1984

Saudi Arabian Industrial Development and Manpower Requirement: Problems and Prospects

Saud Saleh Alsaleh
University of Rhode Island

SAUDI ARABIAN INDUSTRIAL DEVELOPMENT AND MANPOWER REQUIREMENT: PROBLEMS AND PROSPECTS

BY

SAUD SALEH ALSALEH

A THESIS SUBMITTED IN PARITAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF ART

IN

ECONOMICS

UNIVERSITY OF RHODE ISLAND

1984

MASTER OF ARTS THESIS

OF

SAUD SALEH ALSALEH

APPROVED:

Thesis Committee

Major Professor

Gilbert S. Suzawa

Harold C. Barnard

William Crandale

A. A. Michel

DEAN OF THE GRADUATE SCHOOL

UNIVERSITY OF RHODE ISLAND

1984

Abstract

The shortage of qualified Saudi manpower has arisen as the most serious obstacle to Saudi industrial development and economic diversification. This study addresses the labor problem by projecting the industrial sector's manpower needs and the availability of such labor in the indigenous population, then by projecting the number of expatriate workers required to ensure the industrial sector's steady growth and prosperity.

In addition, the educational system is examined and the number of higher and vocational education graduates are projected to show to what extent the educational system can supply the necessary workers. The rationale behind industrialization, the reasons for the manpower shortage, and the negative aspects of depending on expatriate workers are also discussed.

The primary finding of this study is that the industrial sector will continue to depend largely on expatriate workers, particularly in the private sector, i.e., non-oil manufacturing establishments. Secondly, this study concludes that graduates of the educational system will be able to fill a relatively large number of job openings, especially for middle- and high-level positions. Nonetheless, there will not be enough Saudi workers to create a self-sufficient economy in terms of manpower in the near future. Finally, this study finds that there are many current practices and policies negatively affecting the growth of new manpower for the development process and some corrective policies have been proposed.

Acknowledgements

I would like to express my deep appreciation and gratitude to my thesis committee for their continuous encouragement, guidance and valuable advice that made this study possible.

Table of Contents

List of Tables

List of Tables (continued)

Chapter V

List of Figures

CHAPTER I

INTRODUCTION

Purpose of the Study

Saudi Arabia's economy has been largely dependent on crude oil exports. When world demand for oil increased and oil prices began to rise in the 1970's, more revenue became available, which in turn enabled the kingdom to accelerate its economic and social development process. However, the increased development in turn created an increased demand for manpower. Furthermore, because oil is a depletable resource, one of the primary goals of the planned development process is a reduction of the country's dependence on crude oil exports by creating a variety of additional sources of national income, which further taxes the labor pool.

The domestic population cannot adequately provide the number of workers or the wide range of skills required. These skills will take considerable time to develop because of the many social, historical, and administrative factors involved. (These we will discuss in later chapters.) When the industrial sector was chosen to be the central arena for the diversification of the country's sources of revenues, the manpower problem arose as the most serious obstacle to industrial development, and as a result, to Saudi Arabia's diversification objective.

This study addresses the labor problem by projecting the industrial sector's manpower needs and the availability of such labor in the indigenous Saudi labor market, and by projecting the number of

expatriate workers required to ensure the industrial sector's steady growth and prosperity. In addition, the educational system is examined and the number of higher and vocational education graduates are projected to show to what extent the educational system can supply the workers with the necessary skill levels. The rationale behind industrialization, the reasons for the manpower shortage, and the negative aspects of reliance on expatriate workers are also discussed.

Outline of the Study

Chapter II begins with a brief background of Saudi Arabian geography, language, religion, population, and climate, followed by a short discussion of the structure of Saudi economy, showing the importance of the oil industry to the economy. Because background is helpful in analyzing the present and projecting the future, the country's manufacturing history is presented, including a discussion of some of the primary goods produced. The Saudi Arabian rationale behind industrialization is then discussed in some detail and the industrial sector is described at length. The institutional framework and the problems of industrial development are also analyzed in Chapter II.

Chapter III concentrates on the overall manpower condition in Saudi Arabia. It begins with an analysis of the population to the present time and projects the future population through 1990, using a specific growth rate. The Saudi labor force is discussed next in terms of distribution according to economic sectors, nationality, sex, and age. The factors limiting a complete Saudi participation in the

labor force are reviewed. Finally, the reasons for the presence of expatriate workers are examined, as well as some of the problems this situation creates.

After Chapters II and III provide the background information, Chapter IV launches into the main tasks of this thesis. In this chapter, the needs of each of the three industrial sector components are projected through 1990, based on specific growth rates calculated through the use of previous industrial subsector growth during the last 10 to 13 years. The results are added together to provide the total projected needs of the industrial sector.

Calculations for the supply of indigenous industrial labor are based on the projected population, expected participation rate of Saudi males of specific ages in the population, and the distribution of labor according to economic sectors. The projected supply and demand of industrial labor are compared in order to calculate the number of expatriate workers needed to close the gap.

Chapter V deals with the role of the educational system in supplying the needed manpower. A summary description of the educational system's developmental stages and enrollment is provided. The number of graduates are projected through 1990, based on the growth rate of enrollments and graduates of higher education in prior years. The same procedure is followed for the vocational education system. Also in this chapter, some analysis is provided of the the qualitative and quantitative issues affecting the Saudi educational system.

In Chapter VI the major facts about the manpower situation in Saudi Arabia are summarized. The main focus of this Chapter is the analyses of certain factors and practices (past and present) that has effected the availability of Saudi manpower to the various sectors of the economy. It concentrates on the effects some administrative, social and educational practices have had on the manpower supply. This is followed by proposals that could contribute to more efficient utilization of the available Saudi manpower that could be achieved primarily through the restructuring of the existing employment system.

Data and Projection Limitations

Finally, it should be noted that the study was faced with extremely limited available data, which in turn limited the analysis in many ways. Had enough data been available, more analysis and fewer assumptions would have appeared in this study. This limitation also has effected the availability of detailed studies which the Saudi economy is in urgent needs in order to have an adequate planning. However, the available data have been utilized to meet the study's objective.

Certain assumptions were made in projecting the population, industrial sector labor needs, supply of Saudi industrial labor, and the numbers of enrollments and graduates from higher and vocational education. The primary assumption was that the same trends that occurred during the previous years will continue to apply.

CHAPTER II

SAUDI ARABIAN INDUSTRIAL DEVELOPMENT

Highlights of the Kingdom of Saudi Arabia

Background

The kingdom of Saudi Arabia occupies some four-fifths of the Arabian Peninsula, or a little over one million square miles (approximately 2.3 million square kilometers). It is bounded on the west by the Red Sea, on the east by the Arabian Gulf, on the north by Kuwait, Iraq and Jordan, and on the south by the two Yemen and Oman (see Figure II.1).

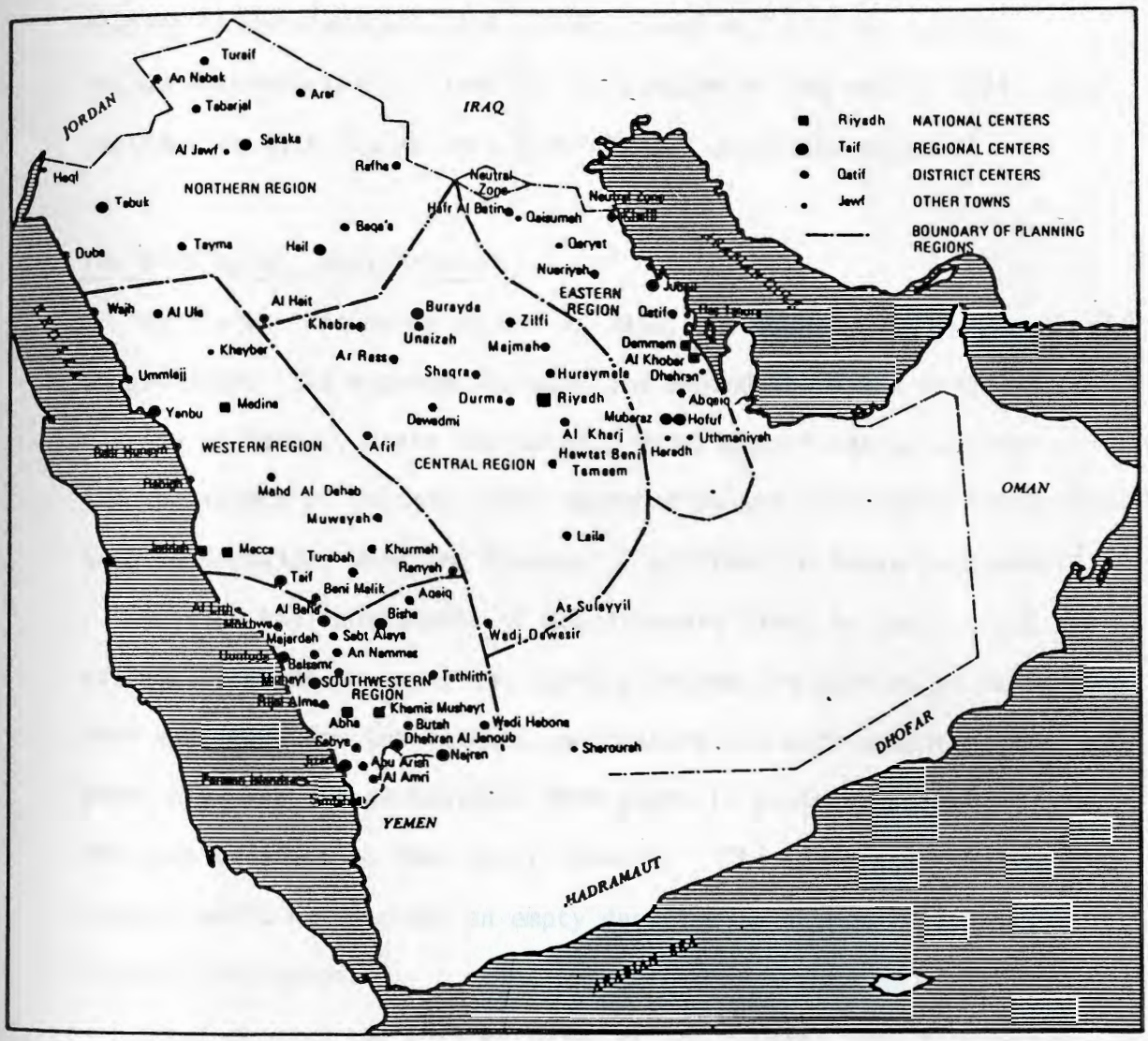
The modern kingdom of Saudi Arabia was founded in 1932 by the late king Abdulaziz ibn Saud, for whom it was named. It is an independent monarchy, using the Holy Koran as its constitution. Saudi Arabia's government is comprised of the king as prime minister, a deputy prime minister, and other ministers. The Council of Ministers is responsible for the national budget and for social and economic development, as well as for defense, foreign affairs, and other domestic matters.[1]

Islam is the official religion of the kingdom and plays a dominant role in the lives of the citizens. The language is Arabic; various regions of the country have distinctive dialects.

Hot and dry are the main characteristic weather patterns in Saudi Arabia. Water is in short supply there because of the scarcity of

Figure II-1

KINGDOM OF SAUDI ARABIA



Source: Third Development Plan

lakes or regular water flow. The average yearly rainfall ranges from 2 to 20 inches in some areas. The land is mostly desert, except for a narrow fertile plain on the western coast, and a number of oases in the middle and eastern sections of the country.

Preliminary statistics released from the 1974 population and housing census indicate that slightly over 6.7 million people, including expatriates, lived in the kingdom at the end of 1974. Also included in this figure were 1.88 million unsettled people.[2]

The Economy of Saudi Arabia

Before the discovery of oil in 1932, the country was very poor and undeveloped. Its economy was weak and dependent on the breeding and raising of camels, goats and sheep. Pilgrimage taxation was the largest source of income. This income flow was threatened during the Great Depression, when the numbers of visitors to Mekka decreased.[3]

Most of the inhabitants of Saudi Arabia lived in small towns and villages scattered across the country around the sources of water that were necessary for subsistence agriculture and were essential for survival. The nomads traveled from place to place in search of rain and grazing areas to feed their animals. "The new kingdom was to the outside world nothing but an empty desert with extremely limited economic resources."[4]

After uniting the various areas of the country, the founder of Saudi Arabia searched for sources of income to help him develop the new kingdom and to enhance the well-being of its people. In 1933, the first oil concession was granted to the Standard Oil Company of

California, later called the California Arabian Standard Oil Company, in the eastern part of the country. In 1938, the discovery of the first commercially exploitable oil field led to an initial export of crude oil in 1939. But with the arrival of World War II, production did not increase much because of the danger of shipping oil through the Mediterranean Sea.

In 1944, the California Arabian Standard Oil Company was renamed the Arabian American Oil Company (Aramco), a conglomerate of three American firms. During the 1940's revenues increased substantially due to a rise in crude oil production and export.[5] Production averaged less than 20,000 barrels daily by the end of 1949. From 1950 through 1969, the amount of crude oil produced by Aramco increased at an average annual rate of approximately nine percent.[6] By 1970, daily average production had reached over 3.5 million barrels a day, a rate that was to almost triple over the next 11 years, reaching slightly over 9.6 million barrels a day in 1981.

Government revenue from oil exports increased sharply from 80 million Saudi Riyales* in 1944, to 2,626 million Saudi Riyales in 1964. In 1973, it reached 13,200 million Saudi Riyales, and was still growing (see Table II-1).

Saudi Arabia has the largest proven oil reserves in the world, which continue to grow as the oil companies expand their exploration efforts (see Figure II-2). Because of this development in the oil

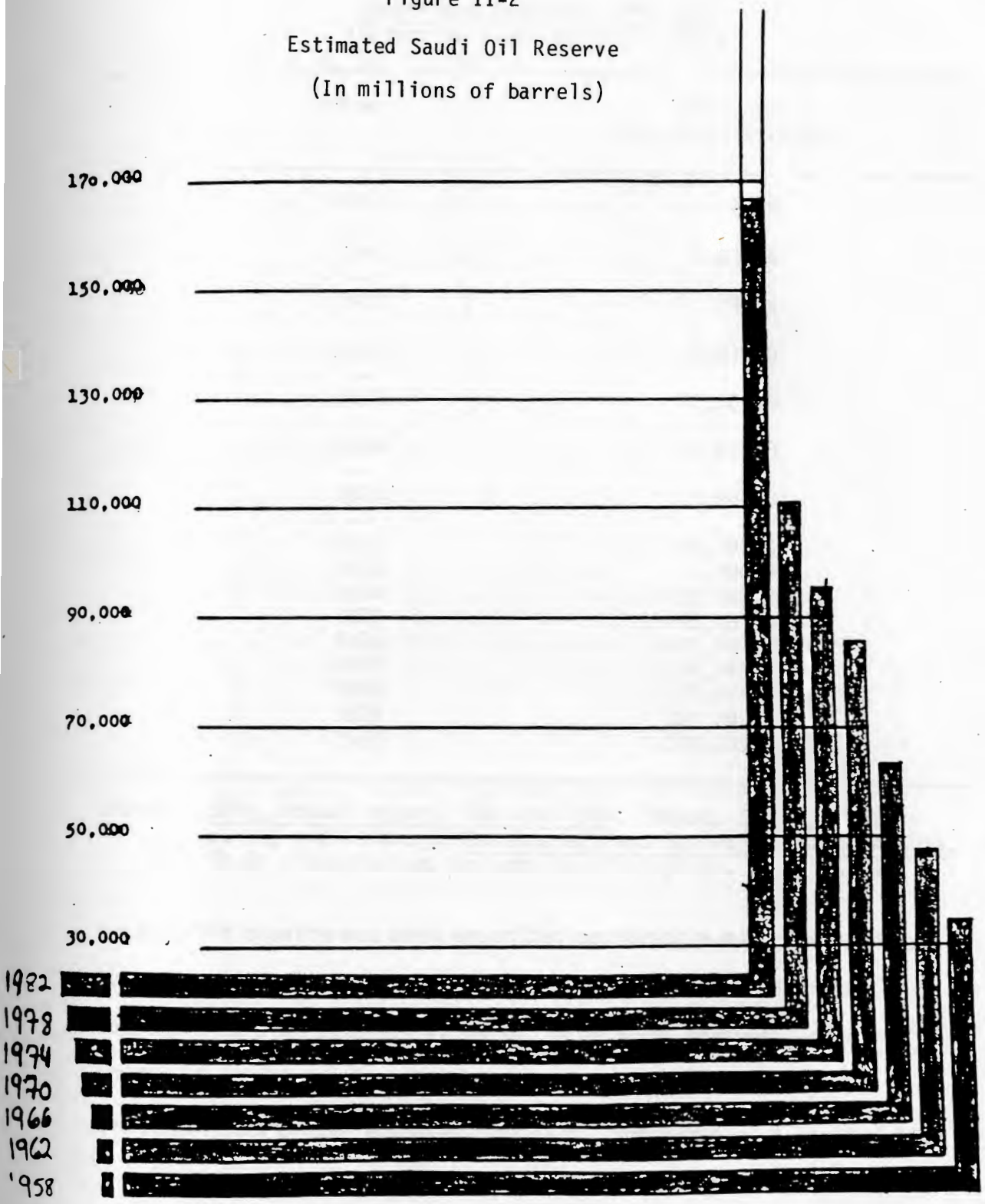
---

*Each U.S. dollar equals 3.51 Saudi Riyals at the present exchange rate.

