j)$ = Observations for the second sample

The null and alternative hypothesis may be stated as :

$$H(0) : \sigma^2(1) = \sigma^2(2)$$

and

$$H(a) : \sigma^2(1) \neq \sigma^2(2)$$

If $F^* \geq F(n(1) - 1, n(2) - 1, \alpha)$

then we reject the null hypothesis H(0) and accept the alternative hypothesis H(A); otherwise we do not reject H(0). However, SPSSX provides the observed significance level for the F test. If the observed significance level is small enough, usually less than 0.05, the hypothesis that the population variances are equal is rejected.

9.2.1.5. A Test of The Difference Between Two (Unweighted) Means

If the variances of the two populations are equal but unknown, the test statistic for testing the equality of the means is

$$t^* = \bar{X}(1) - \bar{X}(2) / \sqrt{S^2(p)(1/n(1) + 1/n(2))}$$

where $S^2(p)$ is the estimate of the pooled variance which is computed as a weighted average of the individual variances, that is,

$$S^2(p) = \frac{(n(1) - 1)\,S^2(1) + (n(2) - 1)\,S^2(2)}{(n(1) + n(2) - 2)}$$

Based on the sampling distribution of the t-statistic, one can calculate the probability that a difference of at least as large as the one observed would occur if the two population means M(1) and M(2) are equal. This probability is called the observed significance level. If the observed significance level is small enough, usually less than 0.05, the hypothesis that the population means are equal is rejected.

It is also assumed that the two samples are independent so that the variances of the difference between the sample means are equal to the sum of the variances of each mean.

If the variances of the two populations are not equal, a test statistic for testing the equality of the mean is :

$$t^* = \frac{\bar{X}(1) - \bar{X}(2)}{\sqrt{S^2(1)/n(1) + S^2(2)/n(2)}}$$

if the observed significance level is small enough, usually less than 0.05, the hypothesis that the population means are equal is rejected.

9.2.2. Test Involving "Weighted Means"

The use of the unweighted arithmetic mean of the establishment values of a variable (ratio) may be criticised on the grounds that a large establishment is given the same weight as a small establishment. For example, if a large establishment with a capital per employee below average is split up into many smaller ones (although this may not be a realistic option), the result would be a decrease in the unweighted average, even if everything else remained the same. Thus, to standardise the establishment variables (ratios) so that capital per employee of an establishment increases the capital intensity of its group in the manufacturing sector more than one with lower value. Thus, to obtain an overall average of capital per employee we should weight the capital per employee by the share of employees in the total employment of its group in the industry. Such an average capital per labour is then the same as the group's capital per employee.

Since all the variables under test are ratios, the usual test of difference between two means is open to criticism in so far as the unweighted mean of the ratios may be considered inappropriate. Hence, our problem is to find an appropriate test for the difference between "weighted" means of sample ratios. As far as we know, such a test has not been covered by the textbooks on statistics. The test of the difference between two sample proportions is not relevant because the capital- employees ratio (which is the same as the "weighted" mean of all establishments' capital- employees ratio) is not a proportion in the statistical sense that the denominator is a fixed value representing the sample size. To derive a test of the difference between two "weighted" means of a sample ratio, it is convenient to start from the formula for the variance of the sample ratio (Yamane 1967, p 343; Cochran 1977, p 31)

9.2.3. Estimate Of The Variance Of A Sample Ratio

The variance formula of a sample ratio and its estimate (Yamane, 1967 and Cochran, 1977):

$$V(r) = 1/Y_p^{-2} \; N - n / n N \left[\sum_{i}^{N} (X_s(i) - R \, Y_s(i))^2 / N - 1 \right] \quad (1)$$

$$\hat{V}(r) = 1/Y_p^{-2} \; N - n / n N \left[\sum_{i}^{N} (X_s(i) - \bar{r} \, Y_s(i))^2 / n - 1 \right] \quad (2)$$

where N = Population size

n = Sample size

X(i) and Y(i) are sample observations on the two random variables X and Y respectively.

and

R = Population ratio

$\bar{r} = \bar{X}/\bar{Y}$

where $\bar{X}$ and $\bar{Y}$ are the arithmetic means of X(i) and Y(i) respectively. Thus $\bar{r}$ is the "weighted" average of the sample ratios r(i) = X(i) / Y(i) (i = 1,...,n) (Note that $\bar{r} \neq 1/n \sum r(i)$, the proof of the above formula is presented in the appendix(D))

For an infinite population N V (r) in (2) becomes

$$\hat{V}(r) = 1/Y^{-2} \, 1/n \left[\sum (X(i) - \bar{r}\, Y(i))^2 / n - 1 \right]$$

or

$$\hat{V}(r) = 1/n(n-1) \left[\sum (X(i) / Y(i) - \bar{r})^2 \, (Y(i) / \bar{Y})^2 \right]$$

$$= 1/n(n-1) \sum [(r(i) - \bar{r}) \, W(i)]^2 \qquad (3)$$

where $W(i) = Y(i)/\bar{Y}$ and r = X(i)/Y(i)

Thus, the estimate of the variance of the sample ratio is equal to the weighted sum of squared deviations of the individual ratios (r) from the weighted mean ratio ($\bar{r}$) divided by n(n-1).

The formula (3) can be written as :

$$\hat{V}(r) = 1/n(n-1) \sum (q(i) - \bar{q})^2$$

where $q(i) = W(i) \cdot r(i) + (1 - W(i))\,\bar{r}$

and

$$\bar{q} = 1/n \sum q(i) = \bar{r}$$

Comparison of two ratios occurs when the units are classified into two distinct groups and we wish to compare ratios estimated separately in the two groups. For instance, a simple random sample of industrial establishments can be divided into joint ventures (JVS) and local establishments (LES) in order to compare the ratio of fixed assets per employee in the two groups. If the estimated ratios are denoted by :

$$\bar{r} = \bar{X} / \bar{Y}, \quad \bar{r}' = \bar{X}' / \bar{Y}'$$

then

$$V(\bar{r} - \bar{r}') = V(\bar{r}) + V(\bar{r}')$$

Finally, to test the null hypothesis that there is no difference between two independent population ratios against the alternative hypothesis that there is a difference, we follow the t-test procedure in SPSSX.

9.3. STATISTICAL RESULTS

The results of statistical difference between joint ventures (JVS) and locally owned establishments (LES) according to average performance and input combinations are reported in Tables (1A,1B). The statistical differences between international joint ventures, after excluding regional joint ventures, and local establishments are presented in Tables (2A,2B). The data show the weighted means for JVS and LES, the

Table(9.1A): Joint Ventures and Local Firms in Bahrain
A Comparison of Average Performance (Weighted mean), 1983

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LFS %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
MIMPRTRI										
ALL	77,4	81,2	105	S	68	3,7	69,5	0	19	59
ALL+	77,3	76,9	99	S	96	3,5	59,2	0	17	42
ALL++	76,7	76,9	100	S	99	3,6	59,2	0	16	42
I	99,0	72,9	74	S	2	1,9	36,2	0	4	13
V	77,4	97,3	126	S	1	0,2	17,3	0	4	9
VIII	18,4	75,1	408	S	2	20,5	92,8	0	8	20
VIII A1	10,7	14,4	135	S	80	6,0	26,2	4	4	4
VIIIoth	57,6	108,4	188	P	3	39,0	39,4	114	4	16
PROFRTI										
ALL	31,1	19,6	63	P	56	66,2	77,1	48	19	59
ALL+	31,3	15,5	50	P	39	63,2	63,6	103	17	42
ALL++	39,6	15,5	39	P	26	89,1	63,6	9	16	42
I	21,3	7,3	34	P	61	36,7	50,2	67	4	13
V	72,1	17,3	24	P	0	20,8	25,8	79	4	9
VIII	-1,5	49,4	-3293	S	0	17,2	57,5	0	8	20
VIII A1	80,1	100,0	125	P	62	22,3	72,0	9	4	4
VIIIoth	-4,5	33,4	-742	S	0	6,3	35,0	2	4	16
PUCRTI										
ALL	28,2	17,5	62	P	56	78,0	65,5	31	19	59
ALL+	28,3	13,9	49	P	41	74,4	54,3	10	17	42
ALL++	32,7	13,9	43	S	51	106,1	54,3	0	16	42
I	32,5	6,6	20	P	38	67,3	44,2	25	4	13
V	87,4	14,1	16	S	13	71,6	19,0	0	4	9
VIII	-0,8	52,8	6600	S	0	9,6	65,4	0	8	20
VIII A1	108,0	96,9	90	P	82	36,5	85,3	20	4	4
VIIIoth	-2,5	37,0	-1480	S	0	3,3	44,3	0,0	4	16

IND	MEAN JVS %	MEAN LES %	Mrat%	V	P-Val	STANDARD DEVIATION JVS %	LFS %	P-Val	SAMPLE SIZE n2	n1
PROFMG1										
ALL	9,0	26,7	297	S	7	16,1	68,9	0	19	59
ALL+	9,0	24,2	269	S	20	15,3	72,4	0	17	42
ALL++	8,5	24,2	285	S	19	15,5	72,4	0	16	42
I	20,3	15,6	77	P	92	32,9	91,0	12	4	13
V	8,7	37,5	431	S	5	9,2	36,6	4	4	9
VIII	-5,7	27,2	477	S	31	84,9	20,7	0	8	20
VIII A1	17,5	41,5	237	P	0	4,5	6,5	56	4	4
VIIIoth	-48,9	20,5	42	S	49	177,7	13,0	0,0	4	16
AVA1										
ALL	1683,4	445,1	26	S	0	1523,4	641,5	0	19	59
ALL+	1689,2	395,5	23	S	0	1449,8	568,6	0	17	42
ALL++	1702,4	395,5	23	S	1	1814,5	568,6	0	16	42
I	529,1	392,8	74	P	79	717,3	922,7	75	4	13
V	2345,0	561,3	24	S	11	1576,8	380,1	0	4	9
VIII	363,7	339,8	93	S	93	778,7	166,9	0	8	20
VIII A1	1197,9	437,6	37	S	18	868,5	221,6	5	4	4
VIIIoth	229,5	303,8	132	S	78	490,4	90,1	0,0	4	16
WGRT1										
ALL	682,8	208,4	31	S	0	291,1	183,8	1	19	59
ALL+	683,8	185,3	27	S	0	275,5	95,4	0	17	42
ALL++	637,0	185,3	29	S	0	377,4	95,4	0	16	42
I	179,3	210,3	117	P	59	153,6	79,3	8	4	13
V	766,2	190,5	25	S	0	10,0	200,4	0	4	9
VIII	425,5	167,5	39	P	0	78,2	61,3	38	8	20
VIII A1	312,3	126,8	41	S	13	179,8	26,8	1	4	4
VIIIoth	443,7	182,5	41	P	0	56,2	67,9	85	4	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
<u>WGPRTI</u>										
ALL	643,3	188,8	29	S	0	357,2	205,4	0	19	59
ALL+	644,4	157,6	24	S	0	338,5	87,7	0	17	42
ALL++	660,4	157,6	24	S	0	404,9	87,7	0	16	42
I	229,4	180,4	79	S	71	236,9	60,8	0	4	13
V	795,9	140,5	18	S	0	15,8	178,3	0	4	9
VIII	422,3	152,4	36	P	0	73,8	65,1	62	8	20
VIII A1	295,5	113,9	39	S	15	188,2	36,2	2	4	4
VIIIoth	444,2	165,3	37	P	0	40,9	69,4	42	4	16
<u>EXPRTRTI</u>										
ALL	95,0	2,7	3	S	0	7,3	12,7	1	19	59
ALL+	95,0	3,4	4	S	0	6,9	13,3	1	17	42
ALL++	95,4	3,4	4	S	0	5,9	13,3	0	16	42
I	0,9	0,02	2	S	35	1,6	0,1	0	4	13
V	96,7	7,5	8	S	0	0,5	20,5	0	4	9
VIII	79,5	5,1	6	S	0	44,7	16,3	0	8	20
VIII A1	92,2	0,0	0,0	P	0	18,8	0,0	100	4	4
VIIIoth	55,8	7,5	13	S	22	62,4	17,8	0,0	4	16
<u>EXPPDRTI</u>										
ALL	101,5	2,7	3	S	0	22,5	13,2	0	19	59
ALL+	101,6	3,4	3	S	0	21,4	13,9	3	17	42
ALL++	97,0	3,4	4	S	0	5,9	13,9	0	16	42
I	0,90	0,02	2	S	35	1,6	0,1	0	4	13
V	98,3	7,5	8	S	0	0,5	20,4	0	4	9
VIII	82,6	5,4	7	S	0	48,1	18,3	0	8	20
VIII A1	97,0	0,0	0,0	P	0	21,8	0,0	100	4	4
VIIIoth	56,7	8,2	14	S	22	62;2	21,2	0,0	4	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
IMPRTRTI										
ALL	63,3	34,9	55	S	0	25,3	44,3	1	19	59
ALL+	63,3	35,7	56	S	1	24,0	47,4	1	17	42
ALL++	65,4	35,7	55	S	0	16,8	47,4	0	16	42
I	62,7	42,7	68	P	51	41,5	53,4	75	4	13
V	66,7	30,5	46	P	1	7,4	23,7	8	4	9
VIII	10,2	30,0	294	S	4	7,8	39,6	0	8	20
VIII A1	7,7	6,0	78	P	78	3,8	10,8	12	4	4
VIIIoth	14,6	42,3	290	P	6	14,1	26,3	33	4	16
BEMPRTI										
ALL	70,3	15,7	22	P	0	27,3	24,2	47	19	59
ALL+	70,4	16,9	24	P	0	25,7	25,0	85	17	42
ALL++	68,7	16,9	25	P	0	35,3	25,0	8	16	42
I	46,8	21,1	45	P	27	39,2	39,4	114	4	13
V	80,0	15,4	19	P	0	3,1	10,7	6	4	9
VIII	45,4	14,7	32	S	7	39,4	18,1	1	8	20
VIII A1	11,1	16,5	149	P	77	17,8	29,9	42	4	4
VIIIoth	50,9	14,0	28	S	8	28,1	10,3	1	4	16
BWAGRTI										
ALL	63,5	21,5	34	S	0	10,9	29,8	0	19	59
ALL+	63,6	26,0	41	S	0	10,1	26,8	0	17	42
ALL++	61,8	26,0	42	S	0	16,0	26,8	3	16	42
I	43,2	29,1	67	P	50	25,1	37,5	56	4	13
V	65,6	33,6	51	S	0	1,7	13,3	1	4	9
VIII	46,4	20,5	44	S	11	39,7	16,8	0	8	20
VIII A1	18,4	19,5	106	P	96	20,6	33,3	45	4	4
VIIIoth	49,6	20,8	42	S	15	30,2	11,4	1	4	16

pTable(9.1B): Joint Ventures and Local Firms in Bahrain:
A Comparison of Imput Combination (Weighted means), 1983

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
CAPLBRTI										
ALL	3217,2	1209,2	38	S	7	4433,2	2449,7	0	19	59
ALL+	3216,9	1358,7	42	S	11	4222,5	2570,0	1	17	42
ALL++	2692,7	1358,7	50	S	23	3984,3	2570,0	3	16	42
I	1640,9	2518,3	153	S	47	432,9	4172,3	0	4	13
V	2190,6	2140,4	98	P	96	1566,2	1872,9	84	4	9
VIII	4249,1	349,1	8	S	8	5470,9	149,9	0	8	20
VIII A1	1105,4	310,9	28	S	27	1171,5	32,6	0	4	4
VIIIoth	4754,7	363,1	8	S	13	4308,6	190,2	0,0	4	16
ICAPLRTI										
ALL	4432,5	1395,3	31	S	1	4641,1	3148,4	3	19	59
ALL+	4429,7	1642,7	37	P	1	4416,9	3474,4	22	17	42
ALL++	4058,6	1642,7	40	P	4	5009,6	3474,4	7	16	42
I	3868,1	3766,5	97	S	96	1497,0	6231,5	4	4	13
V	3559,2	3123,5	88	P	83	2578,8	3572,2	64	4	9
VIUII	5190,5	358,0	7	S	5	5685,6	178,9	0	8	20
VIII A1	1429,2	296,9	21	S	29	1783,0	106,3	0	4	4
VIIIoth	5840,9	378,5	6	S	8	4249,8	206,8	0,0	4	16
ADEMPRTI										
ALL	21,1	14,2	67	P	2	8,1	12,0	7	19	59
ALL+	21,1	15,6	74	P	8	7,7	11,6	8	17	42
ALL++	19,3	15,6	81	S	6	2,5	11,6	0	16	42
I	14,5	21,6	149	P	14	7,3	8,1	98	4	13
V	19,6	19,6	100	P	99	1,7	6,1	6	4	9
VIII	19,7	10,4	53	S	0	3,7	9,9	1	8	20
VIII A1	14,0	13,2	94	S	91	1,4	11,8	1	4	4
VIIIoth	20,7	9,4	45	S	0,0	2,2	9,5	4	4	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
<u>ADWAGRTI</u>										
ALL	31,5	24,6	78	P	31	27,8	24,7	49	19	59
ALL+	31,5	29,2	93	P	74	26,4	21,7	31	17	42
ALL++	24,9	29,2	117	S	21	2,6	21,7	0	16	42
I	23,2	38,6	166	P	14	5,9	18,9	8	4	13
V	25,0	36,0	144	S	7	1,7	15,5	0	4	9
VIII	24,4	19,1	78	S	24	6,0	17,2	1	8	20
VIII A1	26,0	23,6	91	S	81	2,5	18,8	1	4	4
VIIIoth	24,2	17,9	74	P	49	4,9	17,4	6	4	16
<u>CPOUTRTI</u>										
ALL	30,8	137,9	448	S	1	97,2	232,6	0	19	59
ALL+	30,7	158,7	517	S	0	92,0	225,1	0	17	42
ALL++	21,8	158,7	728	S	0	60,1	225,1	0	16	42
I	95,5	213,2	223	S	14	34,4	262,5	1	4	13
V	12,2	215,8	1769	S	1	9,4	171,7	0	4	9
VIII	409,7	58,0	14	S	45	1243,8	37,6	0	8	20
VIII A1	23,0	41,0	178	P	26	8,5	27,8	8	4	4
VIIIoth	1102,4	66,7	6	S	47	2492,9	38,4	0,0	4	16
<u>PUCSRI</u>										
ALL	34,1	154,7	454	S	1	118,3	247,8	0	19	59
ALL+	34,0	177,2	521	S	0	112,0	233,4	0	17	42
ALL++	26,3	177,2	674	S	0	91,5	233,4	0	16	42
I	62,7	235,0	375	S	2	31,9	236,7	1	4	13
V	10,1	265,9	2633	S	0	2,4	180,7	0	4	9
VIII	725,2	54,2	7	S	44	2314,0	42,3	0	8	20
VIII A1	17,1	42,3	247	S	20	2,7	31,1	0	4	4
VIIIoth	1993,6	60,3	3	S	47	4654,9	48,5	0,0	4	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
MPUSRTI										
ALL	81,9	43,0	53	S	0	33,5	76,6	0	9	59
ALL+	81,9	46,5	57	S	2	31,8	80,3	0	17	42
ALL++	85,2	46,5	55	S	1	19,3	80,3	0	16	42
I	63,3	58,6	93	P	93	43,0	100,0	19	4	13
V	86,1	31,4	36	P	0	9,6	21,0	23	4	9
VIII	55,3	39,9	72	S	24	33,3	10,3	0	8	20
VIII A1	72,0	41,7	58	P	0	5,2	8,9	41	4	4
VIIIoth	25,3	39,0	154	P	7	14,5	12,1	55	4	16
RNTSARTI										
ALL	0,1	1,6	1600	S	0	0,1	2,3	0	19	59
ALL+	0,1	1,7	1700	S	0	0,1	2,5	0	17	42
ALL++	0,2	1,7	850	S	0	0,2	2,5	0	16	42
I	1,2	1,7	142	P	72	1,6	2,9	37	4	13
V	0,1	0,8	800	S	8	0,0	1,0	0	4	9
VII	0,9	2,0	222	P	15	1,1	2,0	10	8	20
VIII A1	0,8	0,8	100	P	92	0,6	1,4	20	4	4
VIIIoth	1,2	2,6	217	P	14	1,8	1,6	71	4	16
TENGSRI										
ALL	1,2	3,0	250	S	6	3,0	4,6	5	19	59
ALL+	1,2	3,5	292	P	5	2,8	4,3	7	17	42
ALL+	0,7	3,5	500	S	0	0,6	4,3	0	16	42
I	3,0	3,8	127	P	67	2,5	3,3	71	4	13
V	0,6	5,1	850	S	10	0,1	7,3	0	4	9
VIII	5,1	2,3	45	S	51	11,1	3,0	0	8	20
VII A1	1,6	0,6	38	S	7	0,0	0,7	0	4	4
VIIIoth	11,2	3,1	28	S	52	22,2	3,7	0,0	4	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
<u>DEPRATE1</u>										
ALL	8,2	10,8	132	S	33	5,9	18,2	0	19	59
ALL+	8,2	10,9	133	S	35	5,6	17,0	0	17	42
ALL++	9,4	10,9	116	S	60	6,0	17,0	0	16	42
I	9,6	10,5	109	P	91	4,3	14,9	6	4	13
V	10,8	11,7	108	P	87	3,4	10,9	8	4	9
VIII	7,4	11,2	151	S	1	0,8	5,2	0	8	20
VIII A1	11,7	12,5	107	P	82	1,8	6,2	7	4	4
VIIIoth	7,3	10,8	148	S	1	0,3	5,0	0,0	4	16
<u>OTHINSR1</u>										
ALL	3,0	5,0	167	S	53	5,3	23,3	0	19	59
ALL+	3,0	6,0	200	S	45	5,1	24,1	0	17	42
ALL+	3,3	6,0	182	S	50	6,0	24,1	0	16	42
I	20,8	10,7	51	P	57	36,2	28,7	49	4	13
V	2,1	0,7	33	S	13	0,1	2,4	0	4	9
VIII	47,4	3,0	6	S	42	145,6	9,6	0	8	20
VIII A1	0,0	1,1	-	P	39	0,0	2,3	100	4	4
VIIIoth	132,3	4,0	3	S	44	287,6	13,0	0,0	4	16
<u>PRODMRT1</u>										
ALL	63,8	75,7	119	S	3	13,7	33,0	0	19	59
ALL+	63,8	72,2	113	S	16	13,1	31,9	0	17	42
ALL++	61,2	72,2	118	S	5	9,9	31,9	0	16	42
I	38,5	56,5	147	P	14	19,2	20,3	106	4	13
V	60,2	64,0	106	S	62	0,4	21,5	0	4	9
VIII	69,6	85,0	122	P	2	13,4	14,5	88	8	20
VII A1	74,1	79,3	107	P	67	9,7	21,1	24	4	4
VIIIoth	68,9	87,1	126	P	1	12,3	11,5	73	4	16

IND	MEAN JVS %	LES %	Mrat%	V	P-Val	STANDARD DEVIATION JVS %	LFS %	P-Val	SAMPLE SIZE n2	n1
LANDBRTI										
ALL	32,9	38,7	118	S	68	56,5	31,1	0	19	59
ALL+	32,9	39,2	119	S	65	53,8	24,9	0	17	42
ALL++	34,9	39,2	112	S	84	79,7	24,9	0	16	42
I	40,9	39,9	98	P	90	21,4	12,0	12	4	13
V	6,7	36,0	537	S	4	1,2	35,9	0	4	9
VIII	71,6	42,9	60	S	0	9,7	21,9	4	8	20
VIII A1	22,9	45,8	200	P	4	6,1	16,6	14	4	4
VIIIoth	73,4	42,0	57	S	0	3,2	24,2	1	4	16

Table(9.2A): International Joint Ventures and Local Establishments in Bahrain: A Comparison of Average Performance (Weighted means), 1983

IND	MEAN JVS %	LES %	Mrat %	V	p-Val	STANDARD DEVIATION JVS %	LES %	p-Val	SAMPLE SIZE n2	n1
MIMPRTR1										
ALL	77,2	80,5	104	S	65	3,3	53,8	0	14	59
ALL+	77,2	76,9	100	S	97	3,1	59,2	0	13	42
ALL++	76,6	76,9	100	S	98	3,5	59,2	0	12	42
I	99,9	72,9	73	S	2	0,4	36,2	2	2	13
V	77,4	97,3	126	S	1	0,2	17,3	0	4	9
VIII	12,2	75,1	616	S	1	7,6	92,8	0	6	20
VIII A1	10,7	14,4	135	S	80	6,0	26,2	4	4	4
VIIIoth	27,0	108,4	401	P	1	19,5	39,4	74	2	16
ROFRT1										
ALL	44,8	18,7	42	P	14	64,7	56,7	48	14	59
ALL+	44,8	15,5	35	P	15	62,6	63,6	102	13	42
ALL++	71,7	15,5	22	S	0	30,4	63,6	1	12	42
I	53,8	7,3	14	S	1	1,4	50,2	4	2	13
V	72,1	17,3	24	P	0	20,8	25,8	79	4	9
VIII	76,7	49,4	64	P	28	28,8	57,5	13	6	20
VII A1	80,1	100,0	125	P	62	22,3	72,0	9	4	4
VIIIoth	64,5	33,4	52	P	29	68,2	35,0	14	2	16
PUCRT1										
ALL	51,8	16,7	32	S	15	83,9	48,7	0	14	59
ALL+	51,8	13,9	27	P	6	81,1	54,3	6	13	42
ALL++	87,4	13,9	16	S	4	106,1	54,3	0	12	42
I	106,2	6,6	6	S	0	0,1	44,2	1	2	13
V	87,4	14,1	16	S	13	71,6	19,0	0	4	9
VII	80,3	52,8	66	P	37	63,3	65,4	104	6	20
VIII A1	108,0	96,9	90	P	82	36,5	85,3	20	4	4
VIIIoth	37,8	37,0	98	P	98	36,8	44,3	116	2	16

