Chapter 2
Economic Development Challenges in the Gulf and the Need for Skill Upgrading and Technological Development

2.1 Introduction

In Chap. 1 we introduced the research problem, the aim of this chapter is twofold: first, to present a background to motivate the research by explaining some stylized facts to examine more extensively the research problem along with other strategic problems confronting economic development in the Gulf countries. Second, to highlight the need for upskilling and technological development in these countries.

The Gulf countries have strategic importance in the global economy because the region holds 40 % of world oil supplies (Devlin, 1998) and therefore affects the trends of oil supply and market.[1] At the regional level, oil provides a significant contribution for developing the economies and social welfare in the Gulf, in particular, it leads to higher per capita income. However, the Gulf countries are now confronted with serious challenges posed by oil being an exhaustible resource as well as the uncertain and volatile revenues from oil, because of instability of oil prices. Hence, economic growth and sustainable development strategy in the Gulf depends on both a shift in the focus from an oil resources based economy to a technology and skill based economy and on economic diversification. Also part of this strategy is a shift away from the import of high skilled workers in favour of domestic skilled workers.

Moreover, both the growing employment opportunities and the increased wealth from oil has encouraged migration to the Gulf countries. Consequently, migrant workers have dominated the labour market, particularly in the private sector, which leads to several problematic features such as the low skill levels, duality due to concentration of domestic workers in the public sector and foreign workers in the private sector and a growing unemployment rate. In addition, the Gulf countries

[1] Fasano and Iqbal (2003) indicate that the Gulf region accounts for about 45 % of the world's proven oil reserves and 25 % of crude oil exports (Saudi Arabia is the largest oil exporter). The region possesses at least 17 % of the proven global natural gas reserves (Qatar has become the fourth-largest exporter of liquefied natural gas).

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suffer from structural problem related to the Dutch disease and lack of incentives, which has also affected the structure of labour market.[2] Moreover, skill and technology indicators in the Gulf countries show poor performance and a substantial gap when compared to international standards. Hence, the upskilling and technological development become imperative to overcome the strategic problems and challenges confronting economic development in the Gulf countries.

The rest of this chapter is organized in the following way. Section 2.2 explains the role of oil in the Gulf economies, discusses the strategic problems facing the labour market in the Gulf and highlights the need for skill upgrading and technological development; Sect. 2.3 concludes.

2.2 Economic Characteristics and Strategic Problems for Development in the Gulf Countries

Since the structure of the Gulf economies is related to oil, it will be useful to start by explaining the role of oil in creating opportunities and challenging economic development in these countries. Next, we show the structural problems related to the labour market, skills, technology and productivity.

2.2.1 Oil and the Opportunities for Development in the Gulf Countries

The Gulf countries are characterized by a small population (except Saudi Arabia) and a high GDP per capita. According to the UNDP human development indicators the average GDP per capita in all Gulf countries is higher than the world average. Moreover, according to the World Bank classification of economies four of the Gulf countries are amongst the higher income and the other two are amongst the upper medium income economies – see Table 2.1 below.

Although the GDP of the UAE is still growing – see Table 2.1 above – as is the foreign and domestic labour force, GDP per capita remains stagnant – see Fig. 2.1 below. This implies that the falling contribution of the oil sector has been compensated so far by other sectors – see Table 2.2 below. However, the big question from Chap. 1 above is whether or not this will work in the future. The stagnation in education, particularly in tertiary education – see our discussion in

[2] "The Dutch Disease is a process in which the discovery of natural resources causes a country to experience a 'change in the group of reference' from one that aim at generating a trade surplus in manufacturing to one that able to generate a trade surplus in primary commodities. The country experiencing this disease also shows differences between employment in manufacturing. The process of de-industrialisation due to the discovery of natural resources, mainly natural gas apparent from the case of Holland". (cf. Palma, 2003, p. 21)

Table 2.1 Population, GDP per-capita, real GDP growth and unemployment in the Gulf countries (1990–2002)

	Population size (million)[a]	GDP/ capita (PPP US $)[a]	Real GDP growth (average annual change in per cent)[b]				Unemployment (in per cent of total labour force)[b]			
Country	2002	2002	1995–2000 average	1999	2000	2001	1990	1995	2000	2001
Bahrain	0.7	17,170	4.3	4.3	5.3	4.8	n/a	10.0	12.0	12.0
Kuwait	2.4	16,240	3.8	−2.9	2.9	−0.6	0.5	1.5	2.1	2.3
Oman	2.8	13,340	3.6	−0.2	5.1	7.3	n/a	n/a	n/a	n/a
Qatar	0.6	19,844	9.4	5.3	11.6	7.2	n/a	n/a	n/a	n/a
KSA	23.5	12,650	1.9	−0.8	4.9	1.2	n/a	n/a	n/a	n/a
UAE	2.9	22,420	5.7	3.9	5.0	5.1	n/a	n/a	n/a	n/a
Total GCC	32.9	16,944	3.3	0.3	5.1	2.5	0.5	5.8	7.1	7.2

[a]UNDP (2004) Human Development Report (2004)
[b]The International Monetary Fund (IMF): World Economic Outlook. September 2002; IMF; staff estimates. I/Simple average: nationals only for Bahrain

Chap. 8 below – makes us fairly sceptical, as we argue in the introductory chapter too. In particular, because investment in human capital is going on all over the world, mainly because a sufficiently high quality of education is essential prerequisite for high value added. In addition, as we explain below, the high share of foreign workers indicates that currently the UAE is an agglomeration economy. But it may lose this position and become poor if the oil industry and the complementary ones decline and/or if foreigners leave the country and there is less work in the government sector. Although it is unclear which sector could possibly fill the gap, it is clearly one that will need high levels of education. Therefore, it is quite essential for the government to adopt measures to improve investment and enrolment in education and to upgrade skills.

One should observe that during the past decades the increasing exploitation and development of oil and natural gas reserves have played an important role in developing the economies and raising government revenues, total exports, GDP and GDP per capita in the Gulf countries.[3] Tables 2.2 and 2.3 show that despite the declining share of the oil sector compared to the non-oil sector for all Gulf countries, the share of oil sector remains significant and exceeds 30 % of total GDP, 61 % of total government revenues and 68 % of total exports during the period 1975–1995.[4, 5]

[3] Expect in Bahrain, which shows decreasing trends with respect to both total oil and natural gas reserves.

[4] The share of oil sector refers to the total share of crude oil and oil industries, including refineries, downstream processing and petrochemical, etc. Fasano and Iqbal (2003) indicate that oil contributes about one-third to total GDP and three-fourths to annual government revenues and exports. See also Fasano (2002).

[5] Except in the case of Bahrain, where the share of oil in GDP declines from 26 % in 1975 to 18 % in 1995.

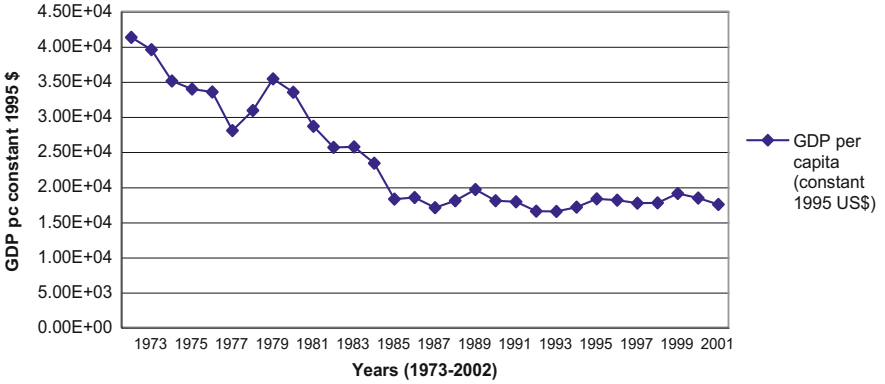


Fig. 2.1 Trend of GDP per capita in the United Arab Emirates (1973–2002) (Constant 1995 US$) (Source: The World Bank, World Development Indicators database (WDI) (2005))