Figure II-2

Estimated Saudi Oil Reserve

(In millions of barrels)



Source: Adapted from different ARAMCO Annual Reports

Table II-1

Government Revenues 1944-1980
(Selective Years Prior to 1972)

Year	Revenues (in million riyals)
1944	80.0
--	--
1948	214.6
--	--
1952	759.9
--	--
1956	1,610.0
--	--
1962	2,166.0
--	--
1964	2,626.0
--	--
1970	5,966.0
--	--
1972	10,782.0
1973	13,200.0
1974	22,810.0
1975	93,481.0
1976	121,191.0
1977	114,042.0
1978	115,078.0
1979	189,295.0
1980	319,305.0

Source: SAMA, Annual report 1940 and 1981. Riyad, Saudi Arabia, p. 12; and AL-Awaji, Bureaucracy and Society in Saudi Arabia, Ph.D. dissertation, University of Virginia, 1971, p. 86.

sector, the country has been described as having a single commodity economy. According to one source, "The dominance of oil in the country's foreign exchange earnings, government revenue, and as a source of growth of the national income, is the most obvious characteristic of the economic system."[7] Furthermore, a comparison

between the pre- and post-oil era economies is meaningless. The two are of totally different dimensions.

Until recently, Saudi Arabia has been able to depend almost entirely on crude oil production for its prosperity. This is an attractive state of affairs, but not necessarily a healthy one. To free itself from such economic obstacles as lack of foreign exchange and an adverse balance of payments due to disturbances in the crude oil market, the government shifted its emphasis to the diversification of the Saudi economy. The industrial sector was chosen as the cornerstone of achieving this objective.

Objectives of Industrialization:

Less developed countries (LDCs) view industrialization as the major path to rapid economic growth and to a high standard of living, thereby enabling them to catch up with the more developed countries (MDCs). They see the industrial sector as the only means of acquiring previously inaccessible modern technology. Consequently, to the LDCs, industrialization appears to be of paramount importance in the overall developmental process, a means to fight poverty and to provide for equity, welfare, and most importantly, independence. The United Nations Industrial Development Organization (UNIDO) has stated the objectives of the industrialization program in developing countries as follows:[8]

To raise living standards;

To accelerate the rate of development of the industrial sector and broaden the range of manufactured goods produced;

To develop greater economic independence;

To ensure that new investment in each branch of industry makes appropriate use of the economies of large-scale production and modern technology;

To make maximum use of the opportunities for regional co-operation in the field of industrial development;

To direct new investment into those branches of industry or projects that have government priority;

To develop and maintain the desired balance between public and private ownership of industrial projects;

To achieve certain balance-of-payments objectives; for example, by developing an appropriate mix of import substitution and export-oriented industrial production;

To promote the desired geographical distribution of new industrial activity;

To promote a more equitable distribution of income and wealth, and a wider spread of ownership of industrial projects;

To ensure that a sufficient volume of finance is available on appropriate terms and conditions for the industrial sector;

To ensure the development of a growing and adequate body of experienced entrepreneurs and trained industrial managers;

To ensure the development of an adequate supply of engineers, technologists and technicians;

To promote the development of national technology and research, suited to the conditions and resource endowments of the country.

It seems that many LDCs are determined to achieve industrial development, whether or not it will help them accomplish the above mentioned objectives with certainty. Saudi Arabia, which has only recently entered into the industrial field, is one such nation. In this chapter, I will survey and analyze the steps it has taken to accomplish its goals and discuss the results thus far.

Industrialization in Saudi Arabia

Manufacturing Activities-History

Saudi Arabia has only recently begun its manufacturing industry. Therefore, in order to evaluate its present state and future prospects, it will be necessary to survey past activities.

Principal Activities

Saudi Arabian industry was originally dominated by a large number of independent shopkeepers, metalsmiths, carpenters, and pedlars catering to a small number of regular customers. Individual artisans or small industrial entrepreneurs, primarily male, worked alone or with a few workers in small workshops, or even in their homes. In cottage industries, female family members made products which were either sold or used by the households.[9] Selected products and their production locations are presented in Table II-2.

Several thousand traditional small scale industries are estimated to have existed in some 25 large towns, serving as the sole source of subsistence for some 20,000 to 30,000 families earning incomes that did not exceed SR 25,000.[10] Most of these male craftsmen were illiterate and were never systematically trained for their jobs. Cottage workers were young females working within their family households.[11] Workplaces were either small stalls in the popular markets (Souk), external workshops, or homes. They did not meet minimum requirements for space, size, light, health, etc.[12]

The workplace locations for Bedoun families were even more spread out across the country. Lack of organization and ignorance about timing and controlling technical operations caused loss of time, elevated costs, and lowered productivity. Raw materials such as sheep wool, goat hair, clay, fibers, fronds and stems from the date palm trees were found domestically and some raw materials were imported. Financing depended on daily earnings, as no banks or government loans were available.[13] One can surmise from this brief description of the traditional manufacturing activites that it was not going to be easy for Saudi Arabia to enter the industrial stage.

Table II-2

Traditional Products and Production Locations

Kinds of Products	Town or District
Traditional footwear	Riyadh, Medina, Hofuf, etc.
Woolen cloth and traditional cloths	Medeira, Hofuf
Carved wooden doors and windows	Medina
Leather belts, pistol holsters, other small leather articles	Riyadh, Madma, Hofuf, etc.
Pottery goods	Hofuf, Mecca, etc.
Metal pots and containers	Hofuf, Riyadh, Taif, etc.
Jewelry	Dammam, Hofuf, Mecca, Riyadh, etc.
Building and repair of fishing boats	Jeddah
Woolen carpets, rugs and tents	Skaka, Madina, Taif, other
Mats made from fronds, stems or fibers, basketware, etc.	Alhasa (75 villages)

Source: UNIDO and ISDC, Traditional Industry in the Kingdom of Saudi Arabia - Survey. 1971.

Reasons Behind Industrialization

As has been mentioned in the beginning of the chapter, Saudi Arabia's economy is presently dominated by the production and export of crude oil, which generates about 90% of the government's revenues and more than 90% of total foreign exchange receipts. Due to large increases in oil production and prices since 1973, oil has come to account for more than 99% of the country's total exports. The sharp increases in government revenues that the country enjoyed were more than sufficient for the developmental process. Consequently, there was an increase in the amount of international financial assets held by the kingdom.

On the other hand, the increase in oil production has greatly accelerated depletion of the country's major natural resource and its chief source of national income. Consequently, the broadening of the sources of national income and the reduction of dependence on crude oil became the primary objectives of planned development in the kingdom.

The industrial sector has been assigned a considerable role in the realization of economic diversification. The goal is to develop only those industrial projects most likely to have long-term advantages. Such efforts will be focused primarily on:

1. Hydrocarbon-based industries
2. Import substitution of essential commodities for which the domestic market is large enough to justify operation[14]
3. Agro-industries as part of the massive agricultural development the country is experiencing
4. Mining to be explored in the short-run, the results of which later will be supplied to the national economy.

Saudi Arabian hydrocarbon-based industry was built for valid reasons. For years, large amounts of associated gas were wasted in the process of producing the crude oil. In 1978, 4,374 billion cubic meters of associated gas were produced, however, only 22 percent of that was put into use (see Table II-3). Thus the development of a gas-gathering and distribution system will have to effectively utilize the associated gas. Another reason to develop the petrochemical industry in the country is the very high comparative cost advantage with respect to energy cost (see Table II-4) that the Saudi Arabian industry will enjoy.

Furthermore, because the established plastic and chemical plants now depend on imported raw material, the new petrochemical industry will contribute to the establishment of more of such plants for both import substitution and export. The number of such manufacturers has already doubled three times in the last two years. It is expected that the dependence on imported raw materials will rapidly decrease during the next few years as the Saudi petrochemical industry enters its rapid expansion stage.

However, economic factors were not the only rationale behind the industrialization process. Government officials have insisted that the most important and valuable cornerstone of the nation is the development of highly-trained Saudi manpower. As one official put it,

> . . .large-scale hydrocarbon-based projects. . .will contribute to the creation of a new class of trained Saudi managers, entrepreneurs, and technicians--to the establishment of new work attitudes and discipline--all of which can be readily transferred to other expanding sectors as the oil sector declines in relative importance.[15]

Table II-3

Production and Utilization of Natural Gas

	Millions of cubic meters				Gas utilized as % of gas produced
	Produced	Re-injected	Utilized	Flared	
1970	20,625	3,532	2,261	14,832	11.0
1971	25,481	2,933	2,652	19,896	10.4
1972	32,568	2,703	2,806	27,059	8.6
1973	44,292	1,768	4,531	37,993	10.2
1974	47,310	2,022	6,201	39,087	13.1
1975	37,812	2,981	5,663	29,168	15.0
1976	47,230	3,021	6,796	37,413	14.4
1977	48,700	3,300	8,000	37,400	16.4
1978	43,748	1,347	9,484	32,917	21.7
1979	50,561	876	11,695	37,990	23.1
1980	53,265	270	14,627	38,368	27.5

Source: Adapted from Ministry of Planning, Facts and Figures, Riyadh, Saudi Arabia. pp. 105.

Table II-4

Percentage of energy cost to total production cost for some petrochemical products

Products	USA	Arabian Gulf Area
Aluminum	35%	10%
Ammonia	74%	11%
Ethylene	80%	10%
Methanol	74%	16%

Source: Alkhalafe, A., "The Basic Industry in Arab Gulf States," The Journal of the Gulf and Arabian Peninsular Studies. Nov., 1982, p 96.

According to the Minister of Industry, "We directed great efforts and sizable portions of our investment toward the training of our 'men' to 'man' our industries."[16]

Still, there are other reasons behind industrial development in the kingdom. The great wealth in the form of financial assets that Saudi Arabia holds outside the country is not the safest or most productive kind of investment. In the long-run worldwide inflation always decreases the value of currency, creating less purchasing power for money holders. Saudi Arabia holds most of its financial assets in United States dollars--it is the single largest United States treasury note holder[17]--but unfortunately, the dollar is never stable. The depreciation of the U.S. dollar between January, 1977 and April, 1978 was very extensive--by more than 22 percent against the Swiss franc, 21.5 percent against the Japanese yen, and 10 percent against the pound.[18]

> . . . the order of magnitude of OPEC losses during the December, 1976-April, 1978 period can be conservatively put at about $15 billion. To this figure should be added the loss of buying power of OPEC's estimated $70 billion in liquid reserves, and of some $80 billion in foreign placement.[19]

Furthermore, any outside investment of assets could be adversely affected by political consequences in foreign nations, such as nationalization of facilities or freezing of assets. As a result, Saudi Arabia has chosen to invest inside the country, such as in education, health services, and the industrial sector, in order to provide a protectaive mechanism for its wealth and to increase the country's capital stock. This shows that industrialization for Saudi Arabia is not merely a choice between development options, but rather is a means for survival in the long-run and also a means of achieving the quality of life toward which the Saudis aspire.

Manufacturing Sector

Most non-oil-related manufacturing establishments are in the private sector, located mainly in the major urban areas. According to the Census of Private Establishments conducted by the Central Department of Statistics, there were some 22,500 manufacturing establishments in the kingdom in 1981, employing some 150,800 workers.[20] These figures compared to some 9,000 establishments in 1972, employing approximately 36,000 workers.

The contribution of aggregate manufacturing to the nominal GNP increased from SR 431 million in 1970 to SR 6467 million in 1980. Table II-5 shows detailed breakdown of the GNP through this period.

The manufacturing share of total GNP has declined from 2.47% to 1.67% between 1970 and 1980. This decline in manufacturing share is attributed to the high rate of growth of the oil sector.

In other countries, manufacturing accounts for a significant portion of total employment, but this is not the case in Saudi Arabia, where only 150,858 workers out of 1,012,015[21] employed in the private sector work in the manufacturing sector. A brief description of the major components of the manufacturing sector will be given to indicate trends.

1. Food, beverages and tobacco

This sub-sector is made up of many small establishments and a number of larger ones as well, totaling some 2,171 establishments in 1981, or about 9% of the total units in the non-oil manufacturing sector (see Table IV-1). In 1966, it accounted for approximately 28% of the total and in 1972 some 27% (see Table II-6). Its share of total employment declined from approximately 29% in 1972 to slightly over 10% in 1981.

2. Textiles, wearing apparel and leather

The main characteristic of this sub-sector is the small size of the units that make it up. Even though it represents approximately 35% of manufacturing establishments in 1981, only 1.3 percent of these businesses employ more than 10 workers.[22] The percentage share of establishments rose from 3.5 percent in 1966 to 38 percent in 1972 (see Table II-6), then declined to 36 percent. The same pattern has followed suit with employment--from 2.14 percent of total employment

Table II-5

Gross Domestic Product by Oil- and Non-Oil Sectors, and Kind of Economic Activity, in Producers' Values (in current prices)

	1389/90 * (1969/70)	1390/91	1391/92	1392/93	1393/94	1394/95	1395/96	1396/97	1397/98	1398/99	1399/1400* (1979/80)
										— Million Saudi Riyals —	
Non-Oil Sectors											
Agriculture, forestry and fishing	984	1,016	1,059	1,139	1,242	1,392	1,586	1,866	3,988	4,195	4,648
Mining and quarrying 1/	47	51	58	91	147	264	535	823	1,025	1,120	1,341
Manufacturing 2/	431	484	543	617	729	1,599	2,211	3,063	4,066	5,173	6,467
Electricity, gas and water	273	298	302	319	328	195	151	144	204	248	271
Construction 3/	715	734	874	1,220	2,002	7,080	14,806	23,984	30,068	32,920	40,433
Transport, storage & communication	1,243	1,479	1,587	2,121	2,718	2,310	4,077	6,774	9,960	12,765	15,011
Other services	3,894	4,191	4,780	5,896	8,264	15,283	23,957	31,039	40,632	50,817	61,723
Sub-Total	7,587	8,253	9,183	11,403	15,430	28,123	47,323	67,693	89,883	107,238	129,894
Oil Sector											
Mining of crude oil and natural gas	8,106	12,581	16,932	26,284	78,345	104,696	109,568	128,466	126,156	131,098	241,788
Petroleum refining	1,241	1,474	1,442	1,811	4,347	5,766	5,962	6,221	5,988	7,442	10,276
Construction associated thereof	219	273	300	589	718	639	1,048	1,562	1,871	1,844	2,358
Sub-Total	9,566	14,328	18,674	28,684	83,418	111,101	116,578	136,249	133,835	140,384	254,342
Summation											
Gross domestic product in producers' values	17,153	22,581	27,857	40,087	98,848	139,224	163,893	203,942	223,818	247,622	384,236
Import duties	264	340	400	464	475	376	633	1,114	1,682	1,917	2,217
Gross domestic product in purchasers' values	17,399	22,921	28,257	40,551	99,315	139,600	164,526	205,056	225,490	249,539	386,453

Source:- Central Department of Statistics Notes: 1) Excluding mining of oil & natural gas 2) Excluding petroleum refining 3) Excluding construction associated with the oil sector

*This is according to Islamic calendar "HIJRI". It should be mentioned here that the HIJRI calendar and the Roman calendar do not necessarily correspond to each other in exact terms.

in 1966 to 16.5 percent in 1972, then down to 14.4 percent in 1981 (see Table IV-1).

3. Wood, wood products and furniture

This sub-sector is also comprised of a number share of small establishments totally dependent on imported raw materials.

4. Paper and paper products

This sub-sector is comprised of medium and large units, totaling 608 in 1981, with approximately 7,900 workers. It depends totally on imported raw material.

5. Chemical and plastic products

This sub-sector is comprised of highly capital intensive units which produce a larger volume of output. In 1966, it represented less than three percent of total number of establishments, and approximately four percent of total employment. In 1981, not only did the percentages change, the number of establishments employing more than 100 workers was the highest of all industries in manufacturing sub-sector. The chemical and plastic products industry has the brightest future of the entire manufacturing sub-sector, especially after the new petrochemical projects enter the production stage. The new petrochemical plants will supply this industry with its raw materials at lower prices than those currently imported.

6. Fabricated metal products and machinery

At present this sub-sector is comprised of a high percentage of large establishments. In 1981 it showed a share of approximately 30 percent of total manufacturing establishment.

Table II-6

Survey of Manufacturing Sector 1966 and 1972

	No. of establishments		Employment		Capital SR million	
	1966	1972	1966	1972	1966	1972
Food, beverages and tobacco	39	2526	2049	10601	26.2	91.0
Textiles, wearing apparel and leather industries	5	3563	130	5959	1.2	14.3
Wood, wood products including furniture	17	1474	439	4429	1.8	18.8
Paper and paper products; printing and publishing	19	67	631	1594	10.3	34.0
Chemicals and chemical, petroleum, coal, rubber, and plastic products	4	38	266	2042	33.2	103.3
Non-metallic mineral products	17	793	1742	6065	70.0	364.7
Basic metal industries	4	33	270	1022	17.2	62.9
Fabricated metal products, machinery and equipment	30	864	464	4260	3.0	26.5
Other manufacturing industries	5	2	62	40	1.5	0.5
TOTAL	140	9360	6053	36012	167.0	716.0

Source: Central Department of Statistics, Survey of Manufacturing Establishments, 1973 and Industrial Studies and Development Centre, Survey of Industrial Establishments in Saudi Arabia, 1389, Vol. I, II and III.

