
Aviation Education in the Middle East: Sustaining Growth and Indigenous Development

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Abstract

The Middle East, particularly the Gulf Coast region, is experiencing major growth in both airlines and airport infrastructure. At the present time, much of this growth is being sustained through the use of expatriates who make up from 20-60 percent of the total workforce in this region. While there are a number of programs in higher education aimed at the aviation/aerospace industry, most are in Western nations and the flow of Middle Eastern students into these programs has been severely limited by the events of September 11th. This paper examines regional needs in aviation education and efforts to meet them through the establishment of local centres of aviation education.

Keywords

Aviation education, airlines, airports, Middle East, higher education

INTRODUCTION

In a region whose recent history has been dominated by developments in the oil industry, the aviation/aerospace industry is now coming into its own. The Middle East, particularly the Gulf Coast region, is experiencing major growth in both airlines and airport infrastructure. Based on growth estimates by the Boeing Corporation, this region will require a fleet of 786 aircraft over the next twenty years (Castillo-Morales, 2003). This would represent nearly a doubling of the current fleet which now stands at 429 (including current aircraft on order) aircraft for the 15 airlines in the region (AeroStrategy, 2004). In order to accommodate this increasing fleet, nations in the region are already investing billions in new airport construction. Dubai International Airport alone is in the second phase of a US\$4.1 billion program that includes construction of Terminal 3 and Concourse 2 and 3 as well as a Cargo Mega Terminal (Menon, 2004). In Doha, Qatar, construction is planned on a new US\$2 billion state-of-the-art airport scheduled to open in 2006 (Doha International Airport, 2003). This growth is fuelled in large part by two factors. The first factor is efforts by several of the region's carriers to create hubs connecting Europe and Asia (Rhoades, 2003). The second factor is the rise of a new breed of low cost carrier that hopes to increase regional traffic by offering low cost, short-haul regional service (Castillo-Morales, 2003).

In a region historically noted for relying on expatriate employees for development of key industries, it is not surprising that much of this growth as been built around foreign recruited talent. One key impediment to increasing the level of country-national employees is the lack of regional programs to train such workers. This paper examines a recent study projecting regional employer demand for graduates with degrees focusing on the aviation/aerospace industry and efforts to meet this demand through the establishment of centres for aviation education.

GULF COAST BACKGROUND

The Gulf Coast region is officially composed of six states: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). These states are members of the Gulf Cooperation Council (GCC) which was founded in May 1981. Article 4 of the organization's Basic Law declares the ultimate goal of the Council to be the complete unification of the states involved, however, border disputes and policy differences have prevented such a union (Al-Hamad, 2003). The GCC has continued to pursue efforts to improve ties between these nations as well as ensure their security and development (UAE Yearbook, 2003).

Demographics

The estimated 2003 population of the GCC is 32.1 million (CIA Factbook, 2003). It has been projected to reach 61.6 million by 2025 (AeroStrategy, 2004). Between 1965 and 1990, the population of Muslim nations grew at a rate of 2.0 percent or better creating an estimated proportion of people between 15 and 24 exceeding 20 percent throughout the region (Huntington, 1996). Current population estimates indicate that the number of people under the age of 14 in GCC countries ranges from 42.4 percent in Oman to 24.2 percent for Qatar. For 2003, the GDP per capita ranges from US\$23,200 for the United Arab Emirates to \$11,800 for Saudi Arabia while growth in GDP ranges from 3.3 percent for Oman to slightly over 8.5 percent for the State of Qatar (CIA Factbook, 2003). Bahrain is the only nation within the GCC which lacks substantial reserves of either oil or gas while Dubai is the only region which derives a major portion of its revenues from non-oil sources (Byman and Green, 2003). With the notable exception of Saudi Arabia, nations within the GCC are pursuing policies of economic, political, and social liberalization (AeroStrategy, 2004). There are also significant efforts to increase the role of GCC nationals in the region's economic activity. On January 1, 2003, the GCC Unified Economic Agreement came into effect. The Agreement would establish a single market customs union and levy a 5 percent import tax on all foreign imports. Tentative steps are being taken to establish a clearinghouse for the collection of the levy as a first step toward a Common GCC Market (UAE Yearbook, 2003).

