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PROFILE OF THE INFORMATION SOCIETY IN THE UNITED ARAB EMIRATES

2003

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INTRODUCTION

During the past 10 years, the UAE has made great progress in liberalizing its economy; according to the “2003 Index of Economic Freedom,” released on November 12th, 2002, the UAE ranks 24th worldwide, second Arab country after Bahrain with a rank of 16th. The Index of Economic Freedom, which is a joint project by the Heritage Foundation and the Wall Street Journal, measures how well a country scores on a list of 50 variables divided into 10 areas of economic freedom. These include trade policy, banking regulations, fiscal burden, foreign investment codes, monetary policy, and black market.¹

While oil revenue continues to be the mainstay of the UAE economy, the country is pressing ahead with efforts to accelerate diversification and economic reform, and continues to seek new foreign direct investment (FDI) inflows. The UAE has the most diversified economy of the Gulf countries, with percentage of oil exports to the total at 44% (compared to Saudi Arabia: 78%, Kuwait 90%, Bahrain 70%, Oman 77% and Qatar 55%). In addition, foreign direct investment reached \$16.4b last year (UAE Ministry of Planning Report 2002).

Some of the seven emirates pursue a policy of openness more than others, with Dubai remaining at the forefront of most new initiatives. Dubai in particular continues to seek investors in high technology, tourism and other service industries to compensate the declining oil in its economy.

In terms of movement towards an information/knowledge Society, the (UAE) has emerged as the forerunner in the Arab region and is among the 30 top information technology (IT) users in the world, based on the classification issued by the United States’ IDC Group. In its global Information Society Index (ISI) for 2002,² the World Times/IDC ISI ranks the UAE twenty-seventh overall out of 55 countries,³ by evaluating 23 indicators measuring the capacity of a nation’s citizenry to exchange information internally and externally. These 23 indicators are classified into four different categories: (1) Computer Infrastructure; (2) Internet Infrastructure; (3) Information Infrastructure; and, (4) Social Infrastructure (World Times and International Data Corporation 2002). The Index measures the country’s achievements in IT and related fields, the level of use and its readiness to cope with IT developments. Only four Arab countries are listed among the top 55 countries in information technology readiness. The index shows that the UAE is classified among the runners in 2002 and is given 3,526 points. Although Saudi Arabia is second in the Arab world, it far lags behind the UAE, receiving 1,854 points and ranking 44th in the list. Jordan is in the 50th rank and gets 1,664 points while Egypt is awarded the 51st rank and 1,478 points. The perfect score would likely be close to 9000.

The ISI establishes a standard by which all nations are measured according to their ability to access and absorb information and information technology. While GDP measures economic wealth, ISI measures information capacity and wealth. The ISI is designed to help countries assess their position relative to other countries and to guide companies to future market opportunities.⁴

(GCC) countries display the highest penetration rates in mobile phones, fixed lines and Internet users. Mobile phone penetration in the GCC stands at 26.16 percent while average Arab world penetration stands at 7.92 percent. GCC mobile phone penetration is also well above the world average, at 17 percent. While fixed line penetration in the Arab world stands at 7.95 percent and Internet penetration at 2.69 percent, the GCC enjoys a much higher fixed line penetration (16.52 percent) and Internet penetration (9.48 percent).

¹ Refer to 2003 Index of Economic Freedom Report by the Heritage Foundation and Dow Jones & Co.

² The 2002 World Times/IDC Information Society Index: Measuring the Global Impact of Information Technology and Internet Adoption is the fifth installment of the Information Society Index (ISI) research.

³ The 55 nations account for 98 per cent of all IT investments in the world.

⁴ Appendix I lists the 23 variables measured to compute the ISI for countries.

GCC countries account for 38.17 percent of Arab mobile phone subscribers, and lay claim to 23.6 percent of fixed lines. In August 2002, GCC Internet users made up 42 percent of all Arab Internet users, but currently account for 40.78 percent, indicating a considerable increase in users in the rest of the Arab world. This is mainly due to measures undertaken to reduce Internet connection and subscription rates or eliminate them altogether, as is the case in Egypt. Heading the Arab telecommunication drive is the UAE, which boasts a 62.97 percent mobile phone penetration rate, a figure on par with many Western European nations. Similarly, a 29.19 percent fixed line penetration rate and 24.86 percent Internet penetration rate place the country squarely at the top of the list, and among leading nations worldwide in telecommunications.

Contrary to common belief, the UAE has a number of supercomputers deployed in several states, mainly in the oil and gas sector. Supercomputing capabilities in the UAE were, and still are, mainly used in geophysical analysis related to oil and gas exploration activities. Abu Dhabi National Oil Company (ADNOC) has an SGI Origin 2000 (64 processors, 32 GB of memory and one terabyte of disk space) that enables the company to carry out large high-definition, full field reservoir simulations with great speed and accuracy. Abu Dhabi Company for Onshore Oil Operations (ADCO) has two SGI Origin 3000s – highly specialized 32-CPU parallel processing supercomputers used for reservoir simulation. These provide 3-D seismic interpretation to assist in optimum placement of wells, thus maximizing oil and gas output. ADCO has also created the UAE's first Virtual Reality Environment Center, powered by a four- CPU, 8 GB SGI ONYX supercomputer designed specifically for heavy-duty graphical output. Finally, a third UAE oil company, Zakum Development Company (ZADCO) at Abu Dhabi has one 16-CPU SGI Origin 2000 supercomputing machine and a multiprocessor SGI Onyx 3200.

I. POLICIES AND STRATEGIES

Over the last ten years, the UAE invested tremendously in ICT sector in order to move toward a knowledge-based economy. It is recognized as a regional hub for ICT services and manufacturing, due to the many pioneering and ambitious ICT initiatives that the UAE has launched in both government and the private sector. The UAE is now not only leading the Arab region in putting IT to work, but it is also positioning itself as the regional interface with the global economy. Some initiatives, such as Abu Dhabi Innovation Center which aims at establishing several spin-off businesses based on ICTs and media technologies; Dubai Internet City and Dubai Silicon Oasis, all aim at creating the infrastructure and environment needed to promote ICT enterprises and contribute positively to the growth of a knowledge-based economy.

The UAE overall strategy has been to diversify into non-oil business sectors; its expenditure program for the ICTs sector is expected to equal US\$1.6 billion over the next three years. Its wealth enables it to constantly expand its programs and implement technologies ahead of others in the region. This sector has experienced a 10-fold increase since 1997. Recently (2003), the UAE received the highest score in a new statistical index devised to compare penetration levels of information and communication technology across Arab countries. The index uses four ICT parameters: PC installed base, number of mobile phone, number of fixed lines, and the number of Internet users.

Even though, a well-formulated ICT strategy has not been articulated yet at the Federal Government level, the recent e-government initiative is a good indication of the government commitment to ICT. In addition, the emirate of Dubai is in the process of revising its ten-year IT strategy, to fully support the vision of making the country a regional hub for new technology. The recent announcement of the establishment of Dubai Silicon Oasis located on a 6.5 million sqm, is another firm indication of the commitment of the leaders to move the country into a knowledge based society. In addition to Dubai Silicon Oasis, an incubation component of the Dubai Free Zone Authority for Technology, E-commerce and Media, the Dubai Ideas Oasis, with an initial funding of \$30 million, was launched recently.

As part of the overall direction (not to say strategy) of the country, in February 2000, a decree was issued setting up a free-trade zone for electronic commerce and technology. The decree established an independent body, the free zone authority headed by Crown Prince Sheikh Mohammed bin Rashid al-

Maktoum, which would operate under the Dubai government to spearhead the emirate's drive to become a regional center for electronic commerce, technology and information. Opened in October 2000, Dubai Internet City is a complete Informational Communication Technology center built inside a free trade zone. It was conceived and built within one year. Dubai Internet City provides an environment that attracts every element of the ICTs value chain. Currently, it hosts a cluster of over 450 firms with different specialization in the ICTs industry. Its value proposition encompasses an environment rich with networking opportunities, 100% tax free, 100% foreign ownership, access to knowledge resources, straightforward laws and regulations, high-end technology infrastructure, and housing/recreational facilities. Dubai Internet City, along with the country's liberal economic policies and regulations, is contributing to the growth of the knowledge base economy of the United Arab Emirates.

The UAE e-government vision focuses on easing the lives of people and businesses interacting with government and on contributing in establishing the country as a leading economic hub. Dubai, for instance, is automating the entire Government of Dubai for all of their Shared Services processes, and other areas including services, Municipalities, etc.

Recently, the UAE received full score in an assessment of its role in creating an environment conducive to information and communication technology. The leadership will of the UAE has met eight performance criteria set by the Global Information Technology Report 2002-2003, under the title Readiness for the Networked World, which was recently published by the World Economic Forum (WEF). These criteria include an "ICT Implementation Plan Clearly Articulated", and "Technology Incubators." This report is a joint effort between WEF and INSEAD of France. The report indicates that the UAE is clearly moving steadily in the right direction of creating a growing information/knowledge society. On March 26 of this year (2003), for instance, the UAE Ministry of Finance and IBM Middle East announced the signing of a contract for the implementation of the first phase of the federal e-government project. This project is integral to a number of transformation initiatives, which have been launched by the UAE Federal Government to achieve rapid and significant transformation in the provision and efficiency of federal government services within the UAE. During the first phase of the project, IBM will be responsible for evaluating the readiness of various ministries for the introduction and implementation of e-Government services covering people, process and technology, as well as studying the functions of these ministries and identifying initiatives or e-government projects to be implemented.

The work team will also be responsible for prioritizing various initiatives, including the identification of specific target performance measures for the successful implementation of various phases of the project; evaluation of technical infrastructure requirements required to support the e-Government initiatives; defining essential policies and procedures required to support the e-Government initiative and developing a comprehensive blueprint which will allow the Federal e-Government Steering Committee to monitor the successful implementation of various phases of the e-Government project.

The first phase of the federal e-government project will be followed by subsequent implementation phases, which will cover the provision of the required infrastructure, as well as the development and implementation of systems identified within the UAE Federal e-Government blueprint, and the federal government IT strategy.

II. LEGAL AND REGULATORY FRAMEWORKS

The Government of the UAE has been a leader in creating the *right* and *appropriate* soft infrastructure, including the legal and regulatory environments, in order to ensure success for its IT initiatives. A number of Laws were enacted and passed during the past decade, with the objective of fostering a safe environment for businesses and investors. In 1992, the UAE federal government passed three laws in regards to intellectual property--a copyright law, a trademark law, and a patent law. These three pieces of legislation have made the UAE largely clean of selling pirated computer software because of a strong enforcement policy. In addition, the UAE is a member of the World Intellectual Property Organization (WIPO) and has joined the Paris Convention for the Protection of Industrial Property; also, the UAE has fully ratified the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), which is one of the main agreements of the World Trade Organization (WTO). The primary difference for the UAE in terms of copyright law as compared to other nations is that any published material must have a registered copyright before being commercialized in the country.

A. INTELLECTUAL PROPERTY RIGHTS AND PRIVACY STATUS

The U.A.E. Copyright Law No. 7 of 2002, repealing the old Copyright Law No. 40 of 1992, came into force on 14 July 2002, upon its publication in the UAE Official Gazette No. 383. The U.A.E. Copyright Law No. 7 of 2002 is a Federal Law and protects: *"Any original work in the areas of literature, arts or science, whatever its description, form of expression and conveyance, significance or purpose"*.

As elsewhere, registration is not required to achieve protection. Registration is possible through an application to the Ministry of Information and Culture, but it is not a pre-requisite for the material in question to achieve protection.

Copyright piracy of software has dropped in the U.A.E. from 86% in 1995 to 41% in 2001, according to an independent research company report. This was a result of the introduction of the U.A.E. Copyright Law No. 40 of 1992, and strict enforcement thereof. Introduction of this and other intellectual property laws in the U.A.E. in 1992, combined with political will made the U.A.E. the leader in the protection of intellectual property rights in the region, as well as illustrated an example for other GCC and Arab countries to follow.

B. TELECOM REGULATORY FRAMEWORK IN THE UAE

Public telecommunications services in the UAE are provided under monopoly conditions by the Emirates Telecommunications Corporation (Etisalat), headquartered in the federal capital, Abu Dhabi. Etisalat is a quasi-state company, with 60% ownership by the UAE Government and 40% by individual UAE nationals.

C. REGULATING THE INTERNET

Most recently, and in an effort to regulate electronic transactions and boost users' confidence, a law was issued for the state of Dubai, Law No. 2 of 2002 concerning electronic transactions and commerce. The Electronic Transactions and Commerce Law abide by international principles associated with e-commerce and dealings and the latest development in this field. The 39 articles Law is a combination of the United Nations guidelines and local qualifications and is intended to: (1) smooth the progress of e-correspondence through trusty e-books; (2) eliminate any impediments to e-commerce and other e-transactions; (3) smooth the submission of e-documents to government departments and institutions; (4) trim down the number of submissions of e-correspondence and amendments thereto; (5) set standardized criteria for certification and security of e-correspondence; (6) raise the public's confidence in security and soundness of e-books and correspondence; and, (7) improve development of e-commerce and other transactions, locally and internationally, through using e-signature.

The proposed federal laws governing Internet-based transactions and related issues are in their second draft, prior to being passed to the higher authorities for approval. A special committee under the Ministry of Justice and Islamic Affairs and Awqaf is overseeing the project with the General Information Authority providing the technical support.