Table 2.2 Proven crude oil and natural gas reserves and the share of oil and non – oil sector in GDP in the Gulf countries (1980–2002)

	Crude oil reserves (in million barrels)				Crude natural gas reserve (in billion cubic meters)			
Country/year	1980[a]	1990[a]	2000[b]	2002[b]	1980[a]	1990[a]	2000[b]	2002[b]
Bahrain	225	100	160[a, c]	160[a, c]	255	173	118[a, c]	118[a, c]
Kuwait	67,930	97,025	96,500	96,500	940	1,518	1,557	1,557
Oman	2,340	4,300	5,240[a, c]	5,240[a, c]	71	204	807[a, c]	807[a, c]
Qatar	3,585	2,993	13,157	15,207	2,800	4,621	14,443	25,768
KSA	168,030	260,004	262,766	262,790	3,183	5,223	6,301	6,646
UAE	30,410	98,100	97,800	97,800	2,730	5,675	6,060	6,060
GCC	272,520	462,522	470,223[d]	472,297[d]	9,979	17,414	28,361[d]	40,031[d]
The share of oil and non – oil sector in GDP (%)								
Year		1974	1985	1990	1995	1998		
Oil sector		75.2	36.1	38.8	34.3	27.2		
Non- oil sector		24.8	63.9	61.2	65.7	72.8		

[a]GOIC Industrial Data Bank (2000b)
[b]OPEC (2002)
[c]Data refers to 1998
[d]Data excludes Bahrain and Oman

Moreover, the concentration of oil reserves is the motivating factor for the bulk of the investments in manufacturing and industrial activities in the Gulf countries being concentrated in Saudi Arabia and the UAE. For instance, Table 2.4 shows that these two countries account for 68.3 % of total number of factories, 80.4 % of total capital investment and 77.1 %, of total employment. Consequently, they account for 78 % of total chemical, petroleum, coal and plastic products; 57 % of total non-metallic mineral products; 76 % of total basic metallic industries and 73 % of

Table 2.3 Oil reserves, share of oil in GDP, government revenues and exports in the Gulf countries (1975–1998)

Country	Years of oil reserves[a]	Share of oil in GDP (%)[a]		Share of oil revenues in total government revenues (%)[a]		Share of oil and gas exports in total exports (%)[a]	Share of oil, chemical, machinery, equipment and manufactured products in total imports (%)[b]	
		1975	1995	1975	1995	1975	1995	1998
Bahrain	5	26	18	77	62	86	70	53.3
Kuwait	136	70	48	74	78	92	95	81
Oman	17	67	37	90	76	98	85	79
Qatar	20	68	36	89	68	96	76	86.6
KSA	82	71	38	80	71	99	95	75.7
UAE	110	68	32	85	88	96	69	86.4
GCC	61.67	61.67	34.83	82.5	73.83	94.5	81.67	79.8

[a]Askari, Nowshirvani and Jaber (1997)
[b]World Development Indicators and GOIC Industrial Data Bank (2000b)

total fabricated metal products, machinery and equipment industrial activities in the Gulf countries.

More recently, the cheap and abundant availability of oil and natural gas in the Gulf region has contributed to an enhancement of the industrial and manufacturing sector; oil, in particular, has promoted the development of the petroleum and petrochemical industries in the Gulf countries. Tables 2.4 and 2.5 indicate that the chemical, petroleum, coal and plastic products; the fabricated metal products, machinery and equipment; and the non-metallic mineral products are the major manufacturing activities in the Gulf and their shares in total number of factories are respectively 18.5 %, 26.7 % and 17 %. In addition, the chemical, petroleum, coal and plastic products category has the highest share among manufacturing industries in terms of capital investment, followed by the fabricated metal industries in terms of the total number of factories and employment.

2.2.2 Oil and the Challenges of Development in the Gulf Countries

On the other hand, the heavy dependence on oil has created several serious challenges for development in the Gulf countries. One serious challenge following the discovery of oil is that the Gulf countries suffer from structural problems related to the Dutch Disease phenomenon. For instance, the World Bank (2004) indicates that despite massive efforts to promote industrialization in many of the MENA (including the Gulf) countries, the manufacturing share in employment and output

Table 2.4 Total number and distribution of operating establishments (factories), capital investment and employment in selected industries in the Gulf countries (1998)

	Number of factory (%)[a]					Total capital investment (million dollars) (%)[a]	Total number of workers (%)[a]
Country	All industries (%)[a]	Chemical, petroleum, coal and plastic products (%)[b]	Non-metallic mineral products (%)[b]	Basic metallic industries (%)[b]	Fabricated metal products, machinery and equipment (%)[b]	All industries (%)[a]	All industries (%)[a]
Bahrain	393 (5.5)	54 (4)	58 (5)	9 (10)	81 (4)	5,293 (6.5)	25,554 (4.6)
Kuwait	720 (10.2)	103 (8)	181 (15)	3 (3)	200 (11)	6,659 (8.2)	47,802 (8.6)
Oman	751 (10.6)	86 (6)	183 (15)	8 (9)	151 (8)	1,690 (2.1)	31,737 (5.7)
Qatar	382 (5.4)	55 (4)	96 (8)	3 (3)	67 (4)	2,322 (2.9)	22,195 (4)
KSA	2,996 (42.3)	639 (48)	444 (36)	34 (37)	877 (46)	57,042 (70.1)	282,700 (50.5)
UAE	1,846 (26.0)	407 (30)	261 (21)	36 (39)	520 (27)	8,362 (10.3)	148,509 (26.6)
GCC	7,088	1,344	1,223	93	1,896	81,367	559,352

Note: Figures between brackets represent the share in total Gulf countries
[a]Shiha, M. (2000), p. 21
[b]GOIC Industrial Data Bank (2000b)

was either stagnant or declining in 1970s and 1980s, a result of the Dutch Disease phenomenon.[6] A general increase in expenditures and appreciation of the real exchange rate brought about by the oil windfall resulted in a boom in nontradables, adversely affecting the production of tradable goods (World Bank, p. 104; Corden, 1984; Richards & Waterbury, 1998). The Dutch Disease or deindustrialization appears from the declining share of manufacturing and industry in total exports, GDP and employment – see Figs. 2.2, 2.3, and 2.4 below.

In contrast to the World Bank (2004) argument presented above, a study by Goyal (2003) provides a conflicting argument against the Dutch disease and indicates that the UAE managed to avoid the Dutch disease. "Access to expatriate workers at internationally competitive wages also contributed to avoiding the consequences of a "Dutch disease" usually observed in oil (or other natural

[6] According to the World Bank classification of world regions the Middle East and North Africa (MENA) region is composed of 14 countries, including Algeria, Djibouti, Egypt, Iran, Iraq, Jordan, Lebanon, Libya, Morocco, Oman, West Bank and Gaza: Occupied Palestine Territories, Syrian Arab Republic, Tunisia and Yemen.