Higher Education

During the so-called medieval era in European history, the Muslim world "was in the forefront of human civilization and achievement" (Lewis, 2002:3). Islamic scholars preserved the knowledge and works of the Greek world and passed them as well as developments (such as paper and the decimal system) from the Far East into the countries of Western Europe. An Islamic renaissance in Baghdad almost eleven centuries ago saw the development of a new type of educational institution, the *al-madrash* or college. The best known of these colleges was Al-Madras Al-Nizammiya, founded in Baghdad in 1067 (Massialas, 1991). These new institutions attracted many of the finest scholars of the Muslim world and helped to make Arabic the language of science. Research and scholarship in places such as Baghdad, Cairo, Damascus, and Tunis led to the invention of algebra and the classic *Canon of Medicine* by Ibn Sina which dominated the teaching of medicine for four centuries in Europe (Del Castillo, 2004).

After its very auspicious start and nearly 500 years of scientific and scholarly contribution, higher education in the Middle East began to decline. In the 1940s, there were only eight Arab universities. This increased to 23 in the 1960s, and 72 by the end of the 1980s (Massialas, 1991). There are currently 20 Arab universities in the region, two each in Bahrain and Kuwait, one each in Oman and Qatar, eight in Saudi Arabia, and six in the UAE. In addition,

there are 16 colleges of polytechnic institutions currently operating in the GCC region. A number of international institutions have begun operation in the region either as joint ventures or government-sponsored foreign campuses. Among this group are such institutions as the College of the North Atlantic, Indira Gandhi National Open University, and Virginia Commonwealth University (Marhaba, 2003). Historically, large numbers of students have also gone abroad for higher education. The United States had been the major beneficiary of these foreign students attracting around 500,000 international students a year from around the world (Plomin, 2001). The events of September 11th have radically changed this pattern for students seeking almost all types of higher education. It has been particularly pronounced for students interested in aviation related higher education.

In a survey of the number of aviation programs and aviation bachelors degree programs available at academic institutions worldwide, AeroStrategy (2004) found a total of 457 programs of which 161 offered bachelor degrees. The vast majority of these programs (and degrees) were in the United States (357 programs, 119 degrees). Europe was second with 77 programs and 29 degrees. There are no programs or degrees offered in the Middle East at the present time.

Aviation Development

In 2001, the 14 countries of the Middle East accounted for roughly 3 percent of the scheduled world passenger traffic. According to the Airbus Global Market Forecast 2002-2022, the regions traffic is predicted to grow at 5.8 percent a year over this period which is above the 5 percent growth rate predicted for the worldwide. At this rate of growth, Middle Eastern traffic would triple in the next twenty years. Currently, most of this traffic is international rather than domestic. Saudi Arabia has the largest domestic Market in the GCC region. The Saudi market grew at an average annual rate of 15 percent for the period 1970-1994 carrying 1.6 million passengers (Ba-Fail, Abed, and Jasimuddin, 2000). In contrast, the other GCC states have almost no domestic traffic (Taneja, 1988).

While traffic to all regions in the world is expected to increase over the next twenty year, it is predicted that the bulk of Middle Eastern traffic will flow to two regions-Europe and Asia. Total traffic to Europe over the period is expected to reach 172 billion for an increase of 216 percent. Total traffic to Asia will approach 166 billion revenue passenger kilometres (RPKs) for an increase of 201 percent. Intra-Middle Eastern traffic totals should reach 74 billion RPKs for an increase of 170 percent in part due to the rise of a number of low-cost carriers in the region (AeroStrategy, 2004; Airbus Global Market Forecast, 2003; Boeing Commercial Market Outlook, 2003). Six new carriers announced their intention to begin operation in the latter part of 2003. These include Etihad Airways of Abu Dhabi, menaJet based in Sharjah, UAE, all-economy Gulf Traveller owned by Gulf Air, United Aviation of Kuwait, Air Arabia of Sharjah, and Al-Khayala of Jeddah, Saudi Arabia (Aviation Week, 2003).

