Chapter 13
Education: A Tool for a Knowledge-Based Economy

All who have mediated on the art of governing mankind have been convinced that the fate of empires depends on the education of youth.

Aristotle

Learning Outcomes

By the end of this section, you would understand:

- *The growth in education expenditure to meet population needs*
- *Facing up to the globalization challenges*
- *The Saudi educational structure*
- *Moves to restructure the educational system*
- *Saudi education and market needs*
- *Options for change in the education structure*

Introduction

There are a number of reasons why education plays such a crucial role in Saudi Arabia: its young population, the influx of expatriate labour, the lack of natural resources besides exhaustible oil and a relatively new educational system. The major issue, however, is not the amount of expansion, but rather the orientation of the educational system. A major problem with this system is that it attributes high social prestige to university education, while underestimating the significance of technological and vocational education. It is widely, if unfairly, believed that only school dropouts and academically poor students enter technical training (Kibbi, 2002). This belief is further strengthened by employment policies which, until recently, encouraged an educational structure that offered priority employment opportunities in the government sector to university graduates, thus making technical and vocational education even less attractive and less socially desirable (The Economist, 1997).

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In development literature, the role of education in building "human capital" has been consistently highlighted. The positive role of higher education in the construction of knowledge-based economies and democratic societies is highly promoted by international organizations such as the World Bank (Larocque, 2002). These groups stress that higher education exercises a direct influence on national productivity, which in turn largely determines living standards and a country's ability to compete in the global economy. Investment in quality training and higher education generates major external benefits that are crucial for knowledge-driven economic and social development (World Bank, 2001).

Technological progress and the "diffusion" of scientific and technical innovations lead to higher productivity. That encourages improvement in all sectors of the economy. Higher skill levels in the labour force – an outcome of increased educational levels – and improved education permit workers to use new technology and boosts productivity. As such, the ability of any society to produce, select, adapt and commercialize knowledge is critical for sustained economic growth and improved living standards. In relation to its population, size and educational investment, Saudi Arabia has produced a negligible number of commercial patents, compared to other countries. Singapore, Malaysia and Korea have invested smaller amounts per capita in higher education than Saudi Arabia, but seem to have used it better to generate sustained economic growth. With Saudi Arabia's accession to the World Trade Organization (WTO), it faces both opportunities and threats stemming from changes in the global environment, specifically in the educational sector. In this regard, the Kingdom has been reassessing the educational sector's role in meeting national development objectives, both quantitatively and qualitatively.

Meeting the Globalization Challenges

Developing economies face significant new trends in the global environment, the most critical of which is the increasing importance of knowledge, the main driver of growth within this information and communication revolution (Salmi, 2003).

Today, economic growth is as much a process of knowledge accumulation as of capital accumulation. Firms in developed countries devote more and more of their investment to knowledge-based intangibles such as training, research and development, patents, licensing and design. The aim is to gain a competitive edge over others in the global economy. The same applies to countries as well as to companies; information and communication technologies (ICTs) speed up the flow of knowledge across boundaries.

However, joining the global knowledge-based economy brings with it both opportunities and threats. Some of these issues are highlighted in Table 13.1.

On the positive side, the role of higher education in the construction of knowledge-based economies and democratic societies is more influential than ever. On the negative side, the technological transformation of knowledge-based societies carries the real danger of a growing digital, and by implication economic, divide between nations.

Table 13.1 Opportunities and threats stemming from changes in the global environment

Change factor	Opportunities	Threats
Growing role of knowledge	• Possibility of leapfrogging in selected areas of economic growth • Resolution of social problems (food, security, health, water supply, energy, environment)	Increasing knowledge gap among nations
ICT revolution	• Easier access to knowledge and information	• Growing digital divide among and within nations
Global labour market	• Easier access to the expertise, skills and knowledge of professionals	• Growing brain drain and loss of advanced human capital
Political and social change	• Positive environment for reform • Spread of democracy	• Growing brain drain and political instability • Loss of human resources

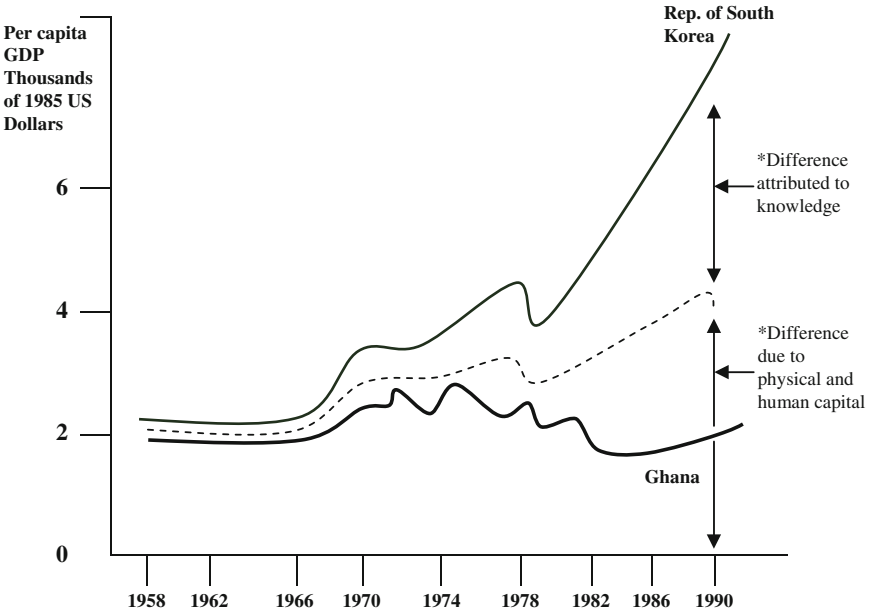

Fig. 13.1 Knowledge as a factor in income differences between countries: Ghana and the Republic of South Korea 1956–1990 (Source: World Bank (1999))

Figure 13.1 demonstrates how, according to World Bank studies, two countries – South Korea and Ghana – that had almost identical per capita GDP in 1957/1958 diverged in their economic growth paths by the late 1990s, owing to the pace of knowledge in their development.

Figure 13.1 illustrates the significant difference a knowledge-based development strategy makes to economic growth. Such knowledge-based development exercises a direct influence on national productivity, which largely determines living standards, as the per capita divergence between Ghana and South Korea confirms. This development approach supports knowledge-driven economic growth strategies and poverty reduction by (a) training a qualified and adaptable labour force, including scientists, professionals, technicians, teachers and business leaders; (b) generating new knowledge; and (c) building the capacity to access existing stores of global knowledge and to adapt that knowledge to local use (Salmi, 2002, Dukhayil, 2002, Larocque, 2002).

Analysis of global competitiveness amongst nations seems to indicate a high degree of correlation between the level of higher education and training and national competitiveness indexes. Saudi Arabia still lags behind other Middle East countries such as the United Arab Emirates and Qatar as illustrated in Fig. 13.2.

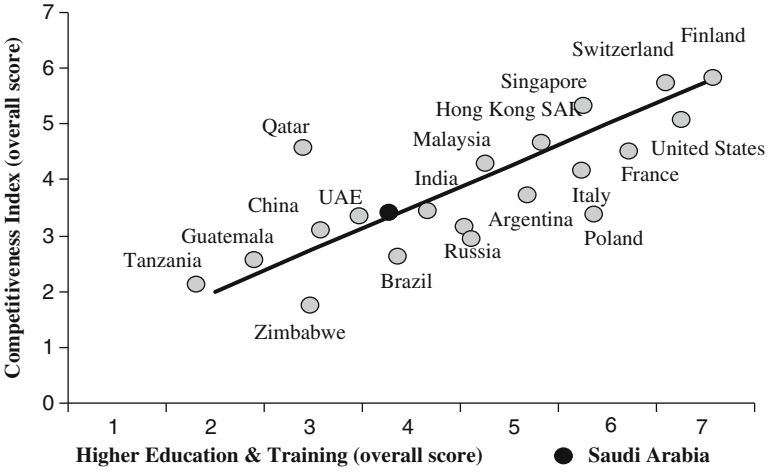

Fig. 13.2 Higher education training and competitiveness index – selected nations 2007 (Source: The Global Competitiveness Report)

According to studies conducted by the US-based Brookings Institute, there has been a gain of 13–30% in productivity because of increased investment in higher education, which comprises both diploma-level and tertiary- or university-level education (Global Competitive Report, 2007).

Education in Saudi Arabia

Education has been an important unifying and nation-building facilitator since the proclamation of the modern Kingdom of Saudi Arabia in 1932 to date (Al-Rasheed, 2002, Champion, 2003). Education advances nation-building by promoting greater social cohesion, trust in social institutions, national participation and appreciation of

diversity in social class. These are the *positive externalities* of applying a national educational programme. Saudi Arabia's wealth in oil resources has provided the means for broader economic and national infrastructural development, including education. This natural desire to develop the nation's human resources has been undertaken with enthusiasm by successive rulers of the Kingdom who have taken a great personal interest in this area (Al-Rasheed, 2002).

Saudi Arabia has been able to build a large educational infrastructure within a short period of time because of the financial resources it derives from oil revenues. As discussed in earlier chapters, budgetary outlays on education had been steadily rising with SR 138 billion allocated in the 2010 budget, or 29% of total expenditure. The total amount planned for education and human resource development in the Ninth Development Plan 2010–2014 was SR 479.9 billion or 55% of total sector expenditures for the 5-year period (Ministry of Planning). As a comparison, the First Five-Year Plan for the period 1970–1974 forecasted education and human resources development at SR 7 billion or 20.6% of total expenditure. As a result of this consistent expenditure pattern, literacy rates and enrolment ratios at all levels have been increasing as illustrated in Fig. 13.3.