Table 2.5 Total number and distribution of establishments (factories), capital investment and employment in the manufacturing industries in the Gulf countries 1998 (defined by industrial categorization)

Industrial category	Number of factory	%	Total capital investment (million dollars)	%	Total number of workers	%
31. Food, beverages and tobacco	1,048	14.8	6,012	7.4	73,471	13.4
32. Textile, wearing, apparel and leather	483	6.8	1,103	1.4	56,990	10.4
33. Wood products including furniture	452	6.4	736	0.9	25,587	4.7
34. Paper products, printing and publishing	455	6.4	1,794	2.2	28,853	5.3
35. Chemical, petroleum, coal and plastic products	1,314	18.5	49,605	61.0	117,805	21.6
36. Non-metallic mineral products	1,173	16.5	9.54	11.1	77,645	14.2
37. Basic metallic industries	93	1.3	6,013	7.4	18,221	3.3
38. Fabricated metal products, machinery and equipment	1,891	26.7	6,730	8.3	137,769	25.2
39. Other manufacturing industries	179	2.5	321	0.4	10,011	1.8
Total	7,088	100	81,368	100	546,352	100

Sources: GOIC Industrial Data Bank (2000b, p. 79) and Shiha, M. (2000, p. 20)

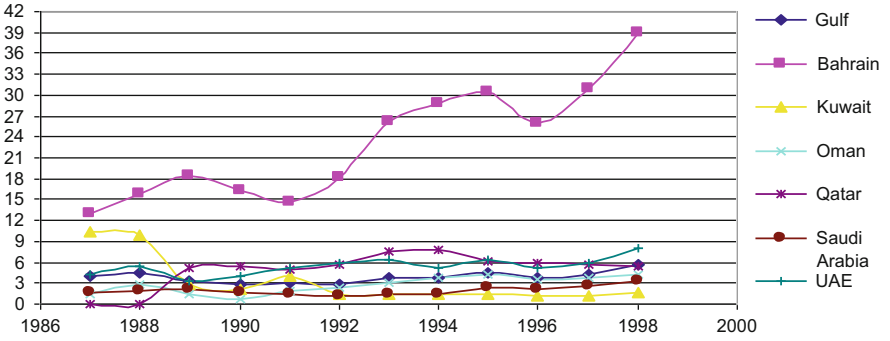


Fig. 2.2 The share of manufacturing in total exports in the Gulf countries (1987–1998) (Source: Adapted from GOIC (1998, 2000a))

resource) rich economies like the UAE. In most of these economies, the formal or organized labor market comprises mainly national. Thus when the world price of oil rises, the wages of these nationals increase, making the non-oil export sector less competitive and encouraging the adoption of import substitution policies. In contrast, the UAE economy has been able to avoid "this disease" because it faces a highly elastic supply of foreign labor at competitive international wages and flexible contracts. In fact, the exogenous decline in real and relative wages of

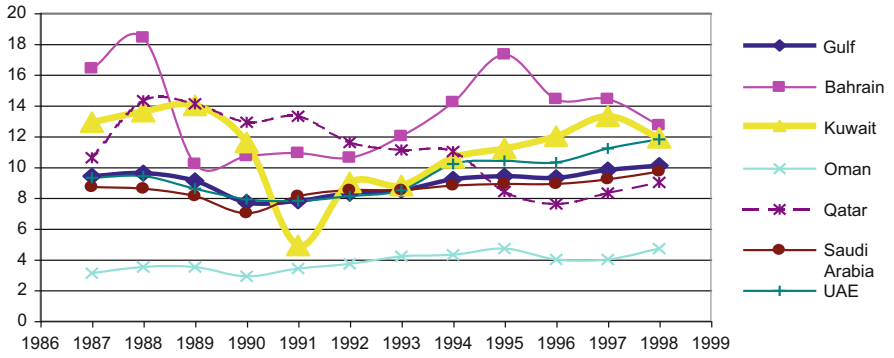


Fig. 2.3 The share of manufacturing in GDP in the Gulf countries (1987–1998) (Source: Adapted from GOIC (1998, 2000a))

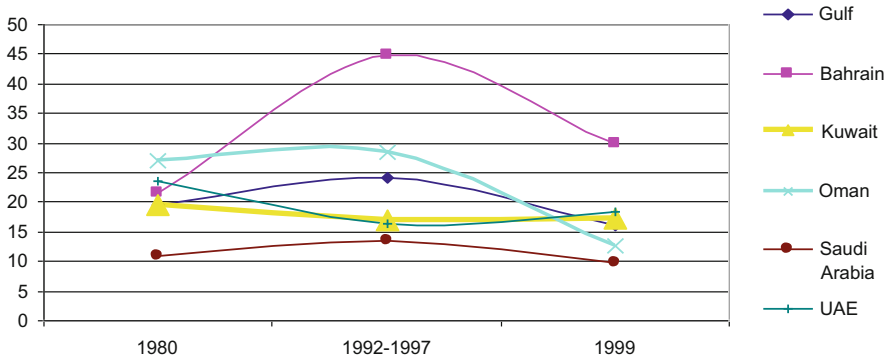


Fig. 2.4 The share of industry in total employment in the Gulf countries (1980–1999) (Sources: Adapted from ERF (2002a, b) and the Joint Arab Economic Report (2001))

low-skilled expatriate workers over the 1990s contributed to boosting employment and output growth by lowering relative labor costs. As a result, employment of low skilled workers was especially strong in that period, as was the growth of sectors such as trade and construction that use low-skilled workers more intensively" (cf. Goyal, p. 46).

Moreover, although oil has contributed to the enhancement of economic development in the Gulf, the general instability of oil prices in the world market and the extreme dependence on uncertain oil revenues lead to serious fluctuations and challenges confronting economic development in the Gulf region - see Fig. 2.5 below. Hence, economic diversification in the Gulf becomes more pressing. The success of the diversification strategy is contingent upon availability of appropriate skills and human resources development.

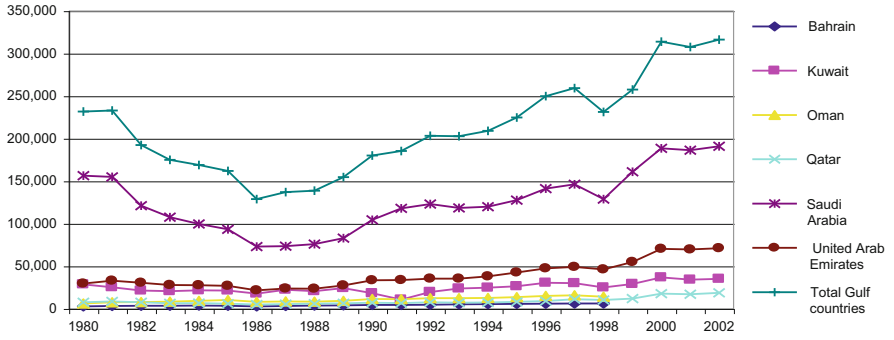


Fig. 2.5 The trend of total GDP in the Gulf countries at current prices (1980–2002) (Million US$) (Sources: (a) GOIC Industrial Data Bank (2000b) and (b) OPEC (2002))

Furthermore, other serious problems facing the Gulf economies appear from the declining reserves of oil and natural gas. Table 2.3 above predicts that oil reserves are likely to last for a century only for a half of the Gulf countries, namely, Saudi Arabia, Kuwait and the UAE, whereas for the other half, Bahrain, Oman and Qatar, proven reserves are likely to be exhausted within the next two decades. In order to avoid the risks of over dependence on diminishing oil resources, the Gulf countries are determined to decrease their dependence on oil revenues and diversify their sources of income. A diversification strategy, mainly industrial diversification, is required to shift to non-oil industries to encourage the development of a wide range of manufacturing industries. Table 2.6 indicates that in the last decade the extent of economic diversification – measured by exports diversification index (excluding oil) – varies across the Gulf countries and shows only a relative success in both Oman and Qatar. However, in general, the average performance for all Gulf countries has declined over the same period of time (Economic Research Forum for the Arab Countries, Iran and Turkey [ERF], 2002a).[7]

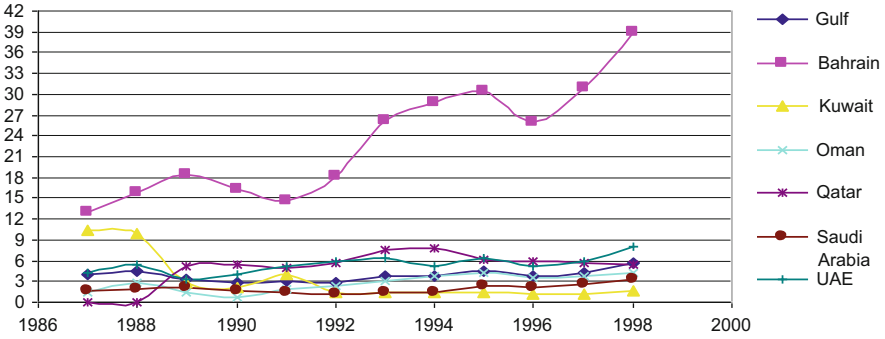
Our results presented above indicate that although the Gulf countries share many economic characteristics, there are important differences among these countries. For instance, the per capita income ranges from less than $13,000 in Saudi Arabia to $22,420 in the United Arab Emirates. The structure and composition of the economy and the degree of diversification also vary across the Gulf countries. For instance, the weight of the manufacturing sector has been growing very rapidly in Saudi Arabia, as with the trade and related activities sector in the United Arab Emirates, the banking and insurance sector in Bahrain, the natural gas sector in Qatar, and natural gas resources and tourism in Oman (cf. Fasano & Iqbal, 2003).