There are currently 15 commercial operators in the GCC ranging in size from Saudi Arabian Airlines with a fleet of 88 active aircraft to small low cost start-ups such as Air Arabia with an active fleet of 2 aircraft. Based on aircraft orders, the two fastest growing airlines in the region are Emirates and Qatar Airways. Emirates currently have a fleet of 56 aircraft with another 95 on order and an additional 30 aircraft on option. The aircraft on order include 45 of the new Airbus A380 aircraft set to enter service beginning in 2006 (AeroStrategy, 2004; Aviation Week, 2003). Qatar Airways currently operates a fleet of 28 aircraft with an additional 44 on order or option (AeroStrategy, 2004). In all, the GCC region leads the world in total aircraft on order. This fleet growth is expected to increase the demand for Maintenance, Repair, and Overhaul (MRO) services by an average 7.4 percent annually through 2013. Much of this

work is expected to stay within the region due to competitive labor rates increasing the need for trained Airframe and Powerplant (A&P) mechanics. General Electric Aircraft Engines has announced the construction of a U.S. \$45 million test facility for Emirates as part of the deal that awarded GE the deal to provide engines for Emirates new A380 aircraft (Aviation Week, 2003). Other major maintenance operations in the GCC include Gulf Aircraft Maintenance Company (GAMCO) which services a number of commercial and military aircraft, Qatar Airways Maintenance, and Hableel Aviation (Aerostrategy, 2004).

Airline growth also demands growth in aviation infrastructure. To date over U.S. \$12 billion has been announced in airport development improvements or expansions. Some of the projects planned or already underway include the U.S. \$4.1 billion expansion of Dubai International, US \$ 2.5 billion for construction of a new Doha airport, US \$1.5 billion for two new terminals in Jeddah, Saudi Arabia, US \$815 million for expansion of terminal and cargo facilities in Bahrain, US \$600 million for a new airport building and second runway in Abu Dhabi, UAE, and US \$300 million for new arrival and departure buildings in Oman. Since airports currently account for 21 percent of all aviation employees, this expansion should generate substantial new employment in the region (AeroStrategy, 2004).

STUDY BACKGROUND AND RESULTS

Embry-Riddle was founded on December 15, 1925, exactly 22 years after the flight of the Wright brothers at Kitty Hawk. Originally a flight training school, Embry-Riddle became a full-fledged university in June 1970. Embry-Riddle is now the world's largest independent aeronautical university offering over 30 degree programs to some 25, 000 students from across the United States and over 100 countries (Embry-Riddle, 2004). The university has two residential campuses located at Daytona Beach, Florida and Prescott, Arizona as well as 130 extended education sites around the world which primarily cater to working adults in the U.S. Armed Forces.

It is estimated that the University has graduated over 200 students in recent years from the GCC region, however, the events of September 11th greatly reduced the number of all students from Muslim countries attending the University. It does not appear to have dampened the demand for aviation education in this region. After a number of inquiries from the region on the possibility of locally offered programs, Embry-Riddle commissioned a study on the market demand for degrees in aviation/aerospace fields. The AeroStrategy Management Consulting Company, headquartered in Ann Arbor, Michigan and Missenden, U.K., was selected to conduct the study. The study's two objectives were to 1) assess the demand for qualified graduates from specified programs and 2) prioritize the demand for these programs (AeroStrategy, 2004). The primary geographic focus of the study was the GCC with the broader Middle East as a secondary focus and a tertiary focus on the far east (India, China, and Pakistan). The study examined demand for 11 undergraduate degree programs, chosen based on early initial inquiries, from five key segments of the industry- airlines, airports, regulatory authorities, maintenance facilities, and the military.

Method

After preliminary discussions with Embry-Riddle about the scope of the project, a series of meetings was held with representatives of each of the proposed degree programs outlining the nature of the degree itself, student profiles, employer profiles, and known global competitors.