7. Bricks, blocks, cement and glass

Establishments in this sub-sector are primarily medium and large in size. Cement and Gypsum are the two most important products of this sub-sector. Cement production went from 30,000 tons in 1958 to

666,000 in 1970, and then jumped to almost 5,674 million tons in 1982.[23] The increase in production still did not come close to satisfying the demand for cement. In 1981, only 33 percent of total demand was produced in Saudi Arabia.[24]

Objectives

The main objectives of the manufacturing sector have been outlined by the Ministry of Industry and Electricity as:[25]

1. To increase the economy's capacity to produce at competitive costs a wide range of products for domestic as well as export markets

2. To the substantial comparative advantages arising from low cost energy, as well as access to raw materials from hyrocarbon-related industry, and from mineral, agricultural and fishery resources

3. To widen and deepen the kingdom's access to modern technology

4. To encourage fuller utilization of capacity in the private manufacturing sector

5. To secure regionally balanced development of industry

6. To increase productivity through the use of the economies of scale

7. To promote interlinkages among industries

To achieve these objectives, policies and incentives have to be established. In 1974, the first industrial development policies and incentives were announced, the primary principles of which are:

1. Objectives of industrial development will be effectively attained in the long-run if the business community takes charge of

it. Thus, those businessmen who are prepared to enter the field, taking the chances of success or failure, will enjoy the full support of the financial and legal power of the government in all stages of preparation, establishment, and operation.

2. Free competition will be the major tool to enhance and shape the individual sectors to suit market requirements.

3. Feasibility studies and other useful information will be available to those interested in participating in the industrial development

4. Incentives will be available for all projects within the sector, including:

   a. loans and government participation in equity capital under encouraging conditions
   b. operational assistance
   c. exemption for foreign partners of taxes on profits
   d. preference to local production by government purchases
   e. protective customs tariffs on competing imports
   f. the providing of all accommodations necessary for industrial areas

5. Licenses for industrial projects will be granted for those exceeding specified size and employment.

Oil Sector: Crude and Refined Oil

This sector is primarily export-oriented and its output is given limited domestic consumption, thus prices and production of oil are totally dependent on the international market for oil. Aramco is the

largest oil company in Saudi Arabia, producing some 95 percent of all Saudi Arabian oil. The Arabian Oil Company and Getty produce the rest of the oil in the kingdom. Oil comes from more than 35 oil fields in the eastern part of Saudi Arabia. The Gawar oil field, the largest in the world, produces more than five million barrels per day.

Crude oil production is not the only activity in the oil sector, particularly since the crude oil market is not stable and does not always show positive growth. Oil byproducts are now being produced to exploit the economics of value-added, and to support the growing domestic demand for such byproducts resulting from greater economic activities.

Production of refined oil has been increasing at an annual average growth rate of 5.8 percent from 1963 to 1982. In 1982, the total production reached 310,858,000 barrels of seven different byproducts.[26] By 1985, three new oil refineries will add 800,000 barrels per day capacity in gasoline and fuel oil.[27] Refined oil share of the value-added products was 86 percent in 1970, 78 percent in 1975, and 54 percent in 1979, indicating that other manufacturing industries are increasing their shares of value-added products.

Although the oil and refined oil sector account for the biggest share of GNP, its share of total employment is rather small. Aramco, the major employer in this sector, only employed some 55,000 workers in 1981[28] because this sector is very capital-intensive and advanced technology are fully applied.

Hydrocarbon-based Industries Sector

Saudi Arabia has adopted an ambitious plan for rapid industrial transformation centered on the construction of two large and completely new industrial cities, one at Jubail on the Arabian Gulf coast, and the other at Yanbu on the Red Sea coast and will receive feed stock and fuel for its plants from the eastern province through PETROMIN's 1,200 kilometer crude oil pipeline and Aramco's parallel natural gas liquid pipelines.[29] Two basic types of industry will be housed there. The first type is the heavy petroleum-based and energy-intensive primary industry that will serve as the foundation of the two industrial complexes.

Both sites will reflect Saudi Arabia's strong commitment to the development of hydrocarbon and other industries that can utilize the country's low cost and abundant supply of crude oil and associated natural gas, which will provide both industrial fuel and raw materials. The plan is to construct major petrochemical fertilizer, iron and steel, aluminum, and other resource-based industries.[30] In addition, secondary industrial enterprises will be established largely as a result of private sector initiative and will emerge as a natural outgrowth of primary industry development in Jubail and Yanbu.[31] These industries would range from heavy to light industries. They would form a ready market for the product mix of the primary industries. Basically, they would consist of manufacturing and fabricating facilities for byproducts of refineries such as rubber products, paints, nylon and detergents, products from the petrochemical plants such as plastic products, fertilizers and

disinfectants; and from the iron and steel plant, reinforcing bars, wire and pipes are mainly produced. These secondary industry products will be marketed at home and overseas.[32]

The main responsibility for developing and supervising the primary industries will be in the hands of the Saudi Basic Industries Corporation (SABIC). SABIC is forming joint venture agreements with foreign partners to install all hydrocarbon-based and energy-intensive industries (see Table II-7). The rationale behind foreign participation is to secure the necessary technology and skills for the planning, management, and operation of such large and complex projects, and to obtain assistance in marketing products overseas.[33]

The Saudi government has used the device of oil entitlements to attract giant companies to participate in these ventures. According to the managing director of SABIC, entitlements depend chiefly on:[34]

1. The equity contributed by the foreign partner
2. The commitment of the partner to the project
3. The contribution of the partner to marketing the product
4. The technology transferred

This incentive strategy will continue to industrialize the Saudi economy. As the Minister of PetroLum stated, "In the future, Saudi Arabia will only grant oil contracts to customers willing to help build up industry in Saudi Arabia."[35]

As already mentioned, Saudi Arabia will be a very strong competitor in the international chemical market in the very near future. According to the Financial Times, Saudi-planned products of ethane and natural liquified gas will equal a third of the total free

world production, almost half of the production in the United States, and one and one third times the production of Europe and Japan combined.[36] Toward the end of the decade, Saudi Arabia is expected to have five percent of the total world petrochemical capacity.[37]

Table II-7

SABIC Joint Venture Affiliates

1. Al-Jubail Petrochemical Company (KEMYA)	Type of Product	Capacity (ton)
Established in April 1980 as a Joint Venture between SABIC and Exxon of U.S.A. with 50% capital participation by each Partner.	L.D.P.E.[2]	260,000
2. Saudi Yanbu Petrochemical Company (YANPET)		
Established in April 1980 as a Joint Venture between SABIC and Mobil of U.S.A. with 50% capital participation by each Partner.	Ethylene Ethylene Glycol L.D.P.E.[2] H.D.P.E.[3]	450,000 200,000 200,000
3. Saudi Petrochemical Company (SADAF)		
Established in September 1980 as a Joint Venture between SABIC and Pecten Arabian (an Affiliate of Shell of U.S.A.) Each Partner contributes 50% of the capital.	Ethylene Ethylene Dichloride Ethanol Styrene Caustic Soda	656,000 456,000 281,000 295,000 377,000
4. Al-Jubail Fertilizer Company (SAMAD)		
Established in December 1979 as a Joint Venture between SABIC and Taiwan Fertilizer Company. Each Partner contributes 50% of the capital.	Urea	500,000

5. Saudi Methanol Company

Established in December 1979 as a Joint Venture between SABIC and a Japanese Consortium headed by Mitsubishi. The Consortium and SABIC each contributes 50% of the capital.	Chemical-grade Methanol	600,000

Source: SABIC, Annual Report 1980.

Problems in Industrial Development

Despite the various incentives and instructional facilities provided to encourage the industrialization process, problems and obstacles still exist. The crucial constraints affecting industrial development in Saudi Arabia can be summarized as:

1. Manpower limitations
2. Vocational training
3. Dependence on foreign raw materials
4. Marketing

Most industries in the kingdom are dependent on imported raw materials, which reduces the domestic value-added and increases the costs of domestic production. Furthermore, the availability of duty-free imports provided by the government for the industrial sector will discourage the country's production of its own raw materials. Marketing problems include the lack of sales promotion, marketing research, and distribution channels. In addition, customer preference for foreign manufactured goods over locally produced commodities is the most important marketing obstacle. The shortage of manpower and the problems of vocational training will be discussed in more detail in the next two chapters.

Institutions for Industrial Promotion

There are a number of institutions which directly or indirectly promote industrialization in the kingdom. A brief description of these is given below.[38]

The Ministry of Planning

The old Central Planning Organization (CPO) has been raised to the status of a full-fledged ministry in 1975. The major responsibilities of the new ministry are the preparation of periodical reports on various aspects of the country's economy, formulation of economic and social development plans and conducting economic studies and making necessary recommendations.

The Ministry of Industry and Electricity

The major function of this ministry is the coordination of industrial endeavors within the framework of the development plan. Another function is the creation of suitable atmosphere for the protection and encouragement of domestic industries. The ministry is responsible for foreign capital investment, industrial protection and encouragement, and the development of industrial estates.

General Petroleum and Minerals Organization (PETROMIN).

PETROMIN's main functions are:

1. Implementation and administration of petroleum projects
2. Establishing companies and participating in their capital at home or abroad

Saudi Basic Industry Corporation (SABI). Established in 1976 and is presently owned by the government,* it has the following responsibility:

1. Implementation of petrochemical, fertilizer and other hydrocarbon based industries

2. Implementation of iron, steel and aluminum industries

3. Implementatiaon of other basic industries which the private sector does not or cannot undertake.

Saudi Arabian Standards Organization (SASO). SASO functions are, among other things, to lay down the rules for granting products certificates and to set the national standards for the various industrial products.

The Directorate General of Mineral Resources (DGMR). The functions of DGMR are to conduct geological surveys, mapping, exploration and studies regarding mineral resources in the country.

The General Investment Fund. The main objective is the financing of investment in commercial production projects.

The Saudi Industrial Development Fund. This fund was established in 1974 to grant medium or long-term interest free loans to new or existing industrial establishments for the purpose of expanding their activities of replacing and modernizing their equipment. The loans extended cover up to 50 percent of total funds required for financing the project or its development (see Table II-8).

---

*In January 1984, 20% of the company's stock was sold to the public as the first step to transfer the company to the private ownership.

Other. Besides the above institutions there are several other agencies that have either direct or indirect relation to the industrial sector. Such agencies are:

1. Chambers of Commerce and Industry
2. The Grain Silos and Flour Mills Organization
3. The Contractors' Financing Programme
4. The Islamic Development Bank
5. The Arab Investment Company
6. The Saudi Investment Bank
7. Saudi International Bank
8. The General Organization for Social Insurance

Table II-8
Investment Credit to Private Sector by Government Sponsored Specialized Financial Institutions
-Million Saudi Riyals-

	1389/90* (1969/70)	1390/91	1391/92	1392/93	1393/94	1394/95	1395/96	1396/97	1397/98	1398/99	1399/1400 (1979/80)
A. Credit Disbursed											
Saudi Agricultural Bank**	16	17	17	20	36	146	269	490	504	703	946
Saudi Credit Bank	--	--	--	--	9	40	82	158	103	57	40
Credit Fund for Contractors**	--	--	--	--	--	--	118	33	22	21	--
Public Investment Fund***	--	--	--	134	263	603	1512	3843	6267	3893	2949
Saudi Industrial Development Fund	--	--	--	--	--	35	1701	2273	5152	6846	6490
Real Estate Development Fund	--	--	--	--	--	--	2159	8900	7534	5768	8589
TOTAL	16	17	17	154	308	824	5841	15697	19582	17288	19014
B. Credit Outstanding (end of period)											
TOTAL	--	--	--	--	--	1160C	6225	20935	35768	51396	68343
C. Annual Rates of Growth and Indices of Total Credit Disbursed											
Annual rates of growth(%)	16.4	6.3	0.0	805.9	100.0	167.5	608.9	168.7	24.7	-11.7	10.0
Indices (1389/90 = 100) (1969/70)	100	106.3	106.3	926.5	1925.0	5150.0	36506.3	98106.3	122387.5	108050.0	118837.5

Source: Ministry of Planning, Facts and Figures.

Note: *See footnote on page 21 **Including loans for working capital ***Including equity investments

Table II-9
Investment Credit to Private Sector by Government Sponsored Specialized Financial Institutions
-Million Saudi Riyals-

	1389/90 (1969/70)	1390/91	1391/92	1392/93	1393/94	1394/95	1395/96	1396/97	1397/98	1398/99	1399/1400 (1979/80)
A. Credit Disbursed											
Saudi Agricultural Bank*	16	17	17	20	36	146	269	490	504	703	946
Saudi Credit Bank	--	--	--	--	9	40	82	158	103	57	40
Credit Fund for Contractors*	--	--	--	--	--	--	118	33	22	21	--
Public Investment Fund**	--	--	--	134	263	603	1512	3843	6267	3893	2949
Saudi Industrial Development Fund	--	--	--	--	--	35	1701	2273	5152	6846	6490
Real Estate Development Fund	--	--	--	--	--	--	2159	8900	7534	5768	8589
TOTAL	16	17	17	154	308	824	5841	15697	19582	17288	19014
B. Credit Outstanding (end of period)											
TOTAL	--	--	--	--	--	1160C	6225	20935	35768	51396	68343
C. Annual Rates of Growth and Indices of Total Credit Disbursed											
Annual rates of growth(%)	16.4	6.3	0.0	805.9	100.0	167.5	608.9	168.7	24.7	-11.7	10.0
Indices (1389/90 = 100)	100	106.3	106.3	926.5	1925.0	5150.0	36506.3	98106.3	122387.5	108050.0	118837.5

Source: Ministry of Planning, Facts and Figures.

Note: *Including loans for working capital
**Including equity investments

Saudi Arabia has achieved many of its industrial objectives. It was able to attract private enterpreneurs to participate fully in the industrial program. It was successful in creating the right environment for modern and productive economic activities. Finally it was able to attract many respected foreign partners to participate in its basic industries. However, Saudi Arabia did not fully achieve its manpower development objectives. This outcome is due to the difficult and time consuming task in creating and advancing humans to perform sophisticated and totally new operations. As a result, the policy makers are forced in the short-run to depend largely on expatriate workers to prevent labor supply shortages. In the next chapter an assessment of the Saudi manpower situation will be presented.

CHAPTER III

MANPOWER IN SAUDI ARABIA

Population of Saudi Arabia

In order to understand and assess human resources, to plan for long-term development, and to evaluate trends in Saudi Arabia, one needs to know the demographic aspects of the country. Unfortunately, the kingdom lacks extensive demographic data, particularly information relating to the period before the new development process began.

The population of Saudi Arabia was estimated to be approximately five million people in 1932.[1] However, because of inaccuracies in the taking of this census, this figure was not generally accepted. A second study was undertaken 30 years later, in 1962, by government officials who estimated the population to be approximately 3.2 million people, about 79% of whom were unsettled Bedoun.[2] Again, because of inaccuracies in data collection procedures, the government chose to discount the results.

The country was without a population figure until 1974, when the government conducted its first official census; this time the data were considered fairly representative of the population. The 1974 census estimated that 6.7 million people lived in Saudi Arabia, including some 0.8 million foreign nationals.[3] Thus, Saudi nationals accounted for approximately 88 percent of the total population, or approximately 5.9 million people.

Population Growth and Composition

Population growth rates had not been determined until recently, although it is known that Saudi Arabia's environment and climate have affected its population growth throughout history. Before the dominance of Islam, many wars were fought for food, water, grazing areas, and power between tribes in the Arabian Peninsula. Many people died in these wars between brothers and cousins. The wars stopped after the area became Islamic. It is thought that the population increased during the period when Medina, in the western part of what is now Saudi Arabia, was the capital of Islam. Unfortunately, when the capital was moved to Damascus, and then to Bhagdad, many of the Arabian Peninsula's inhabitants left for other areas, e.g., Iraq, and what is now known as Syria and Jordan. Because of this out migration, the Saudi population growth was negative over this period of time.

A population growth rate between 2.9 and 3.2 percent is generally accepted in the literature for the modern kingdom of Saudi Arabia. According to Alruaithy's geographic and demographic study of the Saudi population, the modern growth rate is approximately 3.0 percent.[4] In Arab Manpower, Birsk and Sinclair estimate that the growth rate of Saudi nationals will continue to rise at a rate of 3.0 percent, or perhaps a little higher.[5] And finally, it has been reported that death and birth rates for Saudi Arabians are 16.6 and 48.8 per 1,000 people, respectively.[6] By subtracting the death rate from the birth rate, the national growth rate would be

48.8 - 16.6 = 32.2 per 1,000 people annually.

Thus, this would indicate an annual growth rate of approximately 3.22 percent.