[7] The exports diversification index is a measure of products diversification -it assigns a value of zero to the most diversified economies and a value of one to the least. It aims to widen the range of the exports products, to expand exports base and reduce the concentration in a few commodities such as agricultural or raw materials and minerals. For the Gulf countries, the exports diversification index especially defines the move away from primary exports or the dependency on oil exports (ERF, 2002a, p. 53).

Table 2.6 Exports diversification index in the Gulf countries (1980–1990)

	Including oil		Excluding oil	
Countries	Mid 1980	Mid 1990	Mid 1980	Mid 1990
Bahrain	n/a	0.56	n/a	0.55
Kuwait	n/a	0.59	n/a	0.63
Oman	0.91	0.74	0.33	0.27
Qatar	0.71	0.64	0.41	0.34
Saudi Arabia	0.77	0.75	0.57	0.57
United Arab Emirates	n/a	0.36	n/a	0.36
Average Gulf countries	0.7966	0.6066	0.43666	0.4533

Source: ERF (2002a, p. 53)



Source: Adapted from GOIC (1998, 2000a)

Differences also remain in the degree of industrialization and the role of manufacturing sector. For instance, Figs. 2.2, 2.3, and 2.4 above indicate that Bahrain seems to be different from the other Gulf countries in terms of the share of industry in total employment (1980–1999) and the share of manufacturing sector in total exports and in GDP (1987–1998). Bahrain seems to have opted to invest more in manufacturing to diversify the economy, probably because of the more sound institutional settings and policies that were adopted to increase industrialization, Bahrain being compelled to act by the fast depletion of its oil resources as compared to the other Gulf countries.

2.2.3 Structural Problems of the Labour Market in the Gulf Countries

In addition to the challenges associated with the heavy dependence on oil, the structure of the labour markets in the Gulf countries shares several problematic features. One serious structural problem related to oil, and probably also to the Dutch disease, is the minor share of the manufacturing sector in total

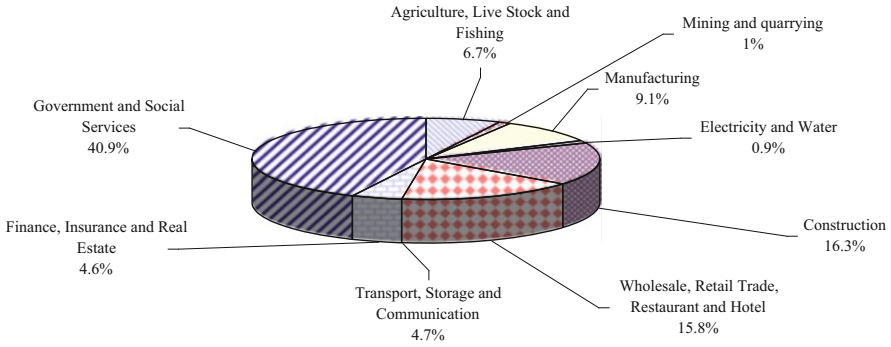


Fig. 2.6 The share of economically active population in economic activities in the Gulf countries 1998 (Source: GOIC Industrial Data Bank (2000b))

employment as the majority of the economically active population is employed by the services sectors. For instance, Fig. 2.6 below illustrates that the services, construction, sales and trade sectors employ 73 % of total economically active population, the government and social services sector alone accounts for 40.9 %, while the manufacturing sector absorbs only 9.1 % of the total economically active population.

Moreover, the labour market in the Gulf countries is characterized by serious structural imbalances due to the minor and declining share of nationals workers in the total labour force when compared to foreign workers – see Table 2.7 below.[8] Several studies (cf. Gray, 1999; Haan, 1999; Issawi, 1982; Serageldin, Socknat, Birks, Li, & Sinclair, 1983) interpret the imbalanced structure in both population and labour market as consequences of the low density of population, shortage of domestic workers, the influx of migrants and a heavy dependence on foreign workers. The migration to the Gulf countries during the last three decades was encouraged in response to the increasing demand for workers to support development projects established following the increasing wealth from oil revenues in the Gulf. The major implication of the dominance of foreign workers in the labour market is the increasing competition for employment opportunities available for national workers, particularly in the private sector of the economy in the Gulf countries. For instance, despite the high share of private sector workers in total

[8] During 1975–1995, the percentage of national to total manpower has decreased in all Gulf countries except in Bahrain. "Available data indicate that the number of expatriate workers is about 7.8 million in 1999, of whom 3.5 million are Arabs (or about 45 %) and 4.3 million are Asians. The former group is dominated by workers from Egypt and, to a lesser extent, Palestine and Sudan. The latter group is made up primarily of workers from India and Pakistan and to a much lesser extent, Iran." ERF (2000, Chap. 5).

Table 2.7 The share of national and foreign labour in total labour force in the Gulf countries (1975–1995)

	Share of foreign labour in total labour force (%)[a]				Share of national labour in total labour force (%)[b]			Annual growth rate of national labour (%)[b]		Annual growth rate of foreign labour (%)[b]	
Country/year	1975	1980	1985	1990	1975	1985	1995	1975–1985	1985–1995	1975–1985	1985–1995
Bahrain*	80.3	59.3	67.7	75.0	18.2	42.1	40	6.6	2.4	11	2.9
Kuwait	69.8	78.1	81.1	82.0	18.2	14.3	16.6	5.6	6.2	8.2	4.6
Oman	45.5	40.0	56.6	75.4	68.9	48.2	35.8	1.4	3	5.1	6.2
Qatar	85.5	81.6	75.5	81.0	17	23.5	17.9	7.3	5.2	3.8	8.1
KSA	25.2	58.3	64.2	78.6	74.8	37.5	36.5	1.2	1.4	8.5	4
UAE	81.4	89.7	87.6	83.5	16	12.4	11.6	3.9	5.5	6.5	6.2
Weighted average Gulf	64.6	67.8	72.1	79.3	61	33.2	26.4	1.7	2.1	8	4.5

Footnote: (*) Data for Bahrain is in respect of census years 1971, 1981, 1985 (estimate) and 1991

[a]Figures through 1990 are from Gameldin (1994)

[b]Girgis (2000)

employment in both Kuwait (70 %) and the UAE (83 %), the share of national workers in the private sector does not exceed 2 % (Khorshid, 2000, p. 6, p. 3).[9]

In addition, the heavy and increasing dependence on foreign workers, especially in the private sector, result in contrasting implications: on the one hand, the high skilled foreign workers have positive impacts on enhancing productivity and output in the private sector. On the other hand, one major drawback related to the heavy dependence on foreign workers is the leakage of foreign remittances away from the Gulf countries, which results in a drain on the current account balance and GNP. For example, in 1990 the remittances from the foreign workers accounted for 20–66 % of the total import bills of the Gulf countries (Datta, Nugent, & Samman, 2000, p. 5; Girgis, 2000). In addition, the excessive use of unskilled foreign workers leads to low skill levels and contributes to declining productivity of labour, as we will explain below and in Chaps. 5 and 6.