IND	MEAN JVS %	LES %	Mrat%	V	P-Val	STANDARD DEVIATION JVS %	LFS %	P-Val	SAMPLE SIZE n2	n1
PROFMG1										
ALL	9,4	26,4	281	S	7	15,0	62,4	0	14	59
ALL+	9,4	24,2	257	S	22	14,5	72,4	0	13	42
ALL++	9,0	24,2	269	S	21	14,8	72,4	0	12	42
I	40,3	15,6	39	S	35	2,4	91,0	4	2	13
V	8,7	37,5	431	S	5	9,2	36,6	4	4	9
VIII	17,2	27,2	158	S	7	5,8	20,7	1	6	20
VIII A1	17,5	41,5	237	P	0	4,5	6,5	56	4	4
VIIIoth	15,8	20,5	130	P	63	13,2	13,0	65	2	16
AVA1										
ALL	2020,7	439,2	22	S	0	1365,7	583,0	0	14	59
ALL+	2023,4	395,5	20	S	0	1324,4	568,6	0	13	42
ALL++	2166,1	395,5	18	S	1	1850,5	568,6	0	12	42
I	1120,4	392,8	35	P	30	198,9	922,7	33	2	13
V	2345,0	561,3	24	S	11	1576,8	380,1	0	4	9
VIII	953,3	339,8	36	S	8	673,4	166,9	0	6	20
VIII A1	1197,9	437,6	37	S	18	868,5	221,6	5	4	4
VIIIoth	725,6	303,8	42	P	0	139,0	90,1	29	2	16
WGRT1										
ALL	751,1	205,6	27	P	0	122,5	163,0	26	14	59
ALL+	752,0	185,3	25	P	0	117,1	95,4	32	13	42
ALL++	717,1	185,3	26	S	0	169,8	95,4	1	12	42
I	307,4	210,3	68	P	12	33,4	79,3	64	2	13
V	766,2	190,5	25	S	0	10,0	200,4	0	4	9
VIII	428,9	167,5	39	S	3	211,3	61,3	0	6	20
VII A1	312,3	126,8	41	S	13	179,8	26,8	1	4	4
VIIIoth	537,4	182,5	34	P	0	91,9	67,9	39	2	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
<u>WGPRT 1</u>										
ALL	694,4	186,3	27	P	0	265,3	197,2	13	14	59
ALL+	695,6	157,6	23	S	0	255,2	87,7	0	13	42
AL+	739,6	157,6	21	S	0	197,7	87,7	0	12	42
I	370,4	180,4	49	P	0	32,6	60,8	80	2	13
V	795,9	140,5	18	S	0	15,8	178,3	0	4	9
VIII	392,5	152,4	39	S	4	220,4	65,1	0	6	20
VIII A1	295,5	113,9	39	S	15	188,2	36,2	2	4	4
VIIIoth	495,9	165,3	33	P	0	143,5	69,4	11	2	16
<u>EXPRTRT1</u>										
ALL	95,4	2,8	3	S	0	5,2	11,6	0	14	59
ALL+	95,4	3,4	4	S	0	5,0	13,3	0	13	42
ALL++	95,9	3,4	4	S	0	3,7	13,3	0	12	42
I	0,03	0,02	67	P	84	0,1	0,1	63	2	13
V	96,7	7,5	8	S	0	0,5	20,5	0	4	9
VIII	74,8	5,1	7	S	2	51,9	16,3	0	6	20
VIII A1	92,2	0,0	0,0	P	0	18,8	0,0	100	4	4
VIIIoth	6,1	7,5	123	P	92	12,5	17,8	101	2	16
<u>EXPPORT1</u>										
ALL	102,0	2,8	3	S	0	20,4	12,1	1	14	59
ALL+	102,0	3,4	3	P	0	19,8	13,9	9	13	42
ALL++	97,5	3,4	3	S	0	3,6	13,9	0	12	42
I	0,03	0,02	67	P	84	0,1	0,1	63	2	13
V	98,3	7,5	8	S	0	0,5	20,4	0	4	9
VIII	78,4	5,4	7	S	2	56,0	18,3	0	6	20
VIII A1	97,0	0,0	0,0	P	0	21,8	0,0	100	4	4
VIIIoth	6,3	8,2	130	P	91	12,9	21,2	90	2	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
<u>IMPRIRT1</u>										
ALL	63,4	35,0	55	S	0	21,9	40,0	2	14	59
ALL+	63,4	35,7	56	S	1	21,2	47,4	0	13	42
ALL+	65,5	35,7	55	S	0	14,5	47,4	0	12	42
I	39,7	42,7	108	S	85	1,3	53,4	4	2	13
V	66,7	30,5	46	P	1	7,4	23,7	8	4	9
VIII	7,7	30,0	390	S	2	4,4	39,6	0	6	20
VII A1	7,7	6,0	78	P	78	3,8	10,8	12	4	4
VIIIoth	7,5	42,3	564	P	9	9,7	26,3	57	2	16
<u>BEMPRT1</u>										
ALL	74,1	15,9	21	P	0	18,4	21,7	52	14	59
ALL+	74,2	16,9	23	P	0	17,6	25,0	19	13	42
ALL++	73,3	16,9	23	P	0	25,4	25,0	86	12	42
I	56,8	21,1	37	P	24	7,9	39,4	31	2	13
V	80,0	15,4	19	P	0	3,1	10,7	6	4	9
VIII	19,8	14,7	74	P	54	17,6	18,1	105	6	20
VIII A1	11,1	16,5	149	P	77	17,8	29,9	42	4	4
VIIIoth	28,0	14,0	500	P	8	2,5	10,3	38	2	16
<u>BWAGRT1</u>										
ALL	64,4	21,6	34	S	0	7,7	33,8	0	14	59
ALL+	64,4	26,0	40	S	0	7,4	26,8	0	13	42
ALL++	62,8	26,0	41	S	0	12,4	26,8	1	12	42
I	52,3	29,1	56	P	41	2,6	37,5	11	2	13
V	65,6	33,6	51	S	0	1,7	13,3	1	4	9
VIII	21,0	20,5	98	P	94	9,3	16,8	20	6	20
VIII A1	18,4	19,5	106	P	96	20,6	33,3	45	4	4
VIIIoth	22,4	20,8	93	P	84	1,7	11,4	24	2	16

Table(9:28): Joint Ventures and Local Establishments in Bahrain: A Comparison of Input Combination (Weighted means), 1983

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat %	V	p-Val	JVS %	LES %	p-Val	n2	n1
CAPLBRT1										
ALL	2835,9	1227,0	43	S	14	3702,4	2207,9	1	14	59
ALL+	2839,8	1358,7	48	P	11	3587,5	2570,0	11	13	42
ALL++	2019,8	1358,7	67	P	41	1858,0	2570,0	25	12	42
I	1511,4	2518,3	167	P	75	347,8	4172,3	13	2	13
V	2190,6	2140,4	98	P	96	1566,2	1872,9	84	4	9
VIII	684,0	349,1	51	S	44	966,8	149,9	0	6	20
VIII A1	1105,4	310,9	28	S	27	1171,5	32,6	0	4	4
VIIIoth	291,6	363,1	125	P	61	49,6	190,2	40	2	16
TCAPLRT1										
ALL	3937,6	1414,2	36	P	1	3727,6	3022,0	28	14	59
ALL+	3945,8	1642,7	42	P	4	3618,9	3474,4	80	13	42
ALL++	3242,8	1642,7	51	P	15	2995,7	3474,4	62	12	42
I	2727,3	3766,5	138	P	82	313,6	6231,5	8	2	13
V	3559,2	3123,5	88	P	83	2578,8	3572,2	64	4	9
VIII	918,3	358,0	39	S	37	1386,2	178,9	0	6	20
VIII A1	1429,2	296,9	21	S	29	1783,0	106,3	0	4	4
VIIIoth	374,1	378,5	101	P	98	40,3	206,8	30	2	16
ADEMPRT1										
ALL	21,2	14,3	67	P	3	8,5	10,4	43	14	59
ALL+	21,2	15,6	74	P	12	8,2	11,6	20	13	42
ALL++	18,9	15,6	83	S	9	1,7	11,6	0	12	42
I	13,1	21,6	165	P	18	4,5	8,1	82	2	13
V	19,6	19,6	100	P	99	1,7	6,1	6	4	9
VIII	14,9	10,4	70	S	6	1,2	9,9	0	6	20
VII A1	14,0	13,2	94	S	91	1,4	11,8	1	4	4
VIIIoth	15,7	9,4	60	S	2	0,2	9,5	3	2	16

IND	MEAN					STANDARD DEVIATION			SAMPLE SIZE	
	JVS %	LES %	Mrat%	V	P-Val	JVS %	LFS %	P-Val	n2	n1
<u>ADWAGRTI</u>										
ALL	32,3	24,6	76	P	35	27,0	27,5	101	14	59
ALL+	32,3	29,2	90	P	67	26,1	21,7	37	13	42
ALL++	25,1	29,2	116	S	24	2,7	21,7	0	12	42
I	21,9	38,6	176	P	25	5,2	18,9	42	2	13
V	25,0	36,0	144	S	7	1,7	15,5	0	4	9
VIII	27,5	19,1	69	S	5	2,5	17,2	0	6	20
VIII A1	26,0	32,6	91	S	81	2,5	18,8	1	4	4
VIIIoth	28,4	17,9	63	P	42	3,4	17,4	30	2	16
<u>CPOUTRTI</u>										
ALL	22,6	140,0	619,5	S	0	57,3	218,2	0	14	59
ALL+	22,5	158,7	705	S	0	55,4	225,1	0	13	42
ALL++	12,7	158,7	1250	S	0	15,6	225,1	0	12	42
I	74,7	213,2	285	S	8	6,3	262,5	4	2	13
V	12,2	215,8	1769	S	1	9,4	171,7	0	4	9
VIII	23,5	58,0	247	S	0	7,7	37,6	0	6	20
VIII A1	23,0	41,0	178	P	26	8,5	27,8	8	4	4
VIIIoth	25,3	66,7	264	P	16	5,4	38,4	22	2	16
<u>PUCSRI</u>										
ALL	19,5	156,9	805	S	0	47,1	230,0	0	14	59
ALL+	19,5	177,2	909	S	0	45,5	233,4	0	13	42
ALL++	10,5	177,2	1688	S	0	4,7	233,4	0	12	42
I	37,9	235,0	620	S	1	2,3	236,7	0	2	13
V	10,1	265,9	2633	S	0	2,4	180,7	0	4	0
VIII	22,4	54,2	242	S	1	12,3	42,3	1	6	20
VIII A1	17,1	42,3	247	S	20	2,7	31,1	0	4	4
VIIIoth	43,2	60,3	140	P	63	5,8	48,5	19	2	16

IND	MEAN JVS %	LES %	Mrat%	V	P-Val	STANDARD DEVIATION JVS %	LFS %	P-Val	SAMPLE SIZE n2	n1
<u>MPUSRTI</u>										
ALL	82,1	43,4	53	S	0	28,7	69,2	0	14	59
ALL+	82,1	46,5	57	S	2	27,8	80,3	0	13	42
ALL++	85,5	46,5	54	S	1	16,4	80,3	0	12	42
I	39,8	58,6	147	S	51	1,5	100,0	2	2	13
V	86,1	31,4	36	P	0	9,6	21,0	23	4	9
VIII	63,0	40,0	63	S	6	23,0	10,3	1	6	20
VIII A1	72,0	41,7	58	P	0	5,2	8,9	41	4	4
VIIIoth	27,8	39,0	140	P	25	16,0	12,1	41	2	16
<u>RNTSARTI</u>										
ALL	0,1	1,6	1600	S	0	0,1	2,2	0	14	59
ALL+	0,1	1,7	1700	S	0	0,1	2,5	0	13	42
ALL+	0,1	1,7	1700	S	0	0,1	2,5	0	12	42
I	0,9	1,7	189	P	71	0,2	2,9	13	2	13
V	0,1	0,8	800	S	8	0,0	1,0	0	4	9
VIII	0,6	2,0	333	S	1	0,5	2,0	1	6	20
VIII A1	0,8	0,8	100	P	92	0,6	1,4	20	4	4
VIIIoth	0,2	2,6	1300	S	0	0,0	1,6	4	2	16
<u>TENGSR</u>										
ALL	1,1	3,0	273	S	4	2,4	4,6	2	14	59
ALL+	1,1	3,5	318	S	1	2,3	4,3	2	13	42
ALL++	0,6	3,5	583	S	0	0,2	4,3	0	12	42
I	2,1	3,8	181	S	10	0,0	3,3	1	2	13
V	0,6	5,1	850	S	10	0,1	7,3	0	4	9
VIII	1,6	2,3	144	S	32	0,2	3,0	0	6	20
VIII A1	1,6	0,6	38	S	7	0,0	0,7	0	4	4
VIIIoth	1,5	3,1	207	P	54	0,6	3,7	26	2	16

IND	MEAN JVS %	LES %	Mrat%	V	P-Val	STANDARD DEVIATION JVS %	LFS %	P-Val	SAMPLE SIZE n2	n1
DEPRATEI										
ALL	8,5	10,9	128	S	38	7,0	14,3	1	14	59
ALL+	8,5	10,9	128	S	46	6,8	17,0	0	13	42
ALL++	10,9	10,9	100	S	99	5,0	17,0	0	12	42
I	11,3	10,5	93	P	95	0,7	14,9	7	2	13
V	10,8	11,7	108	P	87	3,4	10,9	8	4	9
VIII	12,9	11,2	87	P	47	4,4	5,2	76	6	20
VIII A1	11,7	12,5	107	P	82	1,8	6,2	7	4	4
VIIIoth	17,2	10,8	63	P	10	2,4	5,0	72	2	16
OTHINSRI										
ALL	1,9	5,1	268	S	24	1,0	21,0	0	14	59
ALL+	1,9	6,0	316	S	28	0,9	24,1	0	13	42
ALL++	2,1	6,0	286	S	30	0,2	24,1	0	12	42
I	0,7	10,7	1529	S	23	0,1	28,7	0	2	13
V	2,1	0,7	33	S	13	0,1	2,4	0	4	9
VIII	1,4	3,0	214	P	71	4,4	9,6	9	6	20
VIII A1	0,0	1,1	–	P	39	0,0	2,3	100	4	4
VIIIoth	7,0	4,0	57	P	76	14,4	13,0	57	2	16
PRODMRTI										
ALL	63,9	75,3	118	S	3	12,6	28,7	0	14	59
ALL+	63,9	72,2	113	S	17	12,1	31,9	0	13	42
ALL++	60,6	72,2	119	S	3	2,4	31,9	0	12	42
I	45,9	56,5	123	P	49	5,2	20,3	39	2	13
V	60,2	64,0	106	S	62	0,4	21,5	0	4	9
VIII	69,3	85,0	123	P	2	10,6	14,5	51	6	20
VIII A1	74,1	79,3	107	P	67	9,7	21,1	24	4	4
VIIIoth	64,8	87,1	134	P	2	6,5	11,5	85	2	16

IND	Mean					STANDARD DEVIATION			SAMPLE SIZE	
	JVS%	LES%	Mrat%	V	P-Val	JVS%	LFS%	P-Val	n2	n1
LANDBRT1										
ALL	18.0	38.8	216	P	1	26.5	24.3	62	14	59
ALL+	18.0	39.2	218	P	1	25.6	24.9	83	13	42
ALL++	7.7	39.2	509	S	0	3.8	24.0	0	12	42
I	20.6	39.9	194	S	0	0.0	12.0	0	2	13
V	6.7	36.0	537	S	4	1.2	35.9	0	4	9
VIII	26.9	42.9	159	S	2	8.7	21.9	5	6	20
VIII AL	22.9	45.8	200	P	4	6.1	16.6	14	4	4
VIII oth	41.1	42.0	102	S	89	0.2	24.2	2	2	16

NOTES

1. The industries I, V and VII refer to Food and Beverages, Chemicals and Metal Products respectively.

2. The group VIIIAL refers to industry of the Aluminium Products establishments, while group VIIIoth refers to the other Metal Products industry.

3. The group ALL++ consists of industries I, V and VIII.

4. The group ALL+ consists of industries I, V, VII and VIII, that is, the joint venture establishment in Basic Metals (aluminium) is added to group ALL++.

5. The group ALL consists of industries I, III, IV, V, VII and VIII, that is, the industries of Wood Products and Furniture (III) and Paper Products and Printing (VI) are added to group ALL.

6. Mrat % = 100 * (mean of LES/mean of JVS).

7. P and S denote pooled variance and separate variance respectively.

8. P-Val for mean represents the significance level of the t-test for the difference between the means of JVS and LES.

9. P-Val for standard deviation represents the significance level of the F-test for the equality between the variances of JVS and LES.

10. For definition of all variables see table (8.3).

ratio of JVS mean to LES mean (IMrat), the type of variance used in the t-test, the observed significance level (p-value) of the t-test for the mean, the standard deviation for JVS and LES, the observed significance level (p-value) of the F-test for the standard deviation and the sample size of JVS and LES.

The null hypothesis for the t-test is that there is no difference between joint ventures (JVS) and local establishments (LES) with respect to the selected indicators (variables) of performance. The alternative hypothesis states that the performance of joint ventures is better or worse than local establishments. The selected variables used in this study are twelve variables.

9.3.1. Joint Ventures and Local Establishments: A Comparison of Average Performance (Profitability)

Difference in profitability between JVS and LES can be regarded as a direct way of measuring relative potential for an industrial establishment's growth. However, there are difficulties in capturing the influence of ownership on profitability which can be divided into two main categories:

(1) The measures of profitability are subject to the distortion of accounting practices prevalent in most developing countries. In Bahrain, the absence of purchase, sales, income and company profit taxes results in the lack of a standard accounting practice. As a result, establishments vary in their accounting policies and some industrial establishments, particularly the small locally owned

establishments, do not keep proper revenues and expense accounts. In addition, some establishments, especially joint ventures, manipulate their reported figures on profits and consequently hide their real earnings through transfer pricing.

(2) The second set of difficulties are related to the choice of proper measures of profitability. Our data allow us to use more than one measure, namely; return on total fixed assets (PROFRT1), return on paid up capital (PUCRT1), and return on total sales (PROFMG1).

The return on total fixed assets (PROFRT1), which is the ratio of non-wage value added to total fixed asset, can be used to assess the overall managerial performance. In other words, a high profit rate indicates high efficiency and a low rate may point out to over-investment or under-utilisation of fixed assets. Yet, there are some limitations in using this measure as a sole performance indicator. For example, valuation of assets and depreciation vary from one establishment to another and, consequently, affect the book value of assets.

The second gauge of performance is return on paid up capital (PUCRT1), which is measured by the ratio of non-wage value added to paid up capital. This measure not only shows profitability but points out to the equity policy of establishments. However, the disadvantage of this measure can be theoretical, that is, " it does not adequately measure allocative efficiency as price over marginal cost nor does it represent average profit as price over average cost" (Bain, 1968).

The third measure used in this statistical analysis is return on total sales, which is measured as the ratio of non-wage value added to total sales. This measure has the advantage of detecting the degree of inefficiency emerging from monopoly, and hence high profits which can reflect price over average costs.

Given the limitations of profitability measures, we will use employee productivity, measured as the ratio of total value added to total employees (AVA1), in conjunction with the other variables as an indicator of an establishment's growth potential.

When profit rate (PROFRT1) is used as a proxy of profitability, we find that there is no statistically significant difference at the aggregate level of all industries. When industries are disaggregated, the computed p-values suggest that JVS are statistically more profitable than LES in Chemicals (INUS V), LES are statistically more profitable than JVS in Metals (INUS VIII) with negative mean for JVS, and no significant difference in Food and Beverages (INDUS I) in spite of a low Mrat (34 percent). When regional JVS are excluded, the performance of JVS become significantly better than LES in Food and Beverage (1 percent), and there is no significant difference in Metals (28 percent) where there is a positive mean for JVS and a low Mrat (64 percent). At the aggregate level, JVS also become more statistically profitable than LES in ALL++ (0.0 percent), with no statistical difference in ALL+ (15 percent) and in ALL (14 percent).

When return on paid up capital (PUCRT1) is used as an indicator of profitability, we find that LES are statistically more profitable than JVS in Metals (INDUS VIII), with negative mean for JVS, and that there is no statistically significant difference in other individual industries or at the aggregate level. When excluding regional JVS, the performance of JVS improves overall. Thus, JVS become statistically more profitable than LES in Food and Beverages (0.0 percent), in ALL++ (4 percent), in ALL+ (6 percent), and no significant difference in Metals (INDUS VIII) with a positive mean for JVS.

When return on total sales (PROFMG1) is used, we find that the ratio of the mean for LES to the mean for JVS (Mrat percent) is greater than 100 percent in all individual and group industries with the exception of Food and Beverages (INDUS I) and Other Metals (INDUS VIIIoth). Yet, the statistical difference in favour of LES is detected only in Chemicals (5 percent) and in ALL (7 percent).

When average value added per employee (AVA1) is used as a proxy of an establishment's potential growth, the results show that JVS statistically generate more value added per employee than LES at the aggregate level, but there is no statistical significant difference in individual industries. When regional JVS are excluded, the statistical significant difference in favour of JVS is shown in Metals (8 percent), Other Metals (0.0 percent), and all aggregated group industries.

Summing up, we can state that JVS were making a higher return on total fixed assets than LES in Chemicals (INDUS V). This result is expected as JVS in Chemicals (INDUS V) consist of establishments specialising in processing oil and natural gas into petrochemical products. On the other hand, LES are more profitable in terms of PROFRT1 and PUCRT1 in Metals (INDUS VIII) because the mean for JVS in Metals (INDUS VIII) is negative. However, the performance of JVS significantly improves overall after excluding regional JVS. The mean for JVS in Metals (INDUS VIII) turns positive, and JVS statistically become more profitable than LES in terms of PROFRT1 and PUCRT1 in Food and Beverages (INDUS I). Thus, one can conclude that regional JVS are less profitable in terms of PROFRT1 and PUCRT1 than both foreign JVS and LES.

The results of return on total sales (PROFMG1) suggest that LES generate greater profit margins than JVS with the exception of Food and Beverage (INDUS I). These results reflect without doubt the fact that most JVS are export-oriented industries and, consequently, must accept a competitively determined market price, while the majority of LES, which are import-substituting industries, seem to be setting prices much higher than average cost.

Finally, when average value added per employee (AVA1) is used as a proxy of performance and potential growth of establishment, we find that JVS, with or without regional JVS, generate more value added per employee than LES in all individual and group industries. Yet statistical significance shows only at the aggregate level, and in Metals (INDUS VIII) and in Other Metals (INDUS VIIIoth) only after excluding regional JVS.

9.3.2. Trade Performance

The trade performance of JVS and LES is an important dimension of the overall performance of the manufacturing sector and the whole economy.

On the import side, it has been argued that industrial establishments with foreign participation have a higher import propensity than LES. Several reasons have been presented to support this hypothesis, namely; the desire to allow the parent organisation of the foreign partner in JVS to capture suppliers' profits; maintenance of product quality; over-valuation of exchange rates; and the specialisation in products which have a low level of domestic content. Hughes and Song (1969) found that:

> Firms with foreign participation imported 91 percent of their new materials, and the proportion rise to 95 percent for Hong Kong and the US firms which were, however, also the leading exporting, and 94 percent for the UK... locally owned firms imported only 61 percent of the value of their new materials.

Reuber (1973) stated that:

> A higher degree of foreign ownership may be associated with lower purchases from indigenous firms.

Furthermore, Ahia Kapor (1981) observed that:

> The mixed ownership firms were the most import dependent justifying a conclusion that firms with foreign participation tend to be more import dependent.

Import dependency is measured by imported raw materials per unit of output(IMPRTR1) and the share of imported raw materials in total materials used (MIMPRTR1). When IMPRTR1 is used, we find that: JVS are statistically importing more raw materials per unit of output than LES in Chemicals (INDUS V) and at the aggregate level; LES are statistically importing more than JVS in Metals (INDUS VIII) at the 4 percent level, and in Other Metals (INDUS VIIIoth) at the 6 percent level; and there is no statistical significant difference in Food and Beverages (INDUS I). When regional JVS are excluded we notice no significant change in the latter pattern.

When the share of imported raw materials in total materials (MIMPRTR1) is used, we notice that JVS are statistically greater than LES in Food and Beverages (INDUS I) at the 2 percent level, LES are statistically greater than JVS in Chemicals (INDUS V) at the 1 percent, in Metals (INDUS VIII) at the 2 percent, and in Other Metals (INDUS VIIIoth) at the 3 percent level. Yet, there is no significant difference at the aggregate level, with higher means for LES in group ALL+ and group ALL. The exclusion of regional JVS produces no significant change in the previous pattern.

The export beahviour is significntly different between ownership groups as presented in the Table (1A,B). The share of exports in total sales (EXPRTRT1) and export per unit of output (EXPPDRT1) are used to capture the influence of export behaviour. The results show that JVS, with or without regional JVS, are statistially greater than LES in both indicators in all individual and group industries with the exception of Food and Beverages (INUS I) and in Other Metals (INUS VIIIoth). Our results are expected because most JVS are located in export-oriented industries. The absence of a statistically significant difference in Food and Beverages(INDUS I) is due to the fact that most of the output produced by JVS and LES is directed toward domestic consumption.

9.3.3. Employment and Bahrainisation Policy

Employment and the extent of Bahrainisation policy in the manufaturing sector are captured by the following variables: average wage rate (WGRT1), average wage rate per production employee (WGPRT1), share of

Bahraini employees in total employment (BEMPRT1), and the share of Bahraini wages in total wages (BWAGRT1).

When average wage rate (WGRT1) and average wage rate per production employee (WGPRT1) are used, the results show that there is strong statistical evidence that JVS are paying higher wages than their local counterparts. This result is confirmed in all individual and group industries with the exception of Food and Beverages (INDUS I) and Aluminium products (INDUS VIIIAL). When excluding the regional JVS, we notice that JVS become statistically greater than LES for (WGPRT1) in Food and Beverages (INDUS I), with no significant change in the latter pattern.

Concerning the extent of Bahrainisation policy in the manufacturing sector, the results show that JVS are statistically greater than LES for BEMPRTR1 and BWAGRT1 in Chemicals (INDUS V) and at the aggregate level. In addition, JVS are statistically greater than LES for BEMPRTR1 in Metals (INDUS VIII) and Other Metals (INDUS VIIIoth) only at the 7 percent and 8 percent levels, respectively. When excluding the regional JVS, we notice no significant change from the latter pattern with the exception of BEMPRTR1 in Metals (INDUS VIII) and Other Metals (INDUS VIIIoth) showing no significant difference in the former and a statistical difference in favour of LES at the 8 percent level in the latter.

9.3.4. Capital Intensity

Capital intensity in the manufacturing sector of developing countries has been subjected to extensive empirical studies. The available empirical evidences on the relationship between industrial establishments with foreign participation and local establishments on capital intensity are mixed. For example, Riedel (1975), testing the difference between foreign and local firms on capital intensity in Taiwan, found that firms with foreign capital participation are significantly greater than those without it in only one out of six industries (textiles), and a higher capital intensity for local firms in the apparel, metals and electronics industries. In Bahrain, JVS, particularly those that have public sector equity participation, are viewed as a vehicle both for employment generation and the transfer of technology. As a result, it is difficult to state the expected behaviour of JVS regarding the capital-labour ratio.

there are several ways to test the hypothesis that there is difference between JVS and LES on capital intensity in the manufacturing sector in Bahrain. The t-test, which is carried out in this chapter, take the form of testing the equality of means between JVS and LES on the weighted capital-labour ratio. In the next chapter we use discriminant analysis to take account of the effect of other variables on the capital-labour ratio.

The ratio of total fixed assets to total employees (CAPLBRT1) and the ratio of the value of land , buildings and machinery to production employees (TCAPLRT1) are used as indicators of capital intensity. When CAPLABRT1 is used, we find no statistical significant difference between JVS and LES in all individual and group industries with the exception of Chemicals (INDUS V) and group ALL, showing that JVS are more capital intensive than LES at the 8 percent level and the 7 percent level, respectively. When regional JVS are excluded, we find no statistical significant difference in all industries. Using TCAPLRT1 as a proxy for capital intensity, the data show that JVS are statistically more capital intensive than LES in Metals (INDUS VIII) and at the aggregate level. When excluding regional JVS, JVS become statistically more capital intensive than LES only in group ALL+ and group ALL.

9.3.5. Skill Intensity

Another measure to test factor use between JVS and LES in the manufacturing sector is skill intensity. The share of sales and administrative employees (ADEMPRT1) and the share of sales and administrative wages in total wages (ADWAGRT1) have been used to test the hypothesis that there is a difference between JVS and LES on skill intensity.

When ADEMPRT1 is used, we find that JVS are statistically more skill intensive than LES in Metals (INDUS VIII), in Other Metals (INDUS VIIIoth), and in group ALL. Group ALL++, and group ALL+ show statistical differences in favour of JVS only at the 6 percent and 8 percent levels respectively. When regional JVS are excluded, JVS become statistically greater than LES only in Other Metals (INDUS VIIIoth) and in group ALL. Metals (INDUS VIII) and group ALL++ show statistical difference in favour of JVS at the 6 percent and 9 percent levels respectively.

Concerning ADWAGRT1, the data show that there is no statistical difference between JVS and LES in all individual and group industries with the exception of Chemicals (INDUS V), which shows a statistical difference in favour of LES only at the 7 percent level. When excluding regional JVS, JVS become statistically more skill intensive than LES in Metals (INDUS VIII) at the 5 percent level, LES are statistically greater than JVS in the Chemicals (INDUS V) at the 7 percent, and there is no statistical difference in the remaining individual and group industries. When we match the skill intensity difference for ADEMPRT1 with the difference in the capital intensity for TCAPLRT1 between JVS and LES along the individual and group industries, we find some support for the argument of Layard and Walters (1978) that capital intensive technologies require relatively more skilled labour to "manage the machinery" than less skill intensive ones.