There is a consensus among researchers that the population growth rate in Saudi Arabia is approximately 3.0 percent annually, the figure that will be used for this thesis. This rate is high compared to such developed countries as the United States, where the annual growth rates between 1970 and 1980 was 1.08 percent.[7] It is also higher than some developing countries such as Egypt, with a 2.5 percent growth rate, and India, with a 2.7 percent growth rate, both in 1970.[8] Among the most important factors influencing the high rate are:

1. The discovery of oil in 1938, which has greatly affected economic and social conditions

2. The new development process which provided a more attractive environment in which to settle

3. The apparent increase in health facilities that helped upgrade the quality of health (see Table III-1)

Three factors will be used in the projection of future Saudi population (see Table III-2):

1. The 1974 Saudi population figures will be used as the base year figures

2. A 3.0 percent annual growth rate will be used

3. Projection of data will be through the year 1990 because the development processes is assumed to continue until then, although different approaches may be taken, such as more concentration

Table III-1

Development in the Saudi Health Facilities, 1970-80

Year	Number of hospitals, dispensaries and health centers	Number of hospitals	Number of hospital beds	Medical and para-medical personnel				
				Physicians	Nursing staff	Technical assistants (including pharmacists)	Other technicians	Total
1390* (1970)	566	47	7,165	789	2,253	910	542	4,494
1391	570	49	7,942	817	2,268	928	614	4,627
1392	584	51	8,132	1,081	2,962	1,047	733	5,823
1393	620	54	8,870	1,268	3,179	1,227	918	6,592
1394	667	58	9,070	1,900	4,234	1,607	1,063	8,804
1395	693	62	9,250	2,275	4,721	1,737	1,186	9,919
1396	785	64	9,450	2,696	5,666	1,943	1,373	11,678
1397	812	64	10,182	2,820	5,740	2,014	1,408	11,982
1398	860	67	10,412	3,212	6,081	2,359	1,381	13,033
1399	891	67	10,978	3,408	6,306	2,633	1,317	13,664
1400 (1980)	958	69	11,968	3,793	6,859	2,928	1,366	14,946

Source: Ministry of Planning, Facts and Figures, Saudi Arabia 1982.

Notes: The above statement does not cover facilities offered by the private secotr and Government agaencies other than the Ministrty of Health.

*See footnote page 21.

on industry and agriculture, rather than on construction and government services (see Table III-2).

Table III-2

Projected Saudi Population at 3% Growth Rate 1974-1990

Year	Population
1974*	5,930.361
1975	6,108,271
1976	6,291,520
1977	6,480,265
1978	6,674,673
1979	6,874,913
1980	7,081,161
1981	7,293,595
1982	7,512,403
1983	7,737,750
1984	7,969,909
1985	8,209,006
1986	8,455,276
1987	8,708,934
1988	8,970,202
1989	9,239,308
1990	9,516,488

* Base year.

Ages

According to the United Nations Economic and Social Council, the Middle East has one of the lowest proportions of population involved in the labor force in the world, a fact which is attributable in part to the large number of children in the population. Saudi Arabia is no

different. More than 46 percent of its population was under the age of 15 in 1974.[9] One possible explanation for this phenomenon is that improved health facilities keep more children alive today than ever before. In addition, the rising standard of living and income per capita of Saudi families, as well as free education and health services, contribute to the financial ease with which the Saudi family can accommodate another child. Furthermore, Saudi people now marry younger, contributing to a higher birth rate.

Women account for some 47 percent (3.1 million of the total Saudi population.[10] The number of males to females remains greater at each age group (see Table III-3).

Table III-3

Population Distribution According to Major Age and Sex Group 1974

Age Group	Male % of Population	Female % of Population	Total
0-14	23.4%	22.9%	46.3%
15-59	26.1%	21.1%	47.2%
60+	3.7%	2.8%	6.5%

Source: University of Riyadh, Population Atlas of Saudi Arabia, Saudi Arabia, 1981.

Literacy and Education Level

According to the 1974 census, more than 75 percent of the population was illiterate, with an even higher rate among women.

Table III-4 shows the breakdown of these literacy levels. In 1974, 10 percent of the total population 10 years old and over had only completed a primary education, 23 percent an elementary education, 17 percent a secondary education, and only 7 percent a higher education.[11] These figures have changed in recent years because of the huge financial investment in education at all levels and in all areas of Saudi Arabia.

Table III-4

Literacy Rate Among Population 10 Years of Age and Over 1974

Literacy Level	Males	Females	Total
Illiterate	65.18%	85.67%	75.23%
Read only	5.20%	2.90%	4.07%
Read and Write	29.31	10.75	20.20
Not Stated	.31	.68	.49

Source: University of Riyadh, Population Atlas of Saudi Arabia, Saudi Arabia, 1981.

The Labor Force in Saudi Arabia

Manpower can be defined as people who are available for work in various sectors of the economy of a nation. In Saudi Arabia, manpower is comprised of people 12 years old and over who are available for work.[12] In 1974 there were 1.536 million such Saudi and non-Saudi workers in the country.[13] According to the Second Development Plan,

the "estimated" Saudi manpower in 1975 was 1.286 million people, approximately 21 percent of the total Saudi population.[14] A breakdown of males and females was unavailable, however, one could assume that the majority of the labor force would be male because of cultural and social restrictions. In addition, the number of expatriate workers was 314,000 in 1975, based on a Ministry of Planning estimate. By 1980, the estimated number had climbed to 1.024 million non-Saudi men and 44.9 thousand women.[15] Table III-5 is based on information taken from the three development plans beginning in 1970.

Between 1975 and 1985, the growth rate started to change in favor of the labor force coming from abroad, rather than from within the country. The annual growth rate of the Saudi labor force between the same period was 1.93 percent, as compared to 13.0 percent. Also, the proportion of the Saudi labor force decreased significantly after 1970. This proportion declined slowly after 1970, then very rapidly after 1975, as shown in Table III-5. This table also shows that the participation of Saudi women in the work force began an upward trend, increasing from 27,000 in 1975 to 103,000 in 1980.

Distribution of the Labor Force According to Economic Sectors

A comparison of overall employment in the various sectors shows that traditional agriculture has the highest concentration of employees, followed by construction, with government in third place. Manufacturing employs just 4.2 percent of the total labor force, while

Table III-5

Estimated and Projected Civilian Labor Force, 1970-85
In Thousands

Nationality/ Sex	1970	1975	1980	1985	Net Change 1970-75	Net Change 1975-80	Net Change 1980-85	Percentage Increase % 1970-75	Percentage Increase % 1975-80	Percentage Increase % 1980-85	Annual Growth Rate % 1970-75	Annual Growth Rate % 1975-80	Annual Growth Rate % 1980-85
Saudi Men	--	1,259.0	1,308.4	1,437.4		49.4	129.0		3.9	9.9		.77	1.9
Non-Saudi Men	--	306.0	1,014.9	1,023.9		708.9	9.0		231.6	.9		27.00	.2
Subtotal		1,565.0	2,323.3	2,461.9		758.3	138.0		48.4	5.9		8.22	1.2
Saudi Women	--	27.0	103.0	120.0		76.0	17.0		281.4	16.5		30.7	3.1
Non-Saudi Women	--	8.0	44.9	44.9		36.9	0.0		461.1	0.0		41.1	--
Subtotal		35.0	147.9	164.9		139.9	17.0		399.7			33.4	2.2
Total Saudi	--	1,286.0	1411.4	1,557.4		125.4	1,557.4	9.7				1.87	1.9
Total Non-Saudi	--	314.0	1,059.8	1,068.8		745.8	1,068		237.5			27.5	.2
Total	1,006.6	1,600.0	2,471.2	2,626.2	593.4	871.2	155.0	59.0	54.4		9.71	9.08	1.2

Source: Adapted from the Three Development Plans 1970-1980

the oil sector has only 1.4 percent, although it produces up to 90 percent of the government's revenues.

Because the labor force is the major factor influencing social and economic development, it is necessary to look at its distribution. According to the Third Development Plan, the largest portion of the labor force is concentrated in the services sector which includes government as well as trade, transportation, and finance. This sector employed an estimated 55.2 percent of the total labor force in 1980 (see Table III-6).

A breakdown of labor in each sector according to nationality or sex is unavailable. However, it is known that female participation in the production sectors has traditionally been extremely low in Saudi Arabia; in fact the participation of Saudi women in the labor force is very low in general, as only 103,000 out of 1.411 million women were working in 1980. Although figures denoting employment by nationality are unavailable, one can surmise, knowing the skills of the Saudi labor force, that the Saudi participation rate in the production sectors would be extremely low, except in traditional agriculture. Construction, for example, is dominated almost totally by non-Saudi workers. In the manufacturing sector, only five percent of the workers are Saudi.[16] That does not mean that the services sector is in better shape; the opposite may be true. Only the government sector has a high proportion of Saudi employees.

Table III-6

Estimated Civilian Labor Force According to Economic Activities
1979/80

Economic Activity	1980	Percent Distribution
Producing Sector		
Agriculture	598.8	24.2
Mining	7.3	0.3
Manufacturing	104.2	4.2
Utilities	31.5	1.3
Construction	330.1	13.4
Subtotal:	1,071.9	43.4
Services Sector		
Trade	310.6	12.6
Transport	214.6	8.7
Finance	34.8	1.4
Other Services	482.3	19.5
Government	321.0	13.0
Subtotal:	1,363.3	55.2
Total Non-Oil	2,435.2	98.6
Oil Sector	36.0	1.4
Total	2,471.2	100.0

Source: Ministry of Planning, Third Development Plan 1980-1985.

Factors Affecting Manpower Development

The shortage of human resources in Saudi Arabia is considered the most serious constraint to the country's ambitious development plans. In this section, the problems associated with human resource development in Saudi Arabia will be stated and discussed.

1. Size of population: Compared to its area, the population of the kingdom is very small. At this time there are approximately three

kilometers of area per person, a very unfavorable proportion of people to take charge of the process of development. In addition, settlement habits represent another complication, as some 25 percent of the population are unsettled nomads (approximately 1.8 million people). This number is decreasing annually, however, at an average rate of 4.5 percent, due to the country's rapid development and the nomads' interest in increasing their standards of living and their share in the new wealth. Consequently, the number of people entering the labor market are expected to increase.

2. Age: Approximately half of the Saudi population is less than 15 years old, making dependence on expatriate labor unavoidable. However, it should also mean that these young people will in time be able to replace the expatriates, or at least reduce their number, although this outcome will require proper preparation for the types of employment needed by the economy.

3. Education and Training: The low educational level of the Saudi employee is one of the major reasons for the country's dependence of expatriate labor, as has been shown before in the discussion of illiteracy. Furthermore, the Saudi Arabian is geared to academic rather than vocational education. The majority of Saudi students would rather attend universities than technical schools, as an academic education provides an opportunity for higher salaries, excellent benefits, and respectability in the community.

4. Unemployment and Underemployment: Because of a lack of information and communication about the kinds of work available and

restrictive government practices, many Saudi workers with specialized skills are not appropriately employed. For example, all university graduates must work for the government as a means of repaying their educational expenses. Invariably, there are not enough government jobs available to suit the skills of all university graduates. Consequently, there is generally a low level of productivity in the government sector. The low level of productivity is also caused by the lack of training programs available to government employees.*

Also underemployed are housewives, youth, traditional farmers, the handicapped and retired,** all of whom could become more productive with proper training.

5. Customs and Traditions: Most Saudis regard manual work as demeaning to their characters. They have preferred white collar jobs, as evidenced by the extremely small number employed as carpenters, plumbers, electricians and construction workers.

The lack of desire to move from rural to urban areas where most of the production sector (such as industry) is located, is another instance of how customs and traditions influence the availability of labor. It has been estimated that less than one percent yearly of the rural population do move into urban areas.[17]

The most important impact of customs and traditions on industrial development is the extremely low participation of Saudi women in the

---

* It should be mentioned here that the Public Administration Institute is doing a good job in the area of training, however, the limited capacity of the Institute limits its effectiveness in this area.

** The retirement age is 60 years old.

labor force. The average female participation in the Arab world is approximately 6.6 percent of the total female population.[18] However, in Saudi Arabia, the rate is even lower: Saudi women represented some 4.2 percent of the work force in 1980, and only one percent in 1975. The fact that the education of women did not begin until 1961 has undoubtedly had a great deal of impact on the low female participation rate in the labor force.[19] Furthermore, the majority of women graduates become full-time wives and mothers; and most of those who do enter the work world are employed in such traditionally female jobs as nursing and teaching.

6. Cost factor: The low pecuniary cost of bringing men in from outside the country to work is a critical issue, as businessmen are very concerned about the cost of labor in their total operating budget. Thus, by hiring non-Saudi employees, especially the non-skilled and semi-skilled laborer, businessmen are able to substantially reduce expenses. This was the case in almost all projects established by the private sector, particularly in manufacturing. If this pattern continues, the development of the Saudi labor force will be negatively affected.

Expatriate Labor Force

Reasons for Their Presence

The income factor could be considered the main pull factor for the expatriate labor force in Saudi Arabia, as the wage rates there are definitely higher than in foreign countries providing most of the

Text mis-numbered. There is no page 51.

Not only are there people from LDCs holding jobs in Saudi Arabia, there are many expatriate workers from MDCs as well. The main factor here is that there are large salaries which are tax-free in both the countries of origin and employment. Also, most Saudi Arabian projects are built by foreign firms which bring their own countrymen to fill skilled labor needs, rather than try to employ skilled Saudi workers. This practice would prevent the transfer of skills and knowledge from the foreign firms to the Saudi labor force.

Problems With the Expatriate Worker

Although the manpower shortage is considered the main constraint to the country's development, and an outside labor force must be utilized to reach economic goals, the use of the expatriate worker must be seen as a temporary solution to the problem. If this mechanism were seen to be "the" solution, the objective of the entire development process would be severely affected. The most dangerous outcome would be that the Saudis would become very dependent on non-Saudis to accomplish the developmental process objectives.

The present situation of very large numbers of workers with different backgrounds may lead to a great deal of conflict with the host society. Such a conflict could take many shapes and patterns, which in turn could affect the productivity of the entire labor force. Putting together many people with different backgrounds, work habits, and values to accomplish one job may cause a great deal of social disharmony.

In addition, because expatriate workers know they are only in the country for a short period of time and have no long-term commitment to it, their loyalty for the project and their levels of productivity may be negatively affected. An expatriate worker's productivity may also be diminished because he is far from home, family and friends. An additional problem of expatriate workers is the burden that they may place on available service facilities such as housing, airports, water, electricity and police services, which in turn would have to be expanded, thereby creating even greater manpower needs.

Concluding Remarks

The point that has been stressed throughout this chapter is Saudi Arabia's dependence on an expatriate labor force. Expatriate labor constitutes a large proportion of the total labor force in almost all sectors of the economy, except in traditional agriculture. This heavy dependence on expatriate workers was caused primarily by the sudden wealth resulting from the discovery of oil in Saudi Arabia. Consequently, the economy has grown very rapidly in all sectors, creating job opportunities and thereby contributing substantially to a relative shortage in human resources.

In Saudi Arabia, there are two major reasons for the imbalance in the labor supply and demand. On the one hand, there is not enough of an availability of labor because of the high percentage of young people, extremely low percentage of working women, and low eduation and skills levels of the populace. On the other hand, the

productivity range of the available labor force tends to be very low, e.g., traditional agriculture and government.

Because of its capital resources, Saudi Arabia was able to invest in capital-intensive and highly sophisticated technology, but it is the knowhow that cannot be easily created and maintained. As a result, an important question should be seriously addressed: Will the hoped-for benefits from this development process be unfulfilled as a result of depending on expatriates? And if the benefits are realized, will it be more costly to achieve these benefits? Finally, the help and assistance of the expatriate labor force should be appreciated. The expatriate worker's high skill levels have helped and continue to help Saudi Arabia in its task of economic development.

Having discussed the present Saudi manpower situation, simple projections of the industrial sector's manpower needs and the future supply will be presented in the next chapter.

CHAPTER IV

MANPOWER FOR INDUSTRIALIZATION IN SAUDI ARABIA

"Four broad categories of resources are required for the development of industrial output: labor, management and entrepreneurship, capital and natural resources."[1] To establish a successful industrial sector, a country has to provide the capital, natural resources, and labor that are considered to be the major factors of production in any industrial development. For Saudi Arabia, capital is not a problem and natural resources such as oil, natural gas, and minerals are abundant. It is the availability of manpower which is the major obstacle. In this chapter, I will analyze the manpower requirement of the Saudi industrial sector, comparing it to the domestic supply of labor.

Saudi Industrial Sector and its Labor Needs

There is general agreement that the shortage of "native" trained manpower is the greatest obstacle to industrial development in Saudi Arabia. In Chapter II the industrial sector was divided into three major subsectors: manufacturing, oils, and hydrocarbon-based industries. In this chapter, each subsector will be looked at individually in order to estimate its labor requirements. In doing this, I can rely on only limited historical data. Thus, in light of the newness of the Saudi industrial sector, only generalized needs can

be projected. Projections regarding the specific types of workers and levels of skills that will be required are not feasible at this time. Once the generalized labor demand is estimated I will proceed to estimate the total number of Saudi workers available to all sectors of the economy. Finally, I will estimate the number of Saudi workers that will be available to meet the industrial sector's needs and how many expatriate workers must be used to bridge the gap between the demand and supply of the industrial labor force.