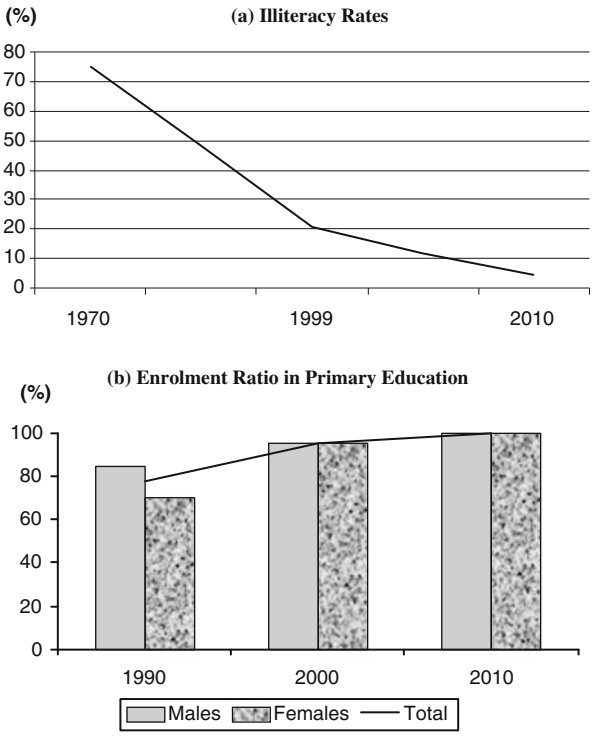

Fig. 13.3 Illiteracy and enrolment rates: Saudi Arabia (Source: Statistical Yearbook, Ministry of Planning, Eighth Development Plan)

As illustrated in Fig. 13.3, youth literacy rate reached 97.3% in 2010 and adult literacy stood at 79.8% for the same year according to the Ministry of Planning. Primary school enrolment ratio registered 100% for both males and females in 2010, compared with around 83% for males and 70% for females in 1990.

The Kingdom provides free education in its public schools, colleges and universities. Furthermore, the Seventh and Eighth National Development Plans made primary- and secondary-level education compulsory for both males and females. In addition the private sector has been assuming an increasing role in the provision of education, historically in primary and secondary education, and more recently in tertiary education with new private sector universities being established such as Prince Sultan University and Al Yamamah University in Riyadh and Prince Mohammed University in Alkhobar in the Eastern Province.

There is a growing imbalance between the quality and quantity of occupational expertise produced by the educational system and the occupational structure demanded by the economy, as reflected in the qualifications and expertise required by present and future employment opportunities. As will be discussed later, about two thirds of the total number of male and female students in higher education graduate with degrees in humanities and other fields that are not in great demand by the labour market. Consequently, the education policy is under continuous review and assessment, with the objective of tuning the system output to better match the needs of economic and social development.

The educational system is increasingly challenged by rapid scientific, technological and other developments, which requires a continuous review of the educational curriculum so it stays attuned to developments in the domestic market as well as to relevant international developments. This policy entails: (a) continuous enhancement of educational methodologies; (b) upgrading the educational environment; (c) strengthening the technical capabilities and performance of the educational system; (d) improving the technical capabilities of teachers, instructors and other educational professionals; and (e) enhancing educational governance and management. These issues will be explored in more depth later on in the chapter.

However, the information and communication revolution that is sweeping the globe is having a profound effect on Saudi Arabian society in the social, educational and economic spheres. It has not been lost upon the Saudi government that new communication technologies have had a positive economic impact on many developing countries, such as China, India, Malaysia and the nearby GCC countries, particularly Dubai and Bahrain. With the help of a relatively effective educational system, these countries have all successfully created information technology that allows them to compete in the global market. Dubai's "Internet City" is indeed a powerful model for Saudi Arabia. However, as Fig. 13.4 shows, there is still a wide divide between the distribution of Internet access and the world's population. The USA and Canada, with 5.1% of the world's population, account for 65% of Internet host sites, compared to around 6% of Internet sites for the developing countries, which have 80% of the world's population (World Bank, 2008).

Compared to World Bank reports as early as 2002, Saudi Arabia has made some significant progress on the spread of technology and information communication.

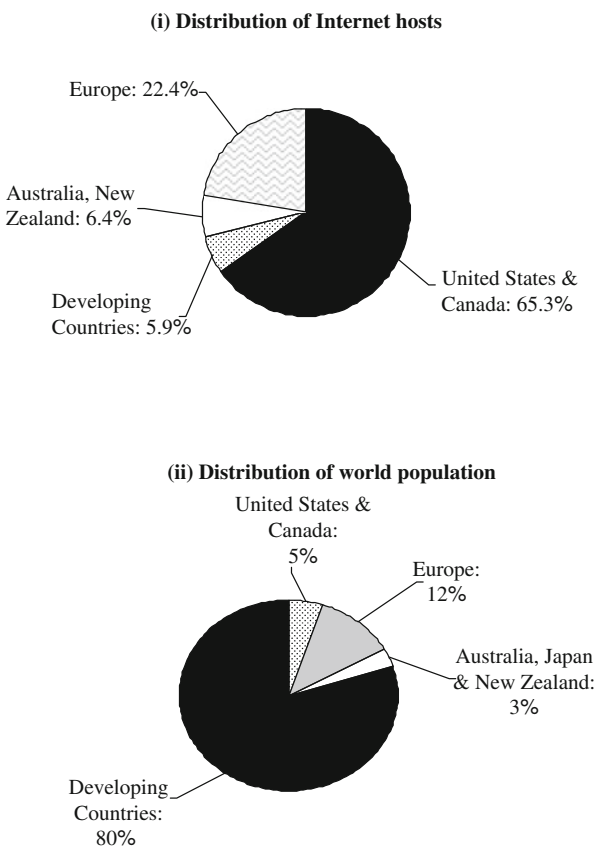

Fig. 13.4 Distribution of Internet hosts and world population, by region (2007) (Source: Data from International Telecommunications Union, the United Nations, World Bank, 2008)

Figure 13.5 indicates that the Kingdom was third in the GCC countries behind the UAE and Bahrain in terms of mobile telephone and Internet user penetration for 2008 and fourth by personal computer ownership.

Globalization, declining communication and transportation costs and the opening of borders combine to facilitate an increased movement of skilled people, leading to a global marketplace for the advanced human capital. In the twenty-first century marketplace, richer countries try in many ways to attract and retain the world's best-trained minds. For example, according to the World Bank, nearly 25% of the science and engineering students in US graduate schools come from other countries, and in 2000 the USA made available 600,000 new visas for immigrant scientists and engineers (World Bank, 2002).

In Saudi Arabia, the Ministry of Communications and Information Technology (MCIT) published, in 2005, its plan for ICT sector development. The vision for ICT sector development has called for the creation of a knowledge-based society that is

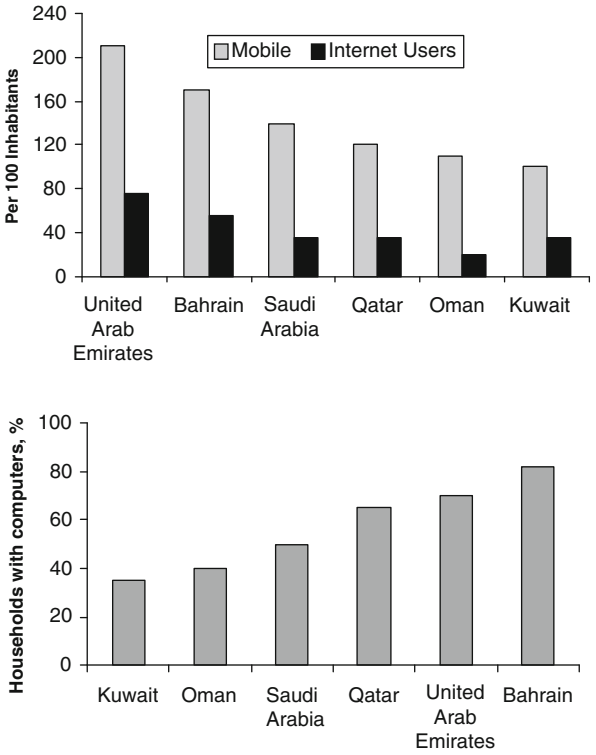

Fig. 13.5 (**a**) Mobile and Internet user penetration in GCC countries (2008) (Source: ITU World Telecommunication /ICT Indicators Database); (**b**) Percentage of households with computers, GCC countries (2008) (Source: ITU World Telecommunication /ICT Indicators Database)

able to produce, access, use and interact with the flow of latest information, thereby contributing to improving efficiency, productivity and the quality of products and services.

The following targets have been attached to the development plan:

- Raising direct foreign investments in ICT projects to US$500 million.
- Establishing a number of IT incubators and technology zones.
- Continuing review of government procedures to make them consistent with e-government best practice and provide government services on the Internet.
- Establishing a national gateway for e-government.
- Creating high administrative posts for IT in government agencies.
- Establishing a centre under the umbrella of the Chambers of Commerce and Industry to support greater use of ICT applications in the private sector.
- Issuing the e-transactions regulation.
- Opening up competition in fixed line services starting from 2006.
- Licensing additional operators to deliver mobile telephone services, which was achieved by 2010 with two other operators, Mobily and Zain, being licensed.

With its relatively high population growth and fluctuating economic wealth due to erratic oil revenues, Saudi Arabia faces challenges in the educational field that have wider implications for human development and economic growth (Looney, 1989). These challenges are summarized in Table 13.2.