9.3.6. Other Ratios

The statistical results of input combination ratios presented in the Tables (1B,2B) can be divided into three broad sets. The first set refers to the statistical results that show LES are statistically greater than JVS on the following variables: total fixed assets per unit of output (CPOUTRT1), paid up capital per unit of output (PUCSR1), rent per unit of output (RNTSART1), total energy cost per unit of output (TENGSR1), production employees to total employees ratio (PRODMRT1), land and building to fixed assets ratio (LANDBRT1), and depreciation per unit of fixed assets (DEPRATE1). The first four variables - CPOUTRT1, PUCSR1, RNTSART1, and TENGSR1 - show statistical difference in favour of LES in Chemicals (INDUS V) (with RNTSART1 and TENGSR1 only at the 8 percent and 10 percent respectively), in all aggregated groups, and only for PUCSR1 in Food&Beverages (INDUS I). PRODMRT1 show statistical difference in Metal (INDUS VIII), in Other Metals (INDUS VIIIoth), group ALL++ and group ALL. LANDBRT1 shows significant difference only in Chemicals (INDUS V) and Aluminium products (INDUS VIIIAL)- with significant difference in favour of JVS in Metals (INDUS VIII) and Other Metals

(INDUS VIIIoth), and DEPRATE1 shows statistical difference only in Metals (INDUS VIII) and Other Metals (INDUS VIIIoth). when regional JVS are excluded, we find that the latter pattern is valid and with additional statistical difference in favour of LES; for CPOUTRT1 in Food&Beverages (INDUS I) at the 8 percent level; for RNTSART1 in Metals (INDUS VIII) at the 1 percent level; and for LANDBRT1 in all individual and group industries with the exception of Other Metals (INDUS VIIIoth) showing no statistical difference. However, DEPRATE1 shows improving difference in favour of JVS with statistical difference in Other Metals (INDUS VIIIoth) at the 10 percent level.

The second set which refers to the statistical results that show JVS are statistically greater than LES, is represented only by materials used per unit of output (MPUSRT1). The data show that JVS, with or without regional JVS, are statistically greater than LES in Chemicals (INDUS V), Aluminium products (INDUS VIIIAL), and all aggregated groups.

The third set refers to other income per unit of output (OTHINSR1) which shows that there is no statistical difference between JVS and LES in all individual and group industries, although LES record higher values of OTHINSR1 than JVS in all aggregated groups and vice versa in all individual industries. With excluding the regional JVS, LES show higher values in all aggregated groups, in Food&Beverages (INDUS I), and in Metals (INDUS VIII).

Summing up, we can state that the results of the first category show that LES have experienced over investment or underutilisation of capital, paying higher rents, higher share of production employees into total employees and consequently lower share of sales and administrative employees into total employees, and higher energy cost per unit of output at the aggregate level cost than JVS. On the other hand, the statistical difference for MPUSRT1 in favour of JVS means that JVS are using higher raw and intermediate materials per unit of output than LES at the aggregate level and Chemicals (INDUS V) and Aluminium products (INDUS VIIIAL). Finally, the variable OTHINSR1 is not a significant measure between ownership groups.

9.4. SUMMARY OF FINDINGS

The behaviour significant difference analysis between joint ventures(JVS) and locally owned establishments (LES) discussed in the preceding section as summarised in Table (3A,3B) and (4A,4B) yields the following observations:

1. JVS have - with or without regional JVS - significantly higher return on total fixed assets (PROFRT1) than LES in Chemical industries.

2. LES have significantly higher PROFRT1 and higher return on paid up capital (PUCRT1) than JVS in Metals industries because mean of JVS is negative. After excluding regional JVS, JVS become higher PROFRT1 and PUCRT1 than LES in Food&Beverages, and group ALL++ industries. In addition, mean values of JVS for both variables turn into positive into Metal industries.

3. LES have significantly higher return on sales (PROFMG1) than JVS - including or excluding regional JVS - in Chemicals and Aluminium products industries. In fact, LES tend to have higher mean values

Table (9.3A): Summary of Significant Differences Between Joint Ventures (JVS) and Local Establishments (LES) in Manufacturing Sector, 1983

INDUS VAR	I	V	VIII	VIIIA1	VIIIoth	ALL++	ALL+	ALL
MIMPRTR1	+	–	–					
PROFRT1		+	–					
PUCRT1			–					
PROFMG1		–		–				––
AVA1						+	+	+
WGRT1		+	+		+	+	+	+
WGPRT1		+	+		+	+	+	+
EXPRTRT1		+	+	+		+	+	+
EXPPDRT1		+	+	+		+	+	+
IMPRTRT1		+	–		––	+	+	+
BEMPRTR1		+	++		++	+	+	+
BWAGRT1		+				+	+	+

Table(9.38): Summary of Significant Difference Between Joint Ventures (JVS) and Local Establishments (LES) - Input Combination, 1983

IND VAR	I	V	VIII	VIII A1	VIIIoth	ALL++	ALL+	ALL
CAPLBRT1			++					++
TCAPLRT1			+		++	+	+	+
ADEMPRT1			+		+	++	++	+
ADWAGRT1			--					
CPOURTR1		-				-	-	-
PUCSR1	-	-				-	-	-
MPUSRT1		+		+	++	+	+	+
RNTSART1		--				-	-	-
TENGSR1		--		++		-	-	--
DEPRATE1			-		-			
OTHINSR1								
RODMRT1			-		-	-		-
LANDBRT1		-	+	-	+			

Table (9.4A): Summary of Significant Difference Between International JVS and LES - Average Performance, 1983

INDUS / VAR	I	V	VIII	VIIA1	VIIIoth	ALL++	ALL+	ALL
MIMPRTR1	+	-	-					
PROFRT1	+	+				+		
PUCRT1	+					+	++	
PROFMG1		-	--	-				--
AVA1			+			+	+	+
WGRT1		+	+		+	+	+	+
WGPRT1	+	+	+		+	+	+	+
EXPRTRT1		+	+	+		+	+	+
EXPPRDT1		+	+	+		+	+	+
IMPRTRT1		+	-			+	+	+
BEMPRT1		+			++	+	+	+
BWAGRT1		+				+	+	+

Table (7.48): Summary of Significant Difference Between International JVS and LES - Input Combination, 1983

INDUS / VAR	I	V	VIII	VIII A1	VIIIoth	ALL++	ALL+	ALL
CAPLBRT1								
TCAPLRT1							+	+
ADEMP1			++		+	++		+
ADWAGRT1		--	+					
CPOUTRT1	--	-	-			-	-	-
PUCSR1	-	-	-			-	-	-
MPUSRT1		+	++	+		+	+	+
RNTSART1		--	-		-	-	-	-
TENGSR1	--	--		++		-	-	-
DEPRATE1					++			
OTHINSR1								
PRODMRT1			-		-	-		-
LANDBRT1	-	-	-	-		-	-	-

Notes:

+ indicates that JVS are greater than LES at the 5% or less significant level

++ indicates that JVS are greater than LES at the significance level (6% - 10%)

- indicates that LES are greater than JVS at the 5% or less significnace level

-- indicates that LES are greater than JVS at the significance level (6% - 10%)

of profit margin than JVS - with or without regional JVS - in all individual and group industries except in Food&Beverages and Other Metals (when regional JVS are included into JVS).

4. JVS have - with or without regional JVS - significantly higher value added per employee (AVA1) than LES at the aggregate level and in Metals (When regional JVS are excluded from JVS).

5. JVS have - including or excluding regional JVS - significantly greater share of exports in total sales (EXPRTRT1) and share of exports in total output (EXPPDRT1) than LES in Chemicals, Metals, Aluminium products and all aggregated group industries.

6. JVS have - with or without regional JVS - statistically higher share of imported materials into total outputs (IMPRTRT1) than LES in Chemicals and all aggregated group industries, but vice versa in Metal industries. On the other hand, LES have significantly higher share of imported materials in total materials used (MIMPRTRT1) than JVS - including or excluding regional JVS - in Chemicals and Metals industries but vice versa in Food&Beverages industries.

7. JVS tend - including or excluding regional JVS - significantly to pay higher wages in Food&Beverages (only on average wages per production employee after excluding regional JVS), Chemicals, Metals, Other Metals, and all aggregated group industries.

8. JVS tend - with or without regional JVS - to have significantly higher share of Bahraini employees into total employment (BEMPRT1) and higher Bahraini wages into total wages (BWAGRT1) than LES in Chemicals and all aggregated group industries.

9. JVS have signifcantly higher capital intensity for land, buildings and machinery to production employees (TCAPLRT1) than LES in Metals and all aggregated group industries. With excluding regional JVS, JVS become signifcantly higher capital intensity only in group ALL+ and group ALL industries.

10. JVS tend to have signifcantly higher skill intensity represented by share of sales and administrative employees into total employment (ADEMPRT1) than LES in Metals, Other Metals, and group ALL industries. With excluding regional JVS, JVs become higher skill intensity only in group ALL industries.

11. JVS tend - with or without regional JVS - to use statistically more materials per unit of output (MPUSRT1) than LES in Chemicals, Aluminium products and all aggregated group industries.

12. LES tend significantly to pay higher rents per unit of output than JVS in all aggregated group industries. With excluding regional JVS, LES pay significantly higher rents per unit of output in Metals, Other Metals, and in all aggregated group industries.

13. LES tend - including or excluding regional JVS - to have significantly higher fixed assets per unit of output (CPOURTR1), paid up capital per unit of output (PUCSR1), and total energy cost per unit of output (TENGSR1) than JVS in Food&Beverages (only for PUCSR1), Chemicals (only for CPOUTR1 and PUCSR1), Metals (for CPOUTRT1 and PUCSR1 only after excluding regional JVS), and all aggregated group industries.

14. Data on the performance and input combination variables, presented

in Tables (3A,3B) and (4A,4B) show that joint ventures tend to be concentrated in industries that have higher value added per employee, higher wage rate, higher exports per unit of output or sales, higher imports per unit of output, higher Bahraini employees to total employees ratio, higher Bahraini wages to total employees wages ratio, higher land, buildings and machinery to production employees ratio and higher imported materials per unit of output.

9.5. DEVELOPMENT IMPLICATIONS

We have developed in Chapter 5 a framework for evaluating the results of our hypotheses tests in terms of their development implication. We have also argued that industrial establishments with the following charateristics are to be examined as promoting or frustrating industrial development and possibly economic development: the appropriateness of capital intensity, appropriateness of skill intensity, choice of trade policy, Bahrainisation policy, and efficiency or potential for faster growth.

The high ratio of total fixed assets to total employees (CAPLBRT1) or high value of land, building and machinery to production employees (TCAPLRT1) as indicators of capital intensity are desirable in Bahrain and other GCC states because it reflects the appropriate choice of techology for an environment where capital is abundant and labour is scarce. By the same token, the high share of sales and administrative employees in total employment (ADEMPRT1) or the share of sales and administrative wages in total wages (ADWAGRT1) as measures of skill intensity are favourable in Bahrain. Indeed, capital and skill intensity of production process are veiwed in Bahrain and other GCC states as a vehicle for the transfer of technology.

The extent of Bahrainisation policy in manufacturing sector is expected to be related to the choice of technology. Bahrain employees are expected to prefer industries which are characterised by their intensive utilisation of capital and modern technology, and hence, offer high skill jobs. Thus, the high share of Bahraini employees in total employment (BEMPRT1) or high share of Bahraini wages in total wages (BWAGRT1) as indicators of Bahrainisation policy are desirable in manufacturing sector.

A high return on total fixed assets (PROFRT1), high return on paid up capital (PUCRT1), and high return on total sales (PROFMG1) can be considered as a direct way of measuring relative potential for industrial establishment's growth. However, these measures of profitability, as we have pointed out earlier, are unreliable due to the lack of standard accounting practices, as the case in most developing countries. Given this limitation, we have used the ratio of total value added to total employees (AVA1), in conjunction with the previous variables, as a proxy of establishment's growth potential. However, value added figures can be subjected to understatement especially in the case of joint ventures which tend to inflate the cost of their imported inputs and consequently lower recorded value added, resulting in transfer pricing.

A high share of exports in total sales (EXPRTRT1) or high export per unit of output (EXPPDRT1) as indicators of the choice of trade policy are preferable in the case of a small-size economy like Bahrain. Indeed, the share of exports in total sales or output reveals the establishment's ability to generate foreign exchange. By the same token, low imported raw materials per unit of output (IMPRTR1) or share of imported raw materials in total materials used (MIMPRTR1) as measures of import dependency and extent of existing linkages in the manufacturing sector.

Based on the framework of evaluation, as discussed in chapter 5, our results are as follows:

1. JVS contribute more to development than LES on account of their significantly higher capital intensity, measured by the ratio of land, building and machinery to employees (TCAPLRT1), in all aggregated group industries and metals. With excluding regional JVS, JVS show a significantly higher capital intensity only in group ALL+ and group ALL industries.

2. JVS show positive contribution by reflecting a higher adaptation to the skill intensity, measured by share of sales and administrative employees in total employment (ADEMPRT1), in the Bahraini economy. In group ALL, Metals and Other Metal products their professional skill mix is significantly higher than those found in LES.

3. JVS show a higher potential for promoting growth by having significantly a higher value added per employee (AVA1) than LES at the aggregate level and in Metal products (only when regional JVS are excluded from JVS).

4. JVS cntribute more to development than LES by having - including or excluding regional JVS - significantly greater share of exports in total sales (EXPRTRT1) and greater share of exports in total output

(EXPPDRT1) in Chemicals, Metals, Aluminium products, and all aggregated group industries.

5. JVS provide a higher contribution to development by tending - including or excluding regional JVS - to pay significantly higher wages than LES in Food and Beverages industry (only on average wages per production employee after excluding regional JVS), Chemicals, Metals, Other Metals, and all aggregated group industries.

6. JVS contribute more to development in employment area and Bahraini welfare by having - with or without regional JVS - significantly higher share of Bahraini employees into total employment and higher Bahraini wages into total wages than LES in Chemicals and all aggregated group industries.

Summing up, we can conclude from our significant results that JVS have more positive developmental contribution than LES regarding the chosen characteristics. It is important to mention that our evaluation of the results should be veiwed within the context of the industrial policy that has been pursued by government in the economy. Although there is a lack of a well-defined industrial policy in Bahrain, the general economic environment can be described as liberal as manifested by the absence of trade restriction and taxation, and the permission of free movement of capital and profits. Indeed, the liberal economic environment and the availability of abundant natural gas with cheap prices have attracted foreign investors through joint ventures into energy intensive industries with export orientation. Thus, these industries are required to employ capital intensive production process and modern technology in order to compete into export markets.

CHAPTER TEN

DISTINGUISHING CHARACTERISTICS OF JOINT VENTURES AND DOMESTIC ESTABLISHMENTS: A DISCRIMINANT ANALYSIS APPROACH

10.1. INTRODUCTION

One technique by which joint ventures (JVS) and local establishments (LES) can be compared in a multivariate context is through the use of discriminant analysis. The first task of discriminant analysis is to find the linear combination of variables (i.e. the discriminant function) that best discriminates between two or more groups of cases. Once the discriminating function has been computed, its coefficient can be used to predict group membership.

In this chapter the objective is to determine whether joint ventures can be distinguished from local establishments, to identify the characteristics that best discriminate between JVS and LES, and to identify JVS misclassified as LES and LES misclassified as JVS and discuss their characteristics.

10.2. VARIABLES AND SAMPLE SIZE

Discriminant analysis is a statistical technique used to distinguish between two or more groups of cases. In this study, the groups are joint ventures (JVS) and local establishments (LES). To distinguish between the two groups one needs to select a collection of discriminating variables that measure characteristics on which the groups are expected to differ. In this study the selected variables are as follows:

1. EXPOPDRT = export orientation
   = export per unit of output

2. BEMPRT = Bahrainisation policy
   = share of Bahraini employees in total employment

3. AVA = Potential growth of the establishment
   = Value added per employee

4. PRODVAL = Size of the establishment
   = Total output in 1983

5. WGRT = Wage rate in the establishment
   = Average wage rate per employee

6. TCAPLRT = Capital intensity of production
   = Ratio of value of land, building and machinery to production employees

7. ADEMPRT = Skill intensity of production
   = Share of sales and administrative employees in total employment

The sample size of joint ventures in the individual industries was relatively small. It was desirable to group the individual industries into different forms of aggregates and run a discrminant analysis at the individual and aggregate level of industries. Part A of Table 9.1 indicates the number of establishments included at the individual and aggregate level of industries. At the aggregate level, the number of establishments included in the analysis in group ALL, group ALL+, and group ALL++ are 78 (59 LES and 19 JVS), 59 (42 LES and 17 JVS), and 58 (42 LES and 16 JVS) respectively. At the individual level, the number of establishments included in the computation are as follows: in Food and Beverages (INDUS I), 17 (13 LES and 4 JVS); Chemicals (INDUS V), 13 (9 LES and 4 JVS); Metals (INDUS VIII), 28 (20 LES and 8 JVS); Aluminium products (INDUS VIIIAL), 8 (4 LES and 4 JVS); and Other Metals (INDUS VIIIoth), 20 (16 LES and 4 JVS).

10.3. STATISTICAL RESULTS

Once the discriminant function, which is a linear combination of the characteristics (variables) that best discriminate between JVS and LES has been derived, it can be used for the purpose of statistical analysis and classification.

10.3.1. Statistical Analysis

Some of the variables listed in the preceding section may contribute little to the the discriminant function, as in multiple regression, and so instead of fitting the function over all the variables, a stepwise technique has been used to identify the set of variables which best discriminate between JVS and LES, that is, the variables in which JVS on average differ most from LES, with greatest weight given to the variables whose means differ the most between the two groups of establishments.

Part C presents the "discriminating' variables selected by the stepwise procedure - based on the minimisation of Wilks'lambda criterion[1]- and their statistics at the last step.[2] The order in which the discriminating variables entered the discriminant analysis is shown by numbers attached to Wilks'lambda for each variable. At the aggregate level, the discriminating variables for group ALL are export orientation(1), skill intensity (2), and wage rate (3); for group ALL+, wage rate (1) and export orientation (2); for group ALL++: export orientation (1), wage rate (2), capital intensity (3), and skill intensity (4). At the individual level, the discriminating variables in Food and Beverages (INDUS I) are the size of establishment (1), export orientation (2); for Chemicals (INDUS V): wage rate (1), Bahrainisation policy (2), export orientation (3); for Metals (INDUS VIII): wage rate (1), export orientation (2); for Aluminium products (INDUS VIIIAL), wage rate is the only discriminating variable; for Other Metals (INDUS VIIIoth): wage rate (1), export orientation (2), and value added per employee (3). These results of step-wise discriminant analysis show that export orientation and wage rate are the best variables to discriminate between JVS and LES. The inclusion of the Bahrainisation policy variable in the model at the second step for the Chemical industry (INDUS V) gives an indication that JVS in Chemicals play an important role in creating jobs for Bahraini employees[3]. It is interesting to note that these JVS also pay higher wages and are export-oriented. There is also evidence that JVS are concentrating in skill and capital intensive industries. Thus, the skill intensity variable enters the model at the second step for the most aggregated group ALL, while in group ALL++, the capital intensity and skill intensity variables enter at the third and fourth step respectively.

To determine the importance of the individual variables we look at the standardised discriminant function coefficients, which are presented in part D.[4] The standardised coefficients are used to determine which variables contribute most to determining scores on the discriminant function. The results recorded in Part D show that wage rate (WGRT) makes the greatest contribution in group ALL+, Chemicals (INDUS V), Metals (INDUS VIII), Aluminium products (INDUS VIIIAL), and Other Metals (INDUS VIIIoth), while export orientation has the highest standardised coefficient in group ALL, group ALL++ and the size variable makes the highest contribution in Food and Beverages (INDUS I).

The results of the standardised discriminant function cefficients are confirmed by the pooled within-group correlation coefficients between the discriminant function and the discriminating variables, as shown in part E.[5] At the aggregate level, export orientation (EXPOPDRT) has the highest correlation with the discriminant function in group ALL and group ALL++ and the second largest correlation in group ALL+. The wage rate (WGRT) variable has the second largest correlation in group ALL and group ALL++ and the highest correlation in group ALL+. Notice that capital intensity (TCAPLRT) has a negative standardised coefficient in the discriminant function but a positive pooled within-group correlation coefficient. This is probably due to the existence of a correlation between capital intensity (TCAPLRT) and value added per employee (0.522).

At the individual level, wage rate (WGRT) has the highest correlation with the discriminant function with the exception of Food and Beverages (the size variable PRODVAL has the highest correlation). The Bahrainisation policy variable (BEMPRT) occupies the second largest correlation in Food and Beverages (INDUS I) and Chemicals (INDUS V). Export orientation has the third largest correlation in Food and Beverages (INDUS I), Chemicals (INDUS V), Metals (INDUS VIII) and Other Metals (INDUS VIIIoth), and the second highest correlation in Aluminium products (INDUS VIIIAL). The negative sign of wage rate (WGRT) and value added per employee (AVA) in Food and Beverages (INDUS I) indicates that low values of wage rate (WGRT) and value added per employee (AVA) increase the probability of observing a local establishment rather than a joint venture. The existence of multicollinearity problems in discriminant analysis make some researchers consider function-variable correlation to be a better guide to the interpretation of the discriminant function than the standardised coefficient [6].

The first conclusion to emerge from the statistical analysis is that the size variable, which is represented by total output (PRODVAL), is not a useful discriminator for this set of data with the exception of Food and Beverges - PRODVAL got the highest standardised coefficient (0.815) and the highest correlation coefficient with the discriminant function (0.829). The results presented in Table 9.1 also show that when individual and aggregated samples are examined, the type of ownership is significantly related to trade policy and wage rate level. Finally, the inclusion of skill intensity and capital intensity variables at the aggregate level(group ALL and group ALL++) indicate that joint ventures are concentrated in skill and capital intensive industries.

10.3.2 Statistical Classification

In the preceding discussion we have dealt mainly with the importance of the discriminant functions and the interpretation of their meanings for explaining group differences. Classification is an aspect of discriminant analysis in which the discriminant functions are used to predict the group to which a case most likely belongs. The classification results are shown in part (H). For each group, the matrix shows the numbers of correctly and incorrectly classified cases. The number of correctly classified establishments appear on the diagonal of the matrix and the overall percentage of cases classified correctly is shown on the bottom line. The percentage of establishments classified correctly is often taken as an index of the effectiveness of the discriminant function[7]. At the aggregate level, the overall percentage of cases classified correctly are: in group ALL, 85.90 percent; group ALL+, 83.05 percent; and in group ALL++, 86.21 percent. At the individual level, the overall percentage of cases classified correctly are as follows: in Food and Beverages (INDUS I), 70.59 percent; Chemicals (INDUS V), 92.31 percent; Metals (INDUS VIII), 92.86 percent; Aluminium products (INDUS VIIIAL), 75.0 percent; and Other Metals (INDUS VIIIoth), 100 percent.

Classification information for each case in a group whose membership is known is shown in Tables (2-9). The column labelled "actual group" indicates the group to which a case actually belongs. The most likely group for a case based on the discriminant analysis - the group with the highest posterior probability - is listed in the column labelled "highest group". The larger posterior probabilities of membership in the two groups P(G/D) follow. When there are only two groups, both probabilities are given since one is the highest and the other is the second highest. Thus, the sum of the two probabilities should equal one because an establishment must be a member of one of the two groups. We can obtain the number of misclassified cases by counting the number of cases with asterisks in the Tables (2-9) in Appendix E.

At the aggregate level, the misclassified cases are as follows: in group ALL, 7 JVS are misclassified in group 1 (LES) and 4 local establishments are misclassified in group 2 (JVS); in group ALL+, 8 JVS are misclassified in group 1 (LES) and 2 local establishments are misclassified in group 2 (JVS); and in group ALL++, 6 JVS are misclassified in group 1 (LES) and 2 local establishments are misclassified in group 2 (JVS). The classification matrix, as shown in part (G), shows that the percentage of cases (establishments) correctly classified is above 83 percent at the aggregate level and 70 percent at the individual level.

When the analysis of misclassified cases at the aggregate level is extended further, we find that the majority of misclassified JVS in each group belong to Food and Beverages; two are regional JVS, one has a foreign partner from a developing country (Pakistan), and one has a foreign partner from a developed country (Denmark). A close examination of their characteristics compared with correctly classified JVS in other industries shows that their output is produced mainly for the domestic market; two of them have no exports, one has a low export volume (less than BD 100,000) and one has a negligible amount of exports. In addition, these JVS pay lower than average wage rates per employee than other correctly classified JVS in manufacturing. Indeed, one of them - a regional public sector JVS - has the lowest wage rate in Food and Beverages and the second lowest in all industries as a whole. It is worth mentioning that this JVS has the highest share of Bahraini employees in total employment (82 percent) in the whole manufacturing sector. Although the wage rate in the international JVS with a foreign partner from Denmark is the highest in Food and Beverages, it is lower than in the correctly classified JVS in other industries. This shows that there is no significant difference between JVS and LES on wage rate (WGRT) in Food and Beverages - all JVS are misclassified in LES. The same results also show that import-substituting JVS industries can not afford to pay wages comparable to the export-oriented JVS industries. The other two misclassified JVS in all aggregated samples, which show similar characteristics to the preceding misclassified JVS on wage rate and export, belong to the aluminium products (VIIIAL) industry and both have foreign partners from developing countries.

On the other hand, four local establishments from the private sector (one in Food and Beverages and three in Chemicals) have been misclassified as JVS in the most aggregated group, ALL. One of the chemicals establishments is misclassified in JVS in all aggregated groups because it has the largest export volume among the local establishments in the manufacturing sector. The three remaining local establishments to be misclassified as JVS have a relatively high skill intensity ratio and pay a high wage rate despite being import-substitution industries. Indeed, the one from Food and Beverages has the highest skill intensity and capital intensity ratios in that industry.

At the individual level, the highest misclassifications between joint ventures and local establishments is to be found in the Food and

Beverages industry. With PRODVAL and EXPOPDRT as discriminating variables, two JVS (one regional and another with a foreign partner from a developing country) are misclassified in group 1 (LES), and three local establishments (one from the private sector, one from the public sector and one a mixed private/public sector establishment) are misclassified in group 2 (JVS). With EXPOPDRT, WGRT and AVA as discriminating variables, Aluminium products (INDUS VIIIA1) experiences the second highest misclassification between LES and JVS, with only two JVS - both with foreign partners from developing countries - misclassified in group 1 (LES). Finally, with WGRT, BEMPRT, and EXPOPDRT as discriminating variables in Chemicals (INDUS V), only one JVS (with a foreign partner from a developed country), is misclassified in group 1 (LES). A close look into the data file of this JVS shows that it has the lowest share of Bahraini employees in total employment and the lowest wage rate and export volume among JVS in the Chemicals industry.

The analysis of misclassified cases is of the utmost importance for policy-makers in Bahrain. The LES which are misclassified as JVS and have the desirable characteristics of JVS such as export-orientation, high skill intensity and high capital intensity should be supported and encouraged, and JVS which behave like LES should be discouraged in so far as they exhibit the disadvantages of JVS, such as leakages of income overseas through repatriated dividends, but only the performance of LES.

10.4. DISCUSSION OF THE RESULTS AND POLICY IMPLICATIONS

The statistical results show that export-orientation and wage rate variables best discriminate between JVS and LES in all aggregated groups and in individual industries with the exception of Food and Beverages (only EXPOPDRT) and Aluminium products (only wage rate). For group ALL and group ALL++ the skill ratio and capital intensity (only for group ALL++) emerged as additional discriminating variables. At the individual level, the size variable (PRODVAL) emerged as the most important discriminating variable in Food and Beverages. The share of Bahraini employees in total employment (BEMPRT) is the second most important discriminating variable in Chemicals, and average value added per employee (AVA) is the third most powerful discriminating variable in Other Metals (INDUS VIIIoth).