Manufacturing Sector

The manufacturing sector is a very recent development in the Saudi economy. The huge amount of imports of almost every kind of product, the aggressive government policy, the incentives for industrialization, and the amount of assets available to many Saudi businessmen have given this sector the opportunity to grow over the years and its labor force requirements have grown commensurately. In this section, I will project the labor needs of this industrial subsector up to 1990. The year 1990 is seen as the maximum projection year because the same trends and behavior that existed in the 1970s are expected to continue up until that time. This belief is supported by the government's continuing determination to see manufacturing grow and take its appropriate place in the economy by the increasing awareness and appreciation in the Saudi marketplace, by the surrounding Gulf state markets for the products coming out of this sector, and by the decreasing private investment opportunities in construction and real estate.* Going beyond 1990 would affect the

relative accuracy of the data because a new kind of environment would have been created by the changes that may not apply to present and near future conditions.

The latest (1981) census of the manufacturing sector is presented in Table IV-1. The total number of laborers observed in the 1981 census will be used as the base number when projecting total labor needs from 1981 up to 1990 with the assumption that the same trends and environment will prevail during this entire period of time.

Table IV-2 shows the level of employment in the manufacturing sector during different years. It also shows the percentage change in the number of workers between these years. From Table IV-2, different annual growth rates can be calculated based on different time intervals.

(a) Annual growth rate over the 15 years from 1966 to 1981:

Using the formula

$$E_{1981} = E_{1966} (1 + g)^{T}$$

$$156087 = 41000 (1 + g)^{15}$$

$$156087/41000 = (1 + g)^{15}$$

growth rate (g) = 9.32%.

(b) Annual growth rate over the 11 years from 1970 to 1981:

Using the same calculation method, the growth rate over this period is 10.54%.

---

* The reasons behind the decrease in construction and real estate investment opportunities are the completion of most of the planned infrastructure projects and a surplus in housing and office buildings.

Table IV-1

Number of Establishments and Workers in the Manufacturing Sector, 1981

Economic Activity	Establishments		Workers	
	No.	Percentage[a]	No.	Percentage[a]
Food, Beverages	2171	9.61	16555	10.6
Textiles, Clothing and Leather	8021	35.50	22472	14.4
Wood, Wood Prod. and Furniture	1985	8.80	11324	7.3
Paper Products and Printing	608	2.70	7944	5.1
Chemicals and Plastics Prod.	195	.90	8196	5.3
Bricks, Blocks, Cement and Glass	2500	11.10	34428	22.1
Base Metal	197	.90	2455	1.6
Fabr. Metal Prod. and Machinery	6579	29.10	51538	33.0
Other Manufacturing Industries	317	1.40	1175	0.8
TOTAL	22573	100.00	156087	100.0

Source: CDS, Summary Results: Census of Private Establishments. Riyadh 1981, pp. 33.

[a] Percentages were calculated by the researcher.

Table IV-2

Historical Data on Number of Workers and the Growth Rates Between 1966-1981 in the Manufacturing Sector

Year	No. of Workers	Time Span (Years)	Net Change	Percentage Change*	Annual Growth Rate**
1966	41000[1]				
		4	10800	26.3	6.02
1970	51800[1]				
		5	7400	-14.3	-3.03
1975	44400[2]				
		6	111687	251.5	23.31
1981	156087[3]				

[1] CDP, The Development Plan. Riyadh, Saudi Arabia, 1970, p. 73.

[2] Ministry of Planning, The Second Development Plan. 1975-1980, Riyach, Saudi Arabia.

[3] CDS, Summary Result: Census of Private Establishments, Riyadh, Saudi Arabia.

*This percentage change is calculated by the formula

$$\frac{\text{No. of Workers } T_2 - \text{No. of Workers } T_1}{\text{No. of Workers } T_1}$$

**Annual growth rate:

$$\text{Employment at } T_1 - \text{Employment } T_2 \ (1 + \text{Growth rate})^{\text{Time}}$$

Table IV-3 shows the projected labor force required by the manufacturing sector from 1981 through 1990, based on the two growth rates calculated in (a) and (b).

Table IV-3

Projected Labor Force For the Manufacturing Sector, 1981-90

Year	Projected labor demand based on 9.32% annual growth rate	Projected labor demand based on 10.54% annual growth rate
1981*	156087*	156087*
1982	170634	172538
1983	186537	190724
1984	203922	210826
1985	222928	233047
1986	243705	257610
1987	266418	284762
1988	291248	314776
1989	318393	347954
1990	348067	384628

*Base year

It seems that a 10.54 percent annual growth rate is more representative of the manufacturing sector's need for labor because of the following factors:

1. The first development plan in the history of Saudi Arabia was only enacted at the beginning of 1970.

2. The country's revenues from oil exports also started to increase at the beginning of the 1970's, as a result of increased production and prices of Saudi crude oil. Even though government oil revenues have fallen lately, Saudi Arabia's vast financial reserve and investment would compensate for the loss of oil revenue in the short-run.

3. Many of the government agencies that are responsible for the industrial development were also established during the early 1970s, such as the Ministry of Industry and Electricity, and the Saudi Industrial Development Fund.

All the above factors indicate that the industrial process in Saudi Arabia has taken a different path since 1970, thus making any trends before that obsolete. It should be mentioned that the same thing could be said about the other sectors of the economy.

The assumption that all trends and climates that prevailed during the eleven years from 1970 to 1981 will, for the overall sector, continue during the nine years up to 1990 should not apply to the distribution of workers among the various components of the manufacturing sector. Table IV-1 shows that 22.1 percent of the total labor force employed in this sector are producing construction material, such as bricks and blocks, but due to a decrease in the country's construction activities and an almost completed infrastructure,[2] this percentage will decrease. In addition, because of the rapid expansion of the modern agricultural sector, I expect that the manufacturing of food and beverages will expand, causing an increase in the share of total workers in this category. Also, the manufacturing of chemicals and plastics will expand very rapidly because of the new petrochemical industries, resulting in an increase in the share of the labor force in this subsector as well.

Crude and Refined Oil Industry

Even though the oil sector contributed slightly over 48 percent of the total GNP in 1980 (see Table II-5), its total employment share is very small compared to other sectors of the economy. According to the Third Development Plan, only 1.4 percent of workers were employed in the oil sector in 1979/80. The reason behind this low percentage is the use of the most modern and sophisticated equipment that requires a minimum number of laborers. Table IV-4 shows the number of employees in the oil subsector from 1970 to 1982.

The development in the number of laborers in the oil sector since 1970 is shown very clearly in Table IV-4. Total employment in 1980 is 4.50 times the number in 1976, reflecting the increase in crude and refined oil and natural gas production.

Table IV-4

Actual Number of Employees in the Oil Sector 1970-1982

Year	Employment	Percentage Change in Total Employment[a]
1970	10,353	-
1976	20,067	27.2
1977	25,527	19.3
1978	30,453	19.3
1979	38,243	25.6
1980	46,870	22.6
1981	53,437	14.0
1982	57,077	6.8

Source: ARAMCO, Facts and Figures 1982, Dharan, Saudi Arabia, p. 17.

[a]This column was calculated by the researcher.

The annual growth rate of employment during the 12 years from 1976 to 1982 is calculated as:

$$E_{1982} = E_{1970} (1 + g)^{12}$$

$$57077 = 10353 (1 + g)^{12}$$

$$57077/10353 = (1 + g)^{12}$$

Growth rate (g) = 15.28% annually.

However, a 15.28% annual growth rate is quite high to be carried through the next eight years to 1990 because:

1. Employment in the oil industry had rapidly expanded as a result of the increased demand for oil since the beginning of the 1970s. This in turn pushed the oil production to an all-time high.

2. Because of a reduced demand for crude oil, Saudi oil production has declined from its high average figure of 9.5 million barrels of oil in 1981.

3. One may argue that Saudi Arabia has greatly increased its refined oil production and that consequently employment should increase more rapidly. However, the refined oil production has only replaced crude oil production.

Therefore, it would seem that the trends that occurred between 1970 and 1980 are not necessarily going to repeat themselves. Thus, because the pattern from 1980 to 1982 may be more representative of the new trends in the oil industry during the next eight years, the annual growth rate of employment during those three years will be used to project the future employment in the oil sector through 1990.

The annual growth rate is determined to be 6.7 percent annually during the three years from 1980 to 1982. The number of people

employed in 1982 will be used as the base year figure in Table IV-5, which shows the projected employment from 1982 to 1990.

Table IV-5

Projected Need of Labor Force in the Oil Industry 1982-90

Year	No. Employed (Projected Based on 6.7% Growth Rate
1982*	57077
1983	60901
1984	64981
1985	69335
1986	73980
1987	78937
1988	84226
1989	89869
1990	95890

*Base year

Hydrocarbon-Based and Heavy Industries

This sector is unique in comparison with the previous two because it was completely planned by the government, then built totally on an area which was only desert land. The total costs of infrastructure facilities such as ports, roads, and houses, as well as other services were paid for by the government. The manufacturing plants are a joint venture between the government agency SABIC and leading Western and Asian companies. The officials who planned this sector outlined all the details, and its manpower needs were estimated and planned by the

Royal Commission for Jubail and Yonbu, the government agency responsible for the development of this sector. The manpower needs were projected for 1981 through 1987, because all the manufacturing plants will be in full operation by 1987. The projected employment would then be at the maximum level after 1987.

Table IV-6

Projected Employment Needs in the New Hydrocarbon and Heavy Industries Sector 1981-90

Year	Jubail	Yonbu	TOTAL
1981	-	500	500
1982	-	2100	2100
1983	2500	2300	4800
1984	4900	2700	7600
1985	7500	3100	10600
1986	10000	3700	13700
1987	12000	4100	16100
1988	12000*	4100*	16100*
1989	12000*	4100*	16100*
1990	12000*	4100*	16100*

*Based on the author's assumption that the total number employed will not change because no more factories are planned for the near future.

Source: RCJY, The Annual Report 1978, Riyadh Saudi Arabia, p. 9.

Total Manpower Needs of the Industrial Sector:

Having estimated the labor force required by each of the industrial subsectors through the year 1990, we can calculate the total needs of the industrial sector during the same period and figure

out each subsector's percentile shares. These figures are shown in Table IV-7.

According to Table IV-7, the manufacturing sector had the largest share of employment in 1981. It's share of projected employment in the industrial sector will increase slightly every year throughout the period from 1981 to 1990. The oil sector has the second highest share of employment in 1981, but this subsector's share is projected to decline throughout the 1980s. The hydrocarbon and basic metal industries subsector is third in terms of 1981 employment share. This subsector's share will increase during the first seven years of the projection period, then decline slightly because of the assumption that employment will not increase after 1987. The annual percentage growth rate of the total projected employment in the industrial sector is about 10.66 percent per annum.

The crucial question now is whether the Saudi indigenous labor force would be capable of providing the number of workers demanded by the industrial sector. If not, how many expatriate workers must be used to achieve the industrial development objectives? This question will be analyzed in the next section.

Indigenous Supply of Industrial Workers

The following factors will be utilized to estimate the labor supply available to the industrial sector:

1. The projection of population size in Table II-2 will be used.

Table IV-7

Projected Employment Needs in the Saudi Industrial Sector 1980-90

Year	Projected Employment Number			TOTAL	Percentage of Employment to Total		
	Manuf. Sector	Oil Sector	Hydrocarbon Sector		Manuf. Indus.	Oil Indus.	Hydrocarbon Base Indus.
1980	-	46870	-	-	-	-	-
1981	156087	53437	500	210024	74.3	25.4	0.3
1982	172538	57077	2100	231715	74.4	24.6	.9
1983	190724	60901	4800	256425	74.3	23.7	2.0
1984	210826	64981	7600	283407	74.3	22.9	2.9
1985	233047	69335	10600	312982	74.4	22.2	3.4
1986	257610	73980	13700	345290	74.6	21.4	4.0
1987	284762	78937	16100	379799	75.0	20.8	4.2
1988	314776	84226	16100*	415102	75.8	20.3	3.9
1989	347954	89869	16100*	453923	76.7	19.8	3.5
1990	384628	95890	16100*	496618	77.5	19.3	3.2

2. According to the 1974 census, males represent 51.3 percent of Saudi Arabia's population.[3] This percentage will be used to calculate the number of Saudi males through 1990 with the assumption that no change will occur to alter this percentage.

3. Based on the Third Development Plan, the participation rate in the labor force for Saudi males between 12 and 64 years old was 65.3 percent in 1980; it is expected to decline by .3% every year as educational and training programs expand (see Table IV-8). Participation rates in Table IV-8 will be used to project the supply of total Saudi labor through 1990.

Table IV-8

Expected Participation Rate of Saudi Males in Labor Force Between 12 and 64 Years Old, 1980-90

Year	Participation Rate
1980	65.3
1981	65.0
1982	64.8
1983	64.5
1984	64.3
1985	64.1
1986	63.8
1987	63.6
1989	63.3
1990	63.1

The age interval provided in the Population Atlas of Saudi Arabia is presented in Table IV-9. But, as the percentage of males aged 10

to 14 is provided rather than from 12 to 14, it is necessary to estimate this latter percentage. Thus:*

(1) $$\frac{\%\text{ of 5-9 category}}{\%\text{ of 5-9 category} + \%\text{ of 15-19 category}} = \%\text{ of 10-11 category}$$

(2) $$\frac{\%\text{ of 15-19 category}}{\%\text{ of 15-19 category} + \%\text{ of 5-9 category}} = \%\text{ of 12-14 category}$$

Substituting in (1) and (2)

(1) $$\frac{8.5}{8.5 + 5.4} = .611$$

(2) $$\frac{5.4}{8.5 + 5.4} = .388$$

By multiplying each result by the 6.4 points which is the total share of males between the ages of 10 and 14, we get each category's share of that 6.4 percent:

Share of category 10-11 = .611 X 6.4 = 3.91

Share of category 12-14 = .388 X 6.4 = 2.48.

Two results have been achieved from the previous analysis:

(a) The percentage of males between 12 and 64 years old is 29.9 percent of the total Saudi population (see Table IV-10). Thus, the percentage of males aged 12 to 64 years is 58.2 percent of the total number of males. This latter group will be called "active males".

---

* According to Table IV-9, the younger the age group the higher the share of population. For this reason the two formulas will take this into consideration by giving the 10-12 year old a higher share than 12-14 years of age.

Table IV-9

Percentage Distribution of Saudi Males According to Age, 1974

Age Interval	Saudi Males
5-9	8.5
10-14	6.4
15-19	5.4
20-24	4.0
25-29	3.3
30-34	2.9
35-39	2.8
40-44	2.5
45-49	1.9
50-54	1.8
55-59	1.5

Source: University of Riyadh, Population Atlas of Saudi Arabia, 1981.

Table IV-10

Percentage Distribution of Saudi Males According to Specific Age, 1974

Age Interval	% of Saudi Males
12-14*	2.4
15-19	5.4
20-24	4.0
25-29	3.3
30-34	2.9
35-39	2.8
40-44	2.5
45-49	1.9
50-54	1.8
55-59	1.5
60-64	1.4
TOTAL	29.9%

*Refer to text for discussion of interpolation method.

(b) The labor force participation rates of active males has been determined for the ten years from 1980 to 1990 (see Table IV-8).

The next step is to use the information gathered thus far to estimate the total Saudi manpower supply (see Table IV-11). Although the participation rate of active males in the labor force is going to decline during the period from 1980 to 1990, the actual number of male workers is projected to rise sue to the increase in the number of males, resulting from the expected increase in the total population. Although the labor force has been estimated to increase in number as shown in Table IV-11, the percentage of the total male workers in the male population will decrease. For example, this percentage is 38 percent in 1980. It will decline to 37.3 percent and then to 36.5 percent by 1985 and 1990, respectively. The major cause for this situation, in my opinion, is the expansion in educational programs which is expected to significantly influence the participation rate of males in the 12-to-20-year-old age category.

Table IV-11

Projected Saudi Total Employment 1980-1990

	SAUDI POPULATION				
	1	2	3	4	5
Year	Total*	Males at 51.3% of Total	Active Males at 58.2% of Males	Participation Rates of Actives in Labor Force	Labor Force 4x3
1980	7,081,161	3,632,635	2,114,193	65.3%	1,380,568
1981	7,293,595	3,741,614	2,177,619	65.0%	1,415,452
1982	7,512,403	3,853,862	2,242,947	64.8%	1,453,429
1983	7,737,775	3,969,478	2,310,236	64.5%	1,490,102
1984	7,969,909	4,088,563	2,379,543	64.3%	1,530,046
1985	8,209,006	4,211,220	2,450,930	64.1%	1,571,046
1986	8,455,276	4,337,556	2,524,457	63.8%	1,610,603
1987	8,708,934	4,467,683	2,600,191	63.6%	1,653,721
1988	8,870,202	4,601,713	2,678,197	63.3%	1,695,298
1989	9,239,308	4,739,765	2,758,543	63.1%	1,740,640
1990	9,516,488	4,881,958	2,841,299	62.8%	1,784,335

*See Table III-2.

Having projected the indigenous Saudi labor force, I will now estimate the industrial sector's share of this projected supply. Table IV-12 presents the distribution of the total labor force into each sector of the Saudi economy, according to the Third Development Plan. Two percentages in Table IV-12 are of concern to us. One is the manufacturing sector's percentage share, which is listed as 4.2 percent in 1980, and 6.3 percent in 1985, with an expected annual growth rate during the five year period of 8.4 percent. Based on prior assumptions that the same trends and conditions which prevailed previously will continue to prevail up to 1990, the expected

percentage share of the manufacturing subsector from the Saudi labor supply is presented in Table IV-13.