Secondary sources were then analyzed for information on 1) general country profiles-political, economic, demographic and 2) aviation demand, growth, and needs. Following the collected of this data, teams were assembled to conduct primary interviews with prospective employers in six categories: Airline, airport, regulatory, MRO, military, and other industries. Finally, a forecasting model was developed to predict employer demand for each of the proposed degrees over a ten year period.

Results

The key findings of the study were as follows:

- Current aviation employment in the GCC region is 147,000, 54 percent of which are GCC nationals.

Excluding military employment, the majority of the employees work in the regions airport (52%). Airlines are the next largest employer with 33 percent. The remaining 15 percent are employed in maintenance, corporate aviation, and regulatory positions.

- Projected 2014 employment in the GCC of 243,000

Based on the projected airline growth and a ratio of 180 employees per aircraft, the estimated number of airline employees in 2014 is 78,300 (annual growth of 5.3%). Airport employee growth is closely associated with traffic growth (passenger movements). Using projected growth figures, the estimated number of airport employees in 2014 will be 126, 000. Maintenance employment is also related to airline fleet growth and is estimated to nearly double to 28, 3000. Estimating regulatory employee growth is more complex given the number of variables that drive this area including aircraft movements, number of airlines, regulatory intensity and scope, historic patterns, etc., but rough estimates place the 2014 employment in this sector at 7,480 for a growth rate of 3.8 percent. Finally, corporate or business aviation is projected by manufacturers to grow in the region at 2.3 percent per annum leading to project 2014 employment of 3,320.

- Demand for 185 graduates per year within the GCC from all programs

Given the pattern of employment growth, business administration degrees with a focus on airline and airport management are predicted to represent the highest degree demands by employers. Other degrees generating employer interest were aeronautical systems maintenance, aeronautical engineering, and technical management.

- Demand for another 142 graduates outside the aviation/aerospace industry in key technical industries

There was substantial interest in technical communication education from outside the industry, mostly in oil and gas and media. The military and general industry expressed interest in technical management education.

DISCUSSION

With a total current industry employment around 150,000 and projected employment of 243,000 within the next ten years, there is clearly a market within the Middle East, particularly the GCC region, for degreed education in the fields of aviation and aerospace. Despite a growing number of state and international efforts in higher education, there are no current programs offered in this expanding market. In an era when aviation in other regions of the world is suffering from the effects of September 11th, the SARS epidemic, economic downturn, and war, it would seem reasonable to pursue opportunities to serve prospective students. The two areas of study that generated the greatest initial interest were business administration (focusing on airline and airport management) and aeronautical systems maintenance. Both areas of study are vital to the successful growth of airlines and airports within the region.

While demand clearly exists, there are a number of challenges to offering aviation/aerospace education in the region. First, many bacheloreate degrees in aviation attract students that either 1) possess technical training and wish a degree for further job advancement or 2) wish to pursue both a technical and degree track. This student profile makes the availability of programs providing quality technical training in flight, air traffic management, and aviation maintenance extremely important for long-term success. The recognized international standard for aviation technical training was developed by the International Civil Aviation Organization-International (ICAO), however, many nations are striving to achieve a higher standard of certification and choose to comply with either the United States standards of the Federal Aviation Administration (FAA) or the European Union standard of the Joint Aviation Authority (JAA). Given its geographic location and the desire to create GCC hubs linking Europe and Asia, the standard most nations would aspire to would be the JAA. The presence of JAA certified training facilities would provide a ready pool of students and allow degree-seeking student the opportunity to pursue technical training.

The lack of a system of academic accreditation in the region of the Middle East has been identified as one impediment to improving the quality of higher education in the region (Cassidy and Miller, 2002; Del Castillo, 2004). In the absence of national standards, a number of the local institutions either strive to adopt one of the accrediting standards used in the United States or Europe (such as AACSB, ABET, or AMA) or they ask foreign institutions already possessing one of these accreditations to offer their programs locally maintaining the same standards for admissions, degree completion, facilities, faculty credentials, etc. The latter approach raises several questions. First, are the language abilities of prospective students adequate for instruction in the language of the foreign institution? Second, do the students possess the necessary secondary education background to pass entrance examinations and successfully complete the degree? Third, is there a pool of faculty available in the region with the terminal credentials and scholarship activity required by the accrediting agencies of these foreign institutions?