Export-orientation and wage rate are the variables which best discriminate between JVS and LES. When the discriminant functions are estimated using a step-wise procedure (in which variables are entered according to their ability to separate the groups) export-orientation was the first variable to be selected in group ALL and group ALL++, the second in group ALL+, Food and Beverages (INDUS I) Metals (INDUS VIII), and Other Metals (INDUS VIIIoth); the third in Chemicals (INDUS V); and was not selected in Aluminium products (INDUS VIIIAL). Wage rate was first in group ALL+, Chemicals (INDUS V), Metals (INDUS VIII), Aluminium products (INDUS VIIIAL), and Other Metals (INDUS VIIIoth); and was not selected in Food and Beverages (INDUS I).

The function-variable correlation results support the above findings. At the aggregate level, export-orientation and wage rate have the highest correlation coefficient in all aggregate groups. At the individual level, wage rate has the highest correlation coefficient in all individual industries except in Food and Beverages (INDUS I), and the export-orientation variable has the second highest in Aluminium products and the third highest in the remaining industries.

Joint ventures are shown to pay higher wages than their local counterparts in the manufacturing sector, with the exception of Food and Beverages. There is some support for the contention that this may be due to the greater skill and capital intensity of their production processes. The skill ratio variable has the second highest correlation with the function in Other Metals (INDUS VIIIoth), the third in group ALL and the fourth in group ALL+, while the capital intensity variable has the fourth highest correlation coefficient with the function in most aggregate groups and individual industries. Other reasons may be the tendency of joint ventures - both foreign-government and foreign-private sector collaboration - to be more strictly policed with respect to existing labour legislation and to pay more attention to labour relations and public image than local establishments, especially small local establishments. Furthermore, private sector employers usually have a higher share of non-Bahraini employees in total employment, who generally receive lower wages and salaries than the indigenous employees, while joint ventures employ a higher share of Bahraini employees in total employment as reflected in the positive correlation of BEMPRT with the discriminant function as shown in Part (D). Consequently, the cost of hiring labour for joint ventures is higher than for local establishments.

The second important finding in our study is that joint ventures tend to be more export-oriented than their counterparts. Bahrain, in fact, does not possess the market potential to attract foreign investment attempting to circumvent trade barriers, as was important in several of the larger developing countries. Instead, the liberal economic policy of the government, which is manifested in the absence of trade restriction and taxation and the free movement of capital and profits, and the existence of abundant and cheap natural gas, have attracted foreign direct investment in export-oriented energy-intensive industries.

These findings have implications for joint ventures in Bahrain. Foreign participation in the manufacturing sector through joint ventures has a greater role than local establishments in introducing skill and capital intensive production processes, in attracting higher Bahraini employees, paying higher wages, and developing and exploiting the economy's comparative advantage within the context of an export-oriented policy. However, the misclassified cases in the classification analysis should give policy makers the raison d'etre for encouraging or discouraging industrial establishments in the manufacturing sector. Thus, in so far as some local establishments are misclassified as JVS and have the desirable characteristics of JVS, policy makers should support these establishments and adopt measures to encourage and induce other LES to become more like them. However, JVS which misclassified as LES and behave like LES should be discouraged in so far as they have the disadvantages of JVS, such as leakeages of income overseas through repatriated dividends, and enjoy tax concessions but only the performance of LES.

Table(10.1A): Summary of Results of Discriminant Analysis at the Aggregate Level

	Variable	Item	ALL	ALL+	ALL++
(A) Sample Size		Own (1)	59	42	42
		(2)	19	17	16
		Total	78	59	58
	EXPOPORT	Mean (1)	0,025	0,034	0,034
		(2)	0,446	0,474	0,409
		S,Dev (1)	0,119	0,141	0,141
		(2)	0,531	0,551	0,497
		Wilks' Lambda	0,698	0,708	0,735
		F ratio	32,90	23,52	20,16
		Significance %	0	0	0
(B) Univarite Statistics	WGRT	Mean (1)	1,847	1,958	1,958
		(2)	3,979	4,033	3,757
		S, Dev (1)	0,935	0,817	0,817
		(2)	2,428	2,478	2,274
		Wilks' Lambda	0,706	0,707	0,737
		F Ratio	31,68	23,66	20,04
		Significance %	0	0	0
	ADEMPRT	Mean (1)	0,116	0,146	0,146
		(2)	0,220	0,217	0,214
		S, Dev (1)	0,118	0,121	0,121
			0,118	0,113	0,115
		Wilks' Lambda	0,871	0,929	0,937
		F Ratio	11,27	4,383	3,743
		Significance %	0	4	6
	TCAPLRT	Mean (1)	11,013	12,522	12,522
		(2)	21,200	20,728	19,524
		S, Dev (1)	20,318	19,546	19,546
		(2)	31,345	32,141	32,797
		Wilks' Lambda	0,965	0,975	0,982
		F Ratio	2,723	1,443	1,000
		Significance %	10	23	32
	BEMPRT	Mean (1)	0,167	0,180	0,180
		(2)	0,360	0,380	0,355
		S, Dev (1)	0,215	0,228	0,228
		(2)	0,299	0,309	0,303
		Wilks' Lambda	0,889	0,884	0,908
		F Ratio	9,497	7,462	5,667
		Significance %	0	1	2

	Variable	Item	ALL	ALL+	ALL++
	AVA	Mean (1)	4,520	4,410	4,410
		(2)	15,173	16,804	16,827
		S. Dev (1)	4,598	4,651	4,651
		(2)	29,208	30,538	31,539
		Wilks' Lambda	0,910	0,895	0,898
		F Ratio	7,475	6,703	6,328
		Significance %	1	1	1
	PRODVAL	Mean (1)	328,263	363,836	363,836
		(2)	47582,895	53163,659	51780,544
		S. Dev (1)	550,010	518,481	518,481
		(2)	176670,100	186546,226	192574,068
		Wilks' Lambda	0,946	0,943	0,948
		F Ratio	4,341	3,454	3,083
		Significance %	4	7	8
C. Discriminating Variables	EXPOPDRT	Wilks' Lambda	(1)0,698	(2)0,644	(1)0,735
		F Value	32,900	15,507	20,157
		Significance	0	0	0
		Partial F	10,109	5,489	8,069
	WGRT	Wilks' Lambda	(3)0,614	(1)0,707	(2)0,658
		F Value	15,533	23,661	14,282
		Significance %	0	0	0
		Partial F	2,462	5,596	4,025
	ADEMPRT	Wilks' Lambda	(2)0,634		(4)0,632
		F Value	21,647		7,719
		Significance %	0		0
		Partial F	2,488		1,019
	TCAPLRT	Wilks' Lambda			(3)0,644
		F Value			9,948
		Significance %			0
		Partial F			1,540
	BEMPRT	Wilks' Lambda			
		F Value			
		Significance %			
		Partial F			
	AVA	Wilks' Lambda			
		F Value			
		Significance %			
		Partial F			

	Variable	Item	ALL	ALL+	ALL++
	PEODVAL	Wilks' Lambda F Value Significance % Partial F			

	Item	Variable	ALL	ALL+	ALL++
(D) Standardized and unstandardized discriminant function coefficients	Standard-ized	EXPOPORT	0,651	0,576	0,685
		WGRT	0,370	0,581	0,546
		ADEMPRT	0,328		0,259
		TCAPLRT			-0,312
		BEMPRT			
		AVA			
		PRODVAL			
	Unstandard-ized	EXPOPORT	2,337	1,825	2,412
		WGRT	0,258	0,391	0,399
		ADEMPRT	2,772		2,176
		TCAPLRT			-0,013
		BEMPRT			
		AVA			
		PRODVAL			
		CONSTANT	-1,298	-1,294	-1,481
(E) Function-Variable Correlation	CORR	EXPOPORT	(1)0,829	(1)0,863	(1)0,786
		WGRT	(2)0,814	(1)0,866	(2)0,784
		ADEMPRT	(3)0,485	(7)0,202	(5)0,339
		TCAPLRT	(4)0,400	(4)0,414	(7)0,175
		BEMPRT	(5)0,377	(5)0,385	(6)0,247
		AVA	(6)0,365	(3)0,425	(4)0,349
		PRODVAL	(7)0,306)	(6)0,384	(3)0,417
(F) Canonical discriminant function - group mean	Group (1)		-0,445	-0,465	-0,463
	Group (2)		1,380	1,150	1,215

	Item	Variable	ALL	ALL+	ALL++
(G) Canonical Discriminant Functions	Function(1)	Eigenvalue	0,630	0,554	0,583
		Cononical CORR	0,622	0,597	0,607
	After Functions (0)	Wilks' Lambda	0,614	0,644	0,632
		Chi-squared	36,387	24,680	24,788
		Significance	0	0	0

	Actual Group	No. of Cases	ALL 1	ALL 2	ALL+ 1	ALL+ 2	ALL++ 1	ALL++ 2
(H) Classifi-cation Results	Group 1		55	4	40	2	40	2
			(93,2%)	(6,8%)	95,2%	(4,8%)	(95,2%)	(4,8%)
	Group 2		7	12	8	9	6	10
			(36,8%)	(63,2%)	(47,1%)	(52,9%)	(37,5%)	(62,5%)
Percent of "Grouped" cases correctly classified			85,90%		83,05%		86,21%	

Table(10.1B): Summary of Results of Discriminant Analysis at the Individual Level

Variable	Item	I	V	VIII	VIIIAL	VIIIoth
(A) Sample Size	Own (1)	13	9	20	4	16
	(2)	4	4	8	4	4
	Total	17	13	28	8	20
(B) EXPOPORT	Mean (1)	0,001	0,096	0,028	0,000	0,035
	(2)	0,008	0,534	0,547	0,537	0,557
	S. Dev (1)	0,005	0,277	0,087	0,000	0,097
	(2)	0,011	0,543	0,530	0,621	0,520
	Wilks' Lambda	0,833	0,739	0,578	0,667	0,522
	F Ratio	3,013	3,890	18,98	2,998	16,51
	Significance %	10	7	0	13	0
WGRT	Mean (1)	2,213	2,251	1,660	1,390	1,727
	(2)	1,664	6,273	3,547	2,853	4,240
	S. Dev (1)	0,564	1,347	0,543	0,297	0,576
	(2)	1,202	2,236	1,464	1,554	1,144
	Wilks' Lambda	0,898	0,397	0,503	0,637	0,306
	F Ratio	1,698	16,69	25,64	3,421	40,82
	Significance %	21	0	0	11	0
ADEMPRT	Mean (1)	0,209	0,204	0,079	0,138	0,064
	(2)	0,188	0,342	0,163	0,135	0,190
	S. Dev (1)	0,120	0,112	0,088	0,113	0,079
	(2)	0,103	0,151	0,039	0,011	0,037
	Wilks' Lambda	0,993	0,761	0,797	0,9997	0,654
	F Ratio	0,107	3,45	6,615	0,002	9,508
	Significance %	75	9	2	97	1
TCAPLRT	Mean (1)	22,863	17,835	3,408	2,038	3,751
	(2)	12,156	40,469	12,735	6,984	18,487
	S. Dev (1)	29,791	14,037	2,637	0,754	2,841
	(2)	8,595	59,653	20,343	8,716	28,309
	Wilks' Lambda	0,969	0,896	0,859	0,824	0,784
	F Ratio	0,484	1,274	4,267	1,278	4,953
	Significance %	50	28	5	30	4
BEMPRT	Mean (1)	0,259	0,187	0,126	0,138	0,123
	(2)	0,433	0,460	0,264	0,185	0,343
	S. Dev (1)	0,346	0,144	0,144	0,255	0,115
	(2)	0,339	0,367	0,265	0,314	0,220
	Wilks' Lambda	0,950	0,734	0,891	0,991	0,689
	F Ratio	0,792	3,991	3,192	0,055	8,138
	Significance %	39	7	9	82	1

Variable	Item	I	V	VIII	VIIIAL	VIIIoth
AVA	Mean (1)	3,661	5,692	4,320	4,565	4,259
	(2)	4,297	47,677	7,667	9,357	5,976
	S, Dev (1)	6,428	5,198	2,834	1,567	3,109
	(2)	5,629	56,253	5,685	6,754	4,707
	Wilks' Lambda	0,998	0,665	0,856	0,758	0,957
	F Ratio	0,031	5,530	4,392	1,911	0,803
	Significance %	86	4	5	22	38
PRODVAL	Mean (1)	521,477	342,778	270,845	459,325	223,725
	(2)	1955,625	200618,850	2273,850	2918,450	1629,250
	S, Dev (1)	803,624	334,541	314,277	274,933	313,288
	(2)	1593,569	382127,671	2686,627	3851,974	946,672
	Wilks' Lambda	0,710	0,798	0,696	0,787	0,397
	F Ratio	6,141	2,789	11,37	1,622	27,35
	Significance %	3	12	0	25	0
(C) EXPOPORT	Wilks' Lambda	(2)0,626	(3)0,278	(2)0,434		(2)0,187
	F Value	4,174	7,778	16,301		37,042
	Significance %	4	1	0		0
	Partial F	1,857	2,279	4,000		11,285
WGRT	Wilks' Lambda		(1)0,397	(1)0,503	(1)0,637	(1)0,306
	F Value		16,691	25,643	3,421	40,821
	Significance %		0	0	11	0
	Partial F		13,269	8,294	3,421	34,861
ADEMPRT	Wilks' Lambda					
	F Value					
	Significance					
	Partial F					
TCAPLRT	Wilks' Lambda					
	F Value					
	Significance					
	Partial F					
BEMPRT	Wilks' Lambda		(2)0,349			
	F Value		9,333			
	Significance		1			
	Partial F		3,452			
AVA	Wilks' Lambda					(3)0,156
	F Value					28,839
	Significance					0
	Partial F					3,134

Variable	Item	I	V	VIII	VIIIAl	VIIIoth
PRODVAL	Wilks' Lambda(1)	0,710				
	F Value	6,141				
	Significance	3				
	Partial F	4,610				

Item	Variable	I	V	VIII	VIIIAL	VIIIoth
(D) Standard-ized	EXPOPORT	0,560	0,710	0,522		0,747
	WGRT		1,599	0,701	1,000	1,003
	ADEMPRT					
	TCAPLRT					
	BEMPRT		-1,298			
	AVA					0,473
	PRODVAL	0,815				
Unstandard-ized	EXPOPORT	87,025	1,925	1,830		3,248
	WGRT		0,976	0,787	0,894	1,426
	ADEMPRT					
	TCAPLRT					
	BEMPRT		-5,702			
	AVA					0,138
	PRODVAL	0,0008				
	CONSTANT	-0,935	-2,303	-2,053	-1,897	-4,265
(E) CORR	EXPOPORT	(3)0,580	(3)0,369	(3)0,748	(2)0,974	(3)0,412
	WGRT	(4)-0,214	(1)0,765	(1)0,870	(1)1,000	(1)0,648
	ADEMPRT	(6)0,075	(7)0,026	(6)0,281	(7)0,164	(2)0,414
	TCAPLRT	(5)0,164	(4)0,314	(4)0,509	(4)0,811	(4)0,329
	BEMPRT	(2)0,581	(2)0,374	(5)0,472	(6)0,391	(6)0,235
	AVA	(3)-0,240	(5)0,257	(7)0,222	(3)0,864	(7)0,091
	PRODVAL	(1)0,829	(6)0,098	(2)0,478	(5)0,699	(5)0,301
(F) Group (1)		-0,402	-0,987	-0,696	-0,654	-1,103
Group (2)		1,308	2,222	1,740	0,654	4,412

(G) Function (1)	Eigenvalue	0,596	2,593	1,304	0,570	5,407
	Canonical CORR	0,611	0,849	0,752	0,603	0,919
After Function (0)	Wilks' Lambda	0,626	0,278	0,434	0,637	0,156
	Chi-Squared	6,548	12,149	20,867	2,481	30,648
	Significance %	4	1	0	12	0

	Actual Group	I		V		VIII		VIIIAL		VIIIoth	
		1	2	1	2	1	2	1	2	1	2
(H)	Group 1	10	3	9	0	20	0	4	0	16	0
	%	(76,9)	(23,1)	(100,0)	(0,0)	(100,0)	(0,0)	(100,0)	(0,0)	(100,0)	(0,0)
	Group 2	2	2	1	3	2	6	2	2	0	4
	%	(50,0)	(50,0)	(25,0)	(75,0)	(25,0)	(75,0)	(50,0)	(50,0)	(0,0)	(100,0)

	I	V	VIII	VIIIAL	VIIIoth
Percent of "Grouped cases correctly classified %	70,59	92,31	92,86	75,00	100,00

NOTES

1. The industries I, V, and VIII refer to Food and Beverages, Chemicals, and Metal Products respectively.

2. The group VIIIAL refers to Aluminium Products, while group VIIIOth refers to Other Metals. Hence, the group VIII consists of VIIIAL and VIIIOth.

3. The group ALL++ consists of industries I, V and VIII.

4. The group ALL+ consists of industries I, V, VII and VIII, that is, the joint venture establishment in Basic Metal (aluminium) is added to group ALL+.

5. The group ALL consists of industries I, III, IV, V, VII, and VIII, that is, wood Products and Furniture (III) and Paper Products and Printing (IV) are added to group ALL.

NOTES

[1] Wilks' lambda - sometimes called the U statistic - is defined as the ratio of the within-group sum of squares to the total sum of squares.

[2] Part (C) presents the following statistics : Wilks' lambda, its F-test, which is the multivariate significance test for group differences of the model, and partial F (F - to - remove), which tests for the significance of the decrease in discrimination should that variable be removed from the list of variables already selected. The partial F statistics, at the last step, refers to the rank order of the unique discriminating power carried by each of the selected variables. Thus, the variable with the highest partial F makes the largest contribution of overall discrimination in comparison with the other variables, and the variable with the second largest partial F makes the second most contribution, and so forth.

[3] Part (F) shows the average score for JVS and LES. On the average, local establishments have smaller discriminant function scores than joint ventures. At the aggregate level, the average values for local establishments in group ALL is -0.445; for group ALL+ -0.465; for groups ALL++ -0.463, whereas the average vlaue for group 2 in the same groups are 1.380, 1.150, and 1.215 respectively. At the individual level, the average value for local establishments in Food and Beverages is -0.402; for Chemicals -0.987; for Metals 0.696; for Aluminium Products -0.654; and for Other Metals -1.103, whereas the average values for the joint ventures in these industries are : Food and Beverages 1.308; Chemicals

2.222, Metals 1.740; Aluminium Products 0.654; and Other Metals 4.412.

[4] Part (D) contains the standardised and unstandardised discriminant function coefficients. The unstandardised coefficients tell us the absolute contribution of a variable in determining the discriminant score. However, this information is misleading when a variable differs in the units and standard deviation in which it is measured. If we want to know the relative importance of the variable we need to look at the standardised coefficients. The standardised coefficients are used when the variables are standardised to a mean 0 and a standard deviation of 1. The standardised coefficients are used to determine which variables contribute most to determining scores on the function. Furthermore, these coefficients are used to compute the positions of the data cases in the discriminant space.

[5] The correlation can be calculated for all establishments and the result is called the total coefficient matrix. A separate correlation can be computed for each group and the results combined into a pooled within-group correlation matrix. Part (E) shows the pooled within - group correlation coefficients between the discriminant function and the discriminating variables.

[6] William R. Klecka (1980) <u>Discriminant Analysis</u> (Beverly Hills : Sage Publications) p.34.

[7] For evaluating the effectiveness of the discriminant function, it is important to compare the observed misclassification rate to that expected by chance alone. Thus, if there are two groups with equal prior probabilities, as in our case, an expected misclassification rate

by chance is 50 percent.

CHAPTER ELEVEN

INDUSTRIAL JOINT VENTURES: A CASE STUDY APPROACH

11.1. INTRODUCTION

The 1980s have seen a global liberalisation in the attitude of host governments toward foreign investors, a growth in the popularity of export-oriented strategies in many developing countries, and abrupt movements in energy prices which have altered traditional patterns of factor usage in some industries. These events have led economists to renew their interest in the theory of comparative advantage.[1] The theory of comparative advantage provides a framework to examine the interrelationship between relative costs and factor abundance and the locational determinants of economic activity. However, the concept of comparative advantage is subject to various qualifications. First, in the neoclassical (Hecksher-Ohlin) tradition, only two factors of production, namely labour and capital are considered. In this study several inputs, including energy, raw materials and labour are relevant to the discussion of comparative advantage. Second, the theory of comparative advantage treats level of production as divisible. This indicates that economies of scale are minimal or not appropriate. However, economies of scale is an important issue in establishing industrial enterprises, especially processing industries. Third, production technologies are assumed to be identical in different countries. The participation of multinationals in industrial establishments through joint ventures in developing countries would suggest that technologies in use may be similar regardless of location. However, it is sometimes difficult to modernise production operations as soon as new technologies become available. Despite these qualifications, the theory of comparative advantage can still sheds some light on the relation between relative costs and factor endowments. This requires information about cost strucure.[2]

The technical coefficient, an economic concept borrowed from input-output analysis, will be used to refer to the cost structure and consequently comparative advantage. In general, the technical coefficient is the amount of inputs required for each industry to produce one Bahraini Dinar worth of the output of a given industry. Technical coefficients are calculated for processing industries only and may be expressed either in monetary or physical terms. Furthermore, technical inputs coefficients may be extended to refer to other cost items. Wassily leontief has noted that:

> The technical structure of each industry can be described by a series of technical input coefficients - one for each separate cost element.[3]

Thus labour input coefficient, which is labour input in physical terms per unit of output, will be estimated. Moreover, other input coefficients, such as raw materials and energy inputs, will also be estimated.

This chapter adopts a case-study approach to asses selected international and regional joint ventures in the manufacturing sector of Bahrain. The case study will include the historical background, the shareholding and the role of the foreign partner or regional partner in the formation of joint ventures, the production processes and technical know-how employed, and the cost structure as an indicator of comparative advantage.

11.2. THE OIL AND NATURAL GAS SECTOR

11.2.1. Introduction

The oil and natural gas industry in Bahrain has been extremely important to the country's economy, contributing about two-thirds of government revenues, more than 80 percent of export earnings, and about 5,000 jobs and the indirect stimulus to a variety of economic activities in the country. However, Bahrain's oil onshore output has never been large and now amounts to less than one thousandth of world production , and its half share of Abu-safa production - shared and operated by Saudi Arabia - is only slightly greater.[4] Although not a member of the Organisation of Petroleum Exporting Countries (OPEC), Bahrain is a member of the Organisation of Arab Petroleum Exporting Countries (OAPEC). Pricing and participation policies have generally been in accord with the OPEC pattern, although Bahrain enjoys the freedom to produce as much oil as it wishes.

11.2.2. HISTORICAL BACKGROUND

In 1932 Bahrain became the first country on the Arabian side of the Gulf to produce oil, and also the first to refine oil in 1936. The Bahrain Petroleum Company (BAPCO), which was formed in 1929 and incorporated in Canada as a subsidiary of Standard Oil of California, played a major role in the discovery of oil in Bahrain and in the later discovery of oil in Saudi Arabia.

The origins of BAPCO can be traced to December 2, 1925 when oil concessionary rights were granted to the British owned Easter and General Syndicate Ltd., through a New Zealander, Major Frank Holmes. In November 1927, the Syndicate sold the option to the US-owned Eastern Gulf Oil Company, a subsidiary of the Gulf Oil Corporation. Shortly afterwards Gulf Oil sold its option to the American-owned Standard Oil of California, the parent of the Bahrain Petroleum Company (BAPCO). BAPCO started drilling operations in October 1931 and by May 31, 1932 oil was found in the first well, although this was not sufficient for commercial exploitation. On Christmas Day of the same year oil was struck in commercial quantities at Well No.2. The significance of the Bahrain discovery was thus described by Ward:

> The finding of oil in Bahrain marked a vital change in the outlook for oil over the entire (Persian) Gulf areas. It stimulated other activities particularly in the mainland areas. The oil producing zones of Bahrain found in the discovery well proved to be dissimilar to those of Iran and Iraq... The Bahrain oil discovery led directly to the oil developments of Saudi Arabia, the neutral Zone, Qatar and Kuwait, and the discovery sustained the conclusions of the Gulf Company geologists that the possibility of finding oil in commercial quantities in Kuwait was very much brighter.[5]

The first oil exported was in 1934. On December 29, 1934,the mining lease of Bahrain oil concession, which replaced the earlier one obtained by Holmes in December 1925, was signed.

In July 1936, SOCAL entered into an agreement with the Texas Oil Company (TEXACO) which gave it access to the marketing facilities of TEXACO in return for a 50 percent stake in BAPCO. CALTEX became the owner of BAPCO which operated the Bahrain concession. The new partnership resulted in the formation of a subsidiary company, CALTEX. Ward attributes the success of CALTEX to its Bahrain operation.

> Beginning with Bahrain, what is now known as the CALTEX Group of companies has grown into a worldwide overseas organisation and has become one of the most efficiently managed major operations with production not only from Bahrain and Saudi Arabia but also from Indonesia. CALTEX executives have carried Bahrain experience around the world.[6]

In early 1936, construction work began on the Bahrain refinery and it was completed by December 1937. On June 19, 1940 supplemented agreements were concluded which extended the concessions to cover all Bahrain's land and some shore areas until Dececmber 31, 2024. The offshore areas are held by American-owned Superior Oil on a 35-year lease with a yearly rental.[7] In 1945, a 34-mile pipeline, about 24 miles of which were submerged, was laid to carry crude oil direct from the Saudi fields to the Bahraini refinery.

Crude production from Bahrain's onshore fields increased from 31,000 barrels in 1933 to 7 million in 1940, 11 milion in 1950, 16.5 million in 1960, and 28 million in 1970. However, crude oil production has been declining since 1970. From a peak of 28 million barrels in that year (equal to 76,000 b/d), it fell to about 16 million barrels (44,000 b/d) in 1982. The main reason for this downward trend was the ageing of existing fields while no new fields came into operation.[8] The prospects of additional major discoveries in Bahrain's onshore area are poor. However, the offshore areas are believed to be more promising, even though no discoveries have yet been realised.

11.2.3. Shareholding

The governement of Bahrain has gradually taken over the control of oil and gas exploration and production. In September 1974, the Bahrain government announced the purchase of 60 percent of BAPCO's share, and on June 30, 1975, an agreement was concluded between the state of Bahrain and BAPCO giving Bahrain a 60 percent share of BAPCO's rights in the production and exploration oil concession in Bahrain excluding refinery operations. The state of Bahrain also acquired 100 percent of future gas discoveries. The decision took effect starting January 1, 1974. In February 1976, the Bahrain National Petroleum Company (BANOCO), founded by an Amiri Decree, was entrusted with the responsibility of protecting the interests of the government in the fields of oil and gas. In addition, BANOCO was entrusted with distribution and marketing for the domestic market of oil products, namely car petrol, kerosene and diesel fuel (excluding jet fuels storage and aircraft supplies). BANOCO is the youngest state oil company in the Gulf, though Bahrain ranks as one of the oldest oil producers.[9] On Dececmber 15, 1979, an agreement giving the Bahrain governemt full control of the country's oil and gas exploration and production was signed by the Minister of Development and Industry and the president of CALTEX. The CALTEX company was to be compensated for its 40 percent share in BAPCO on the basis of the book value as on Dececmber 31,1978.