Table 13.2 Summary of challenges facing Saudi Arabian education

Economic	Access
• Education spending comprises 29 percent of the national budget • High percent of Saudi males are unemployed while only 6% of Saudi females are in employment	• Population growth of 2.2% per annum • 50% of the population is under 18 years of age • The higher education sector cannot accommodate over 30% of the high school graduates • An estimated 636,000 students in higher education in 2010
Relevance	**Quality**
• New teaching methodology, materials and syllabi needed to meet the needs of the knowledge economy • There is a mismatch between skills development and labour market requirements • English-language instruction from primary school level is important	• High, though reducing, dropout and repetition rates • Wide variation in the ability of entrants at each education level • Lack of national capacity to assess educational quality and trends against comparable international data • Adaptability to worldwide information base

The summary table highlights the issues of relevance and quality facing the Saudi educational system today. The government has instigated several initiatives to address these issues by re-examining syllabuses and curriculum to ensure that they meet the requirements of a more technological oriented market, and English language is being introduced from an early age at junior schools. International benchmarking is now being established for accreditation in the sciences and social sciences by leading Saudi universities. Best practices are being introduced guided by the establishment of international "advisory boards," whose members often include distinguished academics from renowned US, European and Asian universities. King Fahd University of Petroleum and Minerals and King Abdulaziz University have set up such international advisory boards, whose members also include non-academic private sector international figures who have made exceptional contributions in their own countries. Other Saudi private sector universities have established strategic alliances with foreign universities for collaboration in teaching and student placements.

The above "spillover" best practice benchmarking will take time to assimilate as it involves a paradigm shift in the manner and mode of teaching and learning, especially in the higher education sector where experimentation with new ideas is

often inhibited by faculty themselves. As such, current educational norms and values affect work ethic perceptions in Saudi society at large.

A survey of Saudi and US male undergraduate students showed that Saudi students in higher education placed greater emphasis on social, non-economic issues in their perception of potential benefits resulting from their studies. US students gave a lower priority to issues of status. The results are set out in Table 13.3.

This table of student perceptions basically reflects the values and attitudes of Saudi society, with higher emphasis placed on prestige and social mobility rather than on professional mobility and adaptation to knowledge-based economy (Wright et al., 1996).

However, there has been a noticeable change in the values and attitudes of some Saudi graduates over the past few years, which indicates a greater emphasis to gain more specialized qualifications as well as a desire to conduct varied undergraduate internships within and outside the Kingdom to acquire more competitive and international skills.

Table 13.3 Potential benefits from higher education: Saudi Arabian and US college students' perceptions

Benefits	Private issues	Public spillover	Saudi students	US students
Economic	• Higher salaries	Greater productivity	*M*	*H*
	• Employment security	National and regional development	*H*	*H*
	• Higher savings	Reduced reliance on government financial support	*L*	*H*
	• Improved working conditions	Increased consumption	*M*	*H*
	• Personal and professional mobility and advancement	Increased potential for transformation from low-skill industrial to knowledge-based economy	*M*	*H*
	• Leadership	Nation-building and development of leadership	*H*	*L*
	• Being a decision-maker	Affecting society's future	*H*	*L*
	• Improved personal status	Public standing and status	*H*	*L*
Social	• Conventionality	Rigid social customs	*M*	*L*
	• Healthier lifestyle and higher life expectancy	Improved health	*M*	*H*
	• Autonomy	Initiative culture	*L*	*H*
	• Working by self	Initiative culture	*L*	*H*

Note: H = High importance; M = Moderate importance; L = Low importance
Source: Survey of KFUPM students and US college students conducted during 2001/2002, Lawrence Shatkin

The Saudi Educational Structure

In quantitative terms, the growth in educational levels of both males and females in Saudi Arabia has been impressive on all counts. According to the World Bank (Diwan and Girgis, 2002) and the Saudi Ministry of Planning (Ministry of Planning, 2002), during the last decade alone, the average education level increased 27% or by more than 1.5–6.6 years on average. The implication for a rise in future productivity in the economy is positive, as World Bank research has tended to support the finding that a one-year rise in a nation's education level generates a 10% increase in GDP (Diwan and Girgis, 2002). However, this largely depends on the quality of education output that matches the needs of the economy. In Saudi Arabia, as we will examine later in this chapter, the largest number of students are taking undergraduate degrees in Islamic and social science studies, with engineering, sciences, education, the humanities and medicine being ranked the next most popular subjects. Women especially predominate in Islamic studies and education, while men do so in engineering, sciences and medicine, but as we will discuss, women are also making progress in the sciences, especially in medicine.

According to the latest data, illiteracy rates are now very low in Saudi Arabia and compare favourably with many developing and other Arab countries. Figure 13.6 sets out the level of educational attainment for Saudis, male and female, over the age of 10 for the year 2007. We note that Saudi male illiteracy stood at around 8% and female at 18%. According to commentators, most illiterates have usually been found in the older age groups (Wilson et al., 2003) as adult literacy programmes

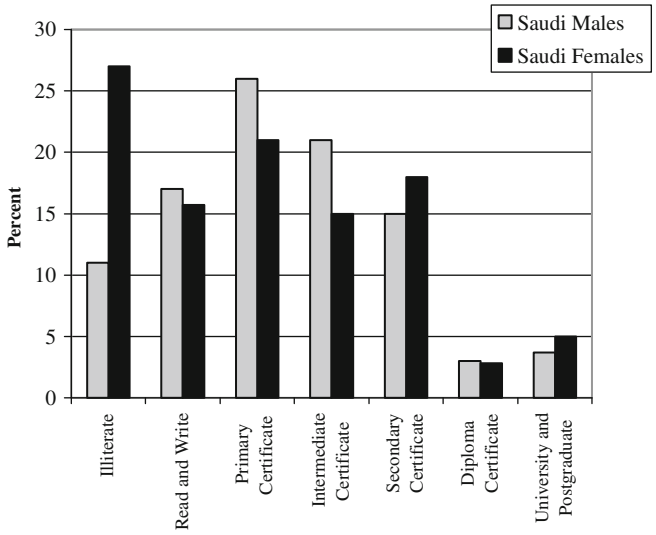

Fig. 13.6 Breakdown of Saudi population (10 years old and above) by educational status in 2007 (Source: Ministry of Planning, UNDP)

have only had a limited impact. The situation had marginally improved for such age groups by 2010.

What is of note from the above figure is that higher-level educational attainment is more prominent for females than for males, especially at the university and graduate level as explored in more detail in Table 13.4.

Table 13.4 showed that there were 2,276 million male and 2,125 million female students at the general education level in 2007. According to Ministry of Education, these students were served by a total of 25,473 schools, of which 12,865 were male and 12,608 for female. They were taught by 202,369 male and 218,074 female teachers, which gave Saudi Arabia a relatively low pupil/teacher and pupil/school ratios. These are illustrated in Table 13.5.

The ratios for Saudi Arabia compare favourably with most developed countries, and are far superior to developing countries. They corroborate the significant budgetary allocations for educational development highlighted earlier. In spite of such impressive statistics, there is still much room for educational development. Reservations as to the quality of Saudi education are commonplace, and hence the figures mask the issue of qualitative education delivery and the state of the teaching

Table 13.4 Saudi Arabia education enrolment and graduate levels by gender (2000–2007)

	2000		2007	
Educational level	Male ('000)	Female ('000)	Male ('000)	Female ('000)
Primary	1,117.5	1,108.4	1,125.5	1,118.7
Intermediate	564.4	471.7	609.3	535.2
Secondary	366.7	338.4	541.9	471.2
Intermediate diploma	25.6	28.1	124.9	38.0
Bachelor	201.9	227.3	275.2	488.1
Master	6.4	3.2	8.2	6.2
Ph.D.	1.3	0.7	1.7	1.6
Total	2,283.8	2,177.8	2,686.7	2,659.0

Source: SAMA

Table 13.5 Saudi pupil/teacher and pupil/school ratios 2000/2007

	2000	2001	2003	2007
Pupil/teacher ratio				
Male	13.7	13.1	13.3	11.2
Female	11.2	11.1	11.4	9.74
Pupil/school ratio				
Male	190.9	189.8	186.1	176.9
Female	186.1	184.5	179.4	168.5

Source: Ministry of Education, SAMA

profession at the general education level. According to surveys on this subject, the following were the major problems relating to teachers:

- Lack of expertise
- Poor commitment to the teaching profession
- Lack of teacher participation in setting curriculum, resulting in teacher apathy and low morale
- Low esteem of teachers in the eyes of society as a whole
- Teachers "moonlighting" for additional income

As for the curriculum, one study (Dukhayil, 2002) made the following criticisms:

- Repetition and duplication of information from year to year
- Too much material, forcing memorization rather than absorbing contents intellectually
- Unrelated to the modern age
- Outdated information, often relying on the translation and copying of other sources
- No attention to special students – whether gifted, talented or those with disabilities
- Weak English language and science curriculum
- Students taught to obey authority and discouraged from showing initiative and creativity

While there are undoubtedly highly committed, dedicated and professional teachers at all levels in Saudi Arabia, yet, according to an employers' survey, there has been a noticeable decline in the quality of student graduates' achievements, especially in higher education. Saudi private sector employers are beginning to voice some concern.

A recent survey of 280 female college students in *Dammam* (Mishkas, 2004) found that educational problems at colleges were still unresolved. Students cited "difficult curriculum, tough teachers, no choice in selecting their majors and lack of preparedness to handle research independently" as major factors. These issues, however, have not deterred Saudis from pursuing further education. Education is perceived as bringing economic and social advancement to those who continue to higher levels. This became clear in a 2000 survey of average monthly compensation for Saudis and non-Saudis who had attained different levels of education, and is set out in Table 13.6.

The survey also showed that compensation to Saudi males is, on average, twice that of Saudi females with the same education, and that compensation for Saudis is, on average, triple that of non-Saudis with the same level of education. The only exception is at the university and postgraduate levels, where it is twice the difference. The unequal compensation levels currently paid to Saudis and non-Saudis pose challenges for labour policy in the Kingdom, especially for the private sector,

Table 13.6 Average monthly compensation (SRs) of Saudis and non-Saudis by educational levels

	2000		2007	
Educational level	Saudi	Non-Saudi	Saudi	Non-Saudi
Illiterate	3,155	1,136	3,100	1,150
Read and Write	3,450	1,260	3,580	1,310
Primary School	4,600	1,378	4,750	1,390
Intermediate School	5,437	1,587	5,640	1,650
Secondary School	7,200	2,580	7,450	2,600
Intermediate School	6,810	2,880	6,970	3,100
University Graduate	10,893	10,856	12,900	11,100
Average (SR)	5,935	3,096	6,341	3,185

Source: Central Department of Statistics, SAMA

which is being forced into employing more Saudis under accelerated *Saudization* programmes.

For sustainable economic development to take place in Saudi Arabia, the educational system's output has to be geared towards the economy's current and future needs. Figure 13.7 is a flow chart of education and training provided in Saudi Arabia under the government's auspices.

The most significant expansion has been in the number of new universities opened in the Kingdom over the period 2005–2010, numbering 13, some of which were community college branches of existing Saudi universities such as Al Jouf and Hail, but others entirely new ones such as the 50,000 all-female Princess Noura bint Abdul Rahman University in Riyadh. The educational establishment flow chart illustrated in Fig. 13.7 does not take into account the new private sector universities and colleges that have opened up over the past decade and which include Prince Sultan University as well as Al Yamamah University in Riyadh and Prince Mohammed University in Alkhobar, while Jeddah boasts of the renowned Effat University and Dar Al Hikma College, as well as Jeddah Business College. All these private sector colleges teach in English and have international affiliations with international universities, as follows: Effat University (Duke University, Mount Holyoke, Georgetown, La Sorbonne), Dar Al Hikma (Fletcher Tufts, University of Colorado, University of California), Prince Sultan (INSEAD) and Prince Mohammed (University of Leeds, American University, Texas A&M, Curtin University of Australia). In a bold move, one of the Saudi female colleges – Effat University – has embarked on a programme to offer its students engineering degrees in association with Duke University of USA, to break away from the mould of only graduating females for teaching and social services jobs, severely restricting their access to the Saudi labour market.

At first glance, it would seem that the Kingdom caters for different types of educational needs, right through from kindergarten to university, as well as specialized

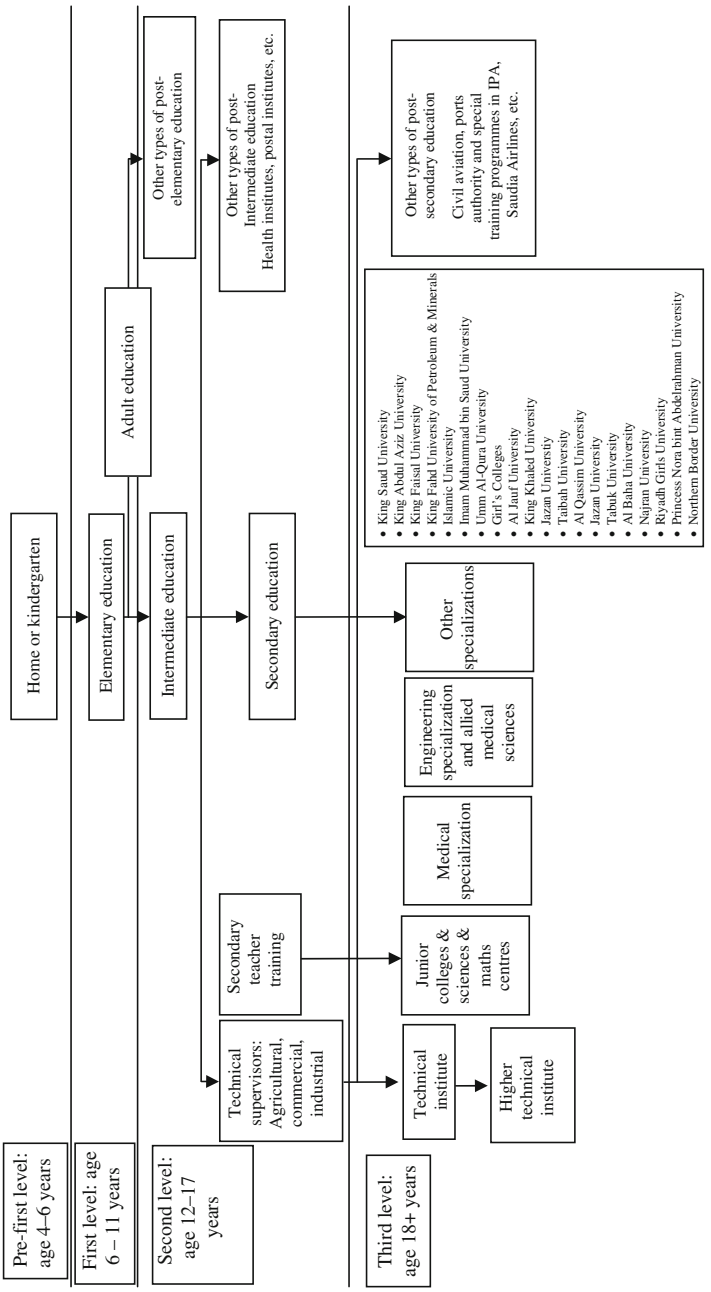

Fig. 13.7 Saudi Arabia: flow chart of education and training

technical and vocational institutes. Girls' education is catered for, albeit on a segregated basis from elementary level, and today girls account for just under 50% of all students in general education, as we saw earlier in Table 13.4. The same table also indicated a stronger desire for higher-level education by Saudi girls, with some 488,000 undertaking a bachelor's degree as opposed to 275,000 male students.

The phenomenon of higher enrolments for women's education is not particular to Saudi Arabia: the rest of the Gulf Cooperation Council (GCC) member states exhibit the same trends. It also seems to hold for other developed economies, as we can see in Table 13.7, which shows gross higher education enrolment for the period 1980–1998 and a breakdown by gender for 1998.

Table 13.7 Gross higher education enrolment rates (%) – selected years 1980–1998 and by gender 1998

					1998		
Country	1980	1985	1990	1995	Total	Male	Female
Middle East							
Bahrain	5.0	12.8	17.7	20.0	25.0	19.0	30.0
Egypt	16.1	18.1	15.8	20.2	21.0	24.2	15.9
Jordan	13.4	13.1	16.1	16.0	17.9	26.3	29.4
Kuwait	11.3	16.6	12.5	19.2	19.3	14.6	24.0
Lebanon	30.0	27.8	28.9	27.0	27.0	27.2	26.8
Oman	0.5	0.8	4.1	5.3	8.0	9.0	7.0
Qatar	10.4	20.7	27.0	27.5	26.6	13.6	40.9
Saudi Arabia	*7.1*	*10.6*	*11.6*	*15.8*	*19.0*	*16.0*	*21.0*
UAE	3.1	6.8	9.2	11.0	13.0	15.2	19.8
Others							
Belgium	26.0	32.2	40.2	56.3	56.0	53.0	59.0
Canada	57.1	69.6	94.7	87.8	87.3	80.7	95.3
Ireland	18.1	22.3	29.3	39.6	48.0	44.0	52.0
Norway	25.5	29.6	42.3	58.6	65.0	55.0	77.0
UK	19.1	21.7	30.2	49.6	58.0	53.0	64.0
USA	55.5	60.2	75.2	80.9	81.0	70.6	91.8

Source: World Bank, Salmi (2003)

The level of female higher education enrolment in the USA and Canada of over 90% dwarfs that in other European countries, which ranges between 52 and 77%. Within the GCC and other selected Arab countries, Oman scores a low of 7% while Qatar is the highest at 41%. However, the gap between some Arab countries of the GCC such as Qatar and Saudi Arabia and the developed countries has narrowed over the 10-year period since 1998, with Saudi Arabia's female enrolment rate standing at around 47% in 2008 (SAMA, 2009), more than doubling over the period.

Saudi Education and Employment

Changes in any educational system cannot be quick-fix solutions, as they must be responsive to social, economic and international labour pressures. Saudi Arabia cannot long ignore the need for a transformation from a state-led employment path to one that is driven by the labour market. In the current development phase, the absence of a unified labour market, where relative wages are set freely for both Saudis and non-Saudis, undermines a key signal about the real value of acquired skills. This can cause people to have less incentive to gain a market-responsive education (Schawb, K. 2003).

A new regulatory approach for the Saudi school system is needed to cope with the demands of the market place. Table 13.8 summarizes key areas where current government educational control needs to be either loosened or tightened, and is based on a comprehensive World Bank study of the Saudi educational system.

Table 13.8 A new regulatory approach for Saudi school education

Issue	Current approach to regulating education	Degree of control by government	Proposed approach to regulating education
Stakeholders' expectations	• Few expectations from stakeholders • Limited performance specifications	*From loose to tight*	• High expectations from stakeholders • Clear sector performance specifications
Teaching autonomy	• Prescriptive and input-based • Minimal autonomy for private schools	*From tight to loose*	• Output-based and freedom to innovate • Greater institutional autonomy
Accountability and performance assessment	• Weak accountability for results • Little performance measurement • Few sanctions for failures	*From loose to tight*	• Strong accountability for results • Information on academic results disclosed • Annual national assessment performance for all schools/students

Source: Based on a World Bank study for Saudi Arabia, 2000

The government of Saudi Arabia has sought advice from the World Bank and UNESCO in restructuring the education system of the Kingdom (Kibbi, 2002). Their aim is to ensure quality education that can meet the twin objectives of internal efficiency and desired learning outcomes. By internal efficiency we mean the ability of institutions to keep students enrolled and progressing in order to reduce dropout levels. By learning outcomes, we mean the extent to which systems produce graduates who possess the knowledge and skills required for effective participation in the

economy. The desired outcome for both would be to link education with the world of work. How has Saudi Arabia performed?

The Saudi government has initiated some internal reform of the educational structure, especially at the elementary and intermediate levels. Their goal is to make the system more responsive to current world standards and to parents' demand for change. For example, the Saudi government has now approved English-language instruction from an earlier age at schools, following internal debate on the subject. English will now be taught from sixth grade (12 years) rather than seventh grade (13 years) starting in 2003/2004 (Abdulgafour, 2003).

The Saudi cabinet decision in August 2003 to introduce English at an earlier age also included the commitment to "improve the teaching of English at intermediate and secondary levels by updating curricula, enhancing the competence of teachers and using modern technologies."

Because of the perception that the public educational system does not provide a wide career choice, there is now a thriving sector of private education in Saudi Arabia. The private delivery and finance of education provides a significant means through which the government can, in a cost-effective way, address the twin challenges of improving quality and expanding access. But in order to maximize the private sector's substantial potential for growth, the Saudi government needs to adopt a different approach to regulating the private pre-university educational sector. At the same time, it must safeguard the broader public interest in education.

This experiment in private higher education will be watched with great interest to see if such universities will produce the kind of graduates that the labour market needs. They will also observe how the private institutions will affect existing state universities.

The Saudi government is also aware that expenditure on education must be allocated in an efficient manner in order to produce an output compatible with the economy's future needs. In the higher education sector alone, the Eighth Development Plan (2004–2009) envisages a total of 730,000 new entrants to the different higher education institutes, while some 392,000 graduates are expected over the same period.

To assess whether the massive investment in education has brought about the desired output of graduates, we look at the breakdown of graduates by specific specialization in Table 13.9.

Teacher education, social sciences and religious studies accounted for nearly 60% of total university graduates during the period 1990–1995, although this declined to around 53% by 2000. The largest change occurred for courses in the computer sciences; these saw their share of graduates double from 7.4% in the period between 1990 and 1995 to 14.6% in the years between 1995 and 2000. Engineering remained steady at around 9% of all university graduates.

The situation in terms of graduates in the "hard sciences" had not changed over the period 2001–2004. According to the Ministry of Planning, there were 199,000 university graduates over that 4-year period, of whom 66% were female or 131,340. While no breakdown was provided by gender for each of the field of specializations, it was revealed that the following were the broad areas of graduate specialization:

Table 13.9 Saudi Arabia: New entrants to the labour force by level of education (1990–2000)

Highest level of education completed	1990–1995				1995–2000			
	Male	Female	Total	%	Male	Female	Total	%
University (Total)	*38,300*	*30,300*	*68,600*	*30.5*	*73,800*	*40,900*	*114,700*	*32.9*
➢ Engineering	4,700	0	4,700	2.0	10,100	0	10,100	2.9
➢ Natural Sciences	4,100	4,700	8,800	3.9	10,000	5,500	15,500	4.4
➢ Medical Sciences & Health	2,300	1,000	3,300	1.4	5,500	2,600	8,100	2.3
➢ Statistics, Math, Computer Sciences	3,000	2,100	5,100	2.3	12,700	4,100	16,800	4.8
➢ Economics and Business	3,700	1,600	5,300	2.4	2,600	700	3,300	0.9
➢ Social Sciences	8,600	10,400	19,000	8.5	9,000	12,800	21,800	6.3
➢ Teacher Education	5,400	5,200	10,600	4.7	8,000	4,500	12,500	3.6
➢ Religious Study	6,500	5,300	11,800	5.3	15,900	10,700	26,600	7.6
Junior colleges Technical (total)	*7,400*	*0*	*7,400*	*3.3*	*12,800*	*0*	*12,800*	*3.7*
➢ Industrial	5,700	0	0		N/A			
➢ Commercial	1,700	0	0		N/A			
Secondary school (Total)	*139,500*	*9,000*	*148,500*	*66.2*	*209,600*	*11,500*	*221,100*	*63.4*
➢ General Education	103,100	7,500	110,600	49.1	172,000	8,900	180,900	51.9
➢ Technical and Vocational	36,400	1,500	37,900	17.1	37,600	2,600	40,200	11.6
Total	185,200	39,300	224,500	100	296,200	52,400	348,600	100

Source: Ministry of Planning, Seventh Development Plan

- *Science and technology* (including science, engineering, medicine and agriculture) – 12.5% or 24,875 graduates
- *Administration and Sociology* (including business administration, economics, accounting, sociology and psychology) – 66.4% or 132,136 graduates
- *Islamic studies and Shariah* – 9.3% or 18,507 graduates
- *Humanities* (including history, languages and art) – 11.8% or 23,482 graduates

To overcome the deficiency in science graduates and meet the growing need of the private sector for technical and vocational college graduates, the Kingdom has embarked on an ambitious programme to expand technical colleges. Table 13.10 illustrates the growth in both technical colleges and student numbers under the auspices of the General Organization for Technical Education and Vocational Training (GOTEVT).

Table 13.10 Technical education at institutions of the General Organization for Technical Education and Vocational Training (2008)

	Number of new students	Total number of students	Number of graduates (2007)	Number of institutes
• Technological colleges				
Diploma level	38,048	61,549	12,426	35
Bachelor level	724	1,337	N/A	N/A
• Girls higher technological institutes	2,111	3,031	N/A	9
• Vocational training centres	11,663	17,430	10,707	57
Total	52,546	83,347	23,133	101

N/A: not available
Source: SAMA

Technical and vocational training seems to have become more popular over the years, as in 2002 the total number of graduates stood at 16,000 compared with 23,000 in 2007, while the number of new students was 31,000 in 2002 compared with just over 52,000 in 2007. Over the period, the number of vocational institutes rose to 101 compared with 83 in 2002. What is interesting from Table 13.9 is that while there was not a single female vocational training institute in 2002, by 2008 there were 9 with a total female enrolment of just over 3,000 girls. More social taboos were being broken in the Kingdom, as some females have decided that it was probably easier to enter the labour market by acquiring a technical and vocational qualification than a university degree. As there have been no female graduates from this sector by 2010, this social and educational experiment will be keenly watched to assess its success in attracting Saudi females to women-only manufacturing facilities being set up. What makes this transition to open up vocational and technical training to Saudi females even more remarkable, given the conservative social attitudes of Saudi society, is that publicly funded education for girls began only in 1960, 7 years after the first school for boys opened (Doumato, 2003). It is the need to work, the need to help support a family, in which Saudi women are finding the incentive to change the facts on the ground.

Restructuring the Saudi Education System

The results of the past decades' educational transformation in the Kingdom have been impressive, at least on paper. The real question is whether the inherent structural imbalances in the output of graduates can be sustained, or whether a fundamental reform of the whole educational system is needed.

Change must also occur at the higher education level. The transformation of domestic economics and international education flows are powerful forces for change in Saudi Arabia. Higher education will face the necessity to competitively deliver competent and relevant educational programmes that meet society's needs

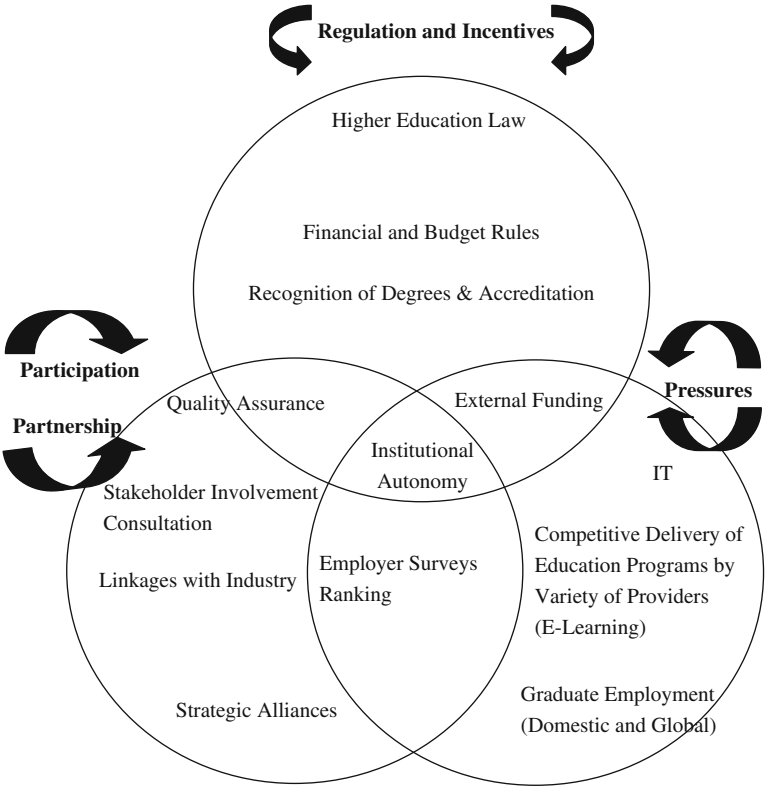

Fig. 13.8 Forces for change in higher education (Adapted from The World Bank 2000)

and achieve international accreditation. Figure 13.8 sets out some of these major forces for change that impact on the higher education sector. Given rising student numbers and budgetary constraints, there will be a growing need for higher education to forge links with industry and external independent financing.

Most universities in developing countries seem to function at the periphery of the international scientific community, unable to participate in the production and adaptation of knowledge necessary to confront their countries' most important economic and social problems (Larocque, 2002). One growing issue is their lack of access to the global knowledge pool and the international academic environment. This situation is often compounded by cumbersome administrative rules and bureaucratic procedures. In many countries, the ministries of higher education determine staffing policies, budgetary allocations and the number of student admissions; the universities have little say about the number of positions, level of salaries and promotion of their staff.

Such total government control is the most extreme scenario. For Saudi Arabia, the truth lies somewhat more in the middle. The Ministry of Higher Education still has a powerful influence, but the Saudi universities are gaining a larger degree of

independence concerning educational and staff issues (Dukhayil, 2003). The 2003 cabinet reshuffle granted greater autonomy to the Saudi university rectors. But until universities acquire further institutional autonomy, they will be hampered by a cumbersome government bureaucracy that is slow to react to the competition that Saudi universities face from private sector higher education colleges and universities.

Recognizing a potential niche in this area, the GCC state of Bahrain (population 766,000) authorized the establishment of eight new private sector universities. Their obvious target market is Saudi Arabia. All new private universities in Bahrain, the United Arab Emirates (UAE) and Qatar have established strong strategic alliances and supra-national links with worldwide centres of academic excellence. In the case of Qatar, several prominent foreign universities have opened branches in the "Education City" of Qatar Foundation, such as Carnegie Mellon University, Weil Cornell Medical College, Virginia Commonwealth University, Texas A&M, Georgetown University of Foreign Service and Northwestern University. This makes their degrees more recognizable and attractive than those from Saudi universities. The issue of degree credibility, accreditation and degree equivalency will become major concerns if private universities proliferate, as a result of both altruistic and profit motives. The focus of teaching in these new Gulf universities is on computer sciences, natural sciences and business management. The fact that they are also co-educational, with both sexes taught together, expands opportunities for Saudi female students, especially those who wish to pursue a broader range of disciplines than Saudi Arabia offers, while still living and studying in societies that are culturally compatible to the Kingdom.

Looking towards the Future

The interplay among a variety of elements – erratic oil revenues, demographic trends, a rigid educational system and low labour productivity – has deeply affected the direction of development outcomes in Saudi Arabia in the past few decades. Population has grown faster than oil revenue in some years and labour productivity has not kept pace with private sector market forces. In order to compensate for this "oil drag," labour productivity, and hence educational standards, will have to rise significantly in the next decade. The educational levels of both males and females in Saudi Arabia have demonstrated impressive improvement by world standards, but the 20-year boom of current education patterns and job creation is now under strain.

Because of these factors, Saudi Arabia is opening up, especially in the education sector, where a revised curriculum and educational approach are needed to ensure Saudi Arabia can compete in the global environment. Saudi Arabia has set the right general priorities in education, but its goals and means are not yet adequate to solving the problem. A mismatch remains between educational output, quality and the needs of the Saudi labour market. Some have argued that the Kingdom is giving undue attention to "education push" rather than "job pull" in the private sector (Cordesman, 2003). This criticism ignores to some extent the recognition by

Table 13.11 Saudi government education development plan recommendations and outcomes

Recommendations	Outcomes
• Establishing new channels and patterns of higher education such as open universities and distance learning	• Achieved in both areas
• Improving the internal efficiency of the universities by reducing number of years for students to graduation	• Process is underway with universities reporting on achievements to the Ministry of Higher Education
• Encouraging the private sector to establish private universities and colleges	• Achieved – new colleges and universities opened such as Prince Sultan University, Prince Mohammed University, Institute of College of Business Administration and Dar Al-Faisal University
• Establishing more effective coordination between research centres and development centres, so that the producers and users of national technological solutions are linked	• Several initiatives to establish technology cities and science parks e.g., Jeddah Bio-Technology, Dhahran Techno Valley at KFUPM, science parks at King Saud University and King Abdulaziz University
External efficiency	
• Matching the output of the education system with the requirements of economic and social development to meet needs of the labour market	• Partially achieved as there is still mismatch between graduate specialization and market needs
• Sending 5,000 students on scholarships abroad	• Target exceeded as 70,000 Saudi students have gone overseas under the King Abdullah scholarship starting from 2006
• Establish National Authority for Academic Evaluation and Accreditation and ensure Saudi universities obtain international accreditation	• Achieved and many Saudi universities have obtained international accreditation, such as AACSB and ABET

Saudi planners for the need for fundamental reforms to education, to align its output with private sector needs. Some of the government's recommendations, as set out in the Eighth Development Plan (2004–2009), illustrate its priorities. These are summarized in Table 13.11.

An analysis of the policy recommendations and achievements indicates that, with the exception of the external efficiency of matching graduate output with labour market needs, most of the other policy objectives have been achieved. Since 2006, the number of Saudi students sent overseas for further education or undergraduate degrees under the King Abdullah Scholarships reached 70,000 by 2010. The initial emphasis had been on science and science-related subjects, but other subjects were soon approved and Saudi students were placed in many countries such as China, Australia, New Zealand, South Korea and Malaysia besides the usual placement countries such as the USA, UK, Germany and France. The King Abdullah Scholarship plan also had another long-term objective: opening up to the outside

world and establishing a means of dialogue amongst nations to promote moderation, which King Abdullah continuously stresses in his public statements.

Curriculum development plans in the Kingdom were accelerated after the events of September 11, 2001 and the violence within Saudi Arabia following the Riyadh bombings of May 2003. In addition, the GCC countries publicly endorsed such educational reforms at their GCC summit meeting in Kuwait in December 2003. Education and other reform issues took centre stage at national dialogue forums held in Riyadh and *Makkah* in 2003 and early 2004 under the auspices of the then Crown Prince Abdullah, who was presented with the *Makkah* forum's recommendation to "root out extremism, immediate reform of academic curricula, and more freedom of media" (Abdulghafour, 15 January 2004).

The academic accreditation programme initiated by nearly all Saudi universities, whether public or private, has been successful. The most common accreditation has been the International Association to Advance Collegiate Schools of Business (AACSB) and Accreditation Board for Engineering and Technology (ABET). In pursuit of this, there are a range of plans in place: to include private sector participants in the continuous review of curricula to ensure that proposed academic trends are commensurate with the actual needs of the market; to improve training in advanced technology; and to develop a national plan for the use of information technology and of information sources, including databases.

In Pursuit of Academic Excellence: Establishing World-Class Universities

According to World Bank studies, there are four complementary roles of strategic dimensions that can guide countries in the transition to a knowledge-based economy: an appropriate economic and institutional regime, a strong human capital base, a dynamic information infrastructure and an efficient national innovation system (World Bank, 2002).

Tertiary education is central to all four pillars of this framework, but its role is particularly crucial in support of building a strong human capital base and contributing to an efficient national innovation system. Tertiary education helps countries build globally competitive economies by developing a skilled, productive and flexible labour force and by creating, applying and spreading new ideas and technologies. A recent global study of patent generation has shown, for example, that universities and research institutes, rather than firms, drive scientific advances in biotechnology (Cookson 2007).

Within the tertiary education system, research universities play a critical role in training the professionals, high-level specialists, scientists and researchers needed by the economy and in generating new knowledge in support of national innovation systems. In this context, an increasingly pressing priority of many governments is to make sure that their top universities are actually operating at the cutting edge of intellectual and scientific development. The same applies to Saudi Arabia as will

be explored further below, exemplified by the establishment of the King Abdullah University of Science and Technology (KAUST), which is set on shaping the direction of how Saudi scientific research and international collaboration should be established.

There are many important questions to ask about the widespread push towards world-class status for universities around the world. Why is "world-class" the standard to which a nation should aspire to build at least a subset of its higher education system? Might many countries be better served by developing the most locally relevant system possible, without concern for its relative merits in a global comparison? Is the definition of "world-class" synonymous with "elite Western" and therefore inherently biased against the cultural traditions of higher education in non-Western countries? There are many factors that lead to the creation of a world-class university.

In the past decade, the term "world-class university" has become a catch phrase, not simply for improving the quality of learning and research in university education but also, more importantly, for developing the capacity to compete in the global higher education marketplace through the acquisition, adaptation and creation of advanced knowledge. With students looking to attend the best possible universities that they can afford, often regardless of national borders, and with governments keen on maximizing the returns on their investments in universities global standing is becoming an increasingly important concern for institutions around the world (Williams and Van Dyke 2007). The paradox of the world-class university, however, as Altbach has succinctly and accurately observed, is that "everyone wants one, no one knows what it is, and no one knows how to get one" (Altbach 2004, 2005).

Becoming a member of the exclusive group of world-class universities is not achieved by self-declaration; rather, elite status is conferred by the outside world on the basis of international recognition. Until recently, the process involved a subjective qualification, mostly that of reputation. For example, Ivy League universities in the United States such as Harvard, Yale or Columbia, the Universities of Oxford and Cambridge in the United Kingdom and the University of Tokyo have traditionally been counted among the exclusive group of elite universities, but no direct and rigorous measure was available to substantiate their superior status in terms of outstanding results such as training of graduates, research output and technology transfer. Even the higher salaries captured by their graduates could be interpreted as a signalling proxy as much as the true value of their education.

With the proliferation of league tables in the past few years, however, more systematic ways of identifying and classifying world-class universities have appeared. Although most of the best-known rankings purport to categorize universities within a given country, there have also been attempts to establish international rankings. The two most comprehensive international rankings, allowing for broad benchmark comparisons of institutions across national borders, are those prepared by the Times Higher Education Supplement (THES) and Shanghai Jiao Tong University (SJTU).

To compare the international stature of institutions, these league tables are constructed by using objective or subjective data (or both) obtained from the universities

themselves or from the public domain. The THES ranking selects the top 200 universities in the world. First presented in 2004, the methodology for this ranking focuses most heavily on international reputation, combining subjective inputs (such as peer reviews and employer recruiting surveys), quantitative data (including the numbers of international students and faculty) and the influence of the faculty (as represented by research citations). Operating since 2003, SJTU uses a methodology that focuses on objective indicators exclusively, such as the academic and research performance of faculty, alumni and staff, to identify the top 500 universities in the world. The measures evaluated include publications, citations and exclusive international awards such as Nobel Prizes and Fields Medals.

Some researchers have highlighted serious methodological limitations of any rankings exercise (Salmi and Savoyan, 2007, Liu and Cheng, 2005) but acknowledge that world-class universities are recognized in part for their superior output in terms of well-qualified graduates who are in high demand on the labour market, and in conducting leading-edge research published in top scientific journals, as well as contributing to technical innovations through patents and licenses.

Table 13.12 lists the top 20 world universities as ranked by the THES and SJTU for 2008, and it is notable for the absence of Middle East universities, while Fig. 13.9 sets out the geographical distribution of these top-ranked universities.

Table 13.12 Top 20 Universities in THES and SJTU world rankings 2008

Rank	THES	Rank	SJTU
1	Harvard University	1	Harvard University
2	Yale University	2	Stanford University
3	University of Cambridge	3	University of California, Berkeley
4	University of Oxford	4	University of Cambridge
5	California Institute of Technology	5	Massachusetts Institute of Technology (MIT)
6	Imperial College London	6	California Institute of Technology
7	University College London	7	Columbia University
8	University of Chicago	8	Princeton University
9	Massachusetts Institute of Tech. (MIT)	9	University of Chicago
10	Columbia University	10	University of Oxford
11	University of Pennsylvania	11	Yale University
12	Princeton University	12	Cornell University
13	Duke University	13	University of California, Los Angeles
14	Johns Hopkins University	14	University of California, San Diego
15	Cornell University	15	University of Pennsylvania
16	Australian National University	16	University of Washington, Seattle
17	Stanford University	17	University of Wisconsin, Madison
18	University of Michigan	18	University of California, San Francisco
19	University of Tokyo	19	University of Tokyo
20	McGill University	20	Johns Hopkins University

Source: THES 2008; SJTU 2008

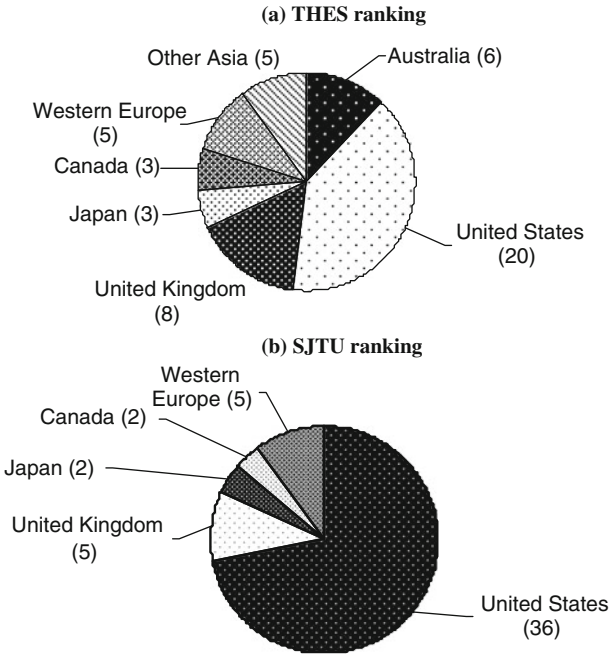

Fig. 13.9 Geographical distribution of world-class universities (top 50 in 2008)

While there were no Arab universities in the top 100 ranked universities in the 2008 THES list, they were represented in the lower rankings, with King Fahd University of Petroleum and Minerals ranked the highest Arab institution at 338th position for 2008, and improving its ranking to 266th position in the 2009 THES ranking. The latest 2009 rankings had a surprise new Saudi ranking of 247 for King Saud University, which was not ranked in the top 500 in the 2008 THES survey. For 2009, the American University of Beirut was ranked at 351, the United Arab Emirates University at 374, Cairo University in the 401–500 list and King Abdulaziz University in Jeddah ranked in the 501–600 category (THES, 2010).

The reasons for the lower rankings of Arab institutions, although Saudi Arabia did relatively well compared to other Arab countries, are due to many factors, some of which are low innovation output and quality, as opposed to quantity of research output. These are illustrated in Figs.13.10 and 13.11.

As Fig. 13.11 illustrates, the number of patents for Middle East countries was negligible compared to Asian countries such as Hong Kong, China, India and Malaysia, while Fig. 13.11 also indicates that despite credible output in terms of the number of articles published, Arab countries are below the world average in terms of relative citations which is the quality benchmark.

A notable attempt has been made to propose some manageable definition of what constitutes a world-class university which concentrates on the following

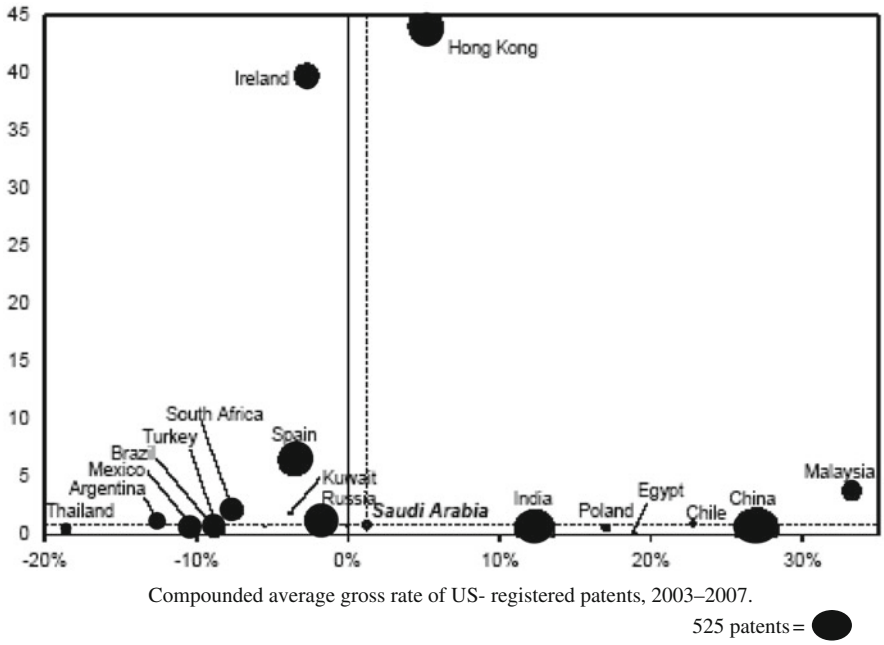

Fig. 13.10 Innovation output of selected countries' average US patents per 1 million population (2003–2007) (Source: USPTO (2008), EIU (2008))

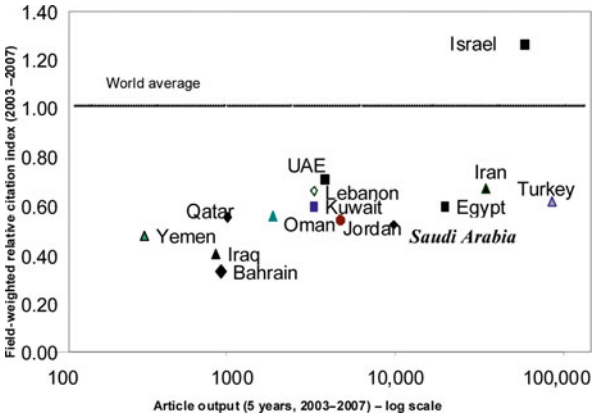

Fig. 13.11 Middle East: research article outputs – quantity vs. quality (Note: citations shown as field-weighted relative index) (Source: Higher Education Policy Institute, UK, 2009)

factors which meet the need to have an output involving highly sought graduates, leading-edge research and commercialized technology transfer (Salmi, 2009):

(i) a high concentration of talent, both faculty and students;
(ii) abundant resources to offer a rich learning environment to conduct advanced research; and
(iii) favourable governance features that encourage strategic vision, innovation and flexibility, and that enable institutions to make decisions and manage resources without being encumbered by bureaucracy.

KAUST: A New Saudi Education Paradigm

In the past, the role of governments in nurturing the growth of world-class universities was not a critical factor, and world-class universities such as those listed in the THES ranking grew to prominence as a result of incremental progress over many decades, and often centuries, such as Oxford and Cambridge universities. Today, however, with rapid globalization, technological changes and mobility of knowledge and labour, it is unlikely that a world-class university can be rapidly created without a favourable policy environment and a direct government initiative and support if only because of the high costs involved in setting up advanced and specialized cutting-edge research facilities and capacities, and "jump-start" the process.

Research carried out by the World Bank and others (World Bank, 2002, Salmi, 2009, Alden and Lin, 2004, Altbach, 2004) reveals that three basic strategies can be followed to establish world-class universities:

- Governments could consider upgrading a small number of existing universities that have the potential of excelling (picking winners).
- Governments could encourage a number of existing institutions to merge and transform into a new university that would achieve the type of synergies corresponding to a world-class institution (hybrid formula).
- Government could create new world-class universities from scratch (clean-slate approach).

Each of the above approaches has their advantages and disadvantages, and these are summarized in Table 13.13.

The establishment of a world-class university requires strong leadership, a bold vision of the institution's mission and goals and a clearly articulated strategic plan to translate the vision into concrete targets and programmes. The establishment of King Abdullah University of Science and Technology (KAUST) seems to fit all the above criteria as evident from Table 13.12 if the Kingdom wishes to "jump-start" its presence into the top ranked world-class universities, while nurturing and upgrading the existing institutions which are beginning to make their mark such as KFUPM and King Saud University.

Table 13.13 Costs and benefits of strategic approaches for establishing world-class universities and Saudi Arabian applicability

Conditions	(A) Upgrading existing institutions	(B) Merging existing institutions	(C) Creating new institutions	Saudi applicability
Ability to attract talent	Difficult to renew staff and change the brand to attract top students	Opportunity to change the leadership and to attract new staff; existing staff may resist	Opportunity to select the best (staff and students); difficulties in recruiting top students to "unknown" institution; need to build up research and teaching traditions	(A) Salary scales are fixed and difficult to adjust for prominent hiring (B) Not common as such institution is established by Royal Decree (C) Viable option: KAUST model
Costs	Less expensive	Neutral	More expensive	Government funding not an issue
Governance	Difficult to change mode of operation within same regulatory framework	More likely to work with legal status different from that of existing institutions	Opportunity to create appropriate regulatory and incentives framework	(A) Difficult to change mode of operation (B) Same regulations could apply (C) New model and policy
Institutional culture	Difficult to transform from within	May be difficult to create a new identity out of distinct institutional cultures	Opportunity to create culture of excellence	(A) Has been tried but results are patchy (B) Not tried (C) KAUST model applicable
Change management	Major consultation and communication campaign with all stakeholders	Normative, approach to educate all stakeholders about expected norms and institutional culture	"Environmentally adaptive" approach to communicate and socially market the new institution	(A) Slow process with internal resistance (B) Not tried (C) New approach and procedures are at the core of KAUST model

Source: Adapted from Jamil, 2009

King Abdullah University of Science and Technology received in September 2009 its first batch of 400 students selected from different parts of the world ahead of its official opening on 23 September 2009, which fell on the 79th anniversary of Saudi Arabia's National Day. It is a bold plan that many around the world are watching closely to assess whether the grand dream can translate into an engine of change in how modern scientific research results can benefit all mankind, just as the results of the early Islamic universities passed on the torch of learning of the ancient Greeks and Egyptians to future generations.

KAUST has long been the brainchild of King Abdullah and he invited several world leaders to attend the grand opening of this international research university which is his dream project and in which he takes great personal interest, often dropping in unannounced to evaluate the progress of construction. Born out of the barren desert, KAUST is now a reality and is located in *Thuwal*, a village on the Red Sea, about 80 km north of Jeddah. King Abdullah first announced his plan to establish the world-class university during a reception given to him by the people of Taif on 23 July 2006. "The establishment of this university has been a living idea in my mind for more than 25 years and I thank God for helping us to realize it," the King said during KAUST's groundbreaking ceremony in October 2007. To make the dream a reality, nothing has been spared to make it a truly global player in terms of research and scientific breakthrough. The King has guaranteed that his dream lives on by ensuring that KAUST is self-funded through one of the most generous endowments of over $10 billion, so as not to depend on the vagaries of state funding.

The emphasis is unambiguous – scientific research and application to complement the humanities bias of some of the major Saudi universities, with the exception of King Fahd University of Petroleum and Minerals, which emphasized science and engineering since its establishment by Saudi Aramco to meet that giant oil company's needs. Saudi Aramco has once again acted as the midwife of a Saudi university, as it was empowered by King Abdullah to manage the overall KAUST project and bring its unmatched project management skills to complete the project on time. KAUST will offer master's and doctoral degrees in all major theoretical and applied sciences.

Specialized research centres, in collaboration with the best international universities and scientific brains, are a hallmark of KAUST. To serve its students, KAUST has recruited highly qualified and experienced faculty members from both sexes from 80 countries as KAUST is also a co-educational institute, a first for Saudi Arabia and a bold experiment that is being closely watched by both opponents and proponents of this model of learning. Its students come from Saudi Arabia and other Gulf and Arab states, Europe, America, East Asia and South Africa and have been offered generous King Abdullah Scholarships to live and study in Saudi Arabia, to dispel some of the image of a secluded and closed Kingdom. Its first president is a highly respected non-Saudi academic from Singapore, again a first for a Saudi university.

KAUST offers master's and doctoral degrees in applied mathematics and computational science, bioscience, chemical and biological engineering, chemical science,

computer science, earth science and engineering, electrical engineering, environmental science and engineering, marine science and engineering, materials science and engineering and mechanical engineering.

The MS degree offered by the university will take 18 months to complete, and will be offered to both traditional full-time students and part-time students including industry-sponsored students on semester-long company leaves. The Ph.D. degree, which is a 3–4-year post-master's degree, involves original research at a KAUST research centre.

To support and drive KAUST's research agenda, the university has identified four primary strategic research thrusts and several interdisciplinary *research centres* that will apply science and technology to problems of human need, social advancement and economic development. The KAUST strategic research thrust areas are as follows:

1. Resources, energy and environment
2. Biosciences and bioengineering
3. Materials science and engineering
4. Applied mathematics and computational science

To meet its objectives, KAUST has established nine research centres and their selection was based on strategic goals that meet the following criteria:

- Ability to advance fundamental knowledge in science and engineering
- Relevance of research thrusts and centres to the existing industries in Saudi Arabia
- Development of future, knowledge-based industries
- Social and economic needs of Saudi Arabia
- The potential regional and international impact

As of 2010, the nine research centres include the following – Catalysis Research, Clean Combustion, Solar and Alternative Energy, Water Desalination, Plant Stress Genomics and Technology and Red Sea Science and Engineering. As discussed in earlier chapters, the Kingdom is now stressing the importance of renewable, especially solar, energy, and the research in water desalination is particularly important given the eminent position of the Kingdom in this sector.

One of the aims of King Abdullah is to foster international understanding, following the events of September 11, 2001 and Saudi Arabia's international image. Speaking at the groundbreaking ceremony, King Abdullah emphasized how the new university would serve as a bridge between cultures and nations and a lighthouse of knowledge. He said KAUST would help Saudi Arabia to have a world-class independent scientific research centre and act as a scientific base as well as a driving force for the national economy. As a new "*Bayt Al-Hekma*" (house of wisdom), KAUST will be a beacon of hope and reconciliation and will serve the people of the Kingdom and benefit all the peoples of the world in keeping with the teachings of the *Holy Qur'an*, which explains that "God created mankind in order for us to come

to know each other," the King said (Saudi Press Agency, September 2009). It will certainly spur the other Saudi universities to adapt to higher peer standards.

Conclusion

The emphasis on qualitative education is now recognized by Saudi intellectuals and others but it will be a hard transition for the younger generation to make. Without change, Saudi youth will be competing in a highly sophisticated market with underdeveloped skills, causing frustration and resentment (Birks and Sinclair, 1980, World Bank, 1995, Yamani, 2000). Their inherited deference to patriarchal authority means the young blame employers and turn to the government for solutions. They definitely prefer government employment, when available. There are encouraging signs of more realistic attitudes towards job searches and the educational needs of the market, but the task is still an uphill one. However, the Government of Saudi Arabia is tackling other major internal reform issues, in addition to education, with a new realism and openness. This sense of increased candour and decisive action gives rise to genuine optimism. The emphasis on a knowledge-based society is receiving greater attention and the tertiary sector especially is being gradually overhauled either through internal processes and change or through the creation of world-class research and teaching institution such as KAUST, which should set an international benchmark for its peers. However, such long-term visions are closely correlated with the country's overall economic and social development, and the ongoing changes and other reforms at the lower levels of the education system to build up an integrated national education programme are just as important.

Summary of Key Points

- *Financial resources have enabled Saudi Arabia to build a large educational infrastructure for both males and females in a short period of time. Expenditure on education is now a major item in budgetary expenditures and rising. The government is aware that education plays a crucial role in economic development and in meeting the demands of the globalization age.*
- *Saudi Arabia faces several challenges in its education policies, namely providing relevant education to meet the needs of a modern society, as well as providing quality education that is adaptable to worldwide education changes.*
- *In terms of the quantity of education output, the Kingdom has done well in comparison with other developing countries in pupil/teacher and pupil/school ratios. There are inherent weaknesses in terms of low output of higher education science and vocational and technical graduates.*
- *Female higher level education has grown rapidly. Currently females outnumber males at the undergraduate and postgraduate levels. Saudi females can now take*

science-based subjects, which previously were only available to male students, but technical education is still restricted to males.

- *To meet enrolment shortages in government-owned schools, the Kingdom has encouraged the provision of education through privately owned education institutions which have seen a remarkable growth in the number of students enrolled.*
- *The issue of Saudi education and meeting the employment requirements of the private sector is one of the immediate concerns. The Saudi education system is being pressed to deliver a varied educational programme that is of high quality, relevant to societies' needs and internationally recognized.*
- *The interplay between erratic oil revenues, high demographic trends, a rigid educational system and low Saudi labour productivity has affected the direction of development outcomes in Saudi Arabia. Education was driven by "education-push" rather than "jobs-pull" in the private sector. This is changing, as recent government budgetary allocations for different higher education establishments indicate that new priorities are now being set out.*
- *The Kingdom has established a new world-class university, KAUST, that will contribute towards creating applied research to the benefit of Saudi Arabia, as well as spur changes and reforms in other Saudi educational establishments.*