The second percentage of concern from Table IV-12 is the oil sector's share of the Saudi labor force, 1.4 percent in 1980 and 1.8 percent in 1985. Applying the same assumption as above, the oil industry's expected percentage share of the Saudi labor supply is presented in Table IV-14.

Table IV-12

Distribution of the Labor Force According to Economic Sector 1980 and 1985

Sector	Percent Distribution		Annual Percentage Change[a]
	1980	1985	
Agriculture	24.2	20.1	-3.6
Other Mining	0.3	.4	5.9
Manufacturing	4.2	6.3	8.4
Utilities	1.3	1.8	6.7
Construction	13.4	9.3	-7.0
Trade	12.6	12.9	.47
Transportation	8.7	10.5	3.8
Finance	1.4	1.7	3.9
Other Services	19.5	19.2	-.3
Government	13.0	16.0	4.2
Oil Sector	1.4	1.8	5.1
TOTAL	100.0	100.0	

Source: Ministry of Planning, Third Development Plan, 1980-85, Riyahd, Saudi Arabia, 1980, p. 100.

[a]Annual percentage rate has been calculated by the researcher.

Using the information in Tables IV-11, IV-12, IV-13, and IV-14, the expected number of workers in the two industrial sectors to be supplied by the Saudi labor force is presented in Table IV-15.

Based on previously stated assumptions, a projection has been made of the number of industrial workers at all levels and skills to be supplied to the oil and manufacturing subsectors by the Saudi labor force. The percentage of the labor supply of the third industrial subsector, hydrocarbon and heavy industries, was not mentioned in Table IV-12, the data for which was drawn from the Third Development Plan. I believe that the reason for this omission was that the first labor demand estimate for the sector was not made until 1981, one year after the Third Development Plan was initiated.

The labor demand in the hydrocarbon-based subsector will be met in one of two ways, or both: by expatriate workers, and/or by shifting the necessary number of workers from other sectors of the economy to the hydrocarbon-based subsector and using more expatriate workers than planned in the other economic sectors. In this analysis I will assume that the first option will be chosen, not because I favor it, but because it is difficult to know from which other sector or sectors the needed Saudi laborers will come. Based on this choice, the total number of workers that would be supplied to the industrial sector from the Saudi labor market are represented in Table IV-15, with the exception of the necessary balance of expatriate workers. Using information in Tables IV-7 and IV-15, we calculate the industrial employees drawn from the indigenous Saudi labor force and from the expatriate labor supply.

Table IV-13

Expected Share of Labor Supply to the Non-Oil Sector
1980-90

Year	Share of Employment at 8.4% Annual Increase
1980	4.2
1981	4.5
1982	4.9
1983	5.3
1984	5.7
1985	6.3
1986	6.8
1987	7.3
1988	8.0
1989	8.6
1990	9.4

Table IV-14

Expected Share of Labor Supply to the Oil Industry
1980-90

Year	Share of Employment at 5.1% Annual Increase
1980	1.40
1981	1.47
1982	1.54
1983	1.62
1984	1.70
1985	1.79
1986	1.88
1987	1.98
1988	2.08
1989	2.19
1990	2.30

Table IV-15

Estimated Labor Force to the Manufacturing Sector and Oil Sector
from the Saudi Manpower Supply 1980-90

Year	Total Labor Supply	Labor Force for Mfg. Sector		Labor Force for Oil		Percent of Total Employment	Total Number[1]
		Percent[2]	Number	Percent[3]	Number		
1980	1,380,568	4.2	57,983	1.40	19,327	5.6	77,310
1981	1,415,452	4.5	63,695	1.47	20,807	5.9	84,502
1982	1,453,429	4.9	71,218	1.54	22,382	6.4	93,600
1983	1,490,102	5.3	78,975	1.62	24,139	6.9	103,114
1984	1,530,046	5.7	87,212	1.70	26,010	7.4	113,222
1985	1,571,046	6.3	98,975	1.79	28,121	8.0	127,096
1986	1,610,603	6.8	109,521	1.88	30,279	8.6	139,800
1987	1,653,721	7.3	120,721	1.98	32,743	8.1	153,464
1988	1,695,298	8.0	135,623	2.08	32,262	9.9	167,885
1989	1,740,640	8.6	149,695	2.19	38,120	10.7	187,815
1990	1,784,335	9.4	167,727	2.30	41,039	11.7	208,766

[1] See Table No. IV-10.
[2] See Table No. IV-12.
[3] See Table No. IV-13.

Table IV-16

Projected Saudi and Non-Saudi Industrial Labor Force 1980-90

Year	Total	Saudi	%	Non-Saudi	%
1980	-	77,310	-	-	-
1981	210,024	84,502	40.2	125,522	59.8
1982	231,715	93,600	40.4	138,115	59.6
1983	256,424	103,114	40.2	153,310	59.8
1984	283,407	113,224	40.0	170,183	60.0
1985	312,982	127,096	40.6	185,886	59.4
1986	345,290	139,800	40.5	205,490	59.5
1987	379,799	153,464	40.4	226,335	59.6
1988	415,102	167,885	40.4	247,217	59.6
1989	453,923	187,815	41.4	266,108	58.6
1990	496,618	208,766	42.0	287,842	58.0

Concluding Remarks

The results summarized in Tables IV-15 and IV-16 suggest important labor issues in the Saudi industrial sector. Its share of the Saudi labor market remains very low in relation to its importance and strategic objectives, such as economic diversification. However, this could be due to huge investment in capital intensive rather than labor intensive technology. The labor productivity of the industrial sector tends to be higher than in other sectors. Thus, the low labor share will not necessarily affect industrial development. The low share of the Saudi labor force implies that the large expatriate worker pool which will be utilized. In Table IV-16, the Saudi share of the industrial labor force accounted for only 40 percent of total industrial employment in 1981 (Table IV-16); in 1985 it is expected to increase very slightly to 40.6 percent, and should reach 42.0 percent

in 1990. This low share makes the use of expatriate workers an absolute necessity for bridging the gap between the supply of and demand for industrial labor, in order to achieve industrial development. But the very slow increase in the Saudi share (see Table IV-16) is problematic because expatriate workers should be used only as a short-term policy until new Saudi skills are developed and increased.

It has been pointed out that "technology can be imported and industries can be created, but skills to maintain and use such facilities cannot be imported, at least in the required number necessary to sustain industry."[5] It may be possible for Saudi Arabia, with its financial capabilities, to follow that dictum, but the social and economic implications should be taken into consideration. For example, the social cost of dependence on expatriate workers is high, causing a compensatory price rise in Saudi industrial products and an unfavorable competitive condition.

Overcoming this complicated problem is extremely difficult. Finding a total or partial solution requires a serious look at many policies in the educational and civil service system. The acceleration of development in the various sectors of the economy should be balanced and set according to priorities. Some of these problems and proposed solutions will be discussed in Chapter VI.

In Saudi Arabia the educational system has been given a major role in providing the necessary manpower for the country's various development programs. A look at the educational system and its policies to achieve its objectives will be discussed in the next chapter.

CHAPTER V

EDUCATION AND MANPOWER

The industrialization process in Saudi Arabia has created urgent manpower needs at all skill levels that cannot be satisfied either quantitatively or qualitatively by the existing and projected Saudi labor pool. Saudi policy-makers look to the educational system as the major means of providing Saudi workers with the necessary skills and knowledge to achieve successful industrial development. The main objective of this chapter is to project the number of enrollment and graduates of both the higher education and vocational education systems. This will determine to what extent the educational systems will be able to provide trained and skilled manpower in the near future. According to the Ministry of Planning, "The objectives of the education and training system as a whole are . . . To equip citizens as future participants in the labor force by providing types of training which are responsive to the changing needs of the economy."[1]

According to the International Labor Office (ILO), sources of industrial skills in developing countries are:[2]

1. general education;
2. formal institutions for specific vocational preparation at secondary and tertiary levels such as technical schools, colleges and universities;
3. on-the-job training;
4. foreign countries.

In Saudi Arabia, all these sources have been utilized to various degrees. However, general education has taken the biggest share of investment and the largest number of students.

Education in Saudi Arabia has gone through several stages of development. Traditional education, the only form of learning available at first, was administered through such institutions as the family and the mosque. The various skills, such as knitting, handicrafts, fishing, hunting, etc., were transferred through families from generation to generation. The main form of traditional education was the Koranic elementary school, the so-called Kuttab. There, students were taught to memorize the Koran, as well as some reading and writing. More recently, such teachings have become part-time activities, usually in the afternoons after the regular school day has ended.[3]

Public education did not exist until the 1930's. In 1936 there were only 27 public schools, with 4,385 students and 160 teachers.[4] The latter were a mixture of Saudi and other Arab citizens, mainly Egyptians. By 1945 there were 46 public schools, and by 1950 the number had climbed to 218, educating some 27,000 students and employing approximately 1,000 teachers.[5] Public education was not available to girls at that time, however, because of social and cultural restrictions. The curriculum was comprised mainly of religion, Arabic literature, and history. Schools for vocational training did not yet exist. The student seeking higher education had to leave the country, generally traveling to Egypt or Lebanon.[6]

The educational system gained a new push in terms of increased enrollment, and number of teachers and schools when the Ministry of Education was established in 1953. In 1961, education was opened to female as well as male students, and changes were made in administration, curriculum and teacher education. In addition, vocational, occupational, and technical institutions were created.[7]

Quantitatively, the educational system has made substantial advances. In the past 30 years, enrollment in public schools has risen from 44,000[8] to more than 1.5 million students.[9] Enrollment of male students from 1960 to 1981 increased very rapidly, from 131.3 thousand[10] to 958.5 thousand students.[11] Female students during the same period increased from 5.2 to 569.8 thousand students. Table V-1 shows that female enrollment began more slowly than male enrollment, but it has accelerated to such a degree during recent years that the old disparity no longer exists. Table V-2 lists the student distribution
among the different levels of education in 1980.

The expansion of education at all levels has increased the demand for teachers and other educational staff, contributing in two ways to the labor shortage in other sectors, such as industry. First, because the government provides free education to anyone willing to continue through the higher education levels, and even pays a monthly allowance of approximately $300 to all students enrolled at institutions of higher education, the majority of students choose this avenue, resulting in too few choosing vocational or technical training, or joining the labor force. Second, the demand for teachers and administrative

Table V-1

Males and Females Enrolled in Public Education 1981
(in thousands)

Year	Males	Females	Total	M %	F %
1961	131.3	5.2	136.5	96.1%	3.9%
1963	188.7	19.1	207.80	90.8%	9.2%
1965	244.3	42.2	286.5	85.2%	14.8%
1967	296.8	71.2	386.0	80.6%	19.4%
1969	352.9	105.4	458.3	77.0%	23.0%
1971	418.1	143.6	560.7	74.5%	25.5%
1973	497.7	200.8	698.5	71.2%	28.8%
1975	--	--	--	--	--
1977	743.4	389.6	1133.0	65.6%	34.4%
1979	861.5	463.2	1324.7	65.0%	35.0%
1981	958.5	569.8	1528.7	62.7%	37.3%

Source: Adapted from SAMA, Annual Reports of 1981, 1980, and 1979.

Table V-2

Males and Females Enrolled in Different Levels of Education 1981

No. of Students	Total	Male	Female
Kindergarten	27843	14771	13072
Primary	930436	570406	360030
Post-primary	377681	244535	133146
Higher Education	54625	40557	15694
Special Education	1971	1432	539
Adult Education	136103	88935	47168

Source: SAMA, Annual Report 1981. p. 86.

staff absorbs much of the educated population, thus creating a shortage in supply to other sectors of the economy. But as indicated before, this is the present cost of investing in society's future development.

High Level Manpower

Highly qualified manpower, e.g., engineers and administrators, is considered one of the most important groups of the total industrial labor force because of their ability to plan, innovate, and administer vital activities for a successful and competitive industrial sector. Because institutions of higher education are usually the primary suppliers of these groups, I will estimate the number of graduating Saudi Arabian university students through the year 1990. However, this does not mean that those who graduate will then be employed in the industrial sector because of the government policy requiring all graduates to work in the government for the first four years as a means to repay their educational expenses. However, as the oil industry is owned by the government, and the hydrocarbon industry is owned in part by the government through the Investment Fund in the Ministry of Finance and National Economy, some of these university graduates will be working in those two sectors. An estimate of how many is not possible at this time. The non-oil (manufacturing) sector, however, cannot employ any of these graduates until four years after graduation, if they choose to enter it at all.

Higher Education Enrollment

Before estimating the number of graduates, it is appropriate to first estimate the number of students enrolling at institutions of higher education. To that purpose:

1. The total numbers of males and females enrolled at institutions of higher education are presented in Table V-3. The annual growth rate in the number enrolled during the seven years is 12.8 percent. Assuming that this growth will at least continue at the same rate from 1983 to 1990, I have projected a total number of students enrolled at institutions of higher education, presented in Table V-4. Projections are consistent with the increase in the number of students enrolled in secondary schools.

2. In 1975 the percentage share of male students at the higher education level was 93.7 percent.[12] In 1980 it declined to 84.7 percent,[13] an annual decline rate of -1.99 percent. The main reason behind this decline is the increasing share of women participating in higher education. However, the total numbers of both males and females have increased (see Table V-3). Assuming that the decline in the male share will continue through the year 1990, I have projected the percentage share of men enrolled at insitutions of higher education as presented in Table V-5. Table V-6 compares the data from Tables V-3 and V-4, i.e., the projected total number of enrollments to the projected percentage shares of men and women.

Table V-3

Numbers of Students Enrolled in Saudi Higher Education 1977-83

Year	Student*
1977	32137
1978	41318
1979	44101
1980	47733
1981	56252
1982	64290
1983	75000

Source: Ministry of Higher Education. Annual Report 1982, Riyadh, Saudi Arabia, p. 85.

* This number is the sum of graduates and undergraduate students enrolled in higher education.

Table V-4

Projected Enrollment in Institutions of Higher Education 1980-1990

Year	Student
1980	47733*
1981	56252*
1982	64290*
1983	75000*[a]
1984	84652
1985	95547
1986	107844
1987	121724
1988	137391
1989	155073
1990	175031

* Actual from Table V-2

[a] Base year

Table V-5

Projected Male and Female Share of Total Higher Education Enrollment 1980-1990

Year	Males	Females
1980	73.6%	26.4%
1981	72.1%	27.9%
1982	70.6%	29.4%
1983	69.1%	30.8%
1984	67.9%	32.1%
1985	66.5%	33.5%
1986	65.2%	34.8%
1987	63.9%	36.1%
1988	62.6%	37.4%
1989	61.4%	38.6%
1990	60.1%	39.9%

The primary indicator in Table V-6 is that the annual growth rate for female students enrolled in higher education will be higher than for males, or 18.6 percent as compared to 11.6 percent. Because of limited job opportunities most female high school graduates either staying at home or enter the universities. Most young women would prefer to go to school rather than stay home, particularly if they are unmarried. This kind of decision could account for the higher growth rate of women attending universities. However, because of limited capacity in the medical, dental and nursing colleges, most young women attend teachers' colleges such as the College of Science or the College of Arts, or business colleges which grant them degrees leading to very limited job opportunities.* Consequently, large numbers of female teachers are produced each year. Although the number of female

* All those colleges are within the universities' system.

teachers has increased more rapidly than male teachers because teaching is the major employment opportunity for women, the number of male teachers still outnumbers that of women.

It should be mentioned here that the number of women enrolled in institutions of higher education only represents women enrolled in universities, because there are, in addition to the universities, some 11 girls' colleges of education, two girls' colleges of arts, and one girls's college of science, all under the administration of the General Presidency of Girls' Teaching. The objectives of all these institutions is to produce female teachers.

Table V-6

Projected Total Male and Female Enrollments in Institutions of Higher Education 1980-90

Year	Total	Males		Females	
		%	No.	%	No.
1980	47733	73.6	35131	26.4	12601
1981	56252	72.1	40557	27.9	15694
1982	64290	70.6	45388	29.4	18901
1983	75000	69.1	51825	30.8	23175
1984	84652	67.9	57478	32.1	27173
1985	95547	66.5	63538	33.5	32008
1986	107844	65.2	70314	34.8	37529
1987	121724	63.9	77781	36.1	43942
1988	137391	62.6	86006	37.4	51384
1989	155073	61.4	95214	38.6	59858
1990	175031	60.1	105193	39.9	69837

Higher Education Graduates

The information presented in the previous section, along with data from the Ministry of Higher Education's 1981 annual report regarding the number of graduates between 1977 and 1981 (Table V-7), will be used to project the number of university graduates. Table V-8 represents a comparison of Tables V-3 and V-7, i.e., the percentage of enrolled students who actually graduated. An 11.48 percent annual growth rate of graduates from institutions of higher education can be extrapolated from Table V-8. This growth rate is then used to project the number of graduates from 1980 to 1990 (see Table V-8). However, because of the complexity of higher education programs, this growth rate may not hold steady. Some programs are longer than others and some are more difficult, which may affect the graduate-to-enrollment ratio. Furthermore, new programs may be introduced and old ones eliminated, practices that could similarly affect enrollees, which in turn would be reflected in the number of graduates.

Higher education should be looked at as having an input stage represented by enrollment, a process stage showing the time and effort put in by students and staff, and an output stage measured by university graduates. Because both time requirements and difficulty vary in the process stage, it is very difficult to project a unified growth rate. If this indicates anything it is that establishing and building an institution is much easier and faster than producing graduates.