On the other hand, oil refining and exports and marketing of oil refined products remained in the hands of CALTEX's subsidiary in Bahrain until the early 1980s. On July 1, 1980 the government owned 60 percent of the shares of Bahrain Petroleum Company (BAPCO) refinery, with CALTEX holding the remaining 40 percent. In 1983, the Supreme Oil Council decided to integrate the international marketing of oil products into BANOCO. This was previously done through the Petroleum Marketing Unit (PMU) within the Ministry of Devlepment and Industry. In addition, under the termination of the marketing arrangement (buyback) with CALTEX at the end of 1983 - whereby CALTEX arranged marketing on behalf of the government of approximately 25,000 barrels per day of refined products - all sales of refined products are directly concluded now by BANOCO through long and short term sales contracts. On July 1, 1984 BANOCO managed 60 percent of aviation activities at Bahrain International Airport, with multinationals holding the remaining 40 percent.[10] Thus, during 1979-1984 the government completed the process of acquiring control over the oil and gas industry. The current organisational structure of the oil and natural gas sector consists of the following entities: the Bahrain National Oil Company(BANOCO), which is responsible for exploration, production from onshore fields and the domestic marketing of refined products; the Bahrain Petroleum Company (BAPCO), with responsibility for refinery operation; the Bahrain National Gas Company (BANAGAS), which is responsible for gas extraction and the operation of the natural gas liquid (NGL) plant; and the Gulf Petrochemical Industries Company (GPIC), which aims to utilise Bahrain's natural gas for the production of basic petrochemical products. The Supreme Oil Council, which is headed by the Prime Minister and composed of the Ministers from Foreign Affairs, Development and Industry, Finance and Economy, Public Works, Electricity and Water, and Labour and Social Services operates as the policy making and supervisory body for the oil and natural gas sector.

11.2.4. Oil Refining

11.2.4.1. Introduction

Bahrain's oil refinery is one of the oldest in the Gulf region. Oil refining began in 1936 with 10,800 barrels per day (b/d), which grew into 250,000 b/d in the early 1970s. The entire crude production of Bahrain is processed at this refinery. Domestic crude, however, presently represents less than 20 percent of the total crude feedstock, the remaining being supplied by Saudi Arabia via a 34-mile Arabian-Bahrain pipline. CALTEX is a major shareholder in the Arabian-American Oil Company (ARAMCO) in Saudi Arabia and allocates part of its share of Aramco's crude oil for processing in Bahrain.

The BAPCO refinery's costs include crude oil imports from Saudi Arabia (on 30-day credit terms). The implicit average import price seems high compared with the posted price for Arabian light.[11] This may indicate the existence of some sort of manipulated transfer price. Concerning local inputs, BAPCO purchases crude oil from the government (also on 30-day credit terms) and some naphtha from BANAGAS. On the other hand, BAPCO's output is exported on 60-day credit terms, and a smaller quantity is sold locally. The oil refinery, which is an export refinery based on imported crude oil, has adversely been affected by changes in the oil products market. Thus, the excess supply of oil on the world market and the high cost of crude imported by Bahrain, relative to the cost of crude oil available to other refineries, caused difficulties in marketing the refined products in 1983.[12] The refinery's petroleum products declined from 86,253 thousand barrels in 1973 to 63,787 thousand barrels in 1983. Further, the Bahrain refinery lost $28 million in 1985. As a result, the refinery pursued rationalisation measures aimed at restoring profitability by the late 1980s.[13] In addition, BAPCO has been looking at ways for product upgrading. The new programme of modernisation is expected to make the refinery produce more lighter grade fuel - kerosene, gasolene and diesel- and less heavy fuel oil . In 1980, BAPCO spent $22.8 million on modernisation and a similar amount in 1989. However, an additional $500 million refinery modernisation was postponed because of the negative employment implication of the new investment. The oil refinery, which is grossly overmanned, employs about 3,000 employees, 87 percent of whom are Bahraini nationals. The implementation of the new programme would make the refinery highly automated and will present far fewer employment possibilities. It is understood, however, that CALTEX was keen to press ahead but the government has reserved judgement on a final decision.[14]

11.2.4.2. Technical coefficients

In 1983 BAPCO produced 63,787 thousand barrels, which consisted of a wide range of finished petroleum products,including LPG, gasolene, naphthas, jet fuels, kerosene,gas oil, fuel oil, marine bunkers and asphalt.

The major component of production costs is crude oil, which represents the major cost of intermediate inputs. Table 11.1 exhibits that intermediate inputs represented 90 percent of the value of output, while value added accounted for the remaining 10 percent. The table also shows that crude oil represented 89 percent of one Bahraini Dinar worth of refined products, the other items of intermediate inputs are not sig-

Table(11.1): The Technical Coefficient in the Refining Industry, Bahrain (1983)

Intermediate Input	Value in BD	Technical Coefficient
I RAW MATERIALS		
1. Crude Oil & Chemical Materials	690,501,978	0.89269
II ENERGY	4,449,171	0.00575
1. Electricity	459	0.00000
2. Natural Gas	3,910,617	0.00506
3. Benzene	99,566	0.00013
4. Kerosene	11,088	0.00001
5. Diesel	245,914	0.00032
6. Lubricants & Other Fuels	181,527	0.00023
III OTHER EXPENSES	3,745,856	0.00484
1. Maintenance Expenses	3,434,207	0.00444
2. Printing & Stationery	167,147	0.00022
3. Communication	144,502	0.00019
Total Intermediate Input	698,697,005	0.90328
Value Added	74,811,067	0.09672
Value of Output	773,508,072	1.00000

Source: Bahrain Centre for Studies and Research, Industrial Survey 1983.

nificant. Thus, one can argue that the key factor in oil refining industry is the price of crude oil.

The oil refinery is a major employer in the economy. It employed 4,226 employees in 1983 and its total labour costs, which consist of wages, salaries and social benefits, were BD 32,539 thousand.

11.2.5. Gas Liquefaction

11.2.5.1. Introduction

The Bahrain National Gas Company (BANAGAS) was established in 1979. The authorised and paid up capital of BANAGAS's equity was BD 8 million. The government owned 75 percent of the shares, with CALTEX (US) holding 12.5 percent, and the Arab Petroleum Investment Company the remaining 12.5 percent. The production of BANAGAS started in 1980 with the capacity to produce propane and butane totalling 1.8 million barrels per year for export and 1.2 millon barrels per year of naphtha for the refinery from roughly 30 billion cubic feet of associated gas. After the natural gas is stripped of its liquids, residual dry gas from the plant is piped to the aluminium smelter. The propane and butane are marketed through CALTEX affiliates, mainly in Japan, while naphtha is used as a blending stock in the refinery.[15] In 1987, The government announced a scheme, costing $65 million, which would double the production capacity of liquid petroleum gas (LPG).

11.2.5.2. Technical Coefficients

The cost of intermediate inputs represents a very small share, accounting for 2.9 percent of one Bahraini Dinar worth of output (LPG) as shown in Table 11.2. The data show that intermediate inputs did not include the cost of the associated gas. Natural gas is made available free of charge from BANOCO. Natural gas liquids are removed from the gas and the dry gas is returned to BANOCO. One can argue that BANOCO assumed that the price of associated gas was zero, because whatever amount not used was simply burned out in the gas fields. In other words, the opportunity cost of associated gas was assumed to be zero. Thus, this BANAGAS plant has given this type of natural gas (associated gas) an economic value. The data also show that LPG production could be divided into 3 percent intermediate inputs and 97 percent value added. Thus, the gas Liquefaction project (BANAGAS) has the highest value added to output value ratio in the manufacturing sector in Bahrain. BANAGAS employed 201 employees in 1983, and its total labour cost was BD 1,516971.

11.2.6. Conclusion

Industrialisation has been initiated by the multinational oil companies, which in 1932 discovered oil and in 1936 established an export-oriented oil refinery. However, the government of Bahrain, like governments of other developing countries has sought to increase its share of revenues from the multinational CALTEX involved in oil extraction. on the basis of "returned value", which refers to the proportion of the value of final output retained in the host country. Gradually, this returned value has increased, due first to direct and indirect taxes on the multinational-owned subsidiary (CALTEX) and later to the establishment of a joint venture (BANOCO) with the multinational subsidiary (CALTEX). Gradually, the desire of the government extended the extraction

Table(11.2): The Technical Coefficient in Gas Liquefaction, Bahrain (1983)

Intermediate Inputs	Value in BD	Technical Coefficient
I RAW MATERIALS	302,274	0.01112
1. Chemical Materials	45,752	0.00168
2. Electrical Materials	4,494	0.00017
3. Pumping & Pressure Mats.	84,085	0.00309
4. Gaseous Materials	28,322	0.00104
5. Purification Materials	14,947	0.00055
6. Other Materials	124,674	0.00458
II ENERGY	342,268	0.01259
1. Water	2,677	0.00010
2. Electricity	304,528	0.01120
3. Benzene	6,336	0.00023
4. Lubricants & Others	28,727	0.00106
III OTHER EXPENSES	155,115	0.00570
1. Maintenance Expenses	123,000	0.00452
2. Printing & Stationery	14,651	0.00054
3. Communication	17,464	0.00064
Total Intermediate Input	799,657	0.02941
Value Added	26,394,343	0.970594
Value of Output	27,194,000	1.00000

Source: Bahrain Centre for Studies and Research, Industrial Survey, 1983.

phase to include domestic processing of natural resources (oil refinary and gas liquefaction) through the formation of joint ventures with the same subsidiary of CALTEX

11.3. THE BAHRAIN ALUMINIUM SMELTER (ALBA)

11.3.1. Historical Background

ALBA was the first major non-oil industrial joint venture in Bahrain. Indeed, it was one of the handful of large scale non-oil industrial projects in the Arab Gulf region completed before the 1973-1974 oil shock. The smelter, which is a primary smelting company producing high-grade metal, has had considerable impact on the economy of Bahrain: diversifying the country's earning base, spawning a range of downstream industries, and providing employment and skills for its nationals.

The origins of ALBA can be traced to the mid 1960s. Faced with the stagnation in the oil prices and the prospect of unemployment and redundancy, the government of Bahrain decided to diversify and to industrialise. By chance, words were received of a group of international aluminium users which had come together to build a smelter in order to secure their own source of aluminium. This group investigated several sites in the world, including Bahrain. The island was found to be well placed geographically between the source of raw materials, particularly alumina from Australia and the market of finished aluminium in Europe and America. But perhaps its major advantage was the availability of plentiful supplies of natural gas in order to meet the high energy requirement of aluminium smelting. Feasibility studies suggested that the cheap energy availability to Gulf smelters could more than offset disadvantages of high capital and shipment costs. Bahrain possessed an additional advantage when the smelter was established beacause of its cheap labour; the project was a labour-intensive plant with a permanent work force of 3,000.[16]

Aluminium Bahrain (ALBA) was incorporated as a company by a charter of the Amir of Bahrain on August 9th, 1968. The smelter commenced operations in May 1971 when the first metal was poured. Since that time, ALBA has grown to become one of Bahrain's largest non-oil industrial undertakings.

11.3.2. Shareholding

At the outset the shareholders of the project suggested that the government should take a stake in the proposed aluminium smelter in order to enhance the scheme, a suggestion which the government accepted with great reluctance. Government involvement was required by foreign shareholders because the scale of investment and risk associated with it was too great for them to bear. The Minister of Development and Industry described the situation during that period:

> The European had a problem. They were so disturbed about the situation in the Middle East that they were hesitant to commit themselves and give guarantee that the Hormuz strait would not be closed. If it were, they asked that they would automatically be relieved of the guarantees.[17]

The first syndicate was formed with the government having a major share in the venture: the Bahrain government held 27.5 percent, sweden's Electrokopper 25.0 percent, British Metal 25.0 percent, Western Metals 12.5 percent, and Aurora 10.0 percent. The board of directors, formed on September 13, 1968, included two officials representing the Bahrain government and two officials from each shareholder, with the chairmanship assigned to the representative of Aurora company. On January 23, 1969, a construction contract was awarded to a British consortium whose shareholders comprised Wimpey, Amari, and John Brown Engineering.

In early 1969 it was decided to raise additional capital to increase the capacity of the smelter from 56,000 tonnes per annum to 90,000 tonnes per annum. The structure of new shareholding looked as follows: Bahrain government 20 percent, Electrokopper 18 percent, British Metal 18 percent, General Cable 18 percent, Breton investment 10 percent, Western Metals 9 percent, and Aurora 7 percent. In January 1971, a third expansion was proposed which raised capacity to 120,000 tonnes per annum. To fund this expansion additional capital was raised in May 1971 in proportion to existing participants' shareholdings. However, Aurora decided to "sell out" and the American firm Kaiser Aluminium took a 17 percent share in the company, resulting in the following equity structure: Bahrain government 19 percent, General Cable 17 percent, British Metal 17 percent, Kaiser Aluminium 17 percent, Electrokopper 12 percent, Breton Investment 9.5 percent, and Western Metals 8.5 percent.

During the following years, the number of shareholders declined for various reasons, including the persistent losses incurred by ALBA through the fluctuating aluminium market of 1970s. Indeed, ALBA, which started production in 1971 remained unprofitable until 1979. General Cable was the second company to withdraw in 1974 after stating that:

> It was inconsistent with their corporate strategy to participate in the capital intensive primary aluminium business.[18]

The shares were subsequently purchased by the Bahrain government, as were Electrokopper's in 1975 and British Metal and Western Metal shares in 1976. As part of the funding operation for the expansion project, a 20 percent stake was sold to the Saudi Arabia state Controlled company SABIC in 1979. The entry of the Saudi Arabian government helped the Bahraini government to accommodate the withdrawal of the foreign companies. The Saudi participation was made through the abandonment by Saudia Arabia of a project to set up an aluminium smelter in the Jubail area in the eastern region of Saudi Arabia. This protected the Bahrain smelter (ALBA) from the risk competition from another aluminium complex in addition to one at Jebel Ali in Dubai in the United Arab Emirates. A 50 percent rise in the free market price of aluminium between July 1979 and Febrauary 1980 encouraged ALBA to expand its capacity to 170,000 tonnes by 1981.

At present ALBA produces about 180,000 tonnes of aluminium per year. ALBA is planning two ambitious major expansions and a modernisation programme which will enable the plant to turn out 460,000 tonnes a year by mid 1992, which will make ALBA the biggest single smelter in the non-communist world.[19] However, these ambitious plans seemed to cause the US Kaiser Aluminium partner to withdraw. In July 1989, the Bahrain government bought out Kaiser Aluminium's 17 percent share in ALBA for BD 28 million.[20] The Bahraini government now have a 74.9 percent share in ALBA, the Saudi Arabia (SABIC) 20 percent, and Breton Investment 5.1 percent.

Summing up, ALBA started with majority multinationals participation, but losses in the 1970s and ambitious plans for expansion caused the multinationals' share to become a small minority.

11.3.3. The Production process

The production of aluminium is based on the electrolysis of alumina solution in molten cryolite. The reduction is undertaken in a series of electrolytic cells called potlines. The technlogy of the smelting process used by ALBA to produce aluminium is known as electrolytic reduction and, with the exception of a few variations, is the same method discovered by Heroult and, Hall in 1886. Using the Hall-Heroult electrolytic process, primary aluminium metal is produced from alumina at a ratio of 1 to 1.95. The main raw materials used by ALBA in the aluminium smelting process are: alumina from Western Australia; petroleum coke from the USA; bulk pitch from Germany, France and Australia, cryolite from the USA and Italy, and fluoride from Japan and Italy. For one year's production of 170,000 tonnes, ALBA needs to import approximately 333,000 tonnes of alumina, 64,000 tonnes of petroleum coke, 15,500 tonnes of pitch, 6,000 tonnes of aluminium flouride and 2,400 tonnes of cryolite. To provide the electricity required in the reduction process, ALBA has its own power station. Twenty-four gas turbines from the company's power complex use over four million cubic meters of gas per day, 365 days a year, giving a rate generating capacity of 480MW, almost as much as the peak demand of the rest of Bahrain.[21] ALBA produces five types of aluminium: standard ingot used for re-smelting; the T-ingot, a larger version of the standard ingot; the extrusion billet, which is used for the extrusion of aluminium profiles, e.g. window frames and structural supports; and rolling ingots or slabs, used in rolling mills for plates, sheet and foil production.

Table 11.3 presents ALBA output by type in 1983 and 1984.

As the data show, standard ingots represent the main output, accounting for more than 66 percent of the total production.

Bahrain's aluminium smelter started production in 1971 and remained unprofitable until 1979. The Bahrain smelter was initially poorly constructed by a combination of inexperienced contractors, workers and investors.[22] Indeed, the absence of proper safety precautions had resulted in a high number of accidents. Emile Nakhleh discussed the safety conditions of ALBA as follows:

> The absence of proper safety precautions has been one of the major difficulties of ALBA. An inspection team from the parent Kaiser company visited ALBA early in 1973 and was appalled by safety conditions at the smelter. The team recommended that safety should be urgently improved and considered a priority issue. The team's confidential report inferred that the poor safety conditions at ALBA would never be tolerated in any western industrial country with the most elemental safety inspection laws. Accordingly the ALBA management immmediately began to strengthen its accident units, and a new program of safety awareness and measures were introduced.[23]

Thus, the emphasis during its first difficulty operating decade was on improving the technical design of the smelter. In 1979, Saudi Arabia (SABIC) took a 20 percent stake to fund an expansion programme to increase plant capacity to 170,000 tonnes at a cost of just over \$ 2,000 per tonne compared with \$ 3,000 per tonne for new (greenfield) capacity built in industrial countries. In adtition, there was a reduction in overhead cost and no increase of labour costs, resulting in declining operating costs.[24]

ALBA is planning an ambitious scheme consisting of two expansion projects and a modernisation programme, which will result in increasing

Table (11.3): ALBA Output by Type in 1983 and 1985

Type	1983 Quantity (tons)	1983 %	1985 Quantity (tons)	1985 %
Standard Ingots	119,850	69.8	116,116	66.5
T-Ingots	13,747	8.0	2,024	1.2
Extrusion Billets	5,396	3.1	37,903	21.7
Rolling Ingots	16,289	9.5	3,571	2.0
Liquid Metal	16,412	9.6	15,117	8.7
Total	171,694	100.0	174,731	100.0

Source: Bahrain Centre for Studies and Research.

the plant's output to 460,000 tonnes per year by mid-1992. The first expansion, which is minor, is underway and will increase production by 25,000 tonnes per year and is expected to complete within one year. The second expansion, which will cost $1.3 billion, is expected to allow ALBA to produce an extra 235,000 tonnes per year. The consulting engineers for this scheme are a joint venture of the US Bechtel and Canada's Lavalin, while the technology supplier is Pechinery of France. The third programme, which will cost $ 120 million, called the retrofit programme, involves modernising four of the six potrooms by using computerising operations which will increase production by 20,000 tonnes per year.[25] These measures together will further shrink overhead costs decrease, labour costs and increase energy efficiency.

11.3.4. Technical Coefficients

The technical coefficient in the industrial production of aluminium in the Bahrain Smelter is the value of intermediate inputs in Bahraini Dinars required to produce one Bahraini Dinar's worth of aluminium. Intermediate inputs consist of raw materials, energy, services and other expenses. In 1983, ALBA consumed BD 43,356,672 of intermediate inputs to produce BD 75,293,478. The value of intermediate input costs by item and the technical coefficients is reported in Table 11.4. The technical coefficient for producing one Bahraini Dinar's worth of aluminium is estimated to be about BD 0.57584. It is important to note that intermediate inputs constitute a large share in aluminium production, which leads to a reduction in the value added. In 1983, aluminium production could be divided into 58 percent intermediate inputs and 42 percent value added. On the other hand, intermediate inputs can be divided into

Table(11.4): The Technical Coefficient in the Bahrain Aluminium Smelter (ALBA), Bahrain (1983)

Intermediate Inputs	Value in BD	Technical Coefficient
I RAW MATERIALS	33,467,859	0.44450
1. Alumina	23,505,947	0.31219
2. Petroleum Coke	4,450,897	0.05911
3. Cryolite	425,555	0.00565
4. Aluminum Fluorite	1,973,796	0.02621
5. Coal Tar & Pitch	1,510,975	0.02007
6. Other Materials	1,600,689	0.02126
II ENERGY	4,685,585	0.06223
1. Water	16,231	0.00022
2. Electricity	–	
3. Natural Gas	4,395,868	0.05838
4. Diesel	226,079	0.00300
5. Lubricant Oil	47,407	0.00063
III OTHER EXPENSES	5,203,228	0.06911
1. Maintenance Expenses	5,055,558	0.06714
2. Printing & Stationery	30,724	0.00041
3. Communications	116,946	0.00155
Total Intermediate Inputs	43,356,672	0.57584
Value Added	31,936,806	0.42416
Value of Output	75,293,478	1.00000

Source: Bahrain Centre for Studies and Research, Industrial Survey 1983.

77 percent raw materials, 11 percent energy, and 12 per cent other expenses. However, the cost of energy is underestimated, bearing in mind the low price of natural gas charged to ALBA.

Energy is the most important element in aluminium production; the electrolytic reduction of aluminium on an economic scale requires large quantities of cheap energy. The sources of energy required in an aluminium smelter varies from one country to another. However, the main sources are natural gas, hydroelectric power, coal, oil and nuclear power. The main advantage to the aluminium industry in Bahrain is the availability of cheap natural gas in large quantities. Accordingly, there is a higher comparative cost advantage in having aluminium smelter in Bahrain.

A comparison of aluminium production cost in the US and Canada in 1980 and Bahrain in 1983 is reported in Table 11.5. The data show that the cost of producing one ton of aluminium in Bahrain, based on the given cost items in the table, was estimated at about $838.1 compared to $1134.30 in the US and $922.10 in Canada. In other words, the production costs in Bahrain are 74 percent of US and 91 percent of Canada's productin costs, to be explained by the relative cost of energy in the different locations. In the US and Canada, energy cost was estimated at $411.80 and $210.60 respectively, compared to a very much lower price in Bahrain of $72.6. This is really the only comparative cost advantage of building an aluminium smelter in Bahrain. On the other hand, labour cost in ALBA is relatively higher than its counterpart in Canada and the US. In 1983, employment in ALBA was estimated at about 1,943 employees and total labour costs, consisting of wages, salaries and other social bene-

Table(11.5): Comparison of Production Costs Per Ton of Aluminium - 1980 prices (all figures in US$)

Intermediate Input & Labour		USA $	Canada $	Bahrain (83) BD	Bahrain (83) $
1.	Alumina	429.00	429.00	136.9	364.1
2.	Petroleum Coke	58.50	58.50	25.9	68.9
3.	Energy	411.80	210.60	27.3	72.6
4.	Maintenance	50.00	54.00	29.4	78.2
5.	Direct Labour, General Admin. etc.	185.00	170.00	95.6	254.3
TOTAL		1134.30	922.10	315.1	838.1

Source: (1) Gulf Organisation of Industrial Consultancy, cited in Atif A Kubursi, Oil, Industrialisation and Development in the Gulf States, (UK, 1984) p 124.
(2) Bahrain Centre for Studies and Research, Industrial Survey 1983.
(3) Exchange rate BD1 = $2.6596 (1983).

fits, were about BD 16,417,081. Despite the relatively higher labour costs, Auty argues that the expansion made the Bahrain smelter one of the most competitive in the world.[26]

11.3.5. Conclusion

The establishment of the first major non-oil industrial joint venture (ALBA) in the late 1960s met with start-up difficulties. Negative returns and future uncertainty persisted for eight years (1971-1979), during which time technical improvements increased productivity. In the 1980s the aluminium smelter generated positive cashflows and became highly competitive. ALBA also triggered considerable downstream aluminium based industries, such as an international state joint venture, Bahrain Atomisers International, the state-owned Bahrain Aluminium Extrusion Company (BALEXCO), the international-private joint venture Midal Cables, and a regional joint venture, the Gulf Aluminium Rolling Mill Company (GARMCO). In recent years, ALBA has embarked on ambitious expansion plans which seemed to be the cause for one of its foreign partners to withdraw.

11.4. ARAB SHIPBUILDING AND REPAIRING YARD (ASRY)

11.4.1. Introduction

Bahrain has long been an essential shiprepairing centre, providing facilities for offshore supply ships operating in the Gulf region and acting as a shore base for repairing vessels and tankers. There are three shiprepairing facilities in Bahrain. The oldest is the Bahrain Slipway Company, which was established in 1952 and started operations in

1954. This is an international joint venture between a local private sector firm with 51 percent of the equity and a British company (Gray Mackenzie) which owns the remainder. The second is the shiprepairing and Engineering Company (BASREC), which was established in 1962 and started operations in 1963. This is a regional joint venture. The latest is the Arab Shipbuilding and Repair Yard (ASRY), which was established in 1974 and started operations in 1977. This is a regional joint venture involving the governments of the Arab Oil Exporting Countries (OAPEC). ASRY, the biggest shiprepairing yard in Bahrain, also provides repair and cleaning services for offshore supply vessels operating in the Gulf.

11.4.2. Shareholding

The Arab Shipbuilding and Repair Yard (ASRY) provides repair and cleaning services for offshore supply vessels operating in the Gulf, especially the very large crude carriers (VLCC). The history of ASRY goes back to 1968 when the three founding members of OAPEC - Saudi Arabia, Kuwait and Libya - first envisioned a major marine repair and service facility in the centre of the international oil trade. ASRY was formally incorporated in Bahrain in 1974 following a feasibility study which established Bahrain as the best location. The study showed that the dry docks prevailing in the world were located in the Far East, far from the tanker lines going from the Arabian Gulf to the west. A further detailed study recommended that the dry dock should be designed to service tankers up to 500,000 dwts. The total cost of ASRY has been financed by equity capital and amounts to $340 million, of which $290 million are fixed costs and $50 million for working capital and to finance first year losses. Shareholders are the governments of Bahrain

(18.84 percent), Saudi Arabia (18.84 percent), Kuwait (18.84), UAE (18.84 percent), Qatar (18.84 percent), Iraq (4.7 percent), and Libya (1.10 percent).

11.4.3. The Production Process

In design, capacity, construction, and equipment, ASRY is considered to be a large industrial project. An artifical island was built in deep water and connected to the main land by a seven kilometer causeway. The construction work was carried out by the South Korean Hyundai conglomerate, the Construction Company using 2,000 Korean workers. The ASRY yard was flooded for the first time in May 1977 and received its first vessel in September of the same year.

ASRY has been principally undertaken under the management of Lisnave of Portugal. A global marketing operation is carried out by an independent organisation, ASRY Marketing Services (ASRYMAR) operating from London.

11.4.4. The Technical Coefficient

The major component of production costs is energy, which represents the major cost of intermediate inputs (76 percent of value of production). Table 11.6 exhibits that intermediate inputs represented 161.7 percent of the value of output, while value added reported a negative contribution (-61.7 percent). The other intermediate inputs of significance, raw materials and other services, accounted for 49.8 percent and 35.7 percent respectively of the value of production in 1983. The higher contribution of energy component to the value of production reflects the

Table(11.6): The Technical Coefficient in Arab Ship-Repairing Establishment (ASRY), Bahrain, 1983

Intermediate Inputs	Value in BD	Technical Coefficient
I RAW MATERIALS	408,940	0.49755
1. Steel & Bar & Beams & Welding Materials	408,940	0.49755
II ENERGY	626,455	0.76220
1. Water	86,035	0.10468
2. Electricity	282,880	0.34418
3. Natural Gas	65,140	0.07926
4. Gasoline	6,800	0.00827
5. Diesel	185,600	0.22582
III OTHER SERVICES	293,240	0.35678
1. Maintenance Expenses	162,995	0.19831
2. Printing & Stationery	36,230	0.04408
3. Communicaton	94,015	0.11439
Total Intermediate Input	1,328,635	1.61654
Value Added	(506,735)	(0.61654)
Value of Output	821,900	1.00000

Source Bahrain Centre for Studies and Research, Industrial Survey 1983.

nature of ship repairing which is basically an oil-related infrastructure maintenance industry. ASRY employed 954 employees in 1983 and its total labour cost was BD 4199.9 thousand.

11.4.5. Conclusion

The ASRY company was conceived by OAPEC around 1974-75 at the time when the demand for VLCCs was very high. Later, the demand for the VLCCs fell due to the decline in oil markets. In addition, the Iran-Iraq war led to additional difficulties for the company. The discussion of the cost structure of 1983 shows that ASRY incurred financial losses. The outlook is expected to improve if major projects such as the Gulf Aluminium Rolling Mill Company and the Arab Iron Steel Company use ASRY's workshop facilities.