Moreover, another common characteristic challenging the labour market in each of the Gulf countries is the dualistic feature that appears from the concentration of domestic workers in the public sector and foreign workers in the private sector. A fact that has been well documented in the Gulf literature is that the national workers lack incentives to work in the private sector and prefer to work in the public sector because the public sector offers higher salaries, subsidies, shorter working hours and other benefits. For instance, Gray (1999) finds that in the UAE, the private sector prefers to employ foreign workers, because they are more productive, less expensive and accept flexible employment contracts. In contrast, the national workers are considered less productive, more expensive and do not possess the prerequisite skills. Both subsidy and wage premiums offered to domestic workers lead to considerable variations in the distribution of average wages between domestic and foreign workers. Further evidence of the dualistic nature and differences in wage premiums and average working hours for both domestic and foreign workers in Kuwait appears from the results of Wadi's study (2001). These results imply the duality and inequality characterizing the distribution of average wages in the Gulf countries.

Furthermore, Table 2.1 above indicates that the average rate of unemployment increased rapidly from 0.5 in 1990 to 7.2 % in 2001. "The labour markets in the Gulf countries are experiencing serious growing trend of both structural and cyclical unemployment. The incidence of structural unemployment is related to discrepancy between the demand for and the supply of workers due to changes in the structure of the economy and the mismatch in both skills and wages premium

[9] See Khorshid (1997, 2000), Gray (1999), Haan (1999) and Cohen (2000) respectively. Gray (1999) finds that the UAE is more dependent on non-national workers than its neighbours, particularly in the private sector. Private sector employers in the UAE are distinctive in their dependence on importing ready-made skills, rather than investing in training nationals in the requisite skills, the sector is currently staffed almost entirely by expatriate workers, with nationals comprising only 2 % of its workforce (Gray, p. 5). The UAE Population Census data (1995) indicates that the non-national constitutes about 75.6 % of total population and 90.9 % of total work force.

for national workers. The major interpretation is related to the failure of the demand to respond to the recent increase in the supply of new national job seekers, (majority of whom do not possess the skill much in demand by private sector)" (ERF, 2000; Girgis, 2000; Khorshid, 2000). "The rapid increase in domestic work force of the Gulf nationals is attributed to the rapid growth in the domestic population, rising participation rates of female workers and projected increase in the share of the economically active population. For instance, during the period (1985–1995), the supply of national manpower in Kuwait, Qatar and the UAE grew by 6.2 %, 5.2 % and 5 % respectively, while, the average growth rate of the national job seekers increased from 1.7 % during the period (1975–1985) to 2.1 % during the period (1985–1995)" (Khorshid, p. 3, p. 6). Moreover, "the Gulf countries suffer from cyclical unemployment that attributed to economic slowdown caused mainly by the instability of the oil prices and revenues. That leads to decline in government spending and had caused serious reduction in the demand for workers and growth rate of employment, particularly in the public sector. The failure of the private sector to fill the gap, due to preference for hiring foreign rather than national workers in the sector created an open unemployment phenomenon especially among the national workers in the Gulf countries" (ERF, p. 118; Girgis; Khorshid, p. 3, p. 5).

Therefore, the Gulf countries need to restructure the labour market, to create more jobs to absorb the growing supply of workers, especially skilled national workers, reduce the unemployment rate and dependence on foreign workers. To that end, more attention needs to be paid to enhancing investment and incentives for public and private sector education and training, mainly tertiary and technical education, and training to promote adequate and appropriate local skills.

2.2.4 The Low Skill Levels in the Gulf Countries

Further to the challenges associated with the extreme dependence on oil and structure of labour market, other serious problem for economic development in the Gulf countries is the low skill levels or educational qualifications of both domestic and foreign population.[10] As we will explain below and in the Chaps. 5 and 8, the low skill levels that appear from several indicators at both macro and micro levels can be attributed to both the deficient educational system and the excess supply of unskilled foreign workers in the Gulf countries. For instance, 67 % of the UAE foreign population have educational qualifications below secondary schooling, 68 % and 72 % of Kuwait foreign workers were either unskilled or low skilled in 1989 and 1999 respectively (cf. Al-Tony, 2002; UAE, 1998, 1999). At the macro level, Table 2.8 indicates that the low skill levels in the Gulf when compared

[10] Similar to other developing countries, the Gulf countries have low skill levels. The more specific feature of the Gulf countries is the low skill levels in a majority of foreign workers.

to World advanced countries are evident from several indicators, including the Harbison Myers Index, the technical enrolment index, the engineering index, the share of tertiary students in science, math and engineering, gross enrolment at tertiary education and school life expectancy.[11] Skill indicators vary enormously across the Gulf countries, for instance, skill indices and gross enrolment ratios in Kuwait and Saudi Arabia are higher than the UAE, while the opposite is true with respect to the share of tertiary students in science, math and engineering. In addition, school life expectancy is higher in Bahrain and Qatar compared to the UAE, Saudi Arabia and Kuwait.

Moreover, Fig. 2.7 illustrates the low skill levels – measured by occupational classification – as the share of white collar/high skilled class accounts for only 16.4 % of total Gulf population, compared to 83.6 % for blue collar/low skilled class. The occupational classification indicates the low share of skilled foreign and national workers; Khorshid (2000) finds that in both the UAE and Kuwait the share of skilled and semi skilled national workers in the total supply are below 5 %. The national workers are greatly biased towards clerical work, military occupations, teachers and non scientific professions, and senior managers. For instance, in Kuwait the share of clerical and policemen; managers and supervisor professions; and teachers represent 41 %, 17 % and 13 % of total labour force respectively, whereas the share in remaining professions does not reach 7 %. The national workers participation rates in four occupational groups: teachers, social scientists, managers and supervisors and clerical exceed 50 % of the total number of workers. Similarly, the UAE shows a low share of national workers in most of occupational

[11] We use many indicators to measure skill levels. For instance, the Harbison Myers Index is sum of secondary enrolment and tertiary enrolment times 5, both as % of age group. Technical enrolment index is tertiary total enrolment (times 1,000) plus tertiary enrolment in technical subjects (times 5,000), both as % of population, Engineering skills index is the same as previous index, with tertiary enrolment in engineering instead of enrolment in technical subjects (Lall, 1999, p. 52). In addition, we use school life expectancy as another measure of skill; according to the UNESCO technical specifications, school life expectancy is one indicator on access to schooling, and is defined as "the total number of years of schooling which a child of a certain age can expect to receive in the future, assuming that the probability of his or her being enrolled in school at any particular age is equal to the current enrolment ratio for that age"- cf. the UNESCO web site. This indicator shows the overall level of development of an educational system in terms of the number of years of education that a child can expect to achieve. We observe that the data used for the estimation of the UNESCO school life expectancy refers to enrolment by age at all levels of education. For that reason, these figures are higher than those of Barro and Lee (2000), which have been used in the UNDP (2001) figures on mean/average years of schooling and refer to age 15 and above. For instance, the UNESCO school life expectancy accounts for 13 and 8.7 in both Bahrain and Kuwait respectively, while Barro and Lee (2000) and the UNDP (2001) mean years of schooling accounts for 6.1 and 6.2 in both Bahrain and Kuwait respectively. However, we use the UNESCO figures in our analysis because Barro and Lee (2000) and the UNDP (2001) figures are available only for Bahrain and Kuwait.

Table 2.8 Skill indicators in the Gulf countries compared to World countries (1992–2000)

	Skill indices (1995)[a]			Gross enrolment ratio (%) at tertiary education	Share tertiary students in science, math and engineering	School life expectancy	
Country	Harbison Myers Index[a]	Technical enrolment index[a]	Engineering enrolment index[a]	1998–2002/2003[b]	1994–1997[c]	1992[d]	2000[e]
Bahrain	n/a	n/a	n/a	21	n/a	13.5	13.0
Kuwait	19.10	36.49	30.57	21	23	7.0	8.7
Oman	8.95	5.35	4.44	7	30	n/a	8.7
Qatar	n/a	n/a	n/a	23	n/a	11.8	13.1
KSA	13.45	18.96	14.42	22	18	8.5	n/a
UAE	12.20	7.51	5.70	10	27	10.6	10.7
Average Gulf	13.425	17.0775	13.7825	17.33	24.5	10.3	10.8
Norway	38.85	73.52	60.25	74	18	n/a	17
Sweden	34.45	64.50	49.94	62.3	31	13.7	16
USA	50.25	88.10	68.98	81	n/a	16.0	15
UK	37.55	68.69	49.83	64	29	15.7	16
Japan	30.05	63.54	63.54	49	23	13.3	14
Korea	36.10	132.06	113.83	85	34	13.5	15
Singapore	23.05	48.81	44.76	n/a	n/a	n/a	n/a
Mexico	12.95	37.53	31.83	21	31	n/a	12
Brazil	10.15	19.87	15.50	18	22	10.7	15

[a]Lall (1999)
[b]UNESCO – UIS (2004b) Educational statistics (1998–2002/2003): most recent data on gross enrolment in tertiary education
[c]UNDP (2002), Human Development Report (2002)
[d]UNESCO (1996)
[e]UNESCO – UIS (2003): www.unesco.org

classifications except military occupations, where national represents 56 % of the total workers (Khorshid, pp. 6–7).