An assumption was made that the male/female ratio of enrollments would hold true for graduates. Therefore, the percentages of men and women enrolled in institutions of higher education as indicated in

Table V-5 was used to calculate the numbers of male and female graduates (see Table V-10).

Table V-7

Number of University Graduates 1976-1981

Year	Graduates
1977	3210
1978	3897
1979	4045
1980	4642
1981	5527

Source: Ministry of Higher Education, Annual Report 1981, Riyadh, Saudi Arabia, p. 86.

Table V-8

Total Enrollment and Graduates in Higher Eduction 1976-1981

Year	Enrollment	Graduates	
		No.	% of Total
1977	32137	3210	9.9
1978	41318	3897	9.4
1979	44101	4045	9.1
1980	47733	4642	9.7
1981	56252	5527	9.8

Table V-9

Projected Number of University Graduates 1980-1990

Year	Total Enrollment	Number of Graduates
1980	47733	4642*
1981	56252	5527*[a]
1982	64290	6161
1983	75000	6868
1984	84652	7657
1985	95547	8536
1986	107844	9516
1987	121724	10608
1988	137391	11826
1989	155073	13184
1990	175031	14698

* Actual [a] Base year

Table V-10

Expected Male and Female Graduates from Institutions of Higher Education 1980-1990

		Males		Females	
Year	Total Graduated	%	No.	%	No.
1980	4642	73.6	3416	26.4	1225
1981	5527	72.1	3984	27.9	1542
1982	6161	70.6	4349	29.4	1811
1983	6868	69.1	4745	30.8	2122
1984	7657	67.9	5199	32.1	2457
1985	8536	66.5	5676	33.5	2859
1986	9516	65.2	6204	34.8	3311
1987	10608	63.9	6778	36.1	3830
1988	11826	62.6	7403	37.4	4422
1989	13184	61.4	8094	38.6	5089
1990	14698	60.1	8833	39.9	5864
Total	99223	64.6	64681	35.4%	34532

The analysis provided here indicates a notable increase in enrollment at institutions of higher education, particularly in view of its very recent genesis. The first Saudi university was only established 25 years ago. However, the numbers of graduates are expected to grow at a slower rate than the number of enrollments. Nevertheless, the increase in the number of Saudis holding university degrees is very noticeable. Although from a quantitative viewpoint Saudi Arabia has achieved very promising progress, the qualitative side has created a great deal of controversy.

Even though the curricula of half of the 56 universities' colleges are scientific, the numbers of students enrolled are disproportionately distributed. In 1983, for example, there were 15,000 students enrolled in arts colleges, 7,000 in administrations colleges, and only 2,400 in medical colleges.[14] Another example is that among total enrollment in the two largest universities King Saud University and King Abudlazize University, only 35 percent are enrolled in scientific colleges, whereas 65 percent are in social sciences and humanities.[15] The negative result of this imbalance of students among the various colleges is that too many graduates are majoring in areas not largely needed, thus preventing them from fully participating in their country's development process. Of course, the industrial sector will suffer the most from this practice because of its need for various skills and knowledge.

The large number of Saudis enrolled in institutions of higher education abroad must be added to the data to complete the picture. In 1975 there were more than 5,000 Saudi students studying outside the

country, and by 1979 the number more than doubled. All of these students were under government support. In addition, in 1979 there were 2,500 Saudi citizens studying abroad at their own expense.[16] The students studying abroad are enrolled in many different undergraduate and graduate programs, majoring in various subjects. However, their future participation in the Saudi labor force is for the most part predetermined as they are acquiring skills needed by the agencies which sponsor them. In fact, the major difference between such students studying abroad and their domestic counterparts is that the former know early in their education (before they leave the country) what jobs they will be doing after graduation, and by whom they will be employed. The practice of sending students abroad to study has been very much limited recently to those majoring in areas not available at Saudi universities.

Vocational Training

Next to the highly qualified manpower, skilled workers, such as supervisors and technicians, are the second most important group in the industrial labor force, playing an important role in plant operations. Unfortunately, enrollment in vocational and technical schools, and ultimately graduates from such schools, represents a small percentage of the total number of graduates from the various Saudi educational institutions. Enrollment in vocational programs is very much influenced by the negative stereotype that continues to be associated with manual work. Some citizens are still strongly against

practicing some occupations; however, such opinions appear to be slowly declining, especially in the large urban areas.

Vocational education in Saudi Arabia is a recent development. The first such institution opened in 1949, increasing to 8 by 1961 and reaching 23 by 1979. It is the number of students enrolled in these vocational schools that did not expand as rapidly as in other types of education. As mentioned before, this dearth of students was due to various social and cultural factors, many people believing that manual workers have less prestige than white collar workers. In addition, most students prefer to continue their general education because they will obtain better-paying jobs and higher status if they are university graduates. Another important factor is that job opportunities in the government sector do not require such hard work as in the private sector, which is a major pull factor for young Saudis with low levels of education.

Enrollment in Vocational Education

There has been a notable increase in the numbers of students enrolled in vocational education between 1970 and 1980 (see Table V-11). Eleven thousand seventy-nine students were enrolled in 1980, more than 13 times the figure in 1971, when just 784 students were enrolled. The average annual growth rate during this period was 30.3 percent, indicating, perhaps, that Saudi youths' perception of technical work is changing and that they are finding new opportunities in this field.

The average annual growth rate just mentioned will be used to project the future number of students enrolled in vocational and technical institutions from 1980 to 1990 (see Table V-12). A 30.3 percent average annual increase in enrollments may seem to be relatively high at first glance, but it may actually be below the expected growth rate, if one considers that:

1. New development for the coming Fourth Development Plan is going to shift from a concentration on building the country's infrastructure to an emphasis on the development of its human resources.*
2. In 1980, the General Organization for Technical Education and Vocational Training was established, the head of which was given a minister position, and was given its own budget.
3. All public vocational training institutions were placed under the jurisdiction of the new agency in order that they be run more efficiently under one responsible agency, rather than under several government agencies, as they were in the past.
4. New incentives to increase enrollment have been provided, such as monthly allowances, free loans for opening workshops, and opportunities for continued education.
5. The labor laws have been streamlined to ensure a fair deal to workers and to promote good relations between workers and employers.[17]

Vocational Education Graduates

The breakdown of students graduating from vocational training institutions in Saudi Arabia is presented in Table V-13 by number and percentage. The numbers of graduates have shown an increasing trend since 1971, following the trend of increased enrollments. The

---

*This is simply because most of the country's planned infrastructure has been already built during the past 10 years.

Table V-11

Number of Students Enrolled in Vocational Education Institutions
1971-1980

Year	Enrollment
1971	784
1972	947
1973	917
1974	1235
1975	1423
1976	1819
1977	3115
1978	6135
1979	11591
1980	11079

Source: Ministry of Planning, Facts and Figures 1982. Riyadh, Saudi Arabia, p. 132.

Table V-12

Projected Number of Students Enrolled
in Vocational Training Institutions
1980-1990

Year	Enrollment
1980	11079*
1981	14435
1982	18810
1983	24509
1984	31935
1985	41612
1986	54220
1987	70649
1988	92056
1989	119950
1990	156294

* Base year

percentage graduating remained steady through 1974, then began to fall in 1975. However, it remained above the 50 percent level, except for one year. This high percentage of graduates is largely attributable to the short length of the training programs, usually between nine and 18 months.

Table V-13

Numbers of Enrollment and Graduates in Vocational Education 1971-1980

Year	Enrollment	Graduates	
		Number	% of Total*
1971	784	533	67
1972	947	643	67
1973	917	623	67
1974	1235	839	67
1975	1423	879	61
1976	1819	889	48
1977	3115	1971	63
1978	6135	3394	55
1979	11591	7525	64
1980	10796	5551	50**
Total		22847	

Source: Ministry of Planning, Facts and Figures, Riyadh, Saudi Arabia, 1982, p. 132.

* Percentages have been calculated by the author.

** The decline here could be attributed to the introduction of new programs that require longer training time.

To project the future number of graduates, the average percentage of graduates to total enrolled (1971-1980) was multiplied by the projected enrollment (Table V-12). On the average 60 percent of those

enrolled have graduated during this 10 year period. A breakdown of the numbers of graduates projected from 1981 to 1990 is presented in Table V-14.

Table V-14

Projected Numbers of Graduates from Vocational Eduction Institutions 1981-90

Year	Enrollment	Graduates
1981	14435	8661
1982	18810	11286
1983	24509	14705
1984	31935	19161
1985	41612	24967
1986	54220	32532
1987	70649	42389
1988	92056	55233
1989	119950	71970
1990	156294	93776

It was stated in Chapter IV that the estimated total Saudi labor force for the year 1990 will be 1,784,335 million workers (see Table IV-11); and total number of vocational training graduates from 1971 to 1990 is estimated at 397,527.* Assuming that all graduates will participate effectively in the labor force, they will account for some 22 percent of total Saudi workers. A 22 percent share of trained

* This number contained the actual number of graduates from 1971 to 1980 (Table V-13) plus the total projected number of graduates from 1981 to 1990 (Table V-14).

workers would appear to be a relatively good portion. However, if we take the total labor force of both Saudi and non-Saudi workers, this share would decline sharply. It is not known for certain how many expatriate workers might be employed in 1990, but if the present situation were to continue in which expatriates account for approximately half the total labor force in Saudi Arabia, then this share would definitely decline by one-half, thus making the total number of graduates insufficient to meet the various sectors' needs for technical labor.

It was shown in Chapter IV that the industrial sector's total labor requirement is expected to reach 496,618 workers in 1990. Most of these workers will require skills which could be learned in vocational training institutions, with some on-the-job training. Therefore, the projected number of vocational training would satisfy this need, but it is unrealistic to assume that all graduates will be channeled to work in the industrial sector. One must consider individual preferences. Furthermore, the locations of industrial parks and wage differentials between different sectors will greatly influence the choices graduates make. However, it is the responsibility of both the industrial sector and the vocational education authorities to direct those graduates to the industrial sector. The task of the industrial sector will be to provide the right incentives and working climate to attract the new graduates. Such incentives must provide wage differentials, housing, better industrial relations, continuous training, and advancement of workers, to name a few.

The vocational education authorities will have to provide the training to create those skills needed by the industrial sector. Furthermore, training should be geared toward the newly-acquired equipment and technology. Because the length of programs influences the number of graduates, it will be necessary to plan programming of minimum duration. However, quality must always be the determining factor. Locations of vocational institutions are also important; such facilities will have to draw the largest number of students possible. Consequently, small towns and villages are good locations because their lack of universities and colleges will attract youth, especially those who do not prefer to move into urban areas in order to enroll in higher education.

On-The-Job Training

On-the-job training, an important tool for creating and enhancing skills, has been adopted recently by the Saudi industrial sector. The heavy dependence on foreign labor and the government's incentives for establishing and sponsoring vocational education centers, however, to some extent limit such training. The financial capabilities of new industries further restrict this practice. Nevertheless, more on-the-job training must be made available because it is the industrial sector which best knows current and future manpower needs, thus making it the best place to conduct training programs. The oil sector used on-the-job training since its beginning, but no data is available with which to judge their performance.

Concluding Remarks

Saudi Arabia's country-wide expansion of its educational systems is one of the most significant achievements of the kingdom's developmental process. However, approximately 25% of the population is comprised of unsettled nomads, and the illiteracy rate is still relatively high. Academic education has witnessed the most significant emphasis by both government and individuals. This has resulted in an increase in high level Saudi manpower. Vocational training has gained greater momentum during the last few years. However, vocational training still lags behind general education. If this condition does not change, a shortage of technicians and middle-level workers will soon be felt.

CHAPTER VI

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

Certain facts about the manpower situation in Saudi Arabia have been underscored this study:

1. A shortage of Saudi labor exists at all levels because rapid expansion and growth of the economy resulted in a labor demand which the native population could not meet. Consequently, the majority of new jobs were filled by expatriate workers.

2. The low participation rate of Saudi women is an important contributing factor to the manpower shortage.

3. The high percentage of the Saudi population under age 15, combined with the low educational level of its labor force, greatly influence the low Saudi participation rate in the labor force.

4. The majority of trained Saudi manpower are concentrated in the service sector, particularly in government.

5. Saudi workers are reluctant to take jobs that require any type of technical or manual labor.

Because of these factors, the Saudi industrial sector is faced with two equally unpleasant options. To allow heavy dependence on expatriate workers, resulting in several social, economic and political problems, that will be described in brief here, or to slow down the industrialization process until adequate domestic manpower can be created, thus making the country's objective of diversifying its economic base a more distant goal.

However, one can propose ways to more efficiently utilize the available Saudi manpower that could be achieved primarily through the restructuring of the existing employment system. As has already been

stated, certain social and economic factors exist which are vital to the success of manpower development in the kingdom, and in turn to the success of the Saudi economic diversification objectives.

The Government Sector

In the government sector, low educational attainment of some employees, underutilization and overstaffing of some government agencies are the key problems causing lower labor productivity in this sector. Measures must be taken to correct this situation. This objective could be accomplished by putting great effort into their preparation and training. This should be a number one priority because a well-prepared staff influences the efficiency of operations, and saves labor. Although the Public Administration Institute is doing a good job in this area, it still has a limited focus and operation. Promotional reward would be a strong incentive to those employees willing to participate in such training programs, which could be undertaken at institutions of higher education because of available facilities and staff. In addition, it would be more impressive for trainees to enroll at such institutions than at the training centers.

The policy requiring all university graduates to work in the government sector should be eliminated. This would induce several changes:

1. Graduates would be given the opportunity to choose the kinds of jobs they are interested in and in which they can be more productive and innovative

2. Other sectors could compete for graduates

3. The labor market would shape the way students choose their majors. If, for example, demand is high for such skills as engineer- ing and administration, enrollment would correspondingly increase at colleges providing such training, thereby eliminating the current problem of overenrollment in the Arts colleges (and underenrollment in the science and engineering colleges).

4. The government would employ only those graduates fitting its skills and productivity needs, thus reducing the excess of unneeded skills.

Moreover, the retirement age should be raised from 60 to 65 years, permitting the government to retain experienced workers for a longer period of time, thereby reducing the demand for more labor. In addition, the government should take advantage of the many advancements in office equipment. Although this may require special training, it would help a great deal in the long-run by reducing the number of workers now needed for tasks that could be performed by such machinery. The government is financially able to invest in modernizing its offices. One example of the benefits gained by this modernization is the reduction of the number of employees working in the record-keeping department of the Civil Service Bureau from 200 to only 40, although the number of records increased by approximately 95%, after introducing advanced office machines.[1]

Benefits and Subsidies

The private sector has come to depend more on expatriate than Saudi workers chiefly because foreign labor is less expensive. Most expatriate workers, particularly those employed in low- and middle-level positions, come from countries with lower standards of

living and per capita incomes than that of Saudi Arabia. In addition, the majority of foreign workers arrive without their families, thereby reducing their living expenses still more. Consequently, they will require and expect lower wage rates than will domestic labor.

There are also indirect or social contributors to the continued practice of hiring expatriate labor. In Saudi Arabia, all services such as education and health care are free to all residents. In addition, the government subsidizes most foodstuffs up to 50% of the total cost. However, employers of expatriate workers do not contribute anything to these benefits. If this practice continues, there will be little chance of developing experienced Saudi workers, and the dependence on foreigners will continue to increase.

Dependence on foreign labor could be lowered, however, by imposing taxes on employers of expatriate workers corresponding to the government's cost for these services. Such a tax would have a balancing effect on the wage costs of both Saudi and expatriate workers. Another way to help eliminate preference toward foreign labor would be to eliminate the free services extended to them and place the financial burden instead on their employers, which would help reduce the wage cost gap between Saudi and non-Saudi workers by increasing employers' expenses when hiring expatriates.

The Educational System

The high percentage of young people in the Saudi population mentioned earlier represents a great prospect for the availability of

manpower in the future, in which the educational system will have a great deal to do with their development and preparation. It was stated earlier that education in Saudi Arabia has achieved great progress in terms of the numbers of enrollments and graduates at all levels of academic education. It is the quality, however, that has not met the needs created by the country's development explosion.

The Saudi educational curriculum tends to be highly theoretical and a majority of it is devoted to the humanities, casting doubt as to its ability to confront a severe manpower shortage. The Saudi society and economy are rapidly changing over time and so are its needs; the educational system should adapt to these changing needs. It must be flexible enough to provide the kind of curriculum that would incorporate recent technological advances and Saudi needs for scientificlly-oriented manpower.

Increasing the number of schools to accommodate the growing number of students, thereby producing more graduates, will only help the quantitative side of the issue, not the qualitative one. Therefore, it may be worthwhile to start mixing the theoretical and academic education with some technical teaching. Pre-university education should be tailored to prepare students not only for university studies, but for vocational and technical institutions as well. Thus, students completing their pre-university education could choose to enroll in either higher technical schools or universities.

Stiff measures must be taken to correct the disproportionate distribution of university enrollments discussed in the previous chapter. The capacity of the different colleges is not the cause of

this problem because higher education has been widely expanded; thus, in addition to governmental policy the imbalance must be caused by either the admission procedures or the level of difficulty in terms of length of time and types of programs. For example, it may be easier to graduate with an art or administration degree than with one in science or engineering. If this is the case, corrective measures must be taken, such as raising the standards of admission to the "easier" colleges, or increasing graduation requirements.

