



Knowledge Creation and Diffusion The Role of UAE Universities

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- **Knowledge Society - UAE Socio-Economic and Human Development Indicators**
- **UAE' Labor Force - Skills and Education**
- **Knowledge Transmission: Graduates of UAE' Universities**
 - **Highly Skilled Personnel: Supply and Demand figures in some economic sectors**
- **Transfer of Exogenous Technology: Imports and Exports in the UAE**
- **UAE' Academic Production and Transfer of Knowledge**
 - **UAE Scientific Publications and Utility Patents**
 - **Main Academic Research Areas**
 - **Knowledge Transfer and Problem Solving**
- **Concluding Remarks**



UAE Socio-Economic and Human Development Indicators

	Population (millions) (1)	GDP per Capita in US \$ (b)	Human Development Index (c)	Literacy Rate (%) (d)	Estimated educational level of people aged 25-50 (e) (weighted Average)	Education and Human Resources Index (f)	Gross enrolment ratio in Tertiary education (%) (f)	Global ranking of UAE's secondary enrolment rate (3)	Global ranking of UAE's tertiary enrolment rate (3)
1995	na	17,755	0.83	73	na	4.27	10.9		
2000	2.9	20,530	0.84	77	na	3.92	17.75		
2005	4.1	34,600	0.87	89	3.31	4.78	na	na	na
2007	4.5	na	na	90	na	4.90	22.85		
2008					na	na	23	50	81

- *In 2005, the HDI for the UAE attained the value of 0.87 which is indicative of a high standard of human and economic development*
- *Average GDP per capita as well as literacy rate are also classified as high*
- *Despite progress, UAE's population has fallen beneath the global average in the World Bank Education and Human Resources index for the last 15 years (4.9 in 2007 over a maximum of 10)*



UAE' Labor Force - Skills and Education

	Labor Force (15 years +)	Professionals, technicians and associate professionals	Professnls, technicians and associate professnls as % of labor force	Professnls, technicians and associate professnls, excluding Education	Employed holding tertiary education University and above university	Share of employed holding tertiary education	Crude employment rate of employed holding tertiary education
2005	2,559,668	437,506	17%	394,000	407,314	15.9%	na
2008	3,043,000	837,980	27.5%	798,000	na	na	79.5%

Sources: Ministry of Economy – Central Department of Statistics - Population Census of 2005 and the Labor Force Survey of 2008

- ***To put things into perspective, in 2005 the share of labor force with tertiary education level in South Korea reached 32.3 % - thus amounting to a total number of 7.66 million - versus 15.9% in the UAE (International Labour Office (ILO) database)***
- ***Employed holding tertiary education (University and above University educational level) are less exposed to unemployment than others in the UAE.***
- ***Absorption at the firm level require availability of workers with high educational level to allow accumulation of know-how and consequently the formation of insights and skills (tacit knowledge) that become embedded in the procedures of the work place.***



Evolution of Graduates as percentage of work permits issued

	Number of work permits issued by UAE MoL	Of which for Graduates of UAE universities and colleges	Balance
2003	42,262	26%	74%
2004	51,189	23%	77%
2005	90,737	13%	87%

Source: Rafiq Hijazi, Taoufik Zoubeidi, Ibrahim Abdalla, Mohamed Al-Waqfi, Nasri Harb (2008)

- *The UAE universities are not producing enough graduates to meet the needs of the growth of its economy in general and of its S&T based industries in particular.*

UAE's Tertiary Education Graduates

	Total number of tertiary education graduates	Number of graduates in Science and Technology fields	Number of graduates in Science	Number of graduates in Engineering, Manufacturing and Construction	Number of graduates in Social Science, Business and Law	Number of graduates in Education	Number of graduates in Health and Welfare
2007	13,000	4,290	3,055	1,235	4,550	1,560	650

Source: UNESCO Statistics Institute– Global Education Digest, 2008



Highly Skilled Personnel: Supply and Demand

Scarcity of Scientists and Engineers

	Number of yearly fresh graduates in Science and Engineering from UAE universities (a)	Estimated number of new Science and Engineering jobs created by growth of the UAE Manufacturing sector (b)	Gap between supply and demand for new Science and Engineering graduates
2007	4,300	9,050	-4,750

Sources: (a) Calculated from UNESCO, 2008; (b) Estimated from GOIC Gulf Statistical Profile, 2007

These shortages were recognized by the relevant authorities. For educational and demographic reasons, public higher education system could not absorb all candidates and public spending could not be increased sufficiently, which led to the political choice of partly privatizing Higher education.

Scarcity of Health and Welfare Graduates

	Total number of Physicians	Total number of Dentists	Total	Number of graduates in Health and Welfare
2005	8,295	1,355	9,650	na
2007	10,123	2,455	12,568	650

Source: United Arab Emirates, National Bureau of Statistics the UAE in Figures, 2009



Transferring Exogenous Technology

Technology Imports and Exports in the UAE

	Exports of Chemical, Machinery, Equipment and Manufactured products in billion US\$ (1)	Imports of Chemical, Machinery, Equipment and Manufactured products in billion US\$ (1)	Trade balance of Chemical, Machinery, Equipment and Manufactured products in billion US\$ (1)	As % of trade surplus of Mineral Fuel and Crude Oil (1)	High-technology exports as % of Manufactured exports (2)
2005	27.2	56.9	-29.7	71%	1.8%
2006	23.6	67.4	-42.9	63%	1.2%

Sources: (1) Calculated from GOIC Gulf statistical profile data, 2007, (2) World Bank data