Therefore, these results highlight the need for reforming the educational and training systems in the Gulf in order to ensure more balanced occupational structure. As we elaborate below and in the next Chapters, the low skill level in the Gulf countries hinders the development of local technologies, productivity and hence economic growth. Since the supply of skills (as shaped by systems of education and training) has not responded fully to the rising demand, skill development has become even more pressing for enhancing productivity of labour, replacing foreign workers with domestic workers, reforming the labour market and developing local technologies.

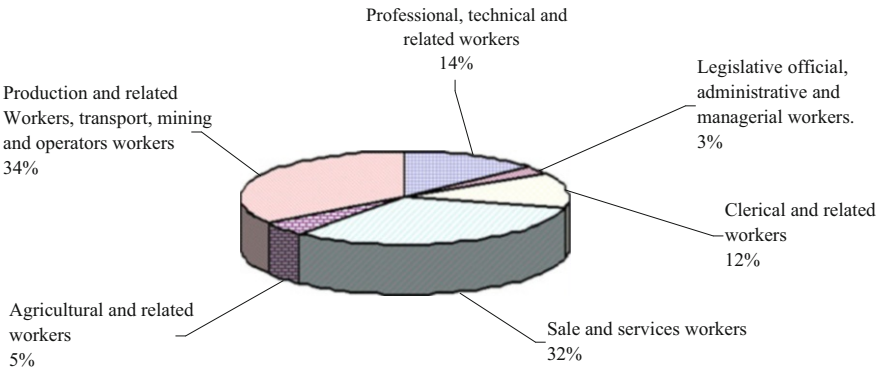


Fig. 2.7 The share of economically active population in the Gulf countries 1998 (defined by occupational level) (Source: GOIC Industrial Data Bank (2000b))

2.2.5 The Low Technological Level and Technological Gap in the Gulf Countries

The low skill levels in the Gulf countries have resulted in poor technological performance and a wide technological gap or distance from the world's rapidly advanced countries such as Singapore, Korea and Malaysia.[12, 13] Table 2.9 illustrates the poor technological performance and technological gap that is manifested in the percentage share of spending on R&D in GDP, the number of scientists and engineers in R&D, patent and population access to Internet, telephone

[12] In recent years there is a growing body of literature focusing on technological capability building in the developing countries, for early references, see e.g. Fransman and King (1987), Lall (1987), Enos (1991), Hillebrand, Messner and Meyer-Stamer (1994), United Nations Conference on Trade and Development [UNCTAD] (1996) and Romijn (1999). Early studies on Trinidad and Tobago, Costa Rica and Iran have brief observations indicating that technological capability building is related to current resources based industries, and that governments work only on static capability building. Another earlier study on the Andean countries in 1979 contains a brief remark on multinationals discouraging capability building.

[13] Several indicators have been used to measure the technological distance between nations. Such as the number of patent registrations; per capita expenditure on R&D, or its share in GDP; the number of skilled persons engaged therein; or the ability of the country to master 'frontier' technologies such as, electronic, informatics, new materials, biotechnology, etc.). These measures are useful for indicating weaknesses in specifically defined areas and determining the need for new policies in specific sectors, but they have shortcomings in reflecting the differences in the degree of technological intensity, or of the efficiency of technological inputs. A broader indicator for a multi-dimensional analysis of technological transformation includes the rate of growth of GDP, per capita GDP and productivity that also reflect changes in the structure of production and trade; domestic production of machinery; availability of advanced education; literacy rate, etc. (Patel, 1995).

Table 2.9 Technology indicators in the Gulf countries compared to World countries (1990–2002)

	Population access (per 1,000 people)[a]										
	Internet users		Telephone mainlines		Cellular subscribers		Spending on R&D as % of GDP[a, b]	Scientists and engineers in R&D (per million people)[a]	Patents[a, c]	High technology exports as % of manufactures exports[a]	
Country	1990	2002	1990	2002	1990	2002	1996–2002	1990–2001	1991–1999	1990	2002
Bahrain	0.0	245	191	261	10	579	0.06[b, d]	n/a	2[c, f]	n/a	n/a
Kuwait	0.0	105.8	188	204	12	519	0.22[b, d]	212	27[c, f]	3	n/a
Oman	0.0	70.0	60	92	2	183	0.07[b, d]	4	3[c, f]	2	2
Qatar	0.0	113.4	220	286	9	433	0.06[b, d]	591	0[c, f]	n/a	0
KSA	0.0	64.6	77	151	1	228	0.14[b, d]	n/a	103[c, f]	n/a	n/a
UAE	0.0	313.2	224	291	19	647	0.02[b, d]	n/a	15[c, f]	n/a	2
Average Gulf	0.0	152	160	214	8.83	432	0.095[b, d]	269	25[c, f]	2.5	2
Norway	7.1	502.6	502	734	46	844	1.6[a, e]	4,377	88[a, g]	12	22
Sweden	5.8	573.1	681	736	54	889	4.6[a, e]	5,186	235[a, g]	13	16
USA	8.0	551.4	547	646	39	906	2.8[a, e]	4,099	298[a, g]	33	32
UK	0.9	423.1	441	591	19	814	1.9[a, e]	2,666	71[a, g]	24	31
Japan	0.2	448.9	441	558	7	637	3.1[a, e]	5,321	884[a, g]	24	24
Korea	0.2	551.9	306	489	2	679	3[a, e]	2,880	490[a, g]	18	32
Singapore	0.0	504.4	346	463	17	796	2.1[a, e]	4,052	27[a, g]	40	60
Mexico	0.0	98.5	65	147	1	255	0.4[a, e]	225	1[a, g]	8	21
Brazil	0.0	82.2	65	223	n/a	201	1.1[a, e]	323	0[a, g]	7	19

Patent data for Norway, Sweden, UK, US, Korea and Singapore, Japan, Mexico and Brazil obtained from UNDP (2003) and refers to patents granted to residents per million people in 1999. For all Gulf countries patent data obtained from US patent office during 1991–1999, it refers to the number of registered US patents (in which the inventor of the patent is a resident) that originated from the selected Gulf countries. One limitation of the comparison in our analysis is that we use patent data from two different sources; the scarcity of data and information covering all countries limited our attempt to use a unified source.

[a]UNDP Human Development Report (2004)

[b]Calculated from Qasem (1998a, b) and GOIC (2000a)

[c]US Patent and Trademark office web site: www.uspto.govt

[d]Data refers to 1996

[e]Data refers to 1996–2002

[f]Data refers to 1991–1999

[g]Data refers to 2000

Table 2.10 Distribution of R&D institutional units and full– time equivalent (FTE) researchers by type of R&D Institution in the Gulf countries 1996

	Number of R&D institutions				Number of FTE researchers			
Country/area	Public	University	Private	Total	Public	University	Private	Total
Bahrain	3	1	0	4	27	59	0	86
Kuwait	11	0	4	15	334	83	23	440
Oman	6	0	0	6	56	26	0	82
Qatar	0	6	0	6	4	30	0	34
Saudi Arabia	19	28	2	49	308	538	0	846
UAE	3	2	0	5	56	51	0	107
Total	42	37	6	85	785	787	23	1,595
% Distribution	49.41	43.53	7.06	100	49.22	49.34	1.44	100

Source: Adapted from ESCWA–UNESCO (1998), Research and Development System in the Arab States: Development of Science and Technology Indicators 1998 (E/ESCWA/TECH/1998/3)

and mobile.[14] We observe that, due to the high GDP per capita income in the Gulf countries, both spending and use of ICT/access to Internet, telephone and mobile increased rapidly during the period 1990–2002. Moreover, technology indicators vary enormously across the Gulf countries, for instance, ICT indicators –access to Internet, telephone and mobile – are higher in the UAE than in Kuwait, Saudi Arabia and the other Gulf countries (cf. Nour, 2002a, b), whereas the percentage share of spending on R&D in GDP, the number of scientists and engineers in R&D and patent are higher in both Saudi Arabia and Kuwait compared to the UAE and other Gulf countries.