Part-time studies are not available at most Saudi universities. Many government and private sector employees would like to raise their educational levels, but they cannot without leaving their jobs, and even if they had the chance to enroll part-time, such instruction would necessitate very limited program choices. It may be a good idea to establish policies to help advance the skills of existing workers in all sectors without requiring them to resign, thus causing more manpower shortages.

The recent decision allowing graduates from vocational education institutions to continue their higher education indicates the government's acknowlegement that without such an option, students would continue to avoid enrolling for vocational training. However, citizens are still unwilling to enroll in vocation training institutions and this problem should be addressed as a priority. In order to overcome this lack of interest, people's attitudes and habits must be changed, no small or easy task. Nevertheless, it is essential to educate the populace, particularly younger people, about the importance of such skills.

The media could be a good tool for correcting the negative beliefs and attitudes about technical education, and the industrial sector must take responsibility in this matter by opening its own schools and training centers. These could be beneficial in two ways: first, because the industrial sector knows exactly what its present and future needs are, it could therefore adjust such programs accordingly; and second, because this sector would be investing money in these programs, it would be certain that the training is adequate, thus ensuring the quality of the graduates.

Also, Saudi Arabia has a lot of multinational corporations. Their experience should also be utilized. Graduates of foreign training programs would learn new and useful working habits.

Women's Participation in the Labor Force

Female participation in the labor force must be increased without endangering religious and traditional beliefs and attitudes. As has been discussed earlier, women make up approximately 50% of the total population, but their share in the labor force is extremely low. However, it should be noted that women have made a great deal of progress during the last two decades in terms of their share in school enrollment and employment. Nevertheless, their employment share is still far below what it should be. I have previously discussed the major problems, i.e., cultural and traditional attitudes that have contributed to women's low participation rate. These restrictions put a cap on the kinds of jobs that are open to women. One major field of

employment available to them is teaching, and many institutions of higher education for women have concentrated on graduating female teachers, creating a surplus, primarily at the elementary education level.

Women could play a substitution role in this situation. In 1981, there were approximately thirty thousand male teachers at the elementary level.[2] If measures are taken to substitute women for men, the country would have more men available for work in other sectors of the economy. Because elementary students are generally between 6 and 11 years old, the religious restrictions of integrating men and women would not apply. There are many jobs within the government sector in which women could substitute for men without affecting the nation's Islamic way of life. Examples of such jobs are telephone operators, in the inside operation of the postal service, and providing airlines information and reservations. None of these would require the integration of the sexes, and the male-female substitution would serve to sharply increase the female participation rate, thus allowing women the first step toward fully realizing their economic and social role. It would also increase the supply of male laborers to the various sectors of the economy, especially the two sectors in which the government has concentrated its greatest development interest, modern agriculture and industry.

Restricting women primarily to teaching also has direct negative effects. If a female teacher has no interest in teaching, her employment would result in a very low productivity level, and/or a poor and ineffective education for her students. Teaching requires a

personal commitment in order for one to reach out and produce good quality students. In fact, low interest in teaching is becoming a very noticeable practice. According to Alymamah weekly magazine, 30% of total Saudi female teachers resigned in 1983.[3] In a recent study cited in the same magazine article, a projected 63.8% of total Saudi female teachers will leave the teaching profession in the next few years, either resigning and becoming school administrators. The study does not give reasons for this development, but one can imagine that teaching may not fulfill the aspirations and ambitions of all young, newly-educated women. However, it would be difficult in the future to employ the approximately 700,000 girls[4] enrolled in all levels of education levels.

New job opportunities must be made available to women so that their role is fully realized. The country cannot afford to waste approximately half of its most valuable resource. However, this must not be taken to suggest that Saudi Arabia should move away from its conservative Islamic way of life in order to achieve the full participation of its female labor force. New ways and innovations to help achieve this objective without changing the social structure will be the best way to achieve higher female participation. The success of the women's branch of the civil service bureau should indicate that women can perform many jobs without necessitating integration with men.

Concluding Remarks

I have outlined only a few of the disturbing factors affecting the availability and quality of the Saudi labor force, however they are the most important areas. The Saudi labor market is in very great need of further detailed research and study. Nobody denies that the economy is a booming one, thus creating tremendous changes every day, which makes such a task extremely difficult. However, the very limited data available about such changes is, in my opinion, the most important factor affecting the availability of detailed studies. We have seen the affect on the accuracy of this research. If enough data were available, one could have been more accurate, and more analysis would have been possible. However, I believe that the best utilization has been made of the available data. Although the procedure used is simple, the results are significant, and they are only a start.

References

Chapter II

1 ISDC, A Guide to Industrial Investment in Saudi Arabia, 5th Edition, Riyadh 1977. p. 1.

2 Ibid. p. 1.

3 Knauarhase, R., The Saudi Arabian Economy, Praeger Publisher, New York, NY 1975. p. 7.

4 Ibid.

5 Ibid.

6 ARAMCO, Annual Report 1982. Dahran, Saudi Arabia.

7 Elmallach, R. Saudi Arabia Push to Development. The John Hopkins University Press, Baltimore 1982, pp.

8 UNIDO, General Issues of Industrial Policy, Athens, 1967. pp.

9 UNIDO and ISDC, Traditional Industry in the Kingdom of Saudi Arabia. 1971.

10 Ibid.

11 Ibid.

12 Ibid.

13 Ibid.

14 ISDC, A Guide to Industrial Investment in Saudi Arabia, Riyadh Saudi Arabia. 1977 p. 35.

15 ELMALLAKH, R and D; Saudi Arabia, Lexington Books, Boston, 1982. p. 18.

16 SABIC, Fourth Annual Report for 1981.

17 Saudi Report, Vol. 4 No. 54 November 21, 1983. p. 5.

18 Amuzegar, J. OPEC and the Dollar Dilemma. Foreign Affairs, July 1978. p. 741.

19 Ibid., p. 742.

20 CSB, Census of private establishment. 1981. Riyadh, Saudi Arabia.

21 CSB, Census of private establishment. 1981. Riyadh, Saudi Arabia.

22 Ibid.

23 SAMA, Annual Report 1981. Riyadh, Saudi Arabia.

24 Ibid.

25 ISDC, A Guide to Industrial Investment in Saudi Arabia. Riyadh, Saudi Arabia. p. 35.

26 CDS, The Statistical Indicator, Seventh Issue 1981. pp. 94-95.

27 The OPEC Exporting Blitz. Business Week January 9th, 1983. p. 36.

28 ARAMCO, Facts and Figures 1982. Daharn Saudi Arabia.

29 Royal Commission of Jubail and Yanbu, Annual Report 1981. Riyadh Saudi Arabia. p. 6.

30 Ibid.

31 Ibid.

32 Hambleton, H., The Saudi Petrochemical Industry. Symposium on State, Economy and Power in Saudi Arabia. Exter, July 1980.

33 Saudi Business and Arab Economic Report, Feb. 22 1980. p. 6.

34 Royal Commission of Jubail and Yanbu, Annual Report 1981. Riyadh Saudi Arabia. p. 6.

35 Financial Times, March 28 1977.

36 Euromoney, October 1982. p. 11.

37 ISDC, A Guide to Industrial Investment in Saudi Arabia, Riyadh Saudi Arabia. 1977 p. 35.

Chapter III

1 Hamza, F. The Saudi Arab Country, Alnasser Bookstore Publishing, Riyad, 1968. pp. 84-5.

2 Central Department of Statistics, Census of Population and Establishment, first part. Saudi Arabia, 1963.

3 University of Riyadh, Population Atlas of Saudi Arabia, Saudi Arabia, 1981.

4 Alruarthy, M., Population of Saudi Arabia: Geographic and Demographic Study. Allewa publishing house, Riyadh, 1979. pp. 34-5.

5 Birks, J. and Sinclair, C. Arab Man Power. St. Martin Press, New York, 1980. pp. 96.

6 Ministry of Planning, Population and Migration in M.S.A. Riyahd, Saudi Arabia 1950.

7 The World Almanac and Book of Facts 1984. Published by Newspaper Enterprise Association, Inc. New York, N.Y.

8 United Nation, Yearbook of National Account Statistics, 1979, Vol 2, New York.

9 University of Riyadh, Population Atlas of Saudi Arabia, Saudi Arabia, 1981.

10 Ibid.

11 Ibid.

12 Ministry of Planning, Third Development Plan, Saudi Arabia, 1980.

13 University of Riyadh, Population Atlas of Saudi Arabia, Saudi Arabia, 1981.

14 Ministry of Planning, Second Development Plan, Saudi Arabia, 1975.

15 Ibid.

16 Central Department of Statistics, Summary Census of Private Establishment, 1981. Saudi Arabia.

17 Ministry of Planning, Population and Migration in M.S.A. Riyahd, Saudi Arabia 1950.

18 Amar, H. "Arab Women". Journal of Arab Affairs, Sept. 1983, pp. 16.

19 United States Department of Labor, "Women Begin to Emerge from Traditional Role", Labor Development Abroad, XV, No. 6, Washington, D.C. Jan. 1970, p. 20.

Chapter IV

1 Sutcliffe, R., Industry and Underdevelopment, Addison-Wesley Publishing Company, Massachusetts. 1971, p. 107.

2 According to the third development plan, the labor force employed in the construction sector is decreasing by 7% annually, starting in 1980.

3 University of Riyadh, Population Atlas of the K.S.A., Riyadh, 1981, p. 21.

4 Ministry of Planning, The Third Development Plan 1980-85, Riyadh, Saudi Arabia 1980, p. 97.

5 Unido. Issues and Problems in Manpower Development. 1967, p. 4.

Chapter V

1 Ministry of Planning, Third Development Plan 1980-5. Riyadh, Saudi Arabia. p. 287.

2 ILO, Human Resources For Industrial Development. Geneva, 1967.

3 Hammad, The Educational System in Saudi Arabia, (Ph.D. dissertation, Indiana University 1973). p. 89.

4 Abdulwassie, A. Education in the Kingdom of Saudi Arabia, Beriut, 1970. p. 4.

5 Hammad, The Educational System in Saudi Arabia, (Ph.D. dissertation, Indiana University 1973). p. 89.

6 Ibid.

7 Ibid.

8 Ibid.

9 SAMA, Annual Report 1981. p. 86.

10 CDS, Statistical Year Book 1961. p. 60.

11 SAMA, Annual Report 1981. p. 89.

12 Ministry of Higher Education, Annual Report 1982. p. 9.

13 Ibid.

14 Alyamamah Weekly Magazine, No. 781. December 14, 1983. p. 9.

15 Al-Jazeera Daily Newspaper. No 4165.21 Feb. 23, 1984. p. 8.

16 Viola, J. The Development of human resources: A case study of U.S. and Saudi Arabian Cooperation. Center of international higher education. Documentation Northeastern University, Boston, MA.

17 SAMA, Annual Report 1981. p. 95.

Chapter VI

1 Alymamah Weekly Magazine. No. 782 December 21, 1983. p. 17.

2 SAMA, Annual Report 1981. p. 86.

3 Alymamah Weekly Magazine. No. 791 Feb. 22, 1984. p. 74.

4 Iqraa Weekly Magazine. No. 460 Feb. 23, 1984. p. 60.

Bibliography

Abdulwassie, A. Education in the Kingdom of Saudi Arabia. Beirut, 1970.

Al-Jazeera Daily Newspaper. No. 4165.21 Feb. 23, 1984.

Al-Ruwaithy, M. Population of Saudi Arabia: Geographic and Demographic Study. Riyadh: Alewa Publishing, 1979.

Al-Yamamah Weekly Magazine. No. 781, December 14, 1983.

Al-Yamamah Weekly Magazine. No. 782, December 21, 1983.

Al-Yamamah Weekly Magazine. No. 791, February 22, 1984.

Amar, H. "Arab Women." Journal of Arab Affairs, Sept. 1983.

Amuzerger, T. "OPEC and the Dollar Dilemma." Foreign Affairs, July 1978.

ARAMCO. ARAMCO and It's World. Dhahran, 1980.

ARAMCO. Annual Report 1982. Dahran, Saudi Arabia.

ARAMCO. Annual Report 1981. Dahran, Saudi Arabia.

ARAMCO. Annual Report 1970. Dahran, Saudi Arabia.

ARAMCO. Annual Report

ARAMCO. Facts and Figures 1982. Dahran, Saudi Arabia.

Arab Bureau of Education for the Gulf States. Educational Plans and Programs in the Gulf State. Riyadh, 1983.

Beling, W. King Faisal and Modernization of Saudi Arabia. Boulder: Westview Press, 1980.

Birks, J. and Sinclair, C. International Migration and Development in the Arab Region. Geneva: ILO, 1980.

Business Week, January 9, 1983.

Cleron, J. Saudi Arabia 2000. New York: St. Martin's Press, 1978.

Cody, J., Hughes, H. and Wall, D. Policies for Industrial Progress in Developing Countries. New York: Oxford University Press, 1980.

Crane, R. Planning the Future of Saudi Arabia: A model for achieving national priorities. New York: Praeger Publishers, 1978.

El Mallakh, R. Saudi Arabia: Rush to Development. Baltimore: John Hopkins University Press, 1982.

El Mallakh, R. and D. Saudi Arabia: Energy, Development Planning and Industrialization. Lexington: Lexington Books, 1982.

Euromoney, October 1982.

Financial Times "London". March 28, 1977.

Hammad. The Educational System in Saudi Arabia. (Ph.D. dissertation, Indiana University 1973).

Harbison, F. and Myers, C. Education, Manpower and Economic Growth. New York: McGraw Hill Book Co., 1964.

Ibrahim, S. The New Arab Social Order: A Study of the Social Impact of Oil Wealth. Boulder: Westview Press, 1982.

ILO. Human Resources for Industrial Development. Geneva, 1967.

ILO. Manpower Aspects of Establishing Chemical Industries in Developing Countries. Geneva, 1976.

Kingdom of Saudi Arabia. Ministry of Planning. Saudi Arabia: Achievements of the Development Plans (1970-1980), Riyadh 1982.

Iqraa Weekly Magazine. No. 460, February 23, 1984.

Kingdom of Saudi Arabia. University of Riyadh. Population Atlas of the Kingdom of Saudi Arabia, Riyadh 1981.

Kingdom of Saudi Arabia. Ministry of Planning. Third Development Plan, 1980-1985, Riyadh 1980.

Kingdom of Saudi Arabia. Central Planning Organization. Development Plan, 1970-1975, Riyadh 1970.

Kingdom of Saudi Arabia. Saudi Arabian Monetary Agency. Annual Report 1979, Riyadh 1979.

Kingdom of Saudi Arabia. Saudi Arabian Monetary Agency. Annual Report 1980, Riyadh 1980.

Kingdom of Saudi Arabia. Saudi Arabian Monetary Agency. Annual Report 1981, Riyadh 1981.

Kingdom of Saudi Arabia. Central Department of Statistics. The Statistical Indicator, Seventh Issue 1982, Riyadh 1982.

Kingdom of Saudi Arabia. Central Department of Statistics. Summary Results: Census of Private Establishment 1981, Riyadh 1981.

Kingdom of Saudi Arabia. Central Department of Statistics. Census of Population and Establishment, First part. Riyadh 1963.

Kingdom of Saudi Arabia. Central Department of Statistics. Statistical Year Book 1961.

Kingdom of Saudi Arabia. Central Department of Statistics. Survey of Manufacturing Establishment, 1973.

Kingdom of Saudi Arabia, Industrial Studies and Development Center. A Guide to Industrial Investment in Saudi Arabia, 5th Edition, Riyadh 1977.

Kingdom of Saudi Arabia, Industrial Studies and Development Center. Survey of Industrial Establishment in Saudi Arabia, 1389 A.H. Vol. I, II, and III.

Kingdom of Saudi Arabia. The Royal Commission for Jubail and Yanbu. Annual Report 1980.

Kingdom of Saudi Arabia. The Royal Commission for Jubail and Yanbu. Annual Report 1978.

Kingdom of Saudi Arabia. ISDC and UNIDO. Traditional Industry in the Kingdom of Saudi Arabia. Riyadh, 1971.

Kingdom of Saudi Arabia. Ministry of Higher Education. Annual Report 1982.

Knauerhase, R. The Saudi Arabian Economy. New York: Praeger Publishers, 1975.

Moliver, D. and Abbondante, P. The Economy of Saudi Arabia. New York: Praeger Publishers, 1980.

Niblook, T. State, Society and Economy in Saudi Arabia. New York: St. Martin's Press, 1982.

Saudi Business and Arab Economic Report, Feb. 22, 1980.

Saudi Report, Vol. 4 No. 54 November 21, 1983.

Sutcliffe, R. Industry and Underdevelopment. London: Addison-Wesley Publishing Co., 1971.

The World Almanac and Book of Facts 1984. New York: News Paper Enterprise Association, Inc.

UNIDO. General Issues of Industrial Policy, Vienna, 1969.

United Nation, Yearbook of National Account Statistics, 1979, Vol. 2, New York, N.Y..

United States Department of Labor. Women Begin to Emerge from Traditional Role. Labor Development Abroad, XV, No. 6, Washington, D.C., Jan. 1970.

Viola, J. The Development of Human Resources: A Case Study of United States - Saudi Arabian Cooperation. Boston: Center for International Higher Education Documentation, 1982.