11.5. CONCLUSION

The case studies of the oil and natural gas, aluminium and shiprepairing industries show that the joint venture is an important element in Bahrain's industrialisation. The discussion of joint ventures thus far reveals two kinds of joint economic behaviour, namely international joint venture and regional joint venture. In the oil and natural gas sector, international joint ventures have been successful due to the nature of the industry. In aluminium, the international joint venture ALBA has passed through a decade of severe difficulties until it started to turn out profits. In shiprepairing, the regional joint venture ASRY experienced difficult markets in the 1980s.

In recent years, the newly established Arab Iron and Steel Company

(AISCO) and the Gulf Petrochemical Industries Company (GPIC) met with start-up difficulties. The AISCO's iron-ore plant, established in 1981 and operating in 1984 as a regional joint venture , was closed in May 1985 because of a shortage of orders. GPIC, established in 1979 and operating in 1985 as a regional joint venture, has also encountered marketing problems.

Bahrain's experience of joint ventures, as revealed in this study, draws attention to the importance of establishing a semi-state body with the responsibility to evaluate and monitor the operations of new industrial joint ventures in Bahrain.

NOTES

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23. Emile A Nakhleh (1976) Bahrain, Canada: Lexington Bool, p 82.

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CHAPTER TWELVE

CONCLUSIONS

12.1. INTRODUCTION

The objective of this study has been to examine the industrialisation process in Bahrain and the effects of joint ventures (JVS).

During the period 1973-81 the government enjoyed a virtual five-fold rise in oil revenues and a consequent increase in its financial resources. These resources were used by the Bahraini public administration to launch an ambitious investment programme to improve the economy's physical infrastructure and to embark on industrialisation by means of joint ventures with foreign investors. Thus, we began this study by reviewing the way oil revenues were used to generate growth of the gross domestic product and to diversify and expand the manufacturing sector, particularly joint venture based industries. Joint venture based industries have been viewed as an appropriate mode for attracting technology, increasing exports and creating jobs and, consequently, to diversify the Bahraini economy away from oil.

12.2. SUMMARY OF THE MAJOR FINDINGS

I. The process of diversifying and expanding industrialisation can only be understood in the context of overall economic policy. Therefore, we began our study with a depth analysis of resource allocation and its influences on the pattern of economic growth over the period 1973-85. The main results of this investigation are as follows:

1. The analysis of the decomposition of GDP growth from the demand side over the entire period (1975-1985) and the sub-periods (1975-1980) and (1980-1985) shows that investment constituted the main source of growth in the entire period and in all sub-periods, accounting for 44.65 percent of GDP growth in the first period, 62.10 percent in the second period and 58.65 percent for the entire period. However, the productivity of investment was low during the period under study. The estimation of the Cobb-Douglas production function shows that the elasticity of output with respect to labour is 0.6 and 0.3 with respect to capital. Defining the productivity of investment as the ratio of GDP growth rate to investment/GDP, we found the productivity index of investment to be deteriorating, although the figures look highly unstable due to the influence of omitted variables. These results confirmed the World Bank report that the acceleration of development spending and the lack of rigorous investment criteria caused apprehension among concerned policy makers about the possibility of over-commitment and major errors in the selection of individual projects.

One way of explaining the low productivity of investment was through the use of the incremental capital-output ratio(ICOR) approach, which indicated that heavy investment in a few high capital intensive sectors, such as electricity which claimed an average of 25 percent of public capital expenditure over the 1971-1985 period, is likely to raise the overall incremental capital-output ratio and lower the productivity of investment. This, in turn, induces a low GDP growth rate. Furthermore, the study argued that the attempt to imitate the pattern of investment expenditure in other oil rich countries of the Gulf Cooperation Council will not result in accelerating the growth rate of GDP.

2. The decomposition of GDP growth shows that GDP growth in the 1973-1977 period was due to the growth of employment and the contribution of labour productivity was negative. Over the 1978-1984 period, employment growth contributed 69 percent while the contribution of labour productivity was 31 percent of GDP growth.

The rapid growth of employment, particularly of foreign labour, can be explained partly by the increase of oil revenues which led to higher levels of investment. However, a large part of the growth of the labour force, particularly foreign labour, can be attributed to the increase in demand for goods and services, especially in construction, finance and trade, communications and manufacturing.

3. The greater importance of the growth of investment and employment relative to their productivities are confirmed by the results of the standard growth accounting approach. This shows that, irrespective of the rate of growth of output, the sources of growth are best explained by the contribution of factor inputs, namely capital and labour to GDP growth.

4. Using the Chenery's growth accountancy method to study the sources of industrial growth of output in GCC states, including Bahrain, over the 1975- 1980 period, we found that the contribution of import-substitution to the growth of industrial output to be negative(-20.3 percent), and export expansion to be 20.1 percent and total domestic

demand to be 100.3 percent. The negative contribution of import substitution to the growth of industrial output is a clear sign of the underdevelopment of import substituting industries in the region. This can be attributed to the fragmentation of domestic regional markets and hence to the small size of each state's domestic market. Export expansion, however, has offset the negative influence of import-substituting industries. The study of the domestic demand for goods and services and its components in Bahrain shows that intermediate demand had the largest share - accounting for 55.6 percent in 1977 and 49.1 percent 1984 - of total domestic demand.

5. The analysis of the sectoral decomposition of GDP growth shows that the contribution of oil was negative (-8.70 percent) over the 1976-1985 period. Over sub-periods, the oil contribution was negative (-11.43 percent) during the first period (1976-1981) but improved slightly in the early eighties, accounting for 4.02 percent during 1980-1985. However, the oil sector is still the main source of income, accounting for over 80 percent of total revenue in the 1970s and about 70 percent in the 1980s.

Bahrain's oil production peaked in 1970, reaching a maximum production of 27.8 million barrels. After this it started to decline at a rate of about 5 percent per year. The decline in oil reserves, which is likely to deplete by the end of the century, is creating a challenge to speed up the process of diversifying and expanding the manufacturing sector.

II. One of the main consequences of increased oil earnings in the

1973-1983 period was the active role of the government in diversifying and expanding industrialisation and encouraging foreign investment in joint venture based industries through an attractive package of incentives. The second part of this study has focussed solely on the contribution of joint ventures to industrial and economic development, assesed as follows: the appropriateness of an establishment's capital and skill intensity for the economy concerned, the choice of trade policy, the efficiency and potential of the establishment for faster growth, and their ability to create jobs for Bahraini employees. The main results are as follows:

1. Joint ventures, as revealed in the literature, are the dominant form of business organisation for multinatinal enterprises in developing countries. Some researchers have gone so far as to suggest that the joint venture is likely to be the dominant mode in the future because of increasing international competition, ever larger invested capital, increased risk and the rapid process of technological change.

2. Joint ventures in Bahrain and other GCC states enjoyed a surge in popularity after 1973-1974 as a means to overcome the difficulties of marketing new industrial products in developed country markets and to increase technology transfer to their economies.

3. The discussion of joint ventures in Bahrain and other GCC states shows that there are two main types of joint ventures, namely international joint ventures and regional joint ventures.

The first type, which refers to joint ventures with foreign partners outside GCC and Arab states, initially met with difficulties due to the concern of multinationals for the risk associated with their investments in the Gulf region. However, the dramatic oil increase in 1973-1974, the establishment of economic commissions between GCC states and various developed countries, and the offset investment programmes have contributed to encourage multinational enterprises to commit their resources to joint ventures in GCC states.

The second type, which refers to joint ventures with other GCC or Arab states, depends to a large degree on contracting technological assistance from multinationals. This implies locking the suppliers of technology into regional joint ventures in order to ensure their commitment and, hence, the success of regional joint ventures.

4. Using weighted mean ratios the study sought to expand the hypothesis that the ownership of estblishments exerts an independent influence on industrial development. The study examined the behaviour of joint ventures and local establishments with regard to the following characteristics: the efficiency and potential of the establishment for faster growth, the choice of trade policy, the appropriateness of capital and skill intensity, and their contribution to employment and Bahrainisation policy. The comparative analysis of joint ventures and locally owned establishments yielded the following observations:

4.1. Profitability indicators

When the return on total fixed assets (PROFRT1), the return on paid up capital (PUCRT1), the return on total sales (PROFMG1), and the ratio of total value added to total employees (AVA1) were used as indicators of profitability, we found that:

performance can be outlined as follows:

1) JVS have a significantly - including or excluding regional JVS - greater share of exports in total sales (EXPRTRT1) and in total output (EXPPDRT1) than LES in chemicals, metals, aluminium products and all the aggregated group industries.

2) JVS have a significantly - with or without regional JVS - higher share of imported materials in total output (IMPRTRT1) than LES in chemicals and all the aggregated group industries, but vice versa in the metal industry. On the other hand, LES have a higher share of imported materials in total materials used (MIMPRTRT1) than JVS - including or excluding regional JVS - in the chemical and metal industries, but vice versa in food and beverages.

4.3. Employment And Bahrainisation Policy

Contributions to employment and Bahrainisation policy in the manufacturing sector are captured by the following variables: average wage rate (WGRT1), average wage rate per production employee (WGPRT1), the share of Bahraini employees in total employment (BEMPRT1), and the share of Bahraini wages in total wages (BWAGRT1). The main findings are summarised as follows:

1) JVS tend - including or excluding regional JVS - to pay significantly higher wages in food and beverages (only on average wages per production employees after excluding regional JVS), chemicals, metals, other metals products, and all aggregated group industries.

2) JVS tend - with or without regional JVS - to have a signifi-

cantly higher ratio of Bahraini employees to total employees (BEMPRT1) and higher Bahraini wages to total wages (BWAGRT1) than LES in chemicals and all the aggregated group industries.

3) JVS tend - with or without regional JVS - to have a significantly higher share of Bahraini employees to total employees (BEMPRT1) and higher Bahraini wages to total wages(BWAGRT1) than LES in chemicals and all the aggregated group industries.

4.4. Capital Intensity

The ratio of total fixed assets to total employees (CAPLBRT1) and the ratio of the value of land, buildings and machinery to production employees (TCAPLRT1) are used as indicators of capital intensity. The main finding is that JVS have a significantly higher capital intensity of land, buildings and machinery to production employees (TCAPLRT1) than LES in metals and all the aggregated group industries. When excluding regional JVS, JVS show a significantly higher capital intensity only in group (ALL+) and group (ALL) industries.

4.5. Skill Intensity

When the share of sales and administrative employees in total employees (ADEMPRT1) and the share of sales and administrative wages in total wages (ADWAGRT1) were used to measure skill intensity, we found that JVS tend to have a significantly higher skill intensity, represented by share of sales and administrative employees into total employees (ADEMPRT1) than LES in metals, other metal products and group (ALL) industries. When excluding regional JVS, JVS show a significantly higher skill intensity only in group (ALL) industries.

5. Figures on the performance and input combination variables discussed in chapter 9 shows that JVS tend to be concentrated in industries that have a higher value added per employees, pay higher wage rates, and have higher exports per unit of output or sales and higher imports per unit of output, a higher ratio Bahraini employees, a higher ratio of Bahraini wages to total employees, a higher ratio of land, buildings and machinery to production employees, and a higher ratio of imported materials per unit of output.

6. Discriminant analysis shows that export orientation and wage rate variables best discriminate between JVS and LES in all aggregated groups and individual industries with the exception of food and beverages (only EXPOPDRT) and aluminium products (only the wage rate).

When the discriminant functions are estimated using a step-wise procedure (in which variables are entered according to their ability to separate the groups) export-orientation was the first variable to be selected in group ALL, and group ALL++, the second in group ALL+, food and beverages (INDUS I), metals (INDUS VIII), and other metals (INDUS VIIIoth), the third in chemicals (INDUS V), and not selected in aluminium products (INDUS VIIIAL). The wage rate was the first to be selected in group ALL+, chemicals (INDUS V), metals (INDUS VIII), aluminium products (INDUS VIIIAL) and other metals (INDUS VIIIoth), and not selected in chemicals (INDUS I).

The function-variable correlation results support these findings. At the aggregate level, export orientation and wage rate have the highest correlation coefficients in all aggregate groups. At the individual level, the wage rate has the highest correlation coefficient in all individual industries except in food and beverages (INDUS I), and the export orientation variable has the second highest correlation coefficient in aluminium products (INDUS VIIIAL) and the third highest correlation in the remaining individual industries.

7. Discriminant analysis also shows that the higher wage rate paid by JVS was related to the greater skill and capital intensity of their production process. The skill intensity variable has the second highest correlation with the function in other metals (INDUS VIIIoth), the third in group ALL, and the fourth in group ALL+. The capital intensity variable has the fourth highest correlation coefficient with the function in most aggregate groups and individual industries.

8. The case studies yield the following observations:

1) In the oil and natural gas sector, the international joint ventures have been successful due to the nature of the industry.

2) In aluminium, the international joint venture ALBA passed through a decade of severe difficulties until it started to turn out profits.

3) In ship-repairing, the regional joint venture ASRY experienced difficult markets in the 1980s.

4) New established regional joint ventures, such as the Arab Iron and Steel Company (AISCO) and the Gulf Petrochemical Industries Companies (GPIC) met with start up difficulties.

12.3. POLICY IMPLICATIONS

A number of suggestions for policy that have been made in the course of the analysis can be summarised as follows:

1. Attempts to imitate the pattern of investment expenditure of the other oil-rich countries of the Gulf Cooperation Council will not improve capital productivity or accelerate GDP growth rate. Instead, the study suggested that substantial portions of investment should go into sectors that can produce goods in which the country has a comparative advantages, such as small and medium scale industries and services particularly those that can reduce consumer goods imports, increase exports, or help in transferring technology to the economy. In addition, the government should encourage the private sector to change its traditional investment behaviour by encouraging new opportunities in the manufacturing sectors instead of limiting itself to trading and construction related activities. Furthermore, a more rigorous investment criteria must be adopted when selecting individual projects and economic programmes.

In recent years the government, rightfully, has launched a new programme of industrial diversification which incorporates incentives to foreign investment and joint ventures. An Industrial Development Centre has recently been formed in the Ministry of Industry and Development to take over the task of coordinating the foreign investment and joint ventures programme and to allocate $2.6 billion to projects in various industrial sectors over the period 1990 to 1995.

2. To overcome the difficulties facing the manufacturing sector in

Bahrain, the study suggested the following measures:

1) A comprehensive strategic outlook analysis for industrial development potential.

2) Introduction of foreign investment legislation with a flexible attitude to joint ventures.

3) Setting up an industrial body with semi-state status with responsibility to evaluate and monitor new industrial joint ventures in Bahrain.

4) Setting up a specialised development fund to finance small and medium scale industrial establishment in producing and marketing industrial products.

5) The introduction of unified GCC states policies on subsidies and tariffs in the manufacturing sector.

3. The statistical results of discriminant analysis show that export orientation and wage rate are the most important variables which best discriminate between joint ventures and local establishments. These findings have some policy implications for the role of joint ventures in Bahrain. Foreign participation in the manufacturing sector through joint ventures result in higher wages but also the development and exploitation of the economy's comparative advantage within the context of an export-oriented policy. Moreover, joint ventures play a greater role in introducing skill and capital intensive production processes, and in attracting a higher employment ratio of Bahraini employees.

4. The analysis of misclassified cases has important implications for

the monitoring, evaluation and support of industrial establishments in the manufacturing sector. In so far as some local eastablishments have the desirable characteristics of the joint ventures, policy makers should adopt measures to encourage other LES to become more like them. However, joint ventures which behave like LES should be discouraged in so far as they have the disadvantages of joint ventures (leakages of income overseas via repatriated dividends, tax concessions, etc.) but only the performance of LES.

12.4. AREAS FOR FURTHER RESEARCH

This research project is an exploratory study which has focussed on the industrialisation process and the role of joint ventures in the industrial development of Bahrain. Extension of this research to other members of the Gulf Cooporation Council may help to generalise the conclusions of the comparative behaviour of international joint ventures, regional joint ventures and locally owned establishments in the manufacturing sector. Furthermore, the repetition of the present study using recent data would be useful in order to check the validity of some of the generalisations discussed in this study.

Research in the past has focussed on the benefits and costs of foreign direct investment but has not considered the effects of varying degrees of foreign ownership on the benefits and costs to the host countries. Another important area is the lack of a bargaining model incorporating the strengths and weaknesses of the multinationals and host governments in the developing countries in general and GCC states in particular. Finally, technology transfer via joint ventures versus wholly foreign-owned establishments promises to be an important area for further research.

APPENDIX A

DESCRIPTION OF DATA

1. DESCRIPTION OF DATA

The following variables are made use of in the study of the sources of growth in the Bahraini economy.

1.1. Gross Domestic Product (GDP)

Gross domestic product values are used to represent output. A gross domestic product series at constant prices of 1977 are obtained from various issues of official national accounts published by the Ministry of Finance and National Economy in Bahrain as listed in Table (A.1). Figures of gross domestic product at constant prices of 1977 for the years 1973 and 1974 are obtained from World Bank Report No. 2058 on Bahrain's current economic position and prospects study in 1978 and cited in the UNIDO study on Recent Industrial and Economic Development in Bahrain.

Table (A.2) reports the components of gross domestic product from the demand side.

1.2. Capital Stock (K)

Using the ICOR equation, as discussed in chapter 3, for three different sub-periods of the period under study, ICOR values were found to be 4.3, 5.4, and 5.5. Therefore, ICOR for the aggregate economy was assumed to be equal to the average value of the calculated three ICORs, that is, 5.00.

With ICOR = 5.00, capital stock for the year 1973 equals five times the gross domestic product in 1973, that is :

$$K_{1973} = ICOR * GDP_{1973}$$

A capital stock series for the rest of the period under study 1974-1985 were derived by cumulating net capital formation as reported in Table (A.3) and (A.4).

1.3 The Labour Force (L)

The time series of the labour force estimates in terms of total numbers working and looking for work in Bahrain are obtained from three official sources. The estimates for the period 1972-1975 are obtained from Socknat Study of Projection of Manpower Demand and Supply 1971-1986 - Socknat, J. was a manpower advisor in the Ministry of Labour and Social Affairs. The estimates for the period 1976-1980 were prepared by the Directorate of Labour in the Ministry of Labour and Social Affairs. The estimates for the period 1982-1985 are obtained from the Statistical Abstract published by the Central Statistics Organisation in 1988 (forthcoming). The figures for 1971 and 1981 are obtained from the population census in 1971 and 1981. Table (A.5) reports the figures for the labour force in the 1977-1987 period, Table (A.6) presents the share of the Bahraini labour force and the non-Bahraini labour force in the total labour force (in percentages), Table (A.7) shows the growth rates of

Bahraini, non-Bahraini and the total labour force, and Table(A.8) reports the Bahraini labour force, the non-Bahraini labour force and the total labour force.

Table(A.1): Gross Domestic Product by Industrial Origin at Constant Prices (1977=100)

TYPE OF ECONOMIC ACTIVITY / YEAR	1971	1972	1973	1974	1975	1976	1977
Agriculture & Fishing			10.2	9.7	10.8	10.0	12.3
Mining & Quarrying			209.0	221.5		178.1	194.0
Mining			208.6	221.3		177.3	193.0
Quarrying			0.4	0.2		0.8	1.0
Manufacturing			48.6	64.7	51.9	72.6	86.1
Electricity & Water			4.5	4.6		1.5	3.2
Electricity			4.4	4.5		1.3	3.1
Water			0.1	0.1		0.2	0.1
Building & Construction			34.9	40.2	49.5	81.5	81.4
Communications			22.9	26.8	43.8	41.9	65.1
Trade & Hotels & Restaurants					74.1	113.4	122.0
Trade						99.6	110.5
Hotels						10.3	9.2
Restaurants						3.5	2.3
Services			56.7	68.7		22.5	23.1
Banking & Insurance			4.1	6.8		43.1	60.9
Local banks						19.2	23.8
Offshore banking units						22.7	35.7
Insurance						1.2	1.4
Real Estate & Rents			23.9	26.1		43.5	48.3
Government			18.9	29.9	39.9	71.5	80.8
			433.7	499.0	568.2	679.6	777.2

Tabe(A.1): (Contd)

TYPE OF ECONOMIC ACTIVITY / YEAR	1978	1979	1980	1981	1982	1983	1984
Agriculture & Fishing	12.5	12.6	14.1	15.7	17.7	16.6	17.1
Mining & Quarrying	195.8	185.0	176.1	155.2	142.5	146.5	161.7
Mining	195.3	184.3	175.0	154.0	140.0	143.0	159.1
Quarrying	0.5	0.7	1.1	1.2	2.5	3.5	2.6
Manufacturing	92.9	96.8	120.8	126.2	122.2	129.1	128.2
Electricity & Water	4.1	6.4	7.2	7.5	8.3	10.1	11.2
Electricity	3.9	6.1	6.9	7.0	7.5	9.3	10.1
Water	0.2	0.3	0.3	0.5	0.8	0.8	1.1
Building & Construction	127.5	112.5	112.8	110.7	115.5	129.3	164.6
Communications	80.1	86.2	77.3	88.0	101.6	116.2	130.9
Trade & Hotels & Restaurants	95.0	104.9	125.4	113.0	126.7	135.9	125.0
Trade	81.7	91.5	108.5	94.8	107.9	117.5	106.9
Hotels	10.6	10.6	13.9	14.9	14.9	13.8	12.7
Restaurants	2.7	2.8	3.0	3.3	3.9	4.6	5.4
Services	24.2	24.9	28.4	33.7	34.1	38.0	39.3
Banking & Insurance	59.1	50.8	72.2	93.2	119.2	130.6	113.2
Local Banks	19.6	24.7	27.8	26.2	38.9	39.5	43.6
Offshore banking units	36.3	21.8	34.8	53.9	64.9	75.3	55.6
Insurance	3.2	4.3	9.6	13.1	15.4	15.8	14.0
Real Estate & Rents	61.4	64.7	68.1	77.4	84.2	87.2	95.2
Government	84.8	89.6	94.5	101.2	109.2	110.2	121.9
	837.4	834.3	896.9	921.8	981.2	1049.7	1108.3

Table(A.1): (Contd)

TYPE OF ECONOMIC ACTIVITY	YEAR 1985	1986	1987
Agriculture & Fishing	16.7		
Mining & Quarrying	186.1		
Mining	183.7		
Quarrying	2.4		
Manufacturing	121.1		
Electricity & Water	10.6		
Electricity	10.0		
Water	0.6		
Building & Construction	135.9		
Communications	123.9		
Trade & Hotels & Restaurants	116.1		
Trade	98.4		
Hotels	12.2		
Restaurants	5.5		
Services	41.4		
Banking & Insurance	92.0		
Local banks	41.9		
Offshore banking units	41.6		
Insurance	8.5		
Estate & Rents	77.2		
Government	133.0		
	1054.0		

Table(A.2): Consumption, Investment and Trade, 1973-1985
at constant prices (1977=100)

Year	Private Consumption	Public Consumption	Consumption	Private Investment	Public Investment	Change in Stock	Investment	GDP
1972								
1973	353.4	101.8	455.2	N.A.	N.A.	N.A.	22.7	433.7
1974	263.2	70.8	334.0	N.A.	N.A.	N.A.	65.8	499.0
1975	200.2	86.8	287.0	90.9	65.8	32.1	188.8	568.2
1976	279.7	96.9	376.6	146.2	153.3	(2.7)	296.8	679.6
1977	314.2	104.0	415.2	201.3	148.3	(111.3)	238.3	777.2
1978	327.5	110.0	437.5	201.5	160.1	(116.4)	245.2	837.4
1979	306.6	110.2	416.8	161.3	155.0	34.0	350.3	834.4
1980	335.9	117.3	453.2	183.9	150.4	14.0	348.3	896.9
1981	380.8	130.2	511.0	251.2	133.9	(86.3)	298.8	921.8
1982	418.6	137.4	556.0	281.8	153.4	51.9	487.1	981.2
1983	420.3	138.9	559.2	405.1	188.7	(34.3)	559.5	1049.7
1984	443.9	125.4	569.3	485.8	191.8	(71.6)	606.0	1108.3
1985	404.1	166.5	570.6	292.6	107.8	(145.9)	254.5	1054.0

Table(A.2): Consumption, Investment and Trade, 1973-1985
at constant prices (1977=100)

Year	Exports	Imports	Trade	GDP
1972				
1973				
1974				
1975	700.8	608.4	92.4	568.2
1976	720.5	714.3	6.2	679.6
1977	926.5	802.7	123.8	777.2
1978	919.5	764.8	154.7	837.4
1979	812.8	745.5	67.3	834.4
1980	850.6	755.2	95.4	896.9
1981	973.0	861.0	112.0	921.8
1982	754.3	816.2	(61.9)	981.2
1983	774.2	843.2	(69.0)	1049.7
1984	785.0	852.0	(67.0)	1108.3
1985	937.5	708.5	229.0	1054.0

Table (A.3)

Gross Capital Formation and Net
Capital Formation, 1973-1985
in Constant Prices (1977=100)

Bd. million

Year	Public Investment (1)	Private Investment (2)	Increase in Stock (3)	Gross Capital Formation (4)=(1+2+3)	Depreciation (5)	Net Capital (4-5)
1970						
1971	N.A.	N.A.	N.A	5.8(1)		
1972	N.A.	N.A.	N.A.	6.2(1)		
1973	N.A.	N.A.	N.A.	22.7 (3)	7.1(2)	15.6
1974	N.A.	N.A.	N.A.	65.8(3)	20.5(2)	45.3
1975	65.8	90.9	32.1	188.8	51.8(3)	137.0
1976	153.3	146.2	(2.7)	296.8	61.3	235.5
1977	148.3	201.3	(111.3)	238.3	77.3	161
1978	160.1	201.5	(116.4)	245.2	96.4	148.8
1979	155.0	161.3	34.0	350.3	106.6	243.7
1980	150.4	183.9	14.0	348.3	109.0	239.3
1981	133.9	251.2	(86.3)	298.8	135.6	163.2
1982	153.4	281.8	51.9	487.1	149.3	337.8
1983	188.7	405.1	(34.3)	559.5	160.6	398.9

Year	Public Investment (1)	Private Investment (2)	Increase In Stock (3)	Gross Capital Formation (4):(1)+(2)+(3)	Depreciation (5)	Net Capital Formation (4)-(5)
1984	191.8	485.8	(71.6)	606	176.5	429.5
1984(4)	107.8	292.6	(145.9)	254.5	137.1	117.4
1986						
1987						

Source : National Accounts. Various issues. Ministry of Finance and National Economy. Bahrain.

(1) at current prices.

(2) assuming depreciation at (31) per cent of Gross Capital Formation.

(3) World Bank : "Bahrain Current Economic Position and Prospects," World Bank, 28 June 1978, Report No. 205 8 - BH. Annex, Table 2.2, as cited in UNIDO. Bahrain. Recent Industrial and Economic Development, New Trends and Regional Prospects. July 10, 1980. p.42. converting to constant prices using price index of GDP.

(4) Converting to constant prices using price index of GDP.