Poor technological performance is closely related to low R&D spending. More recently the UNESCO-UIS (2004a) indicates a remarkably serious weaknesses of investment in R&D in the Arab (including the Gulf) countries when compared to the New Industrialized Economies of South East Asia, such as China and India, and also compared to Latin America. "Despite efforts to increase investment in R&D, expenditures remain very low in developing countries. In 2000, developing countries spent 0.9 % of their GDP on R&D, still falling short of the target of 1 % mentioned in various S&T policy documents and international declarations for over 30 years.[15] Nevertheless, there is considerable variation across countries. . .. . . both sub-Saharan African countries and the Arab states showed much lower levels of R&D expenditures. . .. To complete the picture, the Arab states show a very low level (0.15 %) of research intensity." (UNESCO-UIS, p. 3).

Furthermore, the distribution of R&D institutions indicates that most of the R&D activities are carried out within the public (49.4 %) and university (43.5 %)

[14] As in most other developing countries, the Gulf countries show poor technological performance. In view of their high GDP per capita income, which is comparable to high-income countries, one would have expected a better performance in the Gulf.

[15] For early references to R&D expenditure target setting, cf. United Nations (1970)"United Nations Science and Technology for Development, Proposals for the Second United Nations Development Decade," New York, 1970.

Table 2.11 Technological structure of manufactured exports in the Gulf and developing countries (1985–1997) (% of total manufactured exports)

	Primary products[a]		Resources based manufactures[a, b]		Low technology manufactures[a, b]		Medium technology manufactures[a, b]		High technology manufactures[a, b]	
Countries	1985	1997	1985	1997	1985	1997	1985	1997	1985	1997
Bahrain[a]	54.4	56.1	10.9	12.5	11.8	13.1	22.0	16.7	0.6	1.5
Kuwait[a]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Oman[a]	93.8	76.9	0.7	5.7	0.4	2.6	3.3	11.8	1.2	1.6
Qatar[a]	72.2	67.4	11.0	10.5	5.2	7.9	11.4	13.9	0.1	0.3
KSA[a]	82.7	74.5	13.6	18.0	0.6	1.6	2.9	5.7	0.1	0.2
UAE[a]	22.3	35.6	15.0	14.9	16.1	33.4	33.0	15.7	5.6	0.3
Average Gulf[a]	65.08	62.1	10.24	12.32	6.82	11.72	14.52	12.76	1.52	0.78
World[b, c]	n/a	n/a	n/a	13.7	n/a	21.3	n/a	37.2	n/a	27.7
Singapore[b, c]	n/a	n/a	n/a	12.7	n/a	7.9	n/a	14.0	n/a	65.4
Malaysia[b, c]	n/a	n/a	n/a	17.8	n/a	13.1	n/a	8.7	n/a	60.4
Korea[b, c]	n/a	n/a	n/a	9.4	n/a	28.4	n/a	26.6	n/a	35.7
Mexico[b, c]	n/a	n/a	n/a	7.1	n/a	20.9	n/a	35.2	n/a	36.9
Brazil[b, c]	n/a	n/a	n/a	25.6	n/a	31.8	n/a	34.0	n/a	8.6

[a]Haddad (2001)
[b]Lall (1999) computations based on UNCOMTRADE data 2000 and 1996 respectively
[c]Data refers to 1996

sectors, while the private sector has only a minor contribution and accounts solely for 7 % of total R&D institutions in the Gulf countries – see Table 2.10 below. That also holds for the distribution of human resources available to R&D institutions – defined by the number of full-time equivalent (FTE)[16] researchers. For instance, Table 2.10 illustrates that the majority of FTE researchers are employed by public (49.2 %) and university (49.3 %) sectors, while the private sector absorbs only about 1.4 % of total FTE researchers in the Gulf countries (cf. Nour, 2005a, b). Therefore, these results imply that the private sector, and hence industry, makes only a minor contribution in both human resources (FTE researchers) and total R&D activities, and lags behind most of the industrialized countries, in which more than half of R&D expenditures are financed by industry.[17]

In addition, the large technological gap between the Gulf countries and the world's rapidly advanced countries like Singapore, Malaysia and Korea is also apparent from the technological structure of manufactured exports, in particular the share of high technology exports as a percentage of total manufactured exports. For instance, in contrast to Singapore, Malaysia and Korea, both medium and high technology exports lag behind and constitute only a minor share in total Gulf

[16] The concept of full – time equivalent researcher is adopted by UNESCO statistics on R&D personnel.

[17] See the OECD Second European Report on S&T (1997).

manufacturing exports. In addition, the Gulf countries show heavy concentration on primary and resources based manufactured exports, but serious negligence of medium and high technology exports. The average for Gulf countries also shows a worsening status or declining share of high and medium technologies over the periods 1985–1997 – see Table 2.11 below. Furthermore, the levels of net capital inflows and foreign direct investment indicate a large gap and weak competence of the Gulf countries to attract foreign investment for developing local technologies. For instance, the levels of net capital inflows and foreign direct investment in the Gulf countries fall below those of the rapidly advanced countries, namely Singapore, Malaysia and Korea (cf. UNDP, 2004).[18]

As a result of the poor technological performance and technological distance, the Gulf countries are facing the problem of strong dependence on foreign technologies, which is apparent from the trade balance in technological products.[19] Muysken and Nour (2006) measure the dependence on foreign technology by the share of chemical, machinery, equipment and manufactured products in total imports (Lall, 1999; Patel, 1995). They observe that despite the significant contribution of oil to GDP, government revenues and total exports, the share of chemical, machinery, equipment and manufactured products in total imports remains high in most of the Gulf countries. The high share of crude oil and mineral fuel in total exports together with the strong dependence on foreign technologies indicates a failure to manufacture oil domestically within the Gulf countries. They find that the heavy dependence on foreign technologies varies across the Gulf countries; however, in general, the average for all Gulf countries throughout the period 1989–1998 did not show a considerable change and remained above 70 % (Gulf Organization for Industrial Consulting [GOIC], 2000a, b). They attribute that to a lack of R&D efforts, skills and scientific cooperation and to a poor technology infrastructure (Rasiah, 2002; Zahlan, 1999a, b). Furthermore, the status of the Gulf countries according to the UNDP (2001) classification of world countries according to the technology achievement index (TAI[20])

[18] FDI stimulates the development and dispersion of technology as foreign investors transfer techniques and skills to their local affiliates. These skills then generally spill-over to other companies and institutions in the local markets, and are often the missing resource that countries need to expand their access to international markets and to develop areas in which they have a comparative advantage. FDI also leads to the transfer of important capital goods and intermediate inputs. It can help a country develop new comparative advantages, as was the case with the electronic industry in Southeast Asia. In addition it also contributes to increasing output and/or productivity (Hafasi, 2001, p. 41).

[19] This phenomenon of dependence on foreign technologies is similar to most other developing countries. The Gulf countries, however, are also highly dependent on the import of technical skills to operate them.