Historically, many students from the Middle East have lacked either the language ability or the math and science background to be successful. Intensive language training can help students to thrive in foreign institutional setting, but earlier introduction to languages in primary or secondary educational programs would clearly be of benefit. Math and science ability are particularly important in aviation education because of the technical nature of the industry. These types of classes have not been stressed in many traditional Islamic educational systems or students have been given the opportunity to opt out of such courses of study at the secondary level. This might account for the fact that only one in 20 Arab university students pursue scientific disciplines (Del Castillo, 2004). In order to facilitate success, a bridge program

focusing on language, math, and science skills may be necessary before entry into degree programs.

Foreign institutions operating abroad must still maintain the academic standards of their home country. Accreditation by outside, non-governmental organizations is the standard in the United States and is increasingly gaining acceptance throughout Europe. While accreditation efforts are moving toward outcome-based assessment insure quality and standardization across institutions, the quality of inputs to the academic process is still important. Two key inputs into the process are curriculum and faculty. Accredited institutions must demonstrate that their curriculum is reviewed, updated, and assessed by proper academic groups in an effort to foster continuous improvement and currency of information. Further, institutions are expected to recruit, develop, and assign faculty that have credentials in the field of teaching and can demonstrate currency and intellectual engagement in their chosen fields of instruction (Kimmell, Marquette, and Olsen, 1998; Pechar, 2002). The availability of faculty qualified to foreign accreditation standards is critical to delivering high quality higher education. While it is clearly possible to recruit such faculty from home country or third country faculty pools, this does raise the cost of educational delivery and hence tuition costs to prospective students or their sponsoring governments. This issue could prove particularly problematic for nations with a lower economic base and/or nations facing a demographic bubble of college age students in the future. Given the population data provided in Table 1, this latter concern applies to all the nations in the GCC.

A third more complex challenge relates to the nature of the Middle Eastern region itself. In the years following the Second World War, the peoples of the region established independent nations, but the region remains noted for political instability and conflict. While this is not particularly true of most of the GCC nations, the possibility of such difficulties makes the decision to locate programs and personnel in the region problematic for some institutions. In the wake of September 11th, the issue of aviation education makes the decisions even more sensitive to political considerations. Aviation by its very nature has been associated with development, technical achievement, and modernization. In fact, nations have long considered aviation a special case in national development and modernization because of its link to national defense, economic growth and employment, and symbolic ability to carry a nation's flag around the world (Rhoades, 2003). There has also been a long tradition of linking modernization to westernization which has created many problems in the developing world, particularly in Islamic countries who wish to benefit from the growth, innovation, and economic development associated with modernization without losing the culture that they value highly. Although the question of modernization and westernization is an important one, it is beyond the scope of this paper. Suffice it to say that a number of scholars believe that modernization is essential to long-term sustainable economic growth and depends on the regions ability to adopt Western technology and improve educational systems, but there is no agreement on whether this can take place without losing (or adapting) essential elements of Middle Eastern culture (Cassidy and Miller, 2002; Pipes, 2003; Lewis, 2002). Educational institutions will need to be sensitive to the task of identifying which elements of their systems are important in developing creative, innovative, technically-minded graduates and which elements are unnecessary. Islamic history indicates that there was no incompatibility between the culture of the region and scientific achievement 900 hundred years ago; there should not be any barriers today.

A related issue is the link between educational achievement and employment. The GCC region, as already noted, has a relatively high level of foreign nationals employed not only in

unskilled and semi-skilled positions but also in technical and specialized fields. The oil wealth of the GCC region has been used in many cases to create a system of near guaranteed employment for country nationals, but the bulk of this well-paying employment has been created in the public sector (Cordesman, 1997). While programs exist to encourage employment of country nationals in the private sector, the private sector in many countries remains relatively small and these programs have not always been successful in either attracting employees to the private sector or encouraging private employers to hire the often most expensive country nationals (Cordesman, 1997; Del Castillo, 2004).

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