D. PRIVACY AND SECURITY LAWS

Recently, a new law was issued in Dubai relevant to the use of computers in criminal procedures. Pursuant to this new law, Dubai Law No. 5 of 2001, documents with electronic signatures will be admissible as evidence in criminal investigations. The provisions of the law acknowledge signatures of individuals acquired through the use of computers and other means of information technology for purposes of proof in criminal cases.

A draft of the 'Cybercrime' Law is currently being reviewed at the federal level on electronic signatures, along with direct reference to the Singapore Electronic Transactions Act. According to a Ministry of Justice official, the Law would contain two categories to deal with crimes committed on the Internet. One would be a set of laws on digital signatures and issues related to signing and forgery of electronic documents. The other set would address crimes such as hacking, stealing credit card numbers, invasion of privacy, copyright violations and online theft.

Legislation covering the Dubai Technology, Electronic Commerce and Media Free Zone (the Law) was passed by decree in February 2000. The Law creates a business and regulatory environment in which technology, electronic commerce, Internet and media companies will be able to operate globally out of Dubai with significant competitive advantages over local and regional competitors. More specifically, the Law creates a free zone officially known as the Dubai Technology, Electronic Commerce and Media Free Zone (the 'Free Zone'). The Technology Free Zones are many, but we will concentrate of the main three initiatives within those free zone; these are: (1) Dubai Internet City, (2) Dubai Media City, and (3) Knowledge Village.

To attract technology and media companies, the Free Zone will allow entities operating out of the Free Zone to be 100% foreign owned with no need for any sort of national services agent. Furthermore, Free Zone entities will be able to obtain leases on ready-to-operate-from offices or plots of land on a 50-year renewable basis where they may build structures appropriate to their line of business. To facilitate business operations in the Free Zone, there will be a 'single-window' for all governmental approvals, including those pertaining to trade licenses, visas and work permits. Companies based in the Free Zone will be able to sell goods and services throughout the United Arab Emirates (the UAE). Dubai Internet City and Media City have already begun to issue licenses to qualified companies.

In order to operate in the Free Zone, the rule of law requires a business entity to be licensed by the Free Zone Authority and to be set up either as a branch of a UAE or foreign company or be locally incorporated as a Free Zone limited liability company ('FZ-LLC'). The regulations regarding FZ-LLCs, have not yet been promulgated. However, the Free Zone Authority recently promulgated a specimen article and memorandum of association for all FZ-LLCs.⁵

Free Zone entities and their employees are excluded from any restrictions on repatriation and transfer of capital, profits and wages in any currency to any place outside the Free Zone for at least 50 years. It is anticipated that Free Zone entities will have minimal restrictions with respect to visas, i.e. they will not be restricted with respect to the type and number of workers they need to sponsor. This makes the Free Zone an ideal location from which to access a skilled talent pool from nearby countries such as India, Egypt, and Jordan. The Law specifically states that assets or activities of Free Zone entities shall not be subject to nationalization or any measures restricting private ownership. The Law makes provision for the creation of a court and/or arbitration tribunal with the jurisdiction to hear claims and suits arising out of, or in connection

⁵ For more information, refer to www.internetcitylaw.com.

with, activities carried out by Free Zone entities within the Free Zone including suits between Free Zone entities and parties outside the Free Zone.

Recently and in December 2002, Sheikh Abdalla Bin Zayed AL Nahyan, Minister of Information and Culture, issued a ministerial decree annulling fees on computer programs in a move to help promote the spread of computer software especially in the field of education and to keep abreast of the global advances in IT sectors. The new resolution amended decree no. 6 of (2000) on imposing fees on business-oriented media licenses. In addition, Sheikh Abdalla called during the Arab Information and Communication Technology Summit (ICT) in Dubai last October for free entry of IT to the UAE, providing it with reasonable charges for education and training purposes, and securing easy access to information.

To summarize, then, the regulatory environment and the soft infrastructure in the UAE has lowered the barriers to navigate into a information/knowledge based society, where the enacted laws and regulations act as lubricants and facilitators in the transition phase. It is worth mentioning here that Dubai is rated fifth in the Asia Pacific Universe 2002 index of Economic Freedoms survey in terms of business friendly regulation.

E. OTHER ICT RELATED LAWS AND REGULATIONS

As the U.A.E. is a signatory to the World Trade Organization (WTO), its provisions relating to intellectual property as stated in the TRIPS Agreement, including reciprocity, are applicable to the U.A.E.

III. ICT INFRASTRUCTURE

To describe the technical infrastructure in the UAE, we will be looking at five main indicators: (1) fixed lines; (2) wireless technology; (3) Internet hosts; (4) Internet Users; and, (5) computerization.

Public telecommunications services in the UAE are provided under monopoly conditions by the Emirates Telecommunications Corporation (Etisalat), headquartered in the federal capital, Abu Dhabi. Etisalat is a quasi-state company, with 60% ownership by the UAE Government and 40% by individual UAE nationals, and is the second most valuable quoted company in the Middle East. Revenues in 2001 increased by 9 % over 2000 to US \$2053 millions and profits in 2001 was US \$ 680 million which represents 27 % return on capital employed.

Incorporated in 1976, Etisalat is the sole provider of telecommunication services to individuals and institutions in the U.A.E. To diversify its sources of revenue, the corporation has also invested in Thuraya Satellite, Zanzibar Telecom, Qatar Telecom, and Sudan Telecom. For the year 2001, Etisalat's silver jubilee year, the company surpassed targets and serviced a million customers in each of the fixed line as well as GSM businesses. In an effort to provide seamless communication around the globe, the Corporation now offers connectivity to 258 IDD destinations and 213 GSM roaming partners in 96 countries.⁶

The only networks independent of Etisalat are those operated by Government departments with special needs such as the Ministry of Interior and Armed Forces/General Head Quarters. The oil companies such as the Abu Dhabi National Oil Company (ADNOC) now use Etisalat facilities but retain their own independent telecommunications facilities as back up. Although Etisalat is a monopoly today, but this might change in the future due to internal and external environmental pressures.

During 2001, the Corporation launched nine new services and enhancements, including SMS for prepaid mobile phones and prepaid service for fixed line. Etisalat is also employing a proactive approach to ready itself for opportunities that will arise through the convergence of Internet and mobile phones, namely wireless Internet. To achieve this, the corporation engaged in the development of infrastructure and value added services. A cable TV and multimedia subsidiary, E-vision, offers interactive services through a

⁶ Refer to www.etisalat.co.ae.

fiber/coax network to subscribers. High speed Internet (ADSL) and wireless Internet services (WAP) have also been introduced. The Thuraya Satellite has been launched and the services will soon be introduced to the target market. Implementation of WAP and GPRS technologies is expected to naturally lead to migration to the 3G broadband mobile network.

Etisalat has the second highest capitalization of any public company in the Middle East. It has a capital expenditure program expected to equal US\$1.6 billion over the next three years. Its wealth enables it to constantly expand its programs and implement technologies ahead of others in the region. (www.austrade.gov.au)

To summarize, the United Arab Emirates has a modern telecommunications infrastructure, especially compared to other countries in the region. It has frequently been referred to as the "most wired" state in the Middle East. The UAE residents have relatively unhindered access to all modes of communication that western nations do.

The topic of telecommunications is wide ranging in nature, given that it covers both the physical networks over which information is carried, as well as the means to accessing those networks. For this study we have interpreted the term 'telecommunications' very broadly to include all the networks (cable, mobile, Internet, as well as copper wire) over which all types of information (voice, data, sound, image) are carried. So, although we concentrate on telephony networks, we also look at computer networks, the Internet, cable (TV as well as telephony), and wireless forms of transmission.

ETISALAT continues to improve its network capabilities every year. Its recent milestones include the successful completion of the next-generation Internet Protocol (IP) backbone network, and upgrading the telecommunications infrastructure by Siemens.

According to reports, the UAE will be the first country in the Middle East, and among the first few in the world, to introduce 3G services. The corporation is also preparing towards introducing sophisticated services such as MMS (Multimedia Messaging Service), a sophisticated technique in messaging, enabling users to send and receive messages with sound and motion pictures. ETISALAT, who is also the service provider of the region's first mobile satellite telecommunications venture, Thuraya, has successfully rolled out satellite telecommunication services in the country. Besides embracing superior telecommunications services in its infrastructure, the UAE is known to own a buzzing telecommunications hardware market in the region. With heavy competition in the local market, telecommunications trading houses are offering only the best and cost-effective products in the UAE.

A. TELEPHONE PENETRATION

Within the UAE, Etisalat has a fixed exchange line capacity of 1.4 million telephone lines – 100 percent digital – of which around 50,000 are ISDN in addition to the leased circuits. The number of telephone connections increased from 1,020,097 lines in 2000 to 1,052,930 in 2001, which represents a penetration of 34 lines per 100 inhabitants. The number for 2002 is estimated at 1,120,000,⁷ placing the country squarely at the top of the list in the Arab World, and among leading nations worldwide in telecommunications (refer to Table 1).

During the year 2001, Etisalat announced a substantial reduction in its tariffs. The ISD tariffs were reduced by a whopping 34% on average for 225 countries including some reduction of up to 79%. The proliferation of mobiles has decreased the dependency on payphones for many subscribers. Consequently, the number of payphones decreased from 28,839 to 28,623 over 2001.

⁷ Preliminary estimates from Etisalat headquarter.

TABLE 1. FIXED TELEPHONE LINES

Year	Thousands Subscribers
1997	835
1998	915
1999	975
2000	1,020
2001	1,053
2002 ^a	1,120
2003 ^a	1,195
2004 ^a	1,277
2005 ^a	1,362
2006 ^a	1,461

^a Estimates from Etisalat.

Etisalat was one of the first to introduce Mobile Telephones in the Middle East in 1982 and launched the GSM Service in September 1994. The subscriber base of 130,000 at the end of 1996 exceeds currently 2.3 million. The GSM service incorporates advanced digital communication technology with full roaming facility in countries where there exists a reciprocal agreement. The unique feature of the GSM cellular service is the subscriber's identity module (SIM) card, which is used to activate GSM handsets, and provides unprecedented levels of security and privacy combined with high quality transmission. Etisalat offers a portfolio of rich services and is considered one of the most advanced countries in the application of wireless technology. Following is a description of applications offered to UAE residents.

GSM International Roaming Service (GIRS) is a facility that allows subscribers to use mobile phones when they travel outside the UAE. This is possible because of roaming agreements between Etisalat and countries around the world.

GSM Ishaar Package is a combination of three GSM Value Added Services - GSM Call Waiting Facility, GSM Call Conference and Email Notification on GSM handsets via SMS Text. In addition, Etisalat's GSM Fax and Data Service allows GSM Customers (excluding WASEL) to send and receive fax and data using their mobile phones over the GSM Network at speeds of up to 9600 bps within the UAE or while roaming. The service enables GSM users to work from home, hotels or airport lobbies and constantly keep in touch with the office, colleagues or information sources. GSM users are able to send and retrieve fax and data from GSM, anywhere at any time. Conventional fax modem and plug-in telephone are not required. The service is excellent for business travelers, executives, entrepreneurs, transport, courier and computer companies.

Etisalat's Prepaid GSM Service, WASEL, ensures cost-effective and instant communication. The service is ideal for people who wish to keep in touch with their friends and relatives. International Roaming is also available for WASEL customers. Furthermore, Etisalat's messaging service AL MERSAL for GSM, and WASEL customers, is a combination of Voice Mail, Fax Mail and Short Message Service that includes SMS notification and SMS Mail.

RISALA (SMS Mail) is a service that allows GSM, and WASEL customers to send a short text message of up to 160 characters from their GSM handsets to other GSM subscribers within the UAE.

Etisalat's SMS Breaking News Service provides the latest breaking news in politics, business, sport or entertainment as it happens around the world. News content is provided as SMS alerts on GSM handsets. The service is available to GSM, and WASEL Customers.

Etisalat's EWAP Service and a WAP enable handset people in the UAE to have a more organized life. They can have the latest news, sports scores or stock positions. They can check out airline schedules, make a booking, pay their bills and carry out their banking all from their WAP enabled handset.

GPRS or General Packet Radio Service, is an innovative mobile data technology utilized for accessing information via GPRS enabled mobile phones. Etisalat has also launched prepaid GPRS, following the successful launch of postpaid GPRS at the start of 2002, which has so far attracted over 7,000 subscribers.

SMS 2 Fax & SMS 2 Email: A unique and convenient way to send SMS text messages to a fax number and to an email address. The facility allows GSM customers (Postpaid & Prepaid) to send a text message from their mobile to a fax number and to an Email address with a maximum 160 characters.

Mobile telephony has made giant stride in the UAE in a relatively short time, beating fixed-line telephony. The telecommunication sector in the UAE has undergone extensive development. At the end of 2001, there were 1.9 million GSM users indicating 62 % penetration rate, which is compatible to the most advanced countries in the world. At the end of October 2002, the number of mobile phone users rose to 2.33 million, or at 62.97% penetration rate. Compared to other countries of the Gulf Cooperation Council (GCC), which has a mobile penetration rate of 26.16%, the UAE penetration rate is more than double and stands on par with many Western European nations. Similarly, a 29.19 percent fixed line penetration rate and 24.86 percent Internet penetration rate place the country squarely at the top of the list, and among leading nations worldwide in telecommunications. In absolute numbers, the UAE, at 2.33 million mobile phones, accounts for slightly more than 10% of mobile phones in the Arab World (23.1 million phones.) In addition, the UAE mobile phone penetration rate is well above that of the world average, which stands at 17%.⁸

Currently, Etisalat is focusing on enhancing its service offerings for mobiles. EW@P, Etisalat brand name for its wireless applications protocol (WAP) service, was launched at the beginning of 2001. WAP is essentially a technology that puts a micro browser on the handset and a WAP gateway on the GSM network allowing the mobile subscribers to browse the Web in a text format. EW@P enables a vast range of value added services such as e-mail access, latest news, entertainment, financial information and location based services. By the end of 2001, nearly 150,000 customers had started using EW@P. Responding to this popularity, Etisalat has also launched the Arabic language WAP service (refer to Table 2).