Table (A.4): Net Capital Formation, Gross Domestic Product, and Capital Stock at Constant Prices (1977=100)

(BD Million)

Year	Net Capital Formation	Gross Domestic Product	Capital Stock
1973	15.6	433.7	2168.5
1974	45.3	499.0	2184.1
1975	137.0	568.2	2229.4
1976	235.5	679.6	2366.4
1977	161.0	777.2	2601.9
1978	148.8	837.4	2762.9
1979	243.7	834.4	2911.7
1980	239.3	896.9	3155.4
1981	163.2	921.8	3394.7
1982	337.8	981.2	3557.9
1983	398.9	1049.7	3895.7
1984	429.5	1108.3	4294.6
1985	117.4	1054.0	4724.1

Table (A.5)

Labour Force : 1971-1987

Year	Bahraini work force	Non-Bahraini work force	Total work force	Index
1970				
1971 (April)(4)	22,351	37,950	60,301	47.0
1972(1)	40,868	17,650	58,518	45.6
1973	42,747	21,885	64,632	50.4
1974	44,726	21,996	66,722	52.0
1975	46,816	30,182	76,998	60.1
1976(2)	41,500	61,000	102,500	80.0
1977	46,100	82,100	128,200	100.0
1978	48,500	85,000	133,500	104.1
1979	51,000	79,500	130,500	101.8
1980	54,300	79,000	133,300	104.0
1981(4)	57,700	81,300	139,000	108.4
1982(3)	63,297	85,100	148,397	115.8
1983	65,396	89,014	154,410	120.4
1984	67,495	92,929	160,424	125.1
1985	69,593	96,843	166,436	129.8
1986	71,690	100,751	172,441	134.5
1987	73,972	99,472	173,444	135.3

Source : (1) Socknat, J., projections of Manpower Demand and Supply 1971-1986, Ford Foundation, Bahrain , February 1971, Table 39, p.192, as cited in Birks, J.S. and C.A. Sinclair. International Migration Project, Country Case Study : The State of Bahrain. University of Durham, May 1978 (From 1972-1975)

(2) Ministry of Labour and Social Affairs, Social Indicators for Bahrain. (Estimates prepared by Directorate of Labour From 1976-1980). Bahrain. Dec. 1982. p.79.

(3) Central Statistical Organization. Statistical Abstract 1987 (Forthcoming).

(4) Population Census of 1971 and 1981.

Table(A.6): Shares of Bahraini Labour Force, Non-Bahraini Labour Force in the Total Labour Force (Percentage)

Year	Bahraini Labour Force	Non-Bahraini Labour Force	Total Labour Force
1971			100.0
1972			100.0
1973	66.14	34.86	100.0
1974	67.03	32.97	100.0
1975	60.80	39.20	100.0
1976	40.49	59.51	100.0
1977	35.96	64.04	100.0
1978	36.33	63.67	100.0
1979	39.08	60.92	100.0
1980	40.74	59.27	100.0
1981	41.51	58.49	100.0
1982	42.65	57.35	100.0
1983	42.35	57.65	100.0
1984	42.07	57.93	100.0
1985	41.81	58.19	100.0
1986			100.0
1987			100.0

TABLE (A.7): BAHRAINI, NON-BAHRAINI, TOTAL LABOUR FORCE

Index (1977=100)

Year	Bahraini Labour Force	Non Bahraini Labour Force	Total Labour Force
1971			47.0
1972			45.6
1973	92.7	26.7	50.4
1974	97.0	26.8	52.0
1975	101.6	36.8	60.1
1976	90.0	74.3	80.0
1977	100.0	100.0	100.0
1978	105.2	103.5	104.1
1979	100.6	96.8	101.8
1980	117.8	96.2	104.0
1981	125.2	99.0	108.4
1982	137.3	103.7	115.8
1983	141.9	108.4	120.4
1984	146.4	113.2	125.1
1985	151.0	118.0	129.8
1986			134.5
1987			135.3

CORPORATE STRUCTURE

IN BAHRAIN

The commercial Companies Law, legislated as Amiri Decree No. 28 of 1975, codifies and regulates the way individuals or companies may structure their business operations in Bahrain. Excluding sole ownership, several forms of corporate structure are allowed.

(1) Partnership Under a Collective Name (Joint Liability Company)

Partnership under a collective name is an association of two or more persons under a specific name who assume joint responsibility to the extent of their entire fortune. No partnership shall be established except with partners of Bahraini nationality. However, Amiri Decree No. 13/1980 amended the foregoing paragraph by stating that professional partnerships under collective names may be formed provided some partners shall be Bahraini nationals and after obtaining the consent of the Council of Ministers through the Ministry of Commerce and Agriculture.

(2) Simple Commandite Partnership (Limited Partnership)

The simple commandite partnership is a company between one partner or more who are jointly liable for the commitments of the company to the extent of their entire fortune and between one partner or more who invested capital in the company but are outside the pale of its management and they shall be called commandents. These shall not be liable for the commitments of the company except to the extent of their shares in the capital. The joint partners shall be Bahraini nationals and the percentage of the Bahraini partners shall not be less than 51 percent of the capital.

(3) Association of Participation

A participation in association is a company of which others are not aware and which neither enjoys a juristic personality nor is subject to the publication formalities. The company shall not issue shares or negotiable warrents. A third party cannot have a direct relationship with the company but only with the partner or partners with whom he has dealt. However, the third party may invoke the memorandum of association if the company has dealt with him in this capacity. If the partner who deals with the third party is a foreigner, he must have a Bahraini national to guarantee him in third party dealings.

(4) Joint Stock Company

A joint stock company consists of a number of persons who have subscribed to it by negotiable share warrants. They shall not be held liable for the debts and commitments of the company except to the extent of the value of their shares. An Amiri Decree is needed before the formation of joint stock company and the offer of its shares to the public subscription. The promoters, persons who have signed the initial memorandum or have applied to licence the company or have paid shares in kind at the time of the formation of the company, are required to subscribe for shares which shall not be less than 7 percent and not exceed 15 percent of the company's capital. However, Amiri Decree No. 13/1980 amended the foregoing article by raising the maximum limit to 20 percent of the company's capital. Furthermore, the promoters may, after obtaining the approval of the Council of Ministers, be authorised to subscribe for 40 percent of the company's capital provided the number of promoters shall not be less than sixty.

Although all the partners of joint stock companies shall be Bahraini nationals, non-Bahrainis can be partners when the need for utilisation of foreign capital or expertise arises. In addition, the non-Bahraini promoters may be exempted from the percentage stated above after having obtained the sanction of the Council of Ministers, provided the value of the shares of the Bahrainis shall not be less than 51 percent of the capital of the company. However, the shares representing the foreign capital shall, under no circumstances, be disposed of for a period of three years from the date of the publication of the company. On the other hand, shareholding companies whose shares will not be offered for public subscription but distributed among its promoters who shall not be less than five, could be established without the issuance of an Amiri Decree. However, Amiri Decree No. 13/1980 changed the title of this kind of joint stock company (shareholding company) to closed joint stock company. In addition, the number of promoters may, after obtaining the approval of the Ministry of Commerce and Agriculture, be less than five in respect of joint stock companies in which the government or a public corporate organisation participate, or a joint stock company in which companies having no less than 51 percent government shareholding participate, or the companies which are incorporated by Arab government.

The issued capital shall not be less than BD 500,000 for each of the companies that offer their shares for public subscription and BD 200,000 for companies that do not offer their shares for public subscription. Furthermore, the capital of the company shall be divided into equal shares. The nominal value of each share shall not be less than BD 1 and not more than BD 100.

(5) Mixed Shareholding Company

A mixed shareholding company is one in which a corporation takes part in its establishment or its shareholder engages in commercial, industrial, financial, agricultural and in matters of real estate, or in any further economic activities. In general, the provisions applicable to shareholding companies shall apply to mixed shareholding companies.

(6) Commandite Company by Shares

A commandite company by shares is a company consisting of two categories of partners: the first category is that of the joint partners who are responsible jointly to the extent of their entire fortune for the debts of the company; and the second category is that of those partners who are not responsible for the debts of the company except to the extent of their shares in the capital. A commandite company by shares may be formed by at least one joint partner but the number of shareholding partners shall not be less than ten. The capital of the company shall not be less than BD 10,000.

(7) The Limited Liability Company

A company with limited liability is a company consisting of two or more partner who are responsible for the debt of the company to the extent of their respective interest in the capital and in which the number of partners shall not exceed fifty.

A limited liability company may not resort to public subscription in establishing the company, or raising or increasing its capital or for obtaining a loan. It shall not issue negotiable warrants. The transfer of the partners shares in the company shall be subject to their rights of retrieval, the conditions contained in the company's memorandum of association and the provisions of the commercial companies law. In addition, a limited liability company is not allowed to have for its object the conduct of insurance, investments on accounts, or banking operations. The minimum capital of a limited liability company shall be BD 10,000, which shall be divided into shares of equal value. The minimum value of each share be BD 50.

Every limited liability company shall assume the character of a Bahraini company. This implies that one, at least, of its partners should be a Bahraini national and the head office of the comapny shall be in Bahrain. In addition, Bahraini partners shall hold not less than 51 percent of the total shares of the company.

Appendix C

Structure of Manufacturing Sector by ownership, and Industry: Bahrain, 1983

Variable	All INDUS	INDUS(1)	INDUS(2)	INDUS(3)	INDUS(4)
1. ADEMP					
Total	2281	190	15	7	40
		(8.3)	(0.7)	(0.3)	(1.8)
Own (1)	19.4%	65.3%	100%	28.6%	80.0%
(2)	80.2%	34.7%	-	14.3%	20.0%
(3)	0.4%	-	0.0	57.1%	-
2. ADWAG					
Total	20442.3	655.8	39.5	13.6	219.8
		(3.2)	(0.2)	(0.07)	(1.1)
Own (1)	8.8	71.1	100.0	38.2	72.7
(2)	91.2	28.9	-	26.5	27.3
(3)	0.04	-	0.0	35.5	-
3. PRODEMP					
Total	8698	499	274	100	311
		(5.7)	(3.2)	(1.1)	(3.6)
Own (1)	35.4	64.9	90.9	82.0	97.1
(2)	63.5	35.1	-	10.0	2.9
(3)	1.0	-	9.1	8.0	-
4. PRODWAG					
Total	41122.0	985.9	367.2	120.0	1077.8
		(2.4)	(0.9)	(0.3)	(2.6)
Own (1)	13.3	59.3	92.9	78.3	95.8
(2)	86.5	40.7	-	11.7	4.2
(3)	0.3	-	7.1	10.1	-
5. TOTBEMP					
Total	6524	334	5	12	43
		(5.1)	(0.08)	(0.2)	(0.7)
Own (1)	6.6	36.2	100.0	75.0	86.0
(2)	93.3	63.8	-	8.3	14.0
(3)	0.03	-	0.0	16.7	-
6. TOTBWAG					
Total	38865.0	703.1	12.8	29.3	125.0
		(1.9)	(0.03)	(0.08)	(0.3)
Own (1)	3.4	49.9	100.0	75.4	87.0
(2)	96.6	50.1	-	12.3	13.0
(3)	0.009	-	0.0	12.3	-

Variable	INDUS(5)	INDUS(6)	INDUS(7)	INDUS(8)	INDUS(9)
1. ADEMP					
Total	938	117	531	440	3
	(41.1)	5.1)	(23.3)	(19.3)	(0.1)
Own (1)	6.5%	94.9%	-	21.4%	100.0%
(2)	93.5%	-	100.0%	78.7%	-
(3)	-	5.1%	-	-	0.0%
2. ADWAG					
Total	8802.5	606.7	7976.4	2105.2	22.8
	(43.1)	(3.0)	(39.0)	(10.3)	(0.1)
Own (1)	2.4	99.4	-	13.6	100.0
(2)	97.6	-	100.0	86.4	-
(3)	-	0.6	-	-	0.0
3. PRODEMP					
Total	2900	1179	1411	1986	38
	(33.3)	(13.6)	(16.2)	(22.8)	(0.4)
Own (1)	6.9	97.1	-	38.5	44.7
(2)	93.1	-	100.0	61.5	-
(3)	-	2.9	-	-	55.3
4. PRODWAG					
Total	21776.8	1928.6	8438.3	6321.4	106.0
	(53.0)	(4.7)	(20.5)	(15.4)	(0.3)
Own (1)	1.3	99.2	-	18.4	40.0
(2)	98.7	-	100.0	81.6	
(3)	-	0.8	-	-	60.0
5. TOTBEMP					
Total	3634	78	1487	928	3
	(55.7)	(1.2)	(22.8)	(14.2)	(0.05)
Own (1)	1.3	100.0	-	14.2	100.0
(2)	98.7	-	100.0	85.8	-
(3)	-	0.0	-		0.0
6. TOTBWAG					
Total	22736.3	287.0	11177.3	3771.4	22.8
	(58.5)	(0.7)	(28.8)	(9.7)	(0.06)
Own (1)	0.9	100.0	-	8.2	100.0
(2)	99.1	-	100.0	191.8	-
(3)	-	0.0	-	-	0.0

Variable	ALL INDUS	INDUS(1)	INDUS(2)	INDUS(3)	INDUS(4)
7. TOTNBEMP					
Total	6118	695	292	95	317
		(11.4)	(4.8)	(1.6)	(5.2)
Own (1)	55.9	65.2	90.4	78.9	95.6
(2)	42.1	34.8	-	10.5	4.4
(3)	1.9	-	9.6	10.5	-
8. TOTNBWAG					
Total	28087.5	1319.7	400.9	104.3	1180.3
		(4.7)	(1.4)	(0.4)	(4.2)
Own (1)	22.5	64.9	92.9	73.8	92.2
(2)	77.0	35.1	-	13.4	7.8
(3)	0.5	-	7.1	12.8	-
9. TOTEMP					
Total	12642	1029	297	107	360
		(8.1)	(2.3)	(0.8)	(2.8)
Own (1)	30.5	55.8	90.6	78.5	94.4
(2)	68.6	44.2	-	10.3	5.6
(3)	0.9	-	9.4	11.2	-
10. TOTWAG					
Total	66952.5	2022.7	413.7	133.6	1305.4
		(3.0)	(0.6)	(0.2)	(1.9)
Own (1)	11.4	59.7	93.2	74.2	91.7
(2)	88.4	40.3	-	13.2	8.3
(3)	0.2	-	6.8	12.6	-
11. LOCSAL					
Total	99382.4	14522.9	974.6	733.9	3733.8
		(14.6)	(1.0)	(0.7)	(3.8)
Own (1)	40.4	46.5	91.5	66.8	96.2
(2)	48.8	53.5	-	7.0	3.8
(3)	10.8	-	8.5	26.2	-
12. GCCSAL					
Total	224601.6	71.3	0.0	1.2	101.1
		(0.03)	(0.0)	(0.0005)	(0.05)
Own (1)	0.2	1.5	0.0	100.0	0.0
(2)	99.8	98.5	-	0.0	100.0
(3)	0	-	0.0	0.0	-

Variable	INDUS(5)	INDUS(6)	INDUS(7)	INDUS(8)	INDUS(9)
7. TOTNBEMP					
Total	1161	1338	456	1726	38
	(19.0)	(21.9)	(7.5)	(28.2)	(0.6)
Own (1)	22.7	95.6	-	44.5	44.7
(2)	77.3	-	100.01	55.5	-
(3)	-	4.4	-	-	55.3
8. TOTNBWAG					
Total	12214.2	2323.1	5239.8	5199.2	106.0
	(43.5)	(8.3)	(18.7)	(18.5)	(0.4)
Own (1)	3.2	98.9	-	23.0	40.0
(2)	96.8	-	100.0	77.0	-
(3)	-	1.1	-	-	6.0
9. TOTEMP					
Total	4795	1416	1943	2654	41
	(37.9)	(11.2)	(15.4)	(21.0)	(0.3)
Own (1)	6.5	95.8	-	33.9	48.8
(2)	93.5	-	100.0	66.1	-
(3)	-	4.2	-	-	51.2
10. TOTWAG					
Total	34950.5	2610.1	16417.1	8970.6	128.8
	(52.2)	(3.9)	(24.5)	(13.4)	(0.2)
Own (1)	1.7	99.1	-	16.8	50.6
(2)	98.3	-	100.0	83.2	-
(3)	-	0.9	-	-	49.4
11. LOCSAL					
Total	29575.4	28473.4	9976.1	9291.7	2100.6
	(29.8)	(28.7)	(10.0)	(9.3)	(2.1)
Own (1)	9.6	68.4	-	58.2	31.7
(2)	90.4	-	100.0	41.8	-
(3)	-	31.6	-	-	68.3
12. GCCSAL					
Total	207347.2	0.0	10246.5	6822.4	12.0
	(92.3)		(4.6)	(3.0)	(0.005)
Own (1)	0.1	0.0	-	4.3	100.0
(2)	99.9	-	100.0	95.7	-
(3)	-	0.0	-	-	0.0

Variable	ALL INDUS	INDUS(1)	INDUS(2)	INDUS(3)	INDUS(4)
13. OTHSAL					
Total	693944.6	0.0	20.0	0.0	0.0
			(0.003)		
Own (1)	0.003	0.0	100.0	0.0	0.0
(2)	100.0	0.0	-	0.0	0.0
(3)	0.0	-	0.0	0.0	-
14. TOTSAL					
Total	1017928.7	14594.2	994.6	735.1	3834.8
		(1.4)	(0.1)	(0.07)	(0.4)
Own (1)	4.0	46.3	91.7	66.8	93.7
(2)	95.0	53.7	-	7.0	6.3
(3)	1.1	-	8.3	26.2	-
15. PRODVAL					
Total	955604.1	14601.7	1106.9	735.1	3836.7
		(1.5)	(0.1)	(0.08)	(0.4)
Own (1)	4.3	46.4	92.5	66.8	93.7
(2)	94.6	53.6	-	7.0	6.3
(3)	1.1	-	7.5	26.2	-
16. MLOCPUR					
Total	169518.4	1105.9	0.0	25.0	0.0
		(0.7)		(0.01)	
Own (1)	3.2	98.4	0.0	96.0	0.0
(2)	96.8	1.6	-	0.0	0.0
(3)	0.0	-	0.0	4.0	-
17. MGCCPUR					
Total	522441.1	145.3	0.0	0.4	1.0
		(0.03)		(0.00008)	(0.0002)
Own (1)	0.2	87.6	0.0	0.0	100.0
(2)	99.8	12.4	-	0.0	0.0
(3)	0.0	-	0.0	0.4	-
18. MOTHPUR					
Total	68321.8	7648.3	227.1	220.0	1421.6
		(11.2)	(0.3)	(0.3)	(2.1)
Own (1)	13.7	36.2	96.6	49.9	84.3
(2)	74.4	63.8	-	9.5	15.7
(3)	12.0	-	3.4	40.7	-

Variable	INDUS(5)	INDUS(6)	INDUS(7)	INDUS(8)	INDUS(9)
13. OTHSAL					
Total	581510.6	0.0	103918.4	8495.6	0.0
	(83.8)		(15.0)	(1.2)	
Own (1)	0.0	0.0	-	0.0	0.0
(2)	100.0	-	100.0	100.0	-
(3)	-	0.0	-	-	0.0
14. TOTSAL					
Total	818433.2	28473.4	124141.1	24609.7	2112.6
	(80.4)	(2.8)	(12.2)	(2.4)	(0.2)
Own (1)	0.4	68.4	-	23.2	32.1
(2)	99.6	-	100.0	76.8	-
(3)	-	31.6	-	-	67.9
15. PRODVAL					
Total	805560.4	28749.5	75293.5	23607.7	2112.6
	(84.3)	(3.0)	(7.9)	(2.5)	(0.2)
Own (1)	0.4	68.7	-	22.9	32.1
(2)	99.6	-	100.0	77.1	-
(3)	-	31.3	-	-	67.9
16. MLOCPUR					
Total	156254.3	3548.4	0.0	8584.8	0.0
	(92.2)	(2.1)		(5.1)	
Own (1)	0.02	100.0	-	8.8	0.0
(2)	99.98	-	0.0	91.2	-
(3)	-	0.0	-	-	0.0
17. MGCCPUR					
Total	521547.7	704.3	0.0	42.4	0.0
	(99.8)	(0.1)		(0.008)	
Own (1)	0.006	100.0	-	66.0	0.0
(2)	99.994	-	0.0	34.0	-
(3)	-	0.0	-	-	0.0
18. MOTHPUR					
Total	14573.2	9273.5	30173.2	3428.8	1356.1
	(21.3)	(13.6)	(44.2)	(5.0)	(2.0)
Own (1)	6.2	23.7	-	46.5	24.3
(2)	93.8	-	100.0	53.5	-
(3)	-	76.3	-	-	75.7

Variable	All INDUS	INDUS(1)	INDUS(2)	INDUS(3)	INDUS(4)
19. MTOTPUR					
Total	760281.3	8899.5	227.1	245.4	1422.6
		(1.2)	(0.03)	(0.03)	(0.2)
Own (1)	2.1	44.7	96.6	54.5	84.3
(2)	96.9	55.3	-	8.5	15.7
(3)	1.1	-	3.4	37.0	-
20. MTOTUSD					
Total	763293.5	8918.8	192.5	245.4	1324.1
		(1.2)	(0.03)	(0.03)	(0.2)
Own (1)	2.0	44.5	95.8	54.5	83.1
(2)	96.9	55.5	-	8.5)	16.9
(3)	1.1	-	4.2	37.0	-
21. TOTENG					
Total	12283.4	486.0	29.6	13.0	41.7
		(4.0)	(0.2)	(0.1)	(0.3)
Own (1)	13.3	52.3	96.3	72.3	69.1
(2)	86.7	47.7	-	6.2	30.9
(3)	0.0	-	3.7	21.5	-
22. TOTINP					
Total	790154.1	10205.0	352.3	290.4	1486.6
		(1.3)	(0.04)	(0.04)	(0.2)
Own (1)	2.4	45.5	95.0	57.1	83.4
(2)	96.5	54.5	-	9.4	16.6
(3)	1.1	-	5.0	33.5	-
23. TGFIXAST					
Total	320868.0	21921.2	528.1	508.9	3071.2
		(6.8)	(0.2)	(0.2)	(1.0)
Own (1)	11.6	65.9	97.8	76.0	67.4
(2)	86.9	34.1	-	5.6	32.6
(3)	1.5	-	2.2	18.4	-
24. MGVAL					
Total	173661.4	10151.2	213.9	110.4	1722.9
		(5.8)	(0.1)	(0.06)	(1.0)
Own (1)	11.1	63.4	97.8	79.7	73.0
(2)	88.2	36.6	-	15.4	27.0
(3)	0.7	-	2.2	4.9	-

Variable	INDUS(5)	INDUS(6)	INDUS(7)	INDUS(8)	INDUS(9)
19. MTOTPUR					
Total	692375.2	13526.2	30173.2	12056.0	1356.1
	(91.1)	(1.8)	(4.0)	(1.6)	(0.2)
Own (1)	0.1	47.7	-	19.7	24.3
(2)	99.9	-	100.0	80.3	-
(3)	-	52.3	-	-	75.7
20. MTOTUSD					
Total	692196.2	13372.8	33467.9	12219.7	1356.1
	(90.7)	(1.8)	(4.4)	(1.6)	(0.2)
Own (1)	0.1	48.4	-	17.7	24.3
(2)	99.9	-	100.0	82.3	-
(3)	-	51.6	-	-	75.7
21. TOTENG					
Total	4956.9	1021.8	4685.6	1042.4	6.4
	(40.4)	(8.3)	(38.1)	(8.5)	(0.05)
Own (1)	3.2	99.95	-	11.8	75.0
(2)	96.8	-	100.0	88.2	-
(3)	-	0.05	-	-	25.0
22. TOTINP					
Total	702398.4	16110.7	43370.7	14468.1	1471.9
	(88.9)	(2.0)	(5.5)	(1.8)	(0.2)
Own (1)	0.2	51.9	-	17.2	27.1
(2)	99.8	-	100.0	82.8	-
(3)	-	48.1	-	-	72.9
23. TGFIXAST					
Total	104883.5	14569.6	97585.8	77671.2	128.5
	(32.7)	(4.5)	(30.4)	(24.2)	(0.04)
Own (1)	6.3	67.1	-	4.0	68.9
(2)	93.7	-	100.0	96.0	-
(3)	-	32.9	-	-	31.1
24. MGVAL					
Total	93397.4	7224.8	49367.1	11400.7	73.0
	(53.8)	(4.2)	(28.4)	(6.6)	(0.04)
Own (1)	4.1	82.7	-	12.2	58.9
(2)	95.9	-	100.0	87.8	-
(3)	-	17.3	-	-	41.1

Variable	All INDUS	INDUS(1)	INDUS(2)	INDUS(3)	INDUS(4)
25. PDCAP					
Total	400353.0	20835.0	648.2	726.3	3330.0
		(5.2)	(0.2)	(0.2)	(0.8)
Own (1)	10.2	76.5	94.3	76.8	67.0
(2)	76.9	23.5	-	4.7	30.0
(3)	12.9	-	5.7	18.6	-
26. OTHINCE					
Total	28740.0	2358.0	233.4	132.9	20.3
		(8.2)	(0.8)	(0.5)	(0.07)
Own (1)	5.9	30.9	74.3	33.0	69.5
(2)	93.6	69.1	-	4.5	30.5
(3)	0.5	-	25.7	62.5	-
27. DEP					
Total	27229.9	2237.4	41.4	38.4	306.9
		(8.2)	(0.2)	(0.2)	(1.1)
Own (1)	14.3	67.9	97.1	79.4	67.9
(2)	83.6	32.1	-	10.4	32.1
(3)	2.0	-	2.9	10.2	-
28. RENT					
Total	2005.2	208.1	81.3	17.8	40.4
		(10.4)	(4.1)	(0.9)	(2.0)
Own (1)	24.4	56.3.	91.5	89.9	100.0
(2)	65.2	43.7	-	10.1	0.0
(3)	10.4	-	8.5	0.0	-
29. INDSV					
Total	3214.5	57.6	0.0	53.4	0.0
		(1.8)		(1.7)	
Own (1)	14.4	3.1	0.0	66.3	0.0
(2)	85.2	96.9	-	11.2	0.0
(3)	0.4	-	0.0	22.5	-
30. TVA					
Total	170669.7	4662.4	835.9	515.9	2390.5
		(2.7)	(0.5)	(0.3)	(1.4)
Own (1)	13.3	48.4	91.4	73.1	100.2
(2)	85.5	51.6	-	6.1	-0.002
(3)	1.2	-	8.6	20.8	-

Variable	INDUS(5)	INDUS(6)	INDUS(7)	INDUS(8)	INDUS(9)
25. PDCAP					
Total	89248.6	59516.0	89000.0	134848.9	2200.0
	(22.3)	(14.9)	(22.2)	(33.7)	(0.5)
Own (1)	9.2	16.0	-	2.2	38.6
(2)	90.8	-	100.0	97.8	-
(3)	-	84.0	-	-	61.4
26. OTHINCE					
Total	16669.3	456.7	0.0	8786.9	82.5
	(58.0)	1.6)		(30.6)	(0.3)
Own (1)	0.1	100./0	-	1.9	99.5
(2)	99.9	-	0.0	98.1	-
(3)	-	0.0	-	-	0.005
27. DEP					
Total	11389.7	1503.8	5818.7	5872.4	21.2
	(41.8)	(5.5)	(21.4)	(21.6)	(0.08)
Own (1)	6.9	63.8	-	6.0	79.7
(2)	93.1	-	100.0	94.0	-
(3)	-	36.2	-	-	20.3
28. RENT					
Total	1058.6	263.8	14.0	278.0	43.2
	(52.8)	(13.2)	(0.7)	(13.9)	(2.2)
Own (1)	2.4	33.7	-	39.6	37.3
(2)	97.6	-	100.0	60.4	-
(3)	-	66.3	-	-	62.7
29. INDSV					
Total	2676.7	406.9	0.0	19.5	0.4
	(83.3)	(12.7)		(0.6)	(0.01)
Own (1)	0.0	100.0	-	100.0	0.0
(2)	100.0	-	0.0	0.0	-
(3)		0.0	-	-	100.0
30. TVA					
Total	106897.3	13309.5	31936.8	9437.10	684.3
	(62.6)	(7.8)	(18.7)	(5.5)	(0.4)
Own (1)	1.6	89.3	-	32.4	43.1
(2)	98.4	-	100.0	67.6	-
(3)	-	10.7	-	-	56.9

Variable	All INDUS	INDUS(1)	INDUS(2)	INDUS(3)	INDUS(4)
31. PROFIT					
Total	103717.2	2639.7	422.2	382.3	1085.10
		(2.5)	(0.4)	(0.4)	(1.0)
Own (1)	14.6	39.7	89.6	72.7	110.5
(2)	83.6	60.3		3.7	-10.5
(3)	1.8	-	10.4	23.6	-

Variable	INDUS(5)	INDUS(6)	INDUS(7)	INDUS(8)	INDUS(9)
31. PROFIT					
Total	71946.8	10699.4	15519.7	466.5	555.5
	(69.4)	(10.3)	(15.0)	(0.4)	(0.5)
Own (1)	1.6	86.9	-	332.4	41.3
(2)	98.4	-	100.0	-232.4	-
(3)	-	13.1	-	-	58.7

NOTES

1. The industries from (1) to (9) are defined as follows:

INDUS (1)	=	Food & Beverage
INDUS (2)	=	Wearing Apparel & Leather
INDUS (3)	=	Wood Products
INDUS (4)	=	Paper Products & Printing
INDUS (5)	=	Chemicals & Chemical, Petroleum and Plastic Products
INDUS (6)	=	Non-Metallic Mineral Products except of Petroleum (Construction Materials)
INDUS (7)	=	Basic Metal (Aluminium)
INDUS (8)	=	Fabricated Metal, Products, Machinery and Equipment
INDUS (9)	=	Jewellery

2. The group (ALL INDUS) refers to the industries from INDUS (1) to INDUS (9)

3. The term OWN refers to the type of ownership which is defined as follows: OWN (1) = Full Bahraini Ownership; OWN (2) = Joint Venture; OWN (3) = Full Foreign Ownership. The values of (OWN) are percentage of the corresponding (total) in specific (INDUS)

4. The values between brackets under each total are percentage of the total in (ALL INDUS)

5. For definition of all variables see table (7.2) and table (7.3)

APPENDIX D

Theorem:

If variates Yi, Xi are measured on each unit of a simple random sample size n, assumed large, the mean square error (MSE) and variance of $\bar{r} = \bar{X}(s)/\bar{Y}(s)$ are each approximately

$$MSE(\bar{r}) \doteq V(\bar{r}) \doteq 1/\bar{Y}_p^{-2} \quad N - n/nN \sum_{i=1}^{N} [Y(si) - R\,X(si)]^2 / N - 1 \qquad (1)$$

Where $R = \bar{X}(p)/\bar{Y}(p)$ is the ratio of the population means, and $(\bar{r})$ is the sample estimate

$$\bar{r} - R = \bar{X}(s)/\bar{Y}(s) - R = \bar{X}(s) - R\,\bar{Y}(s)/\bar{Y}(s)$$

if n is large, $\bar{Y}(s)$ should not differ greaterly from $\bar{Y}(p)$. In order to avoid having to work out the distribution of the ratio of two random variables $(\bar{X}(s)-R\,\bar{Y}(s))$ and $\bar{Y}(s)$, we replace $\bar{Y}(s)$ by $\bar{Y}(p)$ in the denominator as an approximation. This gives

$$\bar{r} - R = \bar{X}(s) - R\,\bar{Y}(s)/\bar{Y}(p) \qquad (2)$$

Now average over all simple random samples of size n.

$$E(\bar{r} - R) = E[\bar{X}(S) - R\,\bar{Y}(s)]/\bar{Y}(p)$$
$$= \bar{X}(p) - R\,\bar{Y}(p)/\bar{Y}(p) = 0 \qquad (3)$$

Since $R = \bar{X}(p)/\bar{Y}(p)$.