[20] According to the UNDP (2001), the technology achievement index (TAI) focuses on four dimensions of technological capacity that are important for reaping the benefits of the network age. TAI includes: (1) Creation of technology as measured by the number of patents granted per capita and receipt of royalty and licenses fees from abroad; (2) Diffusion of recent innovations as measured by diffusion of Internet and export of high and medium technology products as a share of all exports; (3) Diffusion of old innovations as measured by diffusion of telephone and electricity;

Table 2.12 Demand for and supply of technologies in the Gulf countries (1989–1998) (%)

Country/items		1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Bahrain	Demand[a]	48.7	39.4	45.6	52.4	51.2	50.8	45.2	39.7	44.6	53.2
	Supply[b]	n/a	n/a	n/a.	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Kuwait	Demand[a]	76.5	79.1	87.4	84.5	82.5	80.4	82	81.5	80.7	81
	Supply[b]	28	23	15	63	53	53	34	36	40	48
Oman	Demand[a]	73.8	70.3	75.6	74.7	72.4	73.4	71.7	74.2	76.8	79
	Supply[b]	n/a	n/a	n/a	n/a	8	13	14	16	24	24
Qatar	Demand[a]	78	78.6	79.2	81.8	82.2	80.9	87.7	86.2	86.8	86.6
	Supply[b]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Saudi Arabia	Demand[a]	78	77.5	80.1	83	84	81.4	77.7	76.4	73.1	75.7
	Supply[b]	32	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
UAE	Demand[a]	78.5	79.5	66.6	85.3	85.1	85.3	85	86.4	86.4	86.4
	Supply[b]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Average Gulf	Demand[a]	75.6	74.7	74.3	81.4	81.5	80.2	78.8	78.3	78	79.8
	Supply[b]	30	23	15	63	31	33	24	26	32	36

Notes: The demand side refers to demand for imported technologies (or dependence on foreign technologies) and measured by the share of chemical, machinery, equipment and manufactured products in total imports. The supply side refers to technological specialization and is measured by the share of value added in machinery and transport equipment/GDP

[a]GOIC (1998, 2000a)

[b]World Development Indicators database and GOIC (1998, 2000a)

shows that none of the Gulf countries are classified as leaders, potential leaders or dynamic adopters of technologies in the world.

Since Muysken and Nour (2006) discuss only the demand side, using the demand for imported technology or dependence on foreign technologies, it may be interesting to complement their analysis by also examining the supply side. We measure the supply side by multiplying the manufactures/GDP ratio taken from Fig. 2.3 above by value added in machinery and transport equipment as % of value added in total manufactures using WDI data, the result is value added in machinery and transport equipment/GDP, which we use as a measure of specialization in production related to technology. When using this measure, our results show a low technological specialization in the Gulf countries – see Tables 2.12 and 2.13 below.[21]

and (4) Human skills as measured by mean years of schooling and gross enrolment ratio of tertiary students enrolled in science, mathematics and engineering (UNDP, 2001).

[21] Since the recent data from the WDI is available only for Kuwait and Oman, we therefore use an alternative set of indicators from GOIC in Table 2.13. Alternatively, we multiply the manufactures/GDP ratio from Fig. 2.3 above by investment in fabricated metal, machinery and equipment/manufactures and we get investment in fabricated metal, machinery and equipment/GDP. This measure may have the advantage of increasing the consistency between supply and demand measures. However, it has a limitation and may also be inaccurate for our analysis since it does not reflect machinery and transport/GDP separately. Rather, it tends to somewhat overestimate the actual value as the figures include fabricated metal in addition to machinery and equipment, which are combined together in one category. This is most probably because the only available data is based on the International Standard Industrial Classification of all economic activities according to ISIC 1968 rather than ISIC Rev 3.

Table 2.13 Demand for and supply of technologies in the Gulf countries (1996–1998) (%)

Items	Supply		Demand	
Country/years	1996	1998	1996	1998
Bahrain	61	71	39.7	53.3
Kuwait	22	11	81.5	81
Oman	24	32	74.2	79
Qatar	11	15	86.2	86.6
Saudi Arabia	71	88	76.4	75.7
United Arab Emirates	64	73	86.4	86.4
Average Gulf	42.17	48.33	78.3	79.8

Notes: The demand for imported technologies is measured by the share of chemical, machinery, equipment and manufactured products in total imports, the supply is measured by the share of investment in fabricated metal, machinery and equipment in GDP
Source: Calculated from GOIC (2000a)

Hence, the Gulf countries need to upgrade skills (enhancing education and training), in order to develop local technologies, reduce dependence on foreign technologies, narrow the technological gap, adapt appropriate foreign technologies and enhance economic development. Although the development of local technologies is indeed a costly process, this can be funded from the oil revenues and by offering further incentives to motivate private investment in skill, technology and technical education.

2.2.6 The Declining Productivity of Labour and Economic Growth in the Gulf Countries

In recent times, the Gulf countries are facing serious additional problems due to the declining productivity of labour, value added and economic growth. Table 2.1 above, indicates that the average real GDP growth rate in the Gulf declined from 5.1 % in 2000 to 2.5 % in 2001. In addition, the declining productivity of labour and value added can be interpreted as implications of low skill levels amongst both domestic and foreign workers. For instance, the UAE Reports (UAE Ministry of Labour Report, 1999; UAE Ministry of Planning Report, 1998) indicate that the UAE migrant population shows a quantitative increase rather than a qualitative improvement, which hinders the improvement of skill structure and the average productivity of labour. The reports also indicate that between 1985 and 1995 an increase in the UAE total labour force at 8.1 %, the GDP at constant prices at average annual rate of 7.0 % and private sector employment at average annual rate of 3.2 % during 1990–1995 resulted in an annual decrease in average productivity of labour by 3.8 %. This implies that the UAE was importing an excess supply of unskilled workers, particularly in the private sector, while the marginal productivity

was below zero.[22] Moreover, the UAE Ministry of Planning (2004) reported continuous annual decline in the productivity of labour in the period 1997–2002. In addition, Cohen (2000) provides evidence for the declining labour productivity and growth of labour productivity in the manufacturing sector in the UAE in the period 1993–1998. Further evidence of the declining growth rates and declining labour productivity in Kuwait and the UAE appear from the results of Wadi (2001) and Abdelkarim and Ibrahim (2001) respectively.

2.3 Conclusions

This chapter presents an introduction and background to motivate the research and explains some stylized facts, the research problem along with other strategic problems confronting economic development in the Gulf countries. We explain that oil has contributed to economic development in the Gulf countries. However, the heavy dependence on oil leads to serious challenges since oil is an exhaustible resource and also, because of the instability of oil prices, the revenue from oil is uncertain and volatile. Hence, economic growth and the sustainable development strategy in the Gulf depend on economic diversification, which is contingent upon availability of adequate and appropriate skills and technologies. Moreover, we present other serious structural problems in the Gulf countries that are related to the Dutch disease, structural imbalances in the labour market, duality between public and private sectors, growing unemployment, slowdown in economic growth, declining labour productivity and lack of incentives. We illustrate the low skill and technology indicators and the gap the Gulf countries exhibit when compared to rapidly advanced countries.

Hence, we show that the Gulf countries need to upgrade skill levels and motivate development of local technologies to narrow the technological gap and enhance economic development in the region. In our view, the upskilling of workers through enhancing the system of education and training will encourage R&D activities and the adoption of appropriate foreign technologies and so motivate both the development of local technologies and the bridging of the technological gap. Moreover, skill upgrading will facilitate economic diversification, restructuring of the labour market, enhancing productivity of labour, and reducing dependence on foreign workers, duality and unemployment.

Therefore, our findings in this chapter confirm our first hypothesis in Scheme 1.1 Chap. 1 above: the Gulf countries need to promote the local skill and local technologies to face the challenges created by the depletion of oil resources. They also need to implement the three strategies of diversification, building local technological capacity and restructuring the labour market. Our results confirm part of

[22] See the UAE Ministry of Planning Report (1998, p. 31) and the UAE Ministry of Labour Report (1999, p. 14) respectively.

the second hypothesis in Scheme 1.1 Chap. 1 above: in the short and medium term, the Gulf countries will be unable to rely on local skill and local technologies and remain heavily dependent on both foreign skills and foreign technologies at the macro level.

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