TABLE 2. MOBILE SUBSCRIBERS

Year	Mobile (Thousands Subscribers)
1997	313
1998	492
1999	830
2000	1,428
2001	1,909
2002 ^a	2,361
2003 ^a	2,770
2004 ^a	3,150
2005 ^a	3,522
2006 ^a	3,854

^a Estimates from Etisalat.

In order to cater to the substantial growth in the telephone and mobile users in the traffic volume and in the product offerings, the support network has been suitably enhanced. The Intelligent Network (IN) capacity has been increased to cater to 2.4 million accounts. The Short Message Service (SMS) platform has been

⁸ Madar Research Group, Dec.2002-Jan 2003 issue.

increased to cater to 1,242 messages per second and a new voice mail platform has been contracted to serve one million accounts.⁹

Currently, Etisalat is focusing on enhancing its service offerings for mobiles. EW@P, Etisalat brand name for its wireless applications protocol (WAP) service, was launched at the beginning of 2001. WAP is essentially a technology that puts a micro browser on the handset and a WAP gateway on the GSM network allowing the mobile subscribers to browse the Web in a text format. EW@P enables a vast range of value added services such as e-mail access, latest news, entertainment, financial information and location based services. By the end of 2001, nearly 150,000 customers had started using EW@P. Responding to this popularity, Etisalat has also launched the Arabic language WAP service (refer to Table 2).

B. INTERNET

In a report issued in July 2000, the Economist ranked the UAE 18th in the world in terms of its Internet infrastructure. While the UAE fixed line subscription grew at an average of 5.2 % in the past five years (1997-2001), and Mobile telephony grew at a whopping average rate of 101 % for the same period, Internet users swelled by 169.6 % on average during the same period. This was due to many factors, including proliferation of Internet Cafes, lower subscription and connection fees, and the introduction of the Internet to all universities and many schools in the countries. At the outset, it must be noted here that individuals who accessed the Internet at least once (regardless of subscription and connection method) are defined as users, while mobile phone penetration is an indication of the number of individuals possessing a mobile phone subscription (an individual might possess more than one phone).

The history of the Internet in UAE goes back to the year 1995 when Etisalat, started providing Internet services to all categories of users, including academic, business, industry, and home users. Since 1995, the number of Internet users in UAE has grown exponentially and reached 256,000 subscribers by the end of 2001.

In March 2000, Emirates Internet and Multimedia (EIM)¹⁰ was established as a Strategic Business Unit within Etisalat to be the first Internet Service Provider (ISP) in the UAE. Even though a newly established unit, EIM has been playing a strategic role in quickly responding to the needs of Internet users, gaining a competitive edge by acquiring state-of-the-art Internet backbone and infrastructures, and enabling people of all walks of life to have access to the Internet.

UAE is the most wired nation in the Arab World and one of the top nations of the online world. With a customer base of about quarter a million, EIM has around 25 percent of Internet users in the Arab World. While the number of Internet subscribers is 256,000, the actual number of Internet users in UAE is about 900,000 users, and 29 % penetration, putting the UAE among the top 18 most wired countries in the world, even ahead of some Western European countries (Etisalat, Yearbook 2001). In addition to the dial up customers, Internet is also used by 427 leased line customers, 600 LAN connected subscribers and 7,511 Al Shamil subscribers. Also there were almost 1,000 Business One customers and 4,500 Web-hosting customers. Business One is a DSL service from Emirates Internet & Multimedia specifically developed for small and medium-sized businesses. Its objective is to provide high-speed internet access and web presence quickly, easily and cost effectively

The growth of Dial up service during the year 2001 was 46,688 subscribers. The recent trends show a decline in the rate of growth because the market is perhaps approaching the saturation stage, and because the launch of prepaid cards and the sprout of Internet Cafes give residents the option to dial up access without having subscription to the service. (refer to table 3).

⁹ Numbers are estimated by Etisalat.

¹⁰ www.emirates.net.ae

TABLE 3. INTERNET DIAL UP SUBSCRIBERS

Year	Thousands Subscribers
1997	27
1998	66
1999	127
2000	209
2001	256
2002 ^a	286
2003 ^a	316
2004 ^a	335
2005 ^a	345

^a Estimates from Etisalat

As mentioned earlier, the number of Internet leased lines was 427 at the end of 2001; this number is estimated at 567 lines for 2002 and, based on Etisalat's estimates, is expected to top 1,280 lines by the end of 2005.

Etisalat is upgrading their Internet access for home users by launching high speed access to enable them to enjoy speeds of up to 2Mb/s. The service is expected to go live this year (2003), offering customers the choice of 1Mb/s or 2Mb/s, up to six times faster than the existing Al Shamil service. The new Al Shamil 1Mb/s and 2Mb/s packages are targeted at domestic internet users who use the web extensively. These subscribers will have superior use of high bandwidth applications from video streaming to online gaming, whilst dramatically speeding up download times of large documents.

Al Shamil Cable will utilize Etisalat's HFC (Hybrid Fiber Coaxial) cable infrastructure, which is presently used to deliver E-Vision's digital cable television services. It will complement the existing DSL infrastructure, which currently delivers high-speed Internet access to homes over copper telephone lines. The experience of Al Shamil Cable will be identical to the existing DSL package, but will utilize a separate network than the current copper telephone lines. The key benefit of offering high speed Internet over the cable is that the service is not limited by distance, while it is not always possible to transmit high speed Internet over very long distances via the current telephone network.

In addition, EIM and E-Vision are working on a bundled package (Al Shamil Cable plus E-Vision's Basic Package). Although the pricing of the new service has yet to be confirmed, subscribers to the bundled E-Vision and Al Shamil Cable package will benefit from a discounted rate.

Al Shamil Internet allows users to access the Internet at speeds up to 10 times faster than the normal dial-up connection. With downstream speeds of up to 384 kbps and upstream speed of 128 kbps, the user is able to effectively use a range of hi-bandwidth applications, from video streaming to online gaming, that are generally slower to download on a Dial-up connection. In addition, Al Shamil gives users unlimited Internet usage with a fixed monthly subscription.

Business One is a ADSL service from Emirates Internet & Multimedia specifically developed for small and medium-sized businesses. Its objective is to provide high speed internet access and web presence quickly, easily and cost effectively.

Digital Subscriber Line, or DSL, is a new technology that transforms ordinary telephone lines into high speed digital lines for Internet access and other broadband applications. It can support downstream speeds of up to 8mbps and up to 1 mbps upstream, depending upon line length and conditions. DSL allows access to corporate networks for telecommuters, as well as exciting new on-demand multimedia applications such as software, video, music and games.

There are two types of general DSL applications: (1) High speed data communication: Internet access, telecommuting (remote LAN access), and specialized network access; and (2) Interactive multimedia: on-demand games, software, news, music and video

At the year end 2001 the total number of subscribers for this service was 946. Small and medium business customers of the Dial Up service, LAN Connect subscribers and Leased Circuit subscribers who require economical "Always On" Internet connections are switching over to Business One. Etisalat estimates the number for 2002 to be 3,260 subscribers. This number is expected to exceed 10,700 subscribers by the end of 2005.

At the end of 2001, the UAE had 4,500 web hosting customers. Estimates for 2002 and 2003 are 8,094 and 13,741, respectively. The number is expected to top 31,000 customers by the end of 2005.

In October 2001, E-SHOP, an online virtual business center, was launched by Etisalat and is available free of charge to customers who can, following a registration process, access and view their bills online and settle outstanding amounts using their credit cards. In addition, they can subscribe to Star Services and track the status of their applications. E-SHOP is a practical demonstration of a successful implementation of e-commerce applications provided by Comtrust, Etisalat's business unit.

The development of the telecommunication sector is a government priority and it is one of the fastest growing areas in the economy. The telecommunications market remains highly competitive, being dominated by government procurement.

C. ISPS AND ASPS

There is only one internet service provider (ISP) in the UAE. Emirates Internet has been the Middle East's first and foremost Internet Service since 1995, from Etisalat - the premier ISP in the Middle East. Its state-of-the-art technology, commitment to the customer, and constant improvement of its services has won it a rapidly growing subscriber base.

D. ACCESS

ICT infrastructure is available, reliable and secure; however, with respect to affordability, the UAE is listed among the most expensive countries in the Middle East in terms of cost of ICT services.

E. PC DISSEMINATION

Computer utilization is on the rise with current computer users moving toward upgraded and higher capacity computers. Recent industry reports indicate that the UAE ICT sector has experienced a ten-fold increase since 1997. Combined ICT spending by the GCC countries (including UAE) in 2001 was US\$ 6.194 billion (WITSA 2002). As of December 2002, the PC installed base in the UAE amounted to 490,000 units, with a penetration rate of 13.24 %. The number of PC Units purchasable per GDP per capita amounted to 18.19 percent in 2002.

Statistics recently released by Madar Research indicate that in the six GCC states, there are 121 users per 100 PCs, a ratio that appears to be set to change dramatically in view of the high computer literacy in the GCC region. The positive growth forecast has generated great interest among PC vendors operating in the region as they can now look forward to expanding their customer base and increased IT spending. The Internet has been a driving force for many people to buy PCs, laptops and notebooks. The excitement surrounding the Internet has become all pervasive and is reflected in the general trend for individuals to own a PC and in the mushrooming of Internet cafes. Sooner or later, these new converts are going to become PC owners, slowly bridging the gap between PC penetration and Internet usage.

According to early forecasts by International Data Corp, the UAE should cross the 200,000 PCs a year mark for the first time in 2003, In value terms, this would be around \$320 million, out of which the portable PCs would account for \$130 million. In 2002, the corresponding figures were \$280 million and just over \$100 million respectively. The growth predicted for 2003 belies the increasingly worst-case scenarios that have been painted in recent times for PC growth in the country. (Gulf New, Dec. 19th, 2002)

UAE packaged software market is estimated at \$190 million, and if combined with the market for customized packages it could be as high as \$550 million. Growth areas include a range of on-line services including tele-banking, financial and trading services, federal and local administration services, health care, insurance, electronic commerce, multimedia publishing, as well as services to the oil and telecommunications sectors (Gulf News). Additionally, the UAE Government is embarking on an ambitious e-Government initiatives aimed at improving government processes and service offerings by employing internet and other technological solutions.

The launch of Tablet PCs, while still a niche product, holds the promise of firmer margins for vendors in the short term. Already, notebooks represent the highest growth category, and are expected to expand by more than 25 per cent in 2003. Of the overall tally, notebook shipments in the UAE are expected to reach nearly 60,000 in 2002 for a total value exceeding \$100 million, according to IDC.

Supercomputing capacity in the Arab world were, and still are, primarily used in geophysical analysis associated with oil and gas exploration activities. The UAE is one of four Arab countries owning supercomputers. Abu Dhabi National Oil Company (ADNOC) has an SGI Origin 2000 (64 processors, 32 GB of memory and one terabyte of disk space) that enable the company to carry out large high-definition, comprehensive field reservoir simulations with great speed and precision. Abu Dhabi Company for Onshore Oil Operations (ADCO) has two SGI Origin 3000s, with 32-CPU parallel processing supercomputers used for reservoir simulations. These offer 3-D seismic explanation to aid in the most advantageous placement of wells, thus maximizing oil and gas output. ADCO has also created the first Virtual Reality Environment Center, which is powered by a four-CPU, 8 GB SGI ONXY supercomputer designed specifically for heavy duty graphical output. Finally, Zakum Development Corporation (ZADCO), another oil company in Abu Dhabi, has one 16-CPU SGI Origin 2000 supercomputer machine and a multiprocessor SGI ONYX 3200.

In general, the UAE has one of the most advanced automated systems in the private and public sectors, whereby all financial institutions, academic entities, governmental agencies, and public service departments are equipped with technology from Web fiber optic all the way to PCs, minicomputers, databases and office tools.

IV. ICT CAPACITY BUILDING

A. AWARENESS AND DISSEMINATION

The UAE takes a leading place in terms of ICT awareness and dissemination of the ICT culture. To facilitate the dissemination process, several initiatives have been undertaken to contribute to ICT capacity building. To raise ICT awareness and increase ICT dissemination, for instance, the Emirates Internet Association was established in June 2000. The Association is the first of its kind in the UAE and supports and coordinates the use of the internet for personal and corporate IT developments.

Emirates Internet and Multimedia (EMI), recognized as the best ISP by the Middle East Information Technology Award for 2001, is dedicated to providing state of the art and best of class services. During 2001, EIM launched Al Mawrood Internet Surfing Centers, M-Player Arabia and re launched the high speed Al Shamil service and bilingual portal Al Bahhar.¹¹

¹¹ www.albahhar.com.

- (a) Al Bahhar, the new value packed bilingual portal, provides Arabic users with their essential information needs covering news and current affairs, business and sports, over one million pages of Arabic literature, history and philosophy, text based Arabic discussion forums and English language news content. The launch of Al Bahhar has been immensely popular with more than one million hits per month;¹²
- (b) Al Mawrood Internet Surfing centers facilitate access to Internet for users of all ages. There are currently 100 such centers all over the UAE and the number of growing. In January 2002, and in collaboration with Galaxy kids, EIM launched ALEFON, the interactive Web learning channel for children and parents. ALEFON provides introduction to reading, writing and mathematics through animated stories and makes learning fun. The launch of www.alefon.albahhar.com is the latest in a line of recent UAE initiatives aimed at facilitating and popularizing Internet usage in the country;
- (c) In October 2001, EIM launched M-Player. Arabia.com, the region's first multiplayer games community site with over 20,000 registered users. This facility provides a wide range of classic games, support for popular PC games and allowing users to play against one or more players over the Internet;
- (d) Future plans of EIM include the launch of several interesting applications such as TV based Video on Demand, Online Distance Learning and Education, Online Travel, Business News and Financial Information Center, Internet Kiosks, Internet Executive Workstations, Web Design Centers, Online Games and Entertainment and Internet Home banking.

B. COMPUTERS IN SCHOOLS

One of the primary goals of the UAE government is economic diversification into the non-oil sector. Therefore, the government has implemented policies and programs to encourage citizens to pursue higher education, specifically training in engineering and information technology. Primary, secondary, and higher education is provided gratis to all Emirati citizens. To meet the challenge of the evolving telecommunications and computer industries in the UAE the government places a strong emphasis on education.

Computer and information technology is being taught as a subject in UAE schools at all levels – starting with primary schools and going all the way through high schools. Currently, a number of committees established by the UAE Ministry of Education and Youth are in the process of developing a computer based integrated curriculum where computers are taught as a subject, in addition of integrating computer based education in other subjects.

The Elementary and Secondary Education Development Committee at the Ministry of Education and Youth has mapped out a plan to reorganize the Resources Centers at government schools for the benefit of students with special needs.

The step comes in line with a comprehensive vision laid down by the committee to improve special education services at government schools, along with introducing e-learning projects and other electronic plans into the UAE's educational sector.

C. VOCATIONAL TRAINING

Emphasizing technical education/vocational training to bridge the gap between the skills possessed by college and high-school graduates and skills required by the labor market, with particular attention to

¹² www.emirates.net.ae.

engineering and sciences qualifications, is a requirement for a successful ICT strategy. In addition, developing human resources is certainly fundamental to put the country on the right ICT track. There is a broad consensus that schools and the education system are the basic tools needed to provide gradual greater comfort with the digital environment.

Hundreds of students who leave schools before finishing their secondary education are taking courses in institutions such as the Abu Dhabi National Oil Company's Career Development Center, whose aim is to train them for technical positions within the oil industry.

The Emirates Institute for Banking and Financial Studies focuses on providing training for personnel within the financial sector. The Higher Colleges of Technology are also involved in the provision of vocational education.

Early on, the UAE government realized the importance of technical and vocational training for its citizens - both male and female - so that they could help in meeting the demands of the local job market.

To help meet these demands, in 1988 a system of Higher Colleges of Technology was set up. These offer a more technically oriented course of study. As in the university and the government schools, tuition at the Colleges is free and curriculum has been produced in consultation with potential employers such as banks, airlines and the local oil industry. In 1992 when the first group of students graduated, they had little or no difficulty in finding jobs.

A new Certificate and Diploma program was introduced in 1995-96, which offers a year-long course of basic studies for those who lack adequate preparation to enter the four year Higher Colleges course.

Additional technical education and training is also available in institutions such as the Dubai Aviation College, the Emirates Banking Training Institute or the Career Development Centre of the Abu Dhabi National Oil Company.

Outside the government sector, there exists a wide range of private vocational training schools with an enrolment of thousands of students. A number of these teach in the language of one of the expatriate communities living in the UAE and follow the curriculum of their countries. For example, there are English, French, German and Urdu schools preparing children for life in their home countries.

In the last few years, a number of universities and colleges from overseas have begun to offer partial or full degree courses through affiliates in the UAE. This means that a full range of education is available for both citizens and expatriates.

D. UNIVERSITY EDUCATION

The UAE authorities officially recognize only six universities, even though 33 private universities reside in the country. UAE students comprise only about 10-15 percent of enrollment. Higher education is provided free to all citizens. In addition to these higher education institutions, Etisalat has placed much importance on the development of engineering education and training facilities particularly, in the field of communications, in order to encourage the reliance on indigenous sources. In this direction Etisalat College of Engineering, has remained dedicated to the engineering education of Nationals and has already produced more than 200 graduates. This institution has served as an important source of National engineers who are appointed in management cadres in the Corporation and some are sent abroad for postgraduate specialization.

Table 4 shows the number of students graduating in the various IT fields, from the major universities and colleges in the UAE:

TABLE 4. IT GRADUATES IN THE UAE

Graduation Year	University	Number of Graduating Students in a Certain Major				Higher Diploma	Diploma	Certificate Program
		MIS	Computer Science	Computer Engineering	IT			
1997-1998	HCT					70		249
	UAE University		2					
1998-1999	HCT					141	171	525
	UAE University		95					
1999-2000	HCT					176	201	305
	UAE University		131					
2000-2001	Sharjah University	50	20					
	HCT	17		1	28	171	314	593
	UAE University		174					
2001-2002	Sharjah University	61	24	35				
	HCT	23	13	27	61	222	330	856
	UAE University		139					
2002-2003 (Fall 2002)	Sharjah University	74	28	33				
	HCT	13	7	13				

^a Estimates from Etisalat.

V. BUILDING THE ICT SECTOR

As stated earlier, country readiness is defined as “initiatives facilitating the change in the transformation process” into an information/knowledge society. In this section, a number of initiatives are presented and their impacts are discussed.

A. ICT FIRMS

A large number of ICT firms operate in the UAE, including major multinationals such as Microsoft, Oracle, HP, Sun Micro system, Cisco, etc.. The distribution of companies by sector appears in table 5.

TABLE 5. DISTRIBUTION OF ICT FIRMS ON SECTORS

Sector	Percentage
Web-based companies	34
IT support	22
Software development	17
Application Service Providers	6
Back Office	8
Consultancy	6
Others	7

^a Estimates from Etisalat.

1. *EBTIKAR*¹³

Etisalat's specialist Card Manufacturing Unit - EBTIKAR, is a sophisticated, state-of-the-art cards manufacturing unit set up by Etisalat in 1996 to tap the exponentially growing card/applications market. This is the only factory of its kind in the Middle East which has its own manufacturing and personalization center for a variety of cards - memory cards, microprocessors and magnetic cards for multimedia applications within diverse industries such as telecommunications (pay phones, GSM, Internet, WAP), social security, health etc. EBTIKAR also attend to the pre-personalization requirements of clients such as the art-work and design of the cards..

Prepaid cards provide a popular currency for the communication culture encouraged in the UAE. The production of prepaid cards, smart cards and GSM SIM cards in Etisalat's Ebtickar Card Systems has nearly doubled from 45 million cards in 2000 to 82 million cards in 2001. The number of 2002 surpassed 110 million cards.¹⁴ The capacity has been enhanced from 70 million cards per year to 130 million cards per year. Ebtikar's business clientele has expanded both nationally and internationally over the past two year. International clients now include Omantel, Zanzibar Telecom – Zantel, Nation Link (Somalia) and Mobitel (Sudan). In UAE, Ebtikar boasts prestigious clients such as Thuraya, Dubai Economic Department, Dubai Municipality and Sharjah Police. The Corporation realizes the potential of card business and its contributory value of facilitating e-commerce, mobile and international telephony.

2. *Data Services*

The demand for data services continues to grow, 44% in 2001, primarily through ATM, Frame Relay, leased circuits and ISDN connections. Revenues from data services contribute up to 7% of total revenues of Etisalat. The major drivers of growth were ISDN facilities, SMS & Al Mersal messaging services, ADSL services and EMIX. Data Services are expected to continue growing due to tariff reductions and introduction of new services. Virtual Private Networks (VPN) has shown much promise.

During the year 2001, the ISDN Basic Rate service was at 2,954 connections, and estimated at 4,565 for 2002 and 4,259 for 2003. The growth rate of ISDN service is likely to be affected when the public acceptance for ADSL AL Shamil increases more.

3. *EMIX*

Emirates Internet Exchange-EMIX is the first Network Access Point (NAP), private or public in the Middle East and one of the first NAPs in the Africa and Asia Region. The stated mission of EMIX is to become the Regional hub providing all neighboring countries with access to the Internet via Fiber Optic at competitive prices.¹⁵

EMIX is developing its network to meet ISP's current and future requirements in the region by increasing its bandwidth to reach 1.1 Gbps by the beginning of 2003. In addition to Etisalat's own EIM, other customers include Internet Service Providers from Pakistan, Zanzibar, Sudan, Kuwait and Oman.

4. *Data Center – eIDC*

In a bid to gain market share in the international hosting market, Emirates Internet and Multimedia (EIM), the Internet Service Provider business unit of Etisalat, announced in July 2002 the launch of their hosting service. Co-location and Telehousing are to be the first Internet hosting services to be offered under the 'EIM Hosting Service' brand.

¹³ For more information on this facility visit http://www.etisalat.co.ae/html/business_div/ebitkar.htm.

¹⁴ Data is from Etisalat

¹⁵ www.emix.net.ae.

For the first time, both national and international companies and organizations are offered the use of the new 'EIM Hosting Service' at the Etisalat Data Center (eIDC). The state-of-the-art eIDC will facilitate the operations of customers' IT hardware and software in a controlled environment, enabling efficient management of their own applications (e.g. ERP and Web sites).

Co-location allows corporate customers to rent space at the eIDC in the form of cabinets, secure cages or enclosures in which to install their own server(s), provide electricity, and high-speed connectivity to the Global Internet. Telehousing customers can choose the same options, but will interconnect their equipment directly to disaster recovery centers or any other location they wish.

The EIM Hosting Service offers a set of services named "remote hand service" such as power cycling, environmental control, and tape backup insertion. These are just a few of the options available. As more companies move to the UAE to conduct business, they will find an e-infrastructure that supports the most demanding of requirements. EIM Hosting Service allows companies from around the world to place their servers in a controlled environment close to their customers in the Middle East. This will dramatically reduce the time it takes for regional customers to access the sites and will increase reliability.

The new service is targeted at large corporations who rely heavily on their Internet presence in the region and need to ensure a minimal risk of 'downtime' or security threats. In addition, companies this service for disaster recovery

EIM Hosting Service also provides physical security such as restricted access to the site and CCTV, which is heavily deployed to protect the servers. A controlled operations environment in which to operate the servers keeps the servers at exactly the correct temperature with fire protection systems in place to guard against damage.

Etisalat Internet Data Center, eIDC, has been established in two locations, Abu Dhabi and Dubai, as a best of breed physical and technical environment to provide centralized redundant repository for secure data processing, storage management and dissemination of data for telecommunication. Services offered at both locations include Secure Housing Option with a Virtual Data Center, high availability storage option with guaranteed quality service, content hosting distribution option. Utilizing clusters deployed at regional data centers for quick response, consultancy option, systems security option and secure solution with VPN hardware and software. In addition, eIDC offers application option and WAP content and applications to its customers.

5. EDCH

The aim of Emirates Data Clearing House (EDCH) is to provide an efficient means of exchanging billing and accounting data (TAP files) between the GSM service providers as per the GSM MoU standards. EDCH eliminates the need for each GSM operator to establish multiple electronic links with every roaming partner (multiple destinations). Instead, EDCH provides a single point of support to service providers, and offers a range of services associated with international roaming.

Emirates Data Clearing House, the only such facility in the region, is being increasingly used by international GSM operators, and currently serves around 16 operators in 12 countries handling around 136 million calls during the year.

6. Thuraya Satellite Telecommunications Company

Thuraya offers cost-effective satellite-based mobile telephone services to nearly one third of the globe. Through its dynamic dual mode handsets and satellite payphones, Thuraya will enhance freedom of movement and connectivity. Thuraya's US\$1 billion regional mobile telecommunications via satellite (GMPCS) system will help meet the need for affordable, high-quality mobile phone services to urban hubs as well as remote communities.

Through partnership with leading national telecom and mobile communications companies, Thuraya provides blanket-to-blanket coverage to 99 countries in Europe, the Middle East, North and Central Africa, the CIS countries and South Asia: a landmass inhabited by an estimated 2.3 billion people.

Subscribers can access Thuraya's mobile satellite system through service providers, who are either be national GSM network companies or local telecom operators. Thuraya in fact, complements national GSM networks, allowing subscribers to remain connected to their national mobile networks, and to access Thuraya's system whenever their preferred national network is out of reach.

Thuraya offers satellite, cellular (GSM) service and location determination system (GPS) in a single dual mode handset that is lightweight, elegant and easy to use. The dynamic handset offers voice, data, fax and short messaging services.

Thuraya was founded in the UAE in 1997 by a consortium of leading national telecommunications operators and international investment houses. The turnkey project was built by US satellite manufacturer Boeing Satellite Systems formerly Hughes.

The Thuraya-1 satellite was successfully launched on board a Sea Launch Zenit-3SL rocket from the equator in the middle of the Pacific Ocean on 21st October 2000. The launch was a record success, as it was the first satellite initiated from the Middle East and also the satellite was the heaviest to be launched ever.

Designed for a lifespan of 12 to 15 years, Thuraya's satellite is in geo-synchronous orbit, positioned 36,000 kms above the earth, at 44 degrees east above the equator. The Thuraya system includes a second satellite that will be launched in early 2003 while a third satellite is contracted to Boeing Satellite Systems to expand system capacity. The Primary Gateway in Sharjah, UAE, serves the entire Thuraya coverage area, and plans are underway to establish additional national gateways at other locations as necessary.

After the successful launch of its first satellite in 2000, Thuraya has made considerable progress in preparation for a full service launch. Driven by the advantages associated with Geo-stationary satellite systems such as lower cost per minute, wide area coverage and long life of satellite. Thuraya has already signed about 50 Service Provider Agreements and launched its services in several countries including UAE, UK, Italy, Sudan, Qatar, France, Romania and Denmark. Thuraya mobile phones are dual mode in that they can operate as a GSM phone when there is a GSM signal. In addition, Thuraya phone offers voice, fax, data and short message service (SMS) and can even pinpoint its position using the GPS facility.

7. E-Vision--Emirates Cable TV Multimedia (LLC)

The end user services for Internet, telephony and entertainment are breaking loose from their dependency on distribution network. In the future, advanced television sets, hybrid terminals and hand held equipment would be used for making calls, watching videos and television programs, accessing the Web, and even as a computer. The Emirates Cable TV and Multimedia (LLC), branded as E-Vision in UAE, is a strategic investment that has made significant progress over a period of less than two years. Currently E-Vision offers 100 national and international television channels, ranging from movies to sports and documentary to music. In keeping with the diversity of UAE, E-Vision offers a choice of programs in 14 different languages and in a variety of affordable packages. In addition to a full range of free to air channels, ART Cable, Show Time, Cable Plus and A la Carte options, E-Vision is investing in the future of the community; it has created two exclusive channels e-junior for children and e-xplor as a documentary channel that are tailor made to the tastes and requirements of its customers in the UAE. E-Vision provides the highest quality services on the first fully digitalized cable telecommunication system in the regions, utilizing hybrid fiber coaxial network and transmitting programs with enhanced picture quality. The network that is owned by Etisalat and partially leased to E-Vision has already reached several thousand homes in Abu Dhabi, Dubai and Sharjah. E-Vision is now focusing on its programming and marketing efforts and has entered into agreements with re-sellers like Jumbo Electronics and Eurostar. In addition, it has entered into co-marketing agreements with National Bank of Abu Dhabi and Standard Chartered Bank. E-Vision plans to introduce

“pay-per-view” (PPV) services, on around 16 channels very shortly. In addition, a Broadband Fixed Wireless Access (B-FWA) system is being considered on a trial basis for Al Ain to provide a very cost effective and time efficient wireless solution.

8. *E-Marine--Emirates Telecommunication Marine Services FZE*

E-marine is a wholly owned subsidiary of Etisalat, which operates two cable ships Umm Al Anber and C.S. Etisalat for submarine cable installation, repair and maintenance projects. Because of E-Marine’s extensive experience in local and international submarine cables, and because of its geographically strategic location, regional customers find its services reasonably priced and of high quality. Recently E-Marine has started focusing its resources on the oil and gas sector and has successfully completed a major project in submarine power cable installation for Zadco.

B. INVESTMENTS IN ICTS

The UAE information and communication technology investment witnessed a host of healthy activities in the past four-five years. This manifested itself in terms of major contracts and projects, both in numbers and values. Among the Arab countries, the UAE market comes second to Saudi Arabia in terms of investment in ICT and amounts to \$1.245 billion in 2002, which constitutes 1.77 percent of the GDP, and \$336 per Capita in 2002.

1. *Dubai Internet City*

Dubai Internet City's (DIC) objective is to nurture the growth of the new economy and the IT industry as a whole, by providing a cutting-edge, high bandwidth, internet services and telecommunications, intelligent infrastructure, real estate, company registration and facilitation, to support any level of service a client might wish to use for efficient operations. The City, which completed its first phase (in 2001) in a record 364 days, gives tenants a technology platform fit for the 21st century. It also fulfils the vision of the government of the UAE to provide the e-world with a world-class ground base for every virtual company.

Dubai Internet City has already attracted more than 450 firms,¹⁶ mostly international companies operating in various IT industry sectors. The number of companies applying to work in the City has run well beyond preliminary expectations. The interest of the international IT industry in the City culminated in decisions by many leading firms, such as Oracle, Cisco, Microsoft, Siemens and IBM, to set up their facilities there. The City is well equipped to play a pivotal role in supporting and promoting IT related activities within a vast geographical area covering the Gulf, Middle East, the Indian Subcontinent, Central Asia, North and South African countries.

The City is also keen on creating an ideal environment for growth and flourishing of IT projects. An environment wherein software and multimedia developers, IT firms, communications companies, service providers and suppliers all work side by side, thereby providing a solid base, not only for the growth of operations of each company within the City, but also for the creation of new business opportunities.

Companies operating within the City enjoy a set of investment promotion incentives including 100% foreign ownership of projects, corporate tax exemptions, streamlined government procedures, 50 years land lease contracts, competitive prices for rendered services, cost effective business sites, in addition to facilities for financing, training, education and research.

The initial DIC complex was established at an estimated cost of \$272 million, provided by the Dubai Government in the form of land in a prime area of Dubai; in addition, the Dubai government is the guarantor

¹⁶ According to Dr. Omar Bin Soleiman, the CEO of DIC, the number of registered partners as of December 15th, 2003 is 450.

of a \$500 million loans put together by a consortium of banks for the purpose of completing the infrastructural support for the project¹⁷; this will ultimately act as an “incubator” for e-commerce in the region. It is estimated that private investors, representing 450 firms, some of them from American, European, Asian, and Australian business communities, would spend three times the amount contributed by the Dubai government to set up their own businesses at the complex. In terms of eligibility, all Information Communication and Technology (ICT) companies who would like to expand their operations to cover the foot-print of Dubai Internet City.¹⁸

Benefits from the DIC project have many spillover effects; for partners,¹⁹ it enhances the chances of success, raises credibility, helps improve skills, creates synergy among client-firms, facilitates access to mentors, information and seed capital. In addition, DIC offers more than 1,000 different services to their partners starting from a pick-up at the airport, issuing of visas, to providing cleaning service of their facilities! The most benefits, though, DIC offers those businesses opportunities for acquiring innovations and interacting with other businesses that might support, complement, or even compete with them in the same geographical area. From the Government perspective, DIC helps promote regional development, generate jobs²⁰ and incomes, and becomes a demonstration of the political commitment to SMEs. As for the local community, in addition to job creation, DIC has created an entrepreneurial culture, especially among young university graduates.

Recently, H.H. Sheikh Maktoum bin Rashid Al Maktoum, Vice President and Prime Minister, issued in his capacity as Ruler of Dubai, law no 6 for 2002 on the establishment and protection of the Dubai Internet City's telecommunications network. Issued on November 10, the 12 article-legislation has set out missions the DIC should carry out in cooperation with other concerned authorities to provide telecommunications services to individuals and companies via a fiber optic network, and land and air stations.

2. *Technology Parks*

Technology parks may be part of urban development plan and encompass: a university; research laboratories, which may be associated with firms or research institutes; new technology firms, including start-up SMEs; testing and analytical facilities; a variety of services for technology transfer; financing association; governmental agencies. The first of its kind in the Gulf region (announced in October 2002) Sheikh Mohammad Technology Park's (the Park) purpose is to support its tenants by playing two main roles. Firstly, provide tenants with technological support, involving ready access to relevant and up-to-date technological knowledge, through contact with a university research center. This is what we call “technology brokering”. Secondly, the Park will support its tenants by establishing and providing business linkages, advice and services as well as general assistance. The latter function, in particular, could cover a wide range of contacts, ranging from basic building refurbishment and maintenance, secretarial and administrative services, advanced business and financial counseling to accessing sophisticated research equipment and instrumentation.

The Park is envisioned simultaneously as an effective instrument for local development and technology transfer, stimulators of innovation and seedbeds for new business enterprises. It is hoped it will create enormous success in employment creation, new technology generation, and as catalyst for enterprises.

¹⁷ The project is to be completed in seven phases; as of the time of this writing, phases one, two and three have been completed and work on phase four is undergoing.

¹⁸ At early stage in the project, initial investment was set at 500,0000 dirhams; but in an effort to help young entrepreneurs, this requirement was reduced to 1,000 dirhams.

¹⁹ DIC refers to tenants as partners.

²⁰ Dr. Omar told the researchers that DIC has created more than 8,500 high tech, professional jobs, in addition to thousands of jobs in support services.

The Park has been designed and developed after years of extensive research, and as part of phase one it will be located in Jebel Ali Free Zone, covering a land area of 3 kilometers square. The Park is a clear indication of the UAE, in general, and Dubai, in particular, strategic focus on its role as an international information technology center. Through the Park, the country will utilize the gains made in both technology and knowledge-based systems in a specific and focused way, which when channeled and applied to industry will benefit the region as a whole. The Park will enhance the development of the knowledge-based economy, providing a wide range of opportunities for technology companies. It is designed to develop industrially-based knowledge economy 'clusters.' These clusters are developed in strategic industrial sectors that will stimulate economic growth and ultimately boost the competitive edge in the region. Clusters will include a range of Research and Development & product development companies, laboratories, incubators, training institutes, technology transfer and technology acceleration organizations. The focus of the Park will center on 'demand-driven' industrial technologies, such as desalination.

Companies providing services associated with industrial technology from across the United Kingdom, Switzerland, Japan, USA and Korea have also expressed interest and will potentially bring with them a range of activities that include laboratory services, renovation services for industrial plants, university research and technical services and engineering and R&D projects. The Park will also focus on attracting business accelerators, consultancy firms and venture capital groups in addition to manufacturing and industrial companies. High Tech services such as design, consultancy, prototype production of incubated innovations, industry and spin-offs will also hold viable positions in the Park. In addition, environmental management companies will focus on water resource management, biosaline products & technology, pollution management and control systems, recycling industries and 'clean energy' industries such as solar and wind technology. Health technology businesses will concentrate on Biotech products and processes, pharmaceuticals and medical devices and equipment.

The Park is in the process of forming strategic alliances with a number of local universities and research institutes. International organizations such as the International High Technologies Consortium from Russia have indicated their interest. The Park is also in the process of forming strategic ties with potential investment organizations and banks.

Renowned services sector in the country is also expected to see business increase as the Park develops. Furthermore, the type of industrial companies in the Technology Park will potentially provide benefits to both the UAE and the region in terms of the study of pollution, improved safety automation with tailor-made intelligent control systems and an improved supply of components through central warehouses for desalination and other industries and components.

Especially important for long-term development of the country and the region are the employment opportunities that the Park will offer. In line with Dubai's focus as a proponent of the High Tech and new education strategy, and with the cooperation of universities locally and throughout the region, skilled national graduates in specialized industries will be able to find lucrative employment in the Park's industries. The Park will not only raise the expectations, skills and abilities of the region's workforce, utilizing local talent as a source of long-term competitive advantage, it will also bridge the gap between industrial viability and the application of knowledge.

3. Dubai Silicon Oasis

On December 29th, 2002, General Sheikh Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and UAE Defense Minister, announced the establishment of the Dubai Silicon Oasis (DSO) for the global semiconductor industry. Spread across 6.5 million square meters, DSO will also encompass the US\$1.7 billion Dubai factory of Communicant, the joint venture between Intel, the Dubai Government and the German government of Brandenburg State. Germany's project cost US\$1.35 billion, and the DSO construction will begin within six months after finalizing the designs by experts including designers of other silicon parks. Construction of the Dubai-based Communicant plant will start within two years and production should commence by 2007.

In collaboration with the German IHP technological center, an Institute of Technology will be set up at DSO to train and develop local technical expertise. DSO will offer several programs with initial focus on communication and system-on-chip design complimented on technology management. Dubai Silicon Incubation Centre (DSIC) at DSO will provide a facility for broadband and wireless incubation for the development and commercialization of intellectual property and will help create regional enterprises at the top end of the technology spectrum.

The incubation center will partner with several high-end global research and development centers and educational institutions. A portal will be based at DSO to provide career management and recruitment services to the global semiconductor industry professionals. Around 320 companies will be able to access it.

As for the agreements with Communicant project partners, it is reported that 240 UAE nationals will be provided with masters studies in microelectronics within ten years and another 250 nationals will be trained over a period of 12 years in IHP and the Germany-based Communicant on two-year contracts. (Gulf News, Dec. 30th, 2002).

C. GOVERNMENT FACILITATION

During the past few years, the UAE has made great progress in liberalizing its economy; according to the “2003 Index of Economic Freedom,” released on November 12th, 2002, the UAE ranks 24th worldwide, second Arab country after Bahrain with a rank of 16th. The Index of Economic Freedom measures how well a country scores on a list of 50 variables divided into 10 areas of economic freedom. These include trade policy, banking regulations, fiscal burden, foreign investment codes, monetary policy, and black market.²¹

With respect to the ICT sector, the government of the UAE has developed a number of policies in order to attract ICT firms and facilitate their ways of doing business in the UAE. Dubai Internet City, for instance, is the first complete IT and Telecommunication Center to be built inside a free zone. Companies are exempt from income tax. In addition companies in the DIC can avail of special terms not previously available for free zone companies in the emirates. The key special terms are: (1) 100% foreign ownership of companies is allowed, without a local sponsor; (2) 100% tax free; and (3) companies may obtain 50 year renewable land leases.

Currently, the newly established Dubai Development Investment Authority is assuming the role of attracting investments to the UAE and encouraging the development of local SMEs. It does not provide capital allowances to support investment by SMEs in ICT; however, it acts as an incubator for ICT SMEs. In addition, the country does not have any provision for tax breaks or credits for ICT training by businesses, something that should be encouraged.

Recently and in December 2002, Sheikh Abdalla Bin Zayed AL Nahyan, Minister of Information and Culture, issued a ministerial decree annulling fees on computer programs in a move to help promote the spread of computer software especially in the field of education and to keep abreast of the global advances in IT sectors

VI. APPLICATIONS IN GOVERNMENT ESTABLISHMENTS

In a recent UNDESA report ‘Benchmarking E-government: A Global Perspective’, the UAE ranked first in the Arab world, and 21st globally, in the introduction of e-government. According to the report, the UAE was ahead of countries such as Japan, Austria and Malaysia. In addition, in a recent governance study (World Bank) comparing governance indicators of countries, the UAE has ranked very well in the region, and relatively well globally, on indices such as ‘Government Effectiveness’, ‘Regulatory Control’ and ‘Control of Corruption’.

²¹ Refer to 2003 Index of Economic Freedom Report by the Heritage Foundation and Dow Jones & Co.

A. COMPUTERIZATION OF PUBLIC ADMINISTRATION

Computerization in public administration has been going hand in hand with e-government and e-procurement plans in the UAE. The most striking applications are those of the emirate of Dubai.

The United Arab Emirates has, in the past 12 months, made momentous advances in bringing its government services online, for both business and individual users. Behind this evolution are two aspects fundamental for the development and success of e-government initiatives in the developing world; these are the political determination of UAE leaders and the availability of pertinent resources.

Criteria for evaluating e-government progress are: levels of integration, plus customization of basic e-services on a single government gateway. The UAE's performance in these areas is still low. A worthy initiative is the Dubai government Web portal (www.dubai.ae) which allows access to services of various government departments, but without integrating these services, or presenting them on a single user-friendly or user customizable interface.

The portal, www.dubai.ae, was launched in October 2001, and has undergone several improvements since. The portal included a comprehensive list of online services available through Dubai Government Websites, a search facility, downloadable application forms for government services, an ePay service, as well as eJawaz, which will allow the user to use all public services without having to register with each relevant government department separately. ePay will allow users of government services to pay all charges electronically through a single site. This portal has the infrastructure required for the integration of all government services, but government departments have not yet made full use of this infrastructure.

The e-government initiative has accelerated the adoption of e-services by many government bodies to an extent that the UAE ranks 21st worldwide in a United Nations report which evaluated e-government performance by 190 countries in 2001. The initiative – the most advanced of its kind in the Arab world – marked a new phase, characterized by a strong drive towards improving the country's ability to provide government services through the Internet.

As the initiative has gained momentum in the administration of the public sector, it has increased the pace at which government services have been coming online, wider segments of the household, business and government sectors are feeling the benefits. The online availability of government services has made it much easier to access related information and has drastically reduced the time required – by businesses and individuals alike – to carry out transactions with government bodies. The benefit to government comes in terms of increased efficiency, and ultimately reduced expenses on provision of public services.

B. DIGITIZATION OF INFORMATION

There is no concrete information available concerning the extent of digitization of information in the UAE; however, some macro trends are indicative of a positive move toward digitization in the country. The ICT revolution in the UAE is multifaceted, encompassing a wide range of areas such as computer hardware and software, high-speed transmission of information by relay stations, satellites and fiber optical cable and digitization of information not only by words and data but also by sound and video, and generating new business applications such as computer aided designs and tele working. These technological advances resulted in explosive growth of the use of mobile phones, fax machines, Internet and e-mail, e-commerce and business. The economy of the emirate of Dubai, and to a lesser extent, Abu Dhabi is the leading exponent of these trends.

Digitization of information in the UAE is viewed as a wealth creating activity that drives the economy and global trade. It is observed recently that more work is being structured around the networked computer. Even social life, all the way from e-mail, to that has been moving at a fast pace in the United Arab Emirates. College students in the UAE, for instance, are able to become part of an on-line nationwide student directory, one of the features of a new website devoted to students' interests. The website, www.students.inuae.com, is in the process of being created by the Abu Dhabi-based Wafa Internet Development Services, a division of

Wafa Technical Systems Services. The official launch of the site, however, is likely to be in the third week of September (2003). The website is divided into nine basic sections, ranging from education and a discussion forum to entertainment and fashion.

C. E-GOVERNMENT PLANS

Since the UAE government has moved toward implementing the eGovernment project, the Ministry of Finance & Industry started to offer online services to its customers and the public through the new electronic services which are eProcurement and eSinaee, where the customer can register, select the service and apply, fill the forms, upload the documents and pay online using the eDirham card and finally receive the services. The e-procurement provides a mechanism for government agencies and businesses to transact electronically. This is the first step towards government e commerce. We are in the midst of further reviewing the “supply-chain process” within the government. By re-engineering the supply chain systems we will eventually create a total “Electronic Procurement” where this application will be linked to our financial and asset management system.

The eSinaee is an application specially introduced to the factories within the UAE. Factories owners not only have the latest information regarding industrial promotion but also apply for tax exemption and other industrial services.

The introduction of all the above services has created awareness on the importance of information technology for easing government administrative services. More importantly, this has laid the path for the introduction of the overall e-government implementation. Much has been learned from the initial application implemented. Among those is the importance of having an overall e government strategy in place.

Given the commitment from the highest authority in e-government, a high steering committee has been formed to drive this project. One item was clear among the members of this committee that is “Information Technology” should be used as a tool to re-invent and reform our current “management” of the government.

It is worth nothing that Dubai Municipality announced at the end of November 2002 an agreement with the Emirates Telecommunication Corporation (Etisalat) whereby Etisalat will provide a secure payment gateway for paid services provided by the municipality, using solutions from Comtrust, the eCommerce arm for Etisalat.

When this project is completed, Dubai Municipality’s entire paid services will qualify for stage four as per the four-stage framework; it is currently at stage three. This will make the municipality the first government department in Dubai to fully qualify for the fourth stage. Among companies operating in Dubai, 635 establishments currently possess usernames for the online services of Dubai Municipality. The municipality's website now handles an average 2,000 transactions per week, 22 percent of which are carried on outside regular working hours.

The eGovernment project will improve the convenience, accessibility and quality of interactions between the Federal Government, business and the people residing in UAE. More importantly, Electronic Government will improve information flows and processes within all government Ministries.

The systems and processes of government will be re-engineered to capitalize on the potential benefits of new ICT applications. This process re-engineering will redefine the way each government department performs its tasks in the new ICT environment. It is hoped that the introduction of Electronic Government will result in the following outcomes:

- (a) Innovative Services;
- (b) Managed government information as a strategic resource;
- (c) A government that is closer and more transparent to the people and businesses;
- (d) Functional integration within the government;
- (e) Effective information flow to facilitate policy development and implementation.

To manage this project effectively we have phased out this initiative into 3 phases:

- (a) Phase 1: Creating a E Government Strategy;
- (b) Phase 2: Contracting out the chosen e government application;
- (c) Phase 3: Implementation the chosen e government application.

Phase 1 of this project is underway and hopes to be completed by June 2003. We have a selected an international management consulting firm to guide us in this first phase.

The E Government initiatives will eventually be the central catalyst that will integrate all government entities towards realizing a single vision.

D. E-PROCUREMENT

At the present time, most of the e-procurement initiatives are concentrated in the emirate of Dubai, and especially in the public sector; though the penetration rate in the private sector has been gaining ground. In a major move towards e-procurement, in May 2001, the Dubai Ruler's Court directed that all of the emirate's 24 departments will, in three months, start using Tejari.com's online marketplace to order their requirements of goods and services. The move towards online procurement would result in greater efficiency and lower costs for the public departments. The Dubai Government's move to online procurement through Tejari will enable all public departments to link up with a wider base of suppliers through a secure platform. The unified purchasing will be optimized through Tejari to take advantage of greater competition in the market and more efficiency in integrated Internet procurement.

VIII. APPLICATIONS IN EDUCATION

It is well known that the transition to a knowledge/information economy can generate demands on the educational system beyond the mastery of basic subject matter, numerical proficiency and literacy. Success in the knowledge economy requires behavioral skills such as the ability to think critically and to be equipped for life - long learning -much of it informal—a constant upgrading of skills. The success of worthy regional IT initiatives depends not only on setting up IT Councils, investing in R&D of the new information infrastructure, or creating the right legal environment. These are necessary but not sufficient conditions. It is equally, if not more, important to improve the skills of the human resource component in the country. Developing human capacity and creating human resources, must be a primary task for the state, however tempting it is in the short term to import skilled labor instead.

To help narrow the gap between the educational system and the requirements of skills needed in the work place, and in its efforts towards the development of skilled labor force, a number of initiatives to attract and to develop skilled workers undertaken by the federal and local governments recently are worth mentioning here. Efforts of the government have been aimed at three different, but complementary, directions:

- (a) attracting a pool of skills from the region;
- (b) developing the national talents through a sound educational system;
- (c) fostering executive training programs.

Currently, nationals comprise only between 15 and 20 percent of the population and even less of the labor market. The IT labor market is composed primarily of expatriates. Over the last decade, the UAE has become the hub for telecommunications and information technology in the Middle East and is therefore attracting IT professionals from around the globe. The UAE is very receptive to inflows of educated business people (both men and women); as a result, the expatriate community is one of the largest in the world. What makes the UAE attractive to IT professionals is the proximity of the country to India and Pakistan, from the East, and Egypt and Jordan, from the West, countries with abundant IT skills. An exact estimate of the number of local IT professionals entering the market each year is unknown; however, there is not a significant risk of “brain drain”. Considering the UAE is the hub of information technology in the Middle East the opposite is true. More college graduates shun the private sector and prefer to join family businesses or seek work in the public sector. Nationals make up almost 70 percent of the government labor

force while expatriates primarily populate the private sector. Recently, the United Arab Emirates has been seeking a plan to creating some 100,000 job opportunities for the UAE citizens during the five coming years in order to limit the rate of foreign labor force employed in the country which reached a very high percentage.

A. E-LEARNING

To meet the challenge of the evolving telecommunications and computer industries in the UAE the government places a strong emphasis on e-learning. By developing and instigating a number of initiatives, the UAE has made a great progress toward executive training in IT and related fields in the past few years through a number of e-learning initiatives. One such initiative is Knowledge Village (KV).²² Knowledge Village is an ambitious initiative aimed at building a vibrant connected learning community that will develop the region's knowledge workforce and catalyze new economic growth and development.

Knowledge Village, with facilities covering an area of a million square feet, will provide a complete environment and infrastructure for a variety of organizations to create and disseminate knowledge, and to help SMEs. Construction of the physical infrastructure will be completed by the third quarter of 2003. It will house a diverse community of knowledge-focused organizations. These include a Media Academy, an Innovation Center, eLearning institutions, institutions that provide graduate and post-graduate education, research and development organizations, a multimedia library, corporate training institutions, scientific and technology institutes, certification and testing organizations and incubators.

One of the key objectives of the Knowledge Village is to raise the abilities of the region's knowledge workforce to compete and innovate in the global economy. The learning community at Knowledge Village will facilitate increased access to world-class learning opportunities in a variety of disciplines for student and corporate communities through e-learning.

The Village will have a 'brick-and-click' infrastructure that supports both traditional and new modes of learning. Members of the learning community will have access to a host of shared facilities. These include modern classrooms and computer labs, a multimedia library, auditorium and conference facilities, information technology and media laboratories, retail area and dormitory.

Another e-learning initiative was undertaken in June 2002, when Dubai Internet City (DIC) announced its joint venture with eCollege from the United States to form "Knowledge Access," a company that will make education more accessible to the Gulf region and surrounding areas. Knowledge Access is located in DIC and will provide technology and support services for academic institutions and corporate training organizations to build full online programs.

B. E SCHOOL PROJECTS

Many of the world's top schools and colleges have realized the importance of e-education as a means to pass on knowledge and prepare young people for future challenges. The so-called cyber-school has become a necessity rather than luxury in many parts of the world, including the UAE where the Internet City is established, paving the way for a real revolution in information technology. The need for graduates who are trained to deal with computers and to work on the Internet is no more just an option for a young man or woman. It has become a must for all types of jobs in the next five years. The establishment of the first accredited online university, as part of the newly established Dubai Internet City, is something unique in this part of the world. The pre-university system must undergo great development to ensure that secondary school graduates fit the requirements of new types of universities and education.

In the past 10 years educators have been bemoaning the poor outcome of the public education system, and the lack of experience among graduates which was badly needed by the private sector, the main source

²² See www.kv.ae.

of employment. Currently, all public schools for boys and girls in the UAE are connected to the Internet and equipped with IT laboratories. Each secondary school is equipped with 35 workstations and cameras which help in monitoring and follow-up processes, in addition to Netfinity servers and color printers. Sheikh Mohammed IT education project is a perfect example in place; it has demonstrated that the connection to the Internet has been of great service, not only to students but to teachers, schools and parents in facilitating the supervision of students' academic achievements as well as monitoring courses. The wired school system helps parents access their children academic records from any place in the world as well as see their children through the cameras fixed in the laboratories. The various IT projects are not only designed to raise the students' academic level but to cultivate a new generation of young people with IT expertise, enhance the level of teachers and to enhance the role of school administration.

The primary mission of cyberschool projects in the UAE is to offer IT education with all possible courses through the Internet. These projects are aimed at providing a collection of high school credit courses offered entirely over the Internet to students in the UAE. The program will allow interaction among students in the emirates with every one of them having an email address and password that allow him/her to log into the system from his/her terminal in the school of home. The benefits of such projects are still very hard to estimate since they are still at a very limited stage of implementation.

It is worth mentioning here that one of the authors of this report²³ was appointed by the Minister of Education and Youth as a chair of a committee whose purpose is the incorporation and integration of IT and computer literacy into the schooling system in the UAE, from Kindergarten to grade 12. The Committee will submit its recommendations to the Ministry next fall, and once the report is acted on by the appropriate authority, it is expected that the plan will be put into effect with the start of the 2004 school year.

C. VIRTUAL UNIVERSITIES

One of the first virtual universities in the UAE is Knowledge Village's Dubai Police's E-TQM College that was inaugurated this past October (2002). Dubai Police has been at the forefront of Dubai's drive towards e government. With the E-TQM College, it is taking the lead in eLearning, which helps the workforce better negotiate the learning curve involved in providing e government services. E-TQM will provide total quality management courses online to professionals in both private and government sectors and to SMEs. Another Knowledge Village based project is the agreement announced this past September (2002) between Purdue University and Village, and which calls for Purdue to offer its top-ranked International Executive MBA program to the Gulf region from Knowledge Village. The International Master in Management (IMM) program is a collaborative executive program jointly offered by four leading business schools in the United States and Europe. Apart from Purdue University, these include Netherlands-based Tias Business School, The Budapest University of Economic Sciences and Public Administration, and the Europe-based ESCP-EAP. The program is ranked 17th worldwide among Global Executive MBA programs.

An important initiative in the "skill development" category is the "Mohammed Bin Rashid Establishment for Young Business Leaders"²⁴ (the Establishment) which is responsible for coordinating a comprehensive program that aims to favorably impact and influence the perception of Dubai Nationals towards entrepreneurship and lower the barriers of entry for new entrepreneurs. The Mohammed Bin Rashid Establishment for Young Business Leaders was launched on June 12, 2002 as the first initiative of the Dubai Development and Investment Authority. The vision of the Establishment is to nurture the domestic entrepreneurial spirit in Dubai and catalyze the development and growth of a key sector of the economy, the Small and Medium Business sector. The core mission of the Establishment is to "encourage and facilitate the development of local businesses and entrepreneurial activity in Dubai. To this end, the Establishment offers various incentive measures and well coordinated programs to the local business community.

²³ Dr. Zeinab Shalhoub was appointed the chair of this Committee on January 2003.

²⁴ For more details, refer to the Establishment site at www.sme.ae.

Notwithstanding the magnificent accomplishments the UAE has achieved in the past few years, a recent UNESCO report lists the UAE among the countries at risk for not achieving universal primary education by 2015.

VIII. APPLICATIONS IN COMMERCE AND BUSINESS

The UAE has perhaps the best-developed physical and IT infrastructure in the region. The continued rapid development of its e-infrastructure through initiatives like the Dubai Internet City and Technology Parks will further increase the UAE's attractiveness to overseas companies.

The popularity of credit and debit cards is steadily gaining ground as evidenced by double digit growth rates in the number of cards in circulation and the level of spending using electronic mediums, reported by various card companies in the UAE. This is clearly contributing to growth in electronic commerce transactions.

A. EXTENT AND MATURITY OF E-COMMERCE AND E-BUSINESS APPLICATIONS

Whilst the dot com bubble may have burst, the digitization of the economy and commercial transactions is slowly but surely gaining momentum. As businesses face increasing competition, they are forced to enhance the quality of service to improve response time and curtail costs. E-commerce helps to achieve all this. Comtrust is Etisalat's brand name for the Business Unit dedicated to the development of e-commerce in the UAE. Against all odds and global depression in this sector, Comtrust has enjoyed two years of substantial growth, developing new alliances and establishing networks to lay the foundation for future growth. In August 2001, the Central Bank of the UAE decided to link Comtrust's e-commerce systems with its UAE exchange network. This link helped facilitate payments for goods and services through direct debit requests processed in a secured environment and transmitted over the Internet. Online payment services are at the heart of Comtrust's activities with more and more organizations opting for these services to support their online business. Financial transactions made through Comtrust have seen a six fold increase during 2001 (www.etisalat.co.ae).

Some of the services that are currently in place are:

1. *Web-Sites Development*

This is the first step towards being a customer focus government. Information and services pertaining to each Ministry is posted in the UAE Government website. The general public or businesses can interact and transact their needs over these web sites. This web site developed maintained and hosted by the Information Systems Department of the Ministry of Finance.

The introduction of these websites became the catalyst for the integration of various government services offered by various Ministries. By just clicking to a single web site (www.uae.gov.ae) the public can navigate through the entire Federal Government and also understand what are various services offered by the different Ministries. Important information is always updated and this website itself has undergone major improvements.

2. *Electronic Mail*

Electronic mail was introduced to improve communication between employees and also to reduce paperwork. Almost all employees have an e-mail account and this has tremendously improved cycle time for making decisions. In some Ministries e-mail has replaced the normal "internal memo" as a formal tool for information dissemination throughout the Ministry.

The introduction of electronic mail has also created much needed awareness on the importance of "information technology" in creating an effective government. This mind set change has become one of the most important impetus for introducing a government wide e-government initiatives.

3. *Business-2-Business*

On 20 June 2000, a major Business-to-Business Marketplace was established by the Dubai government-Tejari.com. This service is for all business-to-business (B2B) e-commerce transactions in the UAE. It is a private venture owned at this time by Ports, Customs and Free Zone Corporation. Tejari has quickly become the premier digital marketplace in the Middle East and has proven a success story for e-commerce implementation in the region.

(a) *Tejari.com*

As part of Dubai's drive to embrace the knowledge economy, Tejari.com was established in June 2000, based on the directives and vision of his HRH Sheikh Mohammed Bin Rashid Al Maktoum, with the aim of facilitating B2B e-commerce in the region. Tejari Marketplace was incubated at the Jebel Ali Free Zone Authority to be the electronic gateway for 1,200 Free Zone companies that serve the region in many different trade commodities. The project was then spun off to cater for the government procurement as a priority for the following reasons:

- (i) Dubai government is the biggest buying power and it is technology ready;
- (ii) Another initiative launched close to this timing was the e-government and one area of collaboration with the trade community was the government to business, since the government buys from these traders it was obvious that the marketplace will affect the G2B part of the e-government initiative;
- (iii) This approach will create the critical mass once the proof of concept was demonstrated by the government purchase through this marketplace.

Tejari's mission is to maximize the business potential of regional customers by providing them with innovative, reliable, and versatile B2B and e-marketplace services that extend their reach and enhance their competitive standing in the new global economy. It provides an online meeting point for buyers and sellers of goods and services. Procuring products through Tejari.com allows buyers to access a global base of suppliers, while reducing paper-based administrative costs. Companies that sell goods and services through Tejari.com instantly reach new markets and customers online.

Based on the Oracle® technology platform, Tejari.com allows organizations to search online catalogues, create auctions, perform spot-buys, and participate in reverse auctioning. Tejari.com uniquely enables companies to reap the benefits of e-business: improved efficiency, faster time to market, better customer awareness, and increased profitability.

Tejari's target market includes business and government organizations that actively trade in goods and services within the region, which including Turkey, the Indian sub-continent, North & East Africa, has a combined foreign trade volume of US \$590 Billion and a total GDP of approximately U.S.\$1,190 Billion (1998). Tejari's market is segmented into:

- (i) Government and Semi-Government Organizations (e.g. ministries, public services departments, municipalities and national companies);
- (ii) Large Businesses (e.g. global companies, manufacturers, producers, agents and financial institutions);
- (iii) Trading Companies (e.g. business groups, and commodity traders operating on a local or regional level);
- (iv) Small Businesses (e.g. business organizations with smaller trade requirements).

During a challenging business climate for the B2B industry, Tejari has come out as a clear winner. The Tejari workforce has more doubled in the last two years to reach 42, the number of auctions being conducted on Tejari is doubling every month, and the value of the Transactions and Auctions has reached more than

\$100 million end of 2001. Tejari's total transaction value since inception had exceeded 500 million dollars as of quarter one 2003 for 8,000 auctions and 4,000 spot purchases. Tejari now has over 1,500 trading partners transacting. Tejari, which started from the UAE, is now aggressively expanding into the rest of the Middle East and Africa region, through local partnerships with influential private and public sector groups. In June 2002, Tejari had signed its first partnership with Jordan. Tejari has also moved significantly in covering the different commodity types on the Marketplace. Currently there are regular auctions and transactions for Computers, IT & Office Equipment, Stationery, Automotive and Spare parts, Pharmaceutical, FMCG, Office Furniture and Building & Construction material. Other commodities are rapidly being catalogued and uploaded on the Tejari Marketplace by eGlobal and Cataloga, our two catalog management partners. The Supplier Adoption rate of Tejari has been one of the highest in the world according to our catalog management partners.

Tejari enables its customers to extract the full benefits of business-to-business transactions from spot-buying to auctions/tenders and RFQs. Tejari is also adding new functionality to enable Logistics Support, Supply Chain Management, Project Management and Design Collaboration to provide a comprehensive suite of services to its customers. By providing an on-line medium to connect, communicate, and collaborate with suppliers, buyers and trade partners, Tejari aims to create value for customers by helping them streamline business processes, reduce costs and ultimately increase revenues.

Success of Tejari in the Middle East can be attributed to many factors. A firm commitment and backing by the Government of Dubai for its procurement needs; a strong and experienced management team led by an accomplished and charismatic Chief Executive Officer; a well orchestrated marketing campaign to establish a strong and well known brand around the region; and a successful business model which leveraged existing trading partner relationships and demonstrated immediate savings.

At GITEX 2000, the premier IT conference and exhibition for the Middle East, Tejari received two awards from publishing group ITP: Best Business-to-Business Marketplace and the Best Personal Achievement award for Tejari's Chief Executive officer, Shaikha Lubna Al Qasimi. Tejari has also been featured at the World Economic Forum in Davos this year and at the Oracle Apps World in Paris earlier in 2001. The World Economic Forum also recently accepted Tejari in their reports as one of the regional champions forum in the category of Technology Pioneers.

The tyrannies of geography, culture and language are significant barriers to company's international trading objectives in the Middle East - Tejari removes these obstacles, saving time for suppliers and dramatically reducing procurement costs for buying organizations. Tejari provides a host of benefits for both suppliers and buyers – in fact anyone involved in the procurement process.

Tejari provides the most technically advanced electronic procurement environment available today, including features such as:

(a) Catalog management, hosting & search facilities

- (i) Tejari enables manufacturers/suppliers to post their products and services they sell on the marketplace;
- (ii) Suppliers can easily load their catalogs through online HTML authoring screens, spreadsheet loaders and XML interfaces;
- (iii) In Tejari, they can even load pricing, that is applicable to all marketplace members or optionally, load buyer specific pricing for one or more of their customers;
- (iv) Suppliers can review, approve and audit their catalog data in the marketplace;
- (v) Products and services listed in the catalogs can be searched by: product type, brand, supplier, country etc.

(b) Spot buying

- (i) Buyers can source products using the powerful search features of Tejari or through its Trading Partner Directory;

- (ii) Buyers can even compare products prices on-line.
- (c) *Contract purchases*
- (i) Both buyers and suppliers have access to a full suite of HTML inquires to check order status, history and related information;
 - (ii) It will also support payment via P-card or on account.
- (d) *Auctions and Tendering (reverse auctions)*
- (i) Tejari supports both seller and buyer auctions;
 - (ii) Other features include: Auto extension, multiple bidding, open/sealed auctions etc.
- (e) *Supply chain management*
- (i) Tejari allows trading partners to view inventory levels, in order to rapidly fulfill purchase needs;
 - (ii) Using Tejari, buyers and suppliers can improve forecast accuracy by enabling collaborative demand buying;
 - (iii) Tejari members can improve end customer service levels across a ‘virtual supply chain’ by instituting collaborative order promising processes.

Together with the creation of the Dubai Internet City and the formation of the Dubai E-Government initiative, Tejari.com aims to sustain a viable e-business strategy for organizations in the Middle East. Furthermore, it is believed that Tejari will break even by the end of 2003.

B. AVAILABILITY AND QUALITY OF E-BANKING

UAE banks may not yet be using e-signatures on a regular basis but have come a long way in the past few years as the realization of the importance of automation and the liberalization of markets forced them to fast track their technology adoption.

Today, many of the UAE banks have underlying technology systems that can match or outstrip their international peers and have cashed in on the lack of technology legacy to do so. While western banks wishing to go aggressively on line may face the problem of harmonizing existing technology infrastructures with those of the future, many UAE banks had only manual back office operations and hence have been able to adopt world-class technology systems from the outset without having to upgrade existing networks or infrastructure.

But the speed of the automation process – some 20% of local banks already have full transactional e-banking services and many more are developing them — has brought with it fears and concerns about the level of associated security and the extent to which local banks are aware of the security implications of going online.

As any other government all over the world, the traditional accountability on “control and measure” lies with the Ministry of Finance. Thus this became one of the important applications introduced to automate financial services provided by the Ministry. The Ministry is currently using a central financial system through the WAN using NCR UNIX Platform.

This system is now undergoing major changes as the Ministry of Finance is introducing the new “Performance Base Budgeting System” where accountability is now decentralized. All financial processes will be re-engineered and “financial personnel” re-trained” on how to operate this new system. All financial processes have been reengineered and are now reviewing the right IT application to be implemented, are being reviewed currently. We hope this system to be on-line by the end of 2003.

1. *E-Dirham*

The eDirham (<https://edirham.uae.gov.ae>) is a payment tool devised by the Ministry of Finance & Industry in order to facilitate collection of federal revenues, providing the government with a secure payment method and providing the public with a convenient payment tool. The eDirham card which is readily available all over the UAE not only improve the financial transaction but also provide “in-situ” transfer of payments between the public and government agencies. Front service government employees do not have to burden themselves with the security of “physical money” and with this system the government could balance the revenue by the end of the day without looking at the physical books.

The eDirham has its own secure payment system guaranteed by the government and the payment card can be use for any government services. This project has been very successful and we have inquires from many other countries in this region to implement a similar system.

IX. APPLICATIONS IN HEALTHCARE

At present the UAE Government finances 81 per cent of the cost of health care. The federal Government and Abu Dhabi emirate have taken steps to begin the privatization of healthcare and several initiatives are taking place as a joint effort between the Ministry of Health and the UAE Offsets Group (UOG).

A. DATABASES FOR NATIONAL HEALTHCARE

Most of the technology related initiatives in healthcare are concentrated in the emirate of Dubai. In February 2003, the Dubai Municipality, one of the key units of Dubai Government, has selected MEDICOM to provide “e-Medical Certification System” at the Dubai Municipality Clinic, as part of its ongoing process to establish e-governance.

Established more than half a century ago, Dubai Municipality is the principal body of the Dubai Emirate to provide civic services, currently with more than 10,000 staff working in over 20 departments. It serves companies in Dubai that apply for occupational health cards and medical certificates. With the Dubai Government opting for “e-Governance”, the Municipality has put in place expansion plans to enhance the efficiency of the current resources and to manage the large volume of applications and clinical services through the use of IT services. MEDICOM will provide a web-enabled software application to aid the business processes of Dubai Municipality. Use of web-based technology would mean that Dubai Municipality could e-enable the services offered to the residents. MEDICOM’s implementation will help process of issue and renewal of medical certificates, occupational health cards and medical examination certificates by tracking the clinical procedures at the Municipality Clinic. It will also provide clinic treatment and consultation activities for the Dubai Municipality staff, patients and dependents. MEDICOM targets the implementation at the Clinic in a record time of 6 months to cater to the overall objectives laid down by the Dubai Municipality.

The UAE Ministry of Health will soon be launching a new e-service to allow online applications for license renewals by doctors, technicians, private medical institutions and health-related advertisements. This e-Government service should save time and cost less.

B. TELEMEDICINE AND MEDICAL USE OF TELECONFERENCING

In line with its policy to adopt the latest in medical technology, recently a wide-ranging telemedicine service aimed at improving patient care and reducing the cost of foreign travel has been undertaken in the UAE.

In 1999, and fully aware that information technology can be of major assistance in improving efficiency, the Ministry of Health engaged in a project to develop a central database at its premises in Abu

Dhabi linking all hospitals, health centers and medical zones in the country. The initial cost of the project was Dh 120 million; in addition the Ministry also implemented a Dh 70 million plan for modernizing its computer network and a Dh 4 million project to replace medical equipment incompatible with the new platform. It has also modernized medical registration services, particularly in Al Ain hospitals, laboratory testing and administrative services at a cost of Dh 40 million. The Ministry also prepared a database on psychiatric services in all medical zones in preparation for developing these services.

Early in 2002, in an effort to improve patient care, Al Mafraq Hospital (in Abu Dhabi) opened a wide-ranging telemedicine service. The system links Al Mafraq Hospital to the Mayo Clinic in Minnesota and enables the exchange of digitized data and high-resolution, diagnostic video images. Al Mafraq Hospital is also purchasing an electronic medical records system, which will make it possible to establish physician-to-physician contact via the telemedicine link.

The telemedicine system will enable physicians at Al Mafraq Hospital to consult 1,600 physicians and scientists at the Mayo Clinic and its associates in Minnesota, Arizona and Florida. Consultations will initially focus on cardiovascular diseases, but the scope will quickly be broadened to cover microsurgery, orthopedics, dermatology, oncology and other disciplines. The Mayo Clinic will also establish similar links with Al Jazeirah Hospital in Abu Dhabi and Tawam Hospital in Al Ain. The Ministry for Health also plans similar links at other hospitals including Al Qasimi Hospital in Sharjah, Al Baraha Hospital in Dubai and Al Ain Hospital.

X. DIGITAL ARABIC CONTENT

Arabs make less than one percent of the world's 500 million Internet users. In the UAE 28 percent of the population use the Internet. Recent research on the ICT sectors in the region sounds the alarm that Arab nations still endure serious digital divide with their international counterparts. It is not the matter of being well educated or computer literate, but the increasing rates of people who lack the ability to have a personal computer.

A. ARABIC VERSUS ENGLISH CONTENT OF THE WEB

While the spoken dialect of the people of the UAE is Arabic, given the fact that more than 80 percent of the UAE residents are expatriate, English is spoken and understood by the majority of the people of the UAE. Nevertheless, Arabic remains the language of written communication, including newspapers and educational material. But the complexity of Arabic has yet to come to terms with IT, a lingo-centric technology favoring English and other Latin alphabet-based Indo-European languages. Arabization of network interfaces and software still slows new product appearances. The lack of enforced standards in Arabization and keyboard layout persists, causing further delays in product integration, despite the 1985 recommendations of the Arab Standards and Metrology Organization.

A common concern, and the focus of much effort in the UAE, has naturally been the Arabization of software. The large regional population, and the localized utility of Arabic, guarantee a substantial amount of work and market for Arabized software products. An Arabic computer standardized code (ASMO-449) was established in 1985 under the Arab Standards and Metrology Organization (ASMO) and the Arabization Coordination Bureau, specialized organizations under the Arab League. However, both groups died of political and budgetary problems and the codes have not been updated, resulting in a proliferation of many new codes and additions.

Creating an awareness of Internet usage requires efficient initiatives to facilitate people's access to the web. Lacking an Arabic content is a factor deterring ICT usage in the Gulf region. An overview of the region's Web sites and their audiences impels the caveat that much of the region's browsing attention has been historically focused outward, mainly to American entertainment sites, news portals, and chat groups. Browsing of foreign Web sites accounted for most Arab traffic at the Internet's dawn in the region, because

local content was scant and online Arab audiences hailed from elite Anglophone strata. This trend is rapidly changing, however. The trendy UAE-based portal Arabia.com has seen a turnaround in audience traffic. Two years ago, 80% of visits dwelled on the portal's English-language content. Today, 60% of its 1.5 million monthly users browse and chat in Arabic. Al-Bawaba.com, the Middle East's premiere portal for news and original content, traces 26% of its visits to Saudi Arabia and the Levant alone, compared to 11% from North America and less than 10% from Europe.

Recent forecasts for Internet usage in the Arab Middle East show pockets of rapid growth in the Gulf States, especially the UAE, with longer-term horizons for substantial uptake in the more populous countries of the eastern Mediterranean and North Africa.

The "Arabization" of Web content and computer interface is a major driver of Internet uptake in the region. New users hail mainly from the region's lower- and middle-income classes, for whom foreign language mastery remains a luxury; nevertheless, computers are becoming more accessible. A meaningful contingent also hails from the more affluent sector, particularly in the UAE, where proficiency in English is not necessarily a prerequisite to a comfortable standard of living. This group has had ample opportunity to use the Internet but has been deterred by a relative lack of Arabic-language content.

Online businesses looking to penetrate or expand their market in the UAE will find it increasingly difficult to meet their objective if they didn't provide their Web content in the Arabic language, according to findings by the research arm of the leading Middle East Web portal, Ajeeb.com.

A new study by *Ajeeb Research Unit* (April 2003) found that the number of Arab Internet users who could not thoroughly benefit from Web content unless it was provided in Arabic was dramatically increasing. The study estimated that half of all Arab users – or 2.5 million – would lie in that category before the end of the current year. With an annual increase of about five to seven percent they will become by far the dominant group in a few years' time.

The Internet in the Arab World is not anymore the realm of the elite, who are as proficient in English as they are in Arabic. While regional users who are proficient in English constituted 99 percent of the regional Internet community in 1995, today they stand at only 55 percent. While the English language remains an important medium for Arab users in a global village environment, it should not supersede Arabic, especially when a Web site is mainly or partially meant for Arab users. As the drive for the digital transformation, which is led by the UAE, continues to fuel IT and telecommunication infrastructure projects, more of the ordinary people with lower skills in a second language start to join the Internet community.

Furthermore, there are some newcomers who are making their way to the Internet, such as housewives. As the culture in many Arab countries still forces a good portion of women to leave school after just a few years of schooling, their increased use of the Internet will push for a trend of more Web sites offering pages in Arabic and in a simpler format and style, especially in the online shopping business. Consequently, despite globalization, the need for more Web sites in Arabic is only a reflection of a global trend for web pages in native languages and less reliance on English. The development of government web sites and the move towards e-governments in the region are also encouraging the use of Arabic in regional sites. This, in turn, is encouraging more Arabs to use the Net.

B. OBSTACLES FOR DEVELOPING DIGITAL ARABIC CONTENT AND WAYS FOR REMOVING THEM

Issues associated with developing digital Arabic content are not country specific. They basically apply to all Arab countries, and such, they will be discussed in general, not specifics. Many believe that the lack of availability of Arabic content and tools are one of the main reasons for the low rate of penetration of ICT infrastructure and applications in the Arab world. Web share of the Arabic content does not match the importance and spread the Arabic language enjoys in the world where more than 300 million people speak the language. Lack of standards for Arabic code and data exchange formats and reluctance by many educated

Arabs to engage in communicating in Arabic for business and professional transactions have also reduced demand for the Arabic language content within the region.

Active steps towards encouraging the production of Arabic content should be taken. Steps involve the establishment of conditions for development of digital content and local multimedia industries including intellectual property right provisions, promotion of tools for the management of Arabic language, including Arabic domain names, as a means for promoting multilingualism and investment in projects aiming at the promotion of this objective. There is also a need to stimulate the interest of various Arab governments in creating the appropriate regulatory, technical and political environments to encourage the development of Arabic content. Some movements have taken place in this direction such as the Arab Digital Economy Initiative and the Muscat Declaration.

Annex 1

INFORMATION SOCIETY INDICATORS FOR THE UNITED ARAB EMIRATES

Indicator	Y2000	Y2001	Y2002
1. Basic Background Indicators			
1.1 Population	3.21 mil.	3.52 mil.	3.7 mil.
1.2 Area	82,880 KM ²	82,880 KM ²	82,880 KM ²
1.3 Density	27	29	31
1.4 Urban population		87%	
1.5 Adult Literacy	94.4%	94.7%	95.1%
1.6 Poverty	N/A	N/A	N/A
1.7 GNI per capita	\$17,700	\$22,800	\$21,100
1.8 GDP Growth	2.9 % average		
2. Telecom Infrastructure			
2.1 Fixed lines (total)	1,020,097	1,052,930	1,120,000
2.2 Domestic (lines per household)			
2.3 Urban (%)	N/A	N/A	N/A
2.4 Waiting list (total number)			745
2.5 Waiting time (average)	N/A	N/A	N/A
2.6 Total Revenue (\$)	\$583 million		
2.7 Cost of local call (\$ per 3 minutes)			
2.8 Cost of call within region (\$ per 3 minutes)			
2.9 Cost of call to US (\$ per 3 minutes)			\$4.11
2.10 Number of fixed lines operators			
2.11 ISDN lines		21,983	24353
2.11.1 Initial cost (\$)			
2.11.2 Monthly charge (\$)			
2.12 DSL lines		8,700	
2.12.1 Initial cost (\$)		\$54	
2.12.2 Monthly charge (\$)		\$295	
2.13 Leased lines	427	450	567
2.13.1 Initial cost (\$)		\$750	
2.13.2 Monthly charge (\$)		\$1800	\$750
2.14 Cable			
2.14.1 Initial cost (\$)			
2.14.2 Monthly charge (\$)			
2.15 Outgoing traffic (minutes)		963.3 million	
2.16 Incoming traffic (minutes per subscriber)			
2.17 Mobile lines	1,428,000	1,909,000	2,557,679
2.18 Number of mobile operators	1	1	1
3. Media Infrastructure			
3.1 Radios	318 per 1,000		
3.2 Television	292 per 1,000		
3.3 Satellites			8
3.4 Daily Newspapers	7	7	7

4. Computers and the Internet			
4.1 Personal computers	400,000	420,000	490,000
4.2 Personal computers in education			
4.3 Percentage of computers that are networked	13.2 %	25.5 %	
4.4 Internet subscribers	209,000	256,000	286,000
4.5 Internet users	765,000	976,000	1,175,000
4.6 Internet hosts	42,962	46,546	52,332
4.7 ISP's	1	1	1
4.8 ISP monthly charges (\$)		\$13	
4.9 Telephone usage charges (\$)		0.00	
4.10 Available national bandwidth		620Mbps	
4.11 Hosting availability		4500	8094
4.12 Secure servers		31	
5. ICT expenditure			
5.1 Telecom expenditure (million \$)			\$1.245billion
5.2 IT expenditure (million \$)	\$720 million		s
5.3 Percentage of GDP (%)			1.77%
5.4 ICT per capita (\$)			\$336
6. Capacity building			