This shows that to the order of approximation used here $\bar{r}$ is an unbiased estimate of R. From (3) we also obtain the result

$$MSE\,(\bar{r}) = E\,(\bar{r} - R)^2 = 1/\bar{Y}(p)^{-2}\; E\,(\bar{X}(s) - R\,\bar{Y}(s))^2 \qquad (4)$$

The quantity of $\bar{X}(s)-R\bar{Y}(s)$ is the sample mean of the variate d(i) = X(si)-RY(si), whose population mean $\bar{D} = \bar{X}(p)-R\bar{Y}(p) = 0$. Hence we find $V(\bar{r})$ by applying the formula for the variance of the mean of a simple random sample to the variate d(i) and dividing by $\bar{Y}(p)^2$, this gives

$$\begin{aligned} V(\bar{r}) &= 1/Y(p)^{-2}\;\; E\,(\bar{X}(s) - R\,\bar{Y}(s))^2 \\ &= 1/Y(p)^{-2}\;\; S(d)^2/n \quad (N - n)/N \\ &= 1/Y(p)^{-2}\;\; N - n/nN \;\sum_{i=1}^{N}(d(i) - \bar{D})^2 /N - 1 \\ &= 1/Y(p)^{-2}\;\; N - n/nN \;\sum_{i=1}^{N}(X(si) - R\,Y(si))^2 /N - 1 \qquad (5) \end{aligned}$$

This completes the proof. It is worth noting that the formula for the variance of the sample mean $\bar{X}(s)$, that is,

$$\begin{aligned} V\,(\bar{X}(s)) &= E\,(\bar{X}(s) - \bar{X}(p))^2 \\ &= S^2/n \quad N - n/N \\ &= S^2/n \quad N - n/N \end{aligned}$$

gives the formula for the approximate variance of the ratio $\bar{X}(s)/\bar{Y}(s)$, if the variates X(i) is replaced by the variates X(si) - R Y(si)/$\bar{Y}$(p). For the estimated standard error of $\bar{r}$, this gives:

$$S(\bar{r}) = 1/\bar{Y}(p)\,\sqrt{N-n/nN}\;\sqrt{\sum[X(si) - \bar{r}\,Y(si)]^2 /n-1}$$

If $\bar{Y}$ is not known, the sample estimate $\bar{Y}(s)$ is substituted in the denominator.

See William G Cochran, Sampling Techniques, Third Edition (NY 1977), pp 31-32.

APPENDIX E

TABLE(2): Classification Results Of Group ALL

CASE SEQNUM	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRM SCORES
1	1		1	0.6877	0.7174	2	0.2826	-0.0425
2	1		1	0.9930	0.8388	2	0.1612	-0.4358
3	1		1	0.9204	0.8150	2	0.1850	-0.3446
4	1	**	2	0.5831	0.6600	1	0.3400	0.8315
5	2	**	1	0.7741	0.7579	2	0.2421	-0.1574
6	1		1	0.6704	0.7086	2	0.2914	-0.0190
7	2	**	1	0.8237	0.8881	2	0.1119	-0.6674
8	1		1	0.8616	0.7936	2	0.2064	-0.2702
9	1		1	0.9658	0.8302	2	0.1698	-0.4016
10	1		1	0.8897	0.8041	2	0.1959	-0.3058
11	1		1	0.5781	0.6570	2	0.3430	0.1117
12	2	**	1	0.9319	0.8607	2	0.1393	-0.5300
13	2	**	1	0.6362	0.6904	2	0.3096	0.0284
14	1		1	0.5980	0.6688	2	0.3312	0.0828
15	1		1	0.6015	0.6708	2	0.3292	0.0778
16	1		1	0.5438	0.9412	2	0.0588	-1.0516
17	1		1	0.7381	0.7417	2	0.2583	-0.1102
18	1		1	0.5426	0.9414	2	0.0586	-1.0535
19	1		1	0.5932	0.9334	2	0.0666	-0.9788
20	1		1	0.5685	0.9374	2	0.0626	-1.0148
21	1		1	0.6966	0.9150	2	0.0850	-0.8345
22	1		1	0.8414	0.7858	2	0.2142	-0.2444
23	1		1	0.5511	0.9401	2	0.0599	-1.0406
24	1		1	0.5511	0.9401	2	0.0599	-1.0406
25	1		1	0.6890	0.9165	2	0.0835	-0.8448
26	1		1	0.5172	0.9452	2	0.0548	-1.0921
27	1		1	0.7958	0.8945	2	0.1055	-0.7032
28	2	**	1	0.8497	0.8819	2	0.1181	-0.6340
29	1		1	0.5117	0.9460	2	0.0540	-1.1007
30	1		1	0.6039	0.9316	2	0.0684	-0.9633
31	UNGRPD		1	0.6648	0.7057	2	0.2943	-0.0113
32	1		1	0.4813	0.9503	2	0.0497	-1.1488
33	2		2	0.4200	0.9584	1	0.0416	2.1868
34	1		1	0.6305	0.9271	2	0.0729	-0.9256
35	1		1	0.5801	0.6582	2	0.3418	0.1087
36	1		1	0.9875	0.8447	2	0.1553	-0.4601
37	1		1	0.5951	0.6671	2	0.3329	0.0869
38	2		2	0.0334	0.9961	1	0.0039	3.5078
39	2		2	0.0180	0.9975	1	0.0025	3.7457
40	2		2	0.4122	0.5421	1	0.4579	0.5603
41	1	**	2	0.4840	0.5958	1	0.4042	0.6805
42	1	**	2	0.9560	0.8270	1	0.1730	1.3252
43	1		1	0.7884	0.8961	2	0.1039	-0.7128
44	1		1	0.5861	0.9345	2	0.0655	-0.9891

45	1		1	0.7890	0.7643	2	0.2357	-0.1769
46	1		1	0.9163	0.8136	2	0.1864	-0.3394
47	1	**	2	0.3986	0.5311	1	0.4689	0.5362
48	2		2	0.3895	0.9621	1	0.0379	2.2408
49	1		1	0.6523	0.6991	2	0.3009	0.0060
50	1		1	0.4406	0.5641	2	0.4359	0.3266
51	2		2	0.0001	0.9998	1	0.0002	5.1803
52	2		2	0.1837	0.9836	1	0.0164	2.7098
53	2		2	0.1957	0.9825	1	0.0175	2.6742
54	1		1	0.9226	0.8632	2	0.1368	-0.5417
55	2	**	1	0.8681	0.8774	2	0.1226	-0.6105
56	1		1	0.5878	0.9343	2	0.0657	-0.9866
57	2	**	1	0.9551	0.8542	2	0.1458	-0.5008
58	1		1	0.7466	0.7456	2	0.2544	-0.1214
59	1		1	0.8890	0.8721	2	0.1279	-0.5841
60	1		1	0.8157	0.7755	2	0.2245	-0.2114
61	1		1	0.9715	0.8494	2	0.1506	-0.4802
62	2		2	0.3663	0.5041	1	0.4959	0.4768
63	1		1	0.6598	0.9219	2	0.0781	-0.8846
64	1		1	0.8648	0.8782	2	0.1218	-0.6148
65	1		1	0.5607	0.9386	2	0.0614	-1.0263
66	1		1	0.7203	0.9104	2	0.0896	-0.8025
67	1		1	0.6159	0.9296	2	0.0704	-0.9461
68	1		1	0.8907	0.8717	2	0.1283	-0.5820
69	1		1	0.5397	0.9418	2	0.0582	-1.0578
70	1		1	0.7136	0.9117	2	0.0883	-0.8116
71	1		1	0.5368	0.6313	2	0.3687	0.1731
72	1		1	0.6514	0.9234	2	0.0766	-0.8963
73	2		2	0.4452	0.5676	1	0.4324	0.6169
74	2		2	0.1667	0.9851	1	0.0149	2.7633
75	2		2	0.2095	0.9812	1	0.0188	2.6352
76	1		1	0.6739	0.7103	2	0.2897	-0.0237
77	1		1	0.7109	0.9122	2	0.0878	-0.8152
78	1		1	0.9240	0.8162	2	0.1838	-0.3491
79	1		1	0.8012	0.7695	2	0.2305	-0.1928

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 FULL BAHRIANI OWNERS	59	55 93.2%	4 6.8%
GROUP 2 JOINT VENTURE	19	7 36.8%	12 63.2%
UNGROUPED CASES	1	1 100.0%	0 0.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 85.90%

TABLE (3): Classification Results Of Group ALL

CASE SEQNUM	ACTUAL GROUP	HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRM SCORES
1	1	1	0.6549	0.6588	2	0.3412	-0.0160
2	1	1	0.8658	0.8444	2	0.1556	-0.6319
3	1	1	0.9257	0.7775	2	0.2225	-0.3696
4	1	1	0.7675	0.7134	2	0.2866	-0.1673
5	2 **	1	0.7414	0.7014	2	0.2986	-0.1328
6	1	1	0.6851	0.6742	2	0.3258	-0.0574
7	2 **	1	0.6925	0.8881	2	0.1119	-0.8584
8	1	1	0.9715	0.7938	2	0.2062	-0.4271
9	1	1	0.9198	0.7754	2	0.2246	-0.3623
10	1	1	0.5328	0.9209	2	0.0791	-1.0867
11	1	1	0.5955	0.6264	2	0.3736	0.0680
12	2 **	1	0.5271	0.9220	2	0.0780	-1.0954
13	2 **	1	0.7239	0.6932	2	0.3068	-0.1096
14	1	1	0.6321	0.6467	2	0.3533	0.0159
15	1	1	0.6854	0.6744	2	0.3256	-0.0577
16	1	1	0.3795	0.9470	2	0.0530	-1.3417
17	1	1	0.4265	0.9395	2	0.0605	-1.2580
18	2	2	0.0032	0.9983	1	0.0017	4.1601
19	2	2	0.1009	0.9846	1	0.0154	2.8554
20	2	2	0.4432	0.5302	1	0.4698	0.4483
21	1 **	2	0.5832	0.6194	1	0.3806	0.6664
22	1 **	2	0.9901	0.8067	1	0.1933	1.2275
23	1	1	0.4796	0.9305	2	0.0695	-1.1698
24	1	1	0.4975	0.9273	2	0.0727	-1.1414
25	1	1	0.9258	0.7775	2	0.2225	-0.3697
26	1	1	0.9822	0.8093	2	0.1907	-0.4851
27	1	1	0.4353	0.5247	2	0.4753	0.3173
28	2	2	0.1551	0.9780	1	0.0220	2.6367
29	1	1	0.9869	0.7990	2	0.2010	-0.4465
30	1	1	0.5404	0.5940	2	0.4060	0.1494
31	2	2	0.0716	0.9882	1	0.0118	3.0167
32	2	2	0.1067	0.9839	1	0.0161	2.8283
33	1	1	0.9128	0.8308	2	0.1692	-0.5724
34	2 **	1	0.8155	0.8581	2	0.1419	-0.6962
35	1	1	0.5745	0.9129	2	0.0871	-1.0243
36	2 **	1	0.9556	0.8178	2	0.1822	-0.5186
37	1	1	0.8443	0.7462	2	0.2538	-0.2665
38	1	1	0.7751	0.8684	2	0.1316	-0.7486
39	1	1	0.6994	0.6813	2	0.3187	-0.0767
40	1	1	0.9795	0.8102	2	0.1898	-0.4886
41	2	2	0.5401	0.5938	1	0.4062	0.6024
42	1	1	0.6556	0.8963	2	0.1037	-0.9089
43	1	1	0.8831	0.8395	2	0.1605	-0.6100
44	1	1	0.5202	0.9232	2	0.0768	-1.1060
45	1	1	0.6925	0.8881	2	0.1119	-0.8584
46	1	1	0.6359	0.9005	2	0.0995	-0.9364
47	1	1	0.8505	0.8486	2	0.1514	-0.6513
48	1	1	0.5094	0.9252	2	0.0748	-1.1226

49	1	1	0.7518	0.8742	2	0.1258	-0.7792
50	1	1	0.5442	0.5963	2	0.4037	0.1436
51	1	1	0.6821	0.8904	2	0.1096	-0.8725
52	2	2	0.9290	0.7787	1	0.2213	1.1260
53	2	2	0.2541	0.9652	1	0.0348	2.3556
54	2	2	0.1079	0.9838	1	0.0162	2.8230
55	1	1	0.7172	0.6900	2	0.3100	-0.1007
56	1	1	0.7516	0.8742	2	0.1258	-0.7795
57	1	1	0.9967	0.8045	2	0.1955	-0.4671
58	1	1	0.8481	0.7477	2	0.2523	-0.2714

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1	42	40	2
FULL BAHRIANI OWNERS		95.2%	4.8%
GROUP 2	16	6	10
JOINT VENTURE		37.5%	62.5%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 86.21%

TABLE(4): Classification Results Of Group ALL

CASE SEQNUM	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRIM SCORES
1	1		1	0.8702	0.7389	2	0.2611	-0.3019
2	1		1	0.9642	0.7985	2	0.2015	-0.5102
3	1		1	0.9853	0.7815	2	0.2185	-0.4469
4	1		1	0.8072	0.7130	2	0.2870	-0.2214
5	2	**	1	0.6707	0.6497	2	0.3503	-0.0402
6	1		1	0.8421	0.7276	2	0.2724	-0.2662
7	2	**	1	0.7944	0.8488	2	0.1512	-0.7260
8	1		1	0.8692	0.8278	2	0.1722	-0.6301
9	1		1	0.9282	0.7611	2	0.2389	-0.3752
10	1		1	0.8704	0.8275	2	0.1725	-0.6286
11	1		1	0.6872	0.6579	2	0.3421	-0.0627
12	2	**	1	0.4990	0.9165	2	0.0835	-1.1414
13	2	**	1	0.8869	0.8226	2	0.1774	-0.6076
14	1		1	0.9474	0.7681	2	0.2319	-0.3994
15	1		1	0.9755	0.7948	2	0.2052	-0.4961
16	1		1	0.6499	0.8847	2	0.1153	-0.9192
17	1		1	0.8485	0.7302	2	0.2698	-0.2744
18	2		2	0.0181	0.9941	1	0.0059	3.5142
19	2		2	0.0178	0.9941	1	0.0059	3.5197
20	2	**	1	0.7349	0.6808	2	0.3192	-0.1267
21	1		1	0.5966	0.6105	2	0.3895	0.0639
22	1	**	2	0.6259	0.6264	1	0.3736	0.6623
23	1		1	0.4931	0.9177	2	0.0823	-1.1507
24	1		1	0.7197	0.8680	2	0.1320	-0.8242
25	1		1	0.9513	0.8026	2	0.1974	-0.5264
26	1		1	0.8515	0.8329	2	0.1671	-0.6525
27	1		1	0.5794	0.6009	2	0.3991	0.0888
28	2		2	0.6291	0.8894	1	0.1106	1.6327
29	1		1	0.7682	0.6960	2	0.3040	-0.1706
30	1	**	2	0.4368	0.5121	1	0.4879	0.3721
31	2		2	0.0003	0.9992	1	0.0008	4.7800
32	2		2	0.2387	0.9611	1	0.0389	2.3281
33	2		2	0.2560	0.9585	1	0.0415	2.2856
34	1		1	0.8613	0.8301	2	0.1699	-0.6401
35	2	**	1	0.7450	0.8617	2	0.1383	-0.7907
36	1		1	0.7225	0.8674	2	0.1326	-0.8205
37	2	**	1	0.8858	0.8229	2	0.1771	-0.6090
38	1		1	0.8439	0.8351	2	0.1649	-0.6623
39	1		1	0.6812	0.8774	2	0.1226	-0.8761
40	1		1	0.7673	0.6956	2	0.3044	-0.1695
41	1		1	0.9787	0.7937	2	0.2063	-0.4921
42	2	**	1	0.4281	0.5061	2	0.4939	0.3271
43	1		1	0.8413	0.8359	2	0.1641	-0.6656
44	1		1	0.9185	0.8130	2	0.1870	-0.5677
45	1		1	0.6779	0.8782	2	0.1218	-0.8807
46	1		1	0.7217	0.8676	2	0.1324	-0.8216
47	1		1	0.7690	0.8555	2	0.1445	-0.7590
48	1		1	0.9271	0.8103	2	0.1897	-0.5568

49	1	1	0.6432	0.8862	2	0.1138	-0.9286
50	1	1	0.9289	0.8098	2	0.1902	-0.5546
51	1	1	0.7236	0.6755	2	0.3245	-0.1117
52	1	1	0.8274	0.8397	2	0.1603	-0.6833
53	2	2	0.8473	0.7297	1	0.2703	0.9571
54	2	2	0.2694	0.9564	1	0.0436	2.2541
55	2	2	0.4017	0.9345	1	0.0655	1.9882
56	1	1	0.8827	0.7438	2	0.2562	-0.3178
57	1	1	0.9245	0.8111	2	0.1889	-0.5601
58	1	1	0.8788	0.8250	2	0.1750	-0.6179
59	1	1	0.7828	0.7025	2	0.2975	-0.1897

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 FULL BAHRIANI OWNERS	42	40 95.2%	2 4.8%
GROUP 2 JOINT VENTURE	17	8 47.1%	9 52.9%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 83.05%

TABLE(5): **Classification Results Of INDUS I**

CASE SEQNUM	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRM SCORES
1	1		1	0.8071	0.8676	2	0.1324	-0.6465
2	1		1	0.6810	0.8971	2	0.1029	-0.8134
3	1		1	0.6473	0.9042	2	0.0958	-0.8598
4	1		1	0.7836	0.8734	2	0.1266	-0.6769
5	2		2	0.5299	0.9266	1	0.0734	1.9358
6	1		1	0.6836	0.8965	2	0.1035	-0.8099
7	2	**	1	0.6975	0.6894	2	0.3106	-0.0136
8	1	**	2	0.9785	0.8047	1	0.1953	1.2807
9	1		1	0.7039	0.8921	2	0.1079	-0.7824
10	1		1	0.6313	0.9074	2	0.0926	-0.8823
11	1		1	0.9211	0.8364	2	0.1636	-0.5014
12	2		2	0.0295	0.9944	1	0.0056	3.4841
13	2	**	1	0.8207	0.7454	2	0.2546	-0.1757
14	1		1	0.6824	0.8968	2	0.1032	-0.8115
15	1	**	2	0.4679	0.5550	1	0.4450	0.5817
16	1		1	0.7104	0.8906	2	0.1094	-0.7737
17	1	**	2	0.3994	0.5052	1	0.4948	0.4649

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 FULL BAHRIANI OWNERS	13	10 76.9%	3 23.1%
GROUP 2 JOINT VENTURE	4	2 50.0%	2 50.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 70.59%

TABLE(6): Classification Results Of INDUS V

CASE SEQNUM	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRM SCORES
1	2		2	0.7997	0.9974	1	0.0026	2.4754
2	2		2	0.4906	0.9994	1	0.0006	2.9110
3	2	**	1	0.1818	0.7035	2	0.2965	0.3479
4	1		1	0.5597	0.9636	2	0.0364	-0.4042
5	1		1	0.5668	0.9648	2	0.0352	-0.4147
6	1		1	0.1767	0.9999	2	0.0001	-2.3383
7	1		1	0.8853	0.9964	2	0.0036	-1.1317
8	1		1	0.9721	0.9948	2	0.0052	-1.0224
9	1		1	0.4124	0.9996	2	0.0004	-1.8071
10	1		1	0.4727	0.9994	2	0.0006	-1.7054
11	2		2	0.3520	0.9997	1	0.0003	3.1524
12	1		1	0.6672	0.9774	2	0.0226	-0.5574
13	1		1	0.1384	0.5973	2	0.4027	0.4943

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1	9	9	0
FULL BAHRIANI OWNERS		100.0%	0.0%
GROUP 2	4	1	3
JOINT VENTURE		25.0%	75.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 92.31%

TABLE(7): Classification Results Of INDUS VIII

CASE SEQNUM	ACTUAL GROUP	HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRM SCORES
1	2	2	0.1387	0.9986	1	0.0014	3.2206
2	2	2	0.1437	0.9985	1	0.0015	3.2019
3	1	1	0.9664	0.9556	2	0.0444	-0.7381
4	2 **	1	0.7300	0.9783	2	0.0217	-1.0411
5	1	1	0.6854	0.9812	2	0.0188	-1.1010
6	2 **	1	0.9838	0.9487	2	0.0513	-0.6756
7	1	1	0.9307	0.9600	2	0.0400	-0.7829
8	1	1	0.6051	0.9856	2	0.0144	-1.2130
9	1	1	0.3657	0.6821	2	0.3179	0.2085
10	1	1	0.7983	0.9125	2	0.0875	-0.4404
11	2	2	0.3414	0.6568	1	0.3432	0.7885
12	1	1	0.9254	0.9606	2	0.0394	-0.7896
13	1	1	0.9176	0.9379	2	0.0621	-0.5926
14	1	1	0.5987	0.9859	2	0.0141	-1.2223
15	1	1	0.6837	0.9813	2	0.0187	-1.1033
16	1	1	0.7784	0.9747	2	0.0253	-0.9774
17	1	1	0.9003	0.9347	2	0.0653	-0.5707
18	1	1	0.5336	0.9888	2	0.0112	-1.3185
19	1	1	0.8968	0.9341	2	0.0659	-0.5663
20	1	1	0.3074	0.6179	2	0.3821	0.3247
21	1	1	0.8972	0.9638	2	0.0362	-0.8252
22	2	2	0.4625	0.9915	1	0.0085	2.4747
23	2	2	0.1329	0.9987	1	0.0013	3.2426
24	2	2	0.3331	0.9952	1	0.0048	2.7078
25	1	1	0.8404	0.9225	2	0.0775	-0.4946
26	1	1	0.9055	0.9357	2	0.0643	-0.5772
27	1	1	0.9981	0.9508	2	0.0492	-0.6935
28	1	1	0.8026	0.9135	2	0.0865	-0.4459

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 FULL BAHRIANI OWNERS	20	20 100.0%	0 0.0%
GROUP 2 JOINT VENTURE	8	2 25.0%	6 75.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 92.86%

TABLE(8): Classification Results Of INDUS VIIIAL

CASE SEQNUM	ACTUAL GROUP	HIGHEST PROBABILITY GROUP P(D/G) P(G/D)	2ND HIGHEST GROUP P(G/D)	DISCRM SCORES
1	2	2 0.2433 0.9154	1 0.0846	1.8206
2	2	2 0.2222 0.9207	1 0.0793	1.8747
3	1	1 0.8022 0.6289	2 0.3711	-0.4034
4	2 **	1 0.9255 0.7266	2 0.2734	-0.7474
5	1	1 0.8717 0.7439	2 0.2561	-0.8154
6	2 **	1 0.7478 0.6070	2 0.3930	-0.3324
7	1	1 0.8417 0.6443	2 0.3557	-0.4542
8	1	1 0.7728 0.7743	2 0.2257	-0.9426

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 FULL BAHRIANI OWNERS	4	4 100.0%	0 0.0%
GROUP 2 JOINT VENTURE	4	2 50.0%	2 50.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 75.00%

TABLE(9): **Classification Results Of INDUS VIIIoth**

CASE SEQNUM	ACTUAL GROUP	HIGHEST PROBABILITY GROUP	P(D/G)	P(G/D)	2ND HIGHEST GROUP	P(G/D)	DISCRM SCORES
1	1	1	0.1663	0.9995	2	0.0005	0.2812
2	1	1	0.9450	1.0000	2	0.0000	-1.0340
3	2	2	0.0387	0.9783	1	0.0217	2.3449
4	1	1	0.7541	1.0000	2	0.0000	-1.4162
5	1	1	1.0000	1.0000	2	0.0000	-1.1020
6	1	1	0.1983	1.0000	2	0.0000	-2.3895
7	1	1	0.2443	1.0000	2	0.0000	-2.2672
8	1	1	0.5079	1.0000	2	0.0000	-1.7651
9	1	1	0.5972	1.0000	2	0.0000	-0.5745
10	1	1	0.2496	1.0000	2	0.0000	-2.2543
11	1	1	0.6058	1.0000	2	0.0000	-0.5869
12	1	1	0.1976	0.9997	2	0.0003	0.1854
13	1	1	0.4886	1.0000	2	0.0000	-1.7956
14	2	2	0.6558	1.0000	1	0.0000	4.8577
15	2	2	0.4391	1.0000	1	0.0000	5.1857
16	2	2	0.3965	1.0000	1	0.0000	5.2599
17	1	1	0.9847	1.0000	2	0.0000	-1.0838
18	1	1	0.9391	1.0000	2	0.0000	-1.1794
19	1	1	0.9141	1.0000	2	0.0000	-1.2109
20	1	1	0.0994	0.9978	2	0.0022	0.5446

CLASSIFICATION RESULTS

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 FULL BAHRIANI OWNERS	16	16 100.0%	0 0.0%
GROUP 2 JOINT VENTURE	4	0 0.0%	4 100.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 100.00%

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