- The domestic demand for technology products and equipment is increasing
- The domestic production of technology products and equipment is insufficient to cater to domestic needs. As a consequence, the country's demand for and dependency on foreign technology accelerates
- This dependency creates a huge negative impact on the national balance of trade



UAE Scientific Publications and Utility Patents

Academic Patents (UAE U & AUS) 2000-2009	Average number of Patent over 2003-2007 granted by USPTO	UAE Cit ed Documents (all sciences) (1996-2008) (1)	The share of the UAE in world publications in 2008 (1)	Total number of Academic S&E Publications (1995 - 2009) (2)	Share of Co-authored Academic papers (in - country) (2)	Share of Co-authored Academic papers (international) (2)
25	4.40	5,510	0.07%	4,925	19.3%	80.7%

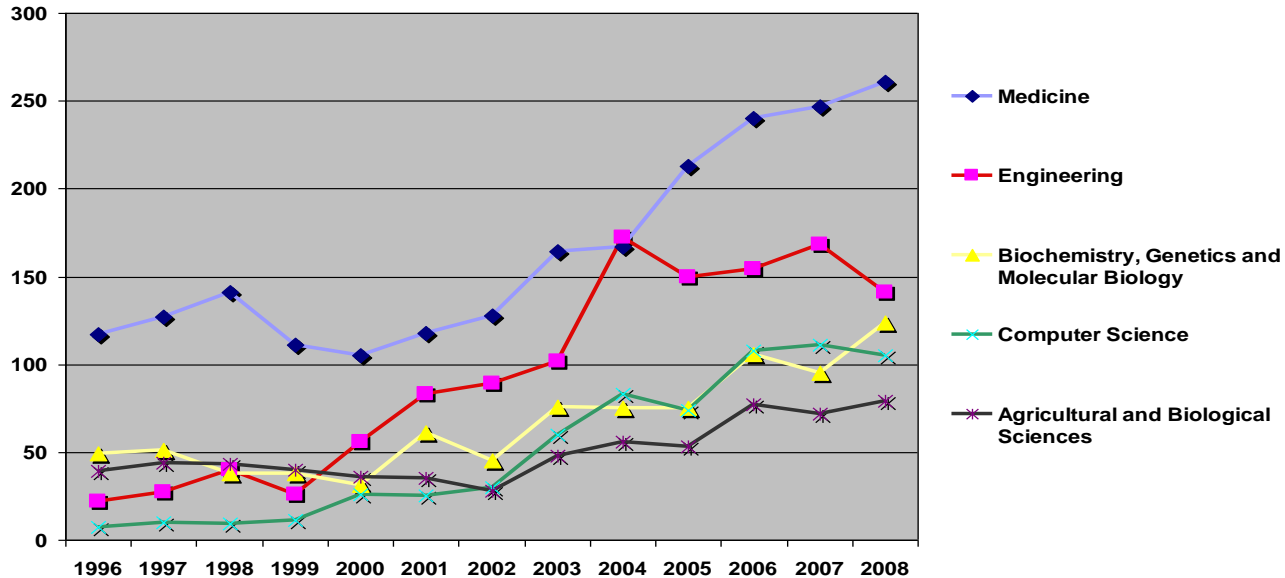
Source: UAEU and AUS (1) SCImago. (2007). SJR — SCImago Journal & Country Rank. Retrieved September 16, 2010, from <http://www.scimagojr.com> (2) Zahlan 2010 based on SCOPUS

- ***Around 90% of UAE cited S&E documents are produced by its universities***



Main Academic Research Areas

UAE Publications per Main Subject Area over 1996 - 2008



Source: Based on data Retrieved September 16, 2010, from <http://www.scimagojr.com>

- **Five main subjects: Medicine (19.4%); Engineering (11.2%); Biochemistry, Genetics and Molecular Biology (7.8%); Computer Science (6.0%); and Agricultural and Biological Sciences (5.9%)**



Industry - University Collaboration in R&D: The case of UAEU

- *UAEU led around 335 collaborative projects from 2001 to 2009 in partnership with national and international industries, for an amount of 56 million UAE Dirhams (15.24 million US\$)*
- *This represented 23% of the total internally and externally funded projects in both basic and applied research and a remarkable 62% of the total related funds*
- *The main research areas of the UAEU collaborative projects were led by the Engineering College on the performance of concrete composition and structures, leading to multiple discoveries and patents.*
- *One of these, Sulfur Modified Concrete invention forms the basic technology for a joint venture between Al-Qudra Holding - UAE and Nippon Oil Corporation, Japan - towards the establishment of a new sulfur-based concrete plant in Abu Dhabi*



- *In the context of the global race for talents, where knowledge-based industries in many countries are driving global demand for human resources in science and technology, the availability of such a pool of HSP will be a critical differentiating element of development.*
- *Successful partnerships and mechanisms of knowledge transfer are largely based on the engagement of researchers and their experience.*
- *In addition to supplying the economy with trained engineers and applied scientists, measures should include attracting and retaining quality teaching staff, sufficient funding, and adaptive forms of collaboration with local industries that are learning to do their R&D.*
- *To conclude:*
Achieving competence in many areas of manufacturing requires staying up with a moving target. Further, as the frontier is approached, the lines between sophisticated imitation and creative design of new products and processes become blurry. A strong R&D capability becomes essential. To a considerable extent the R&D needs to go on in firms. However, research in universities and public laboratories can play a strong supporting role, and one that is likely to take on different connotations at different stages of the process of catching up (Mazzoleni and Nelson 2007)

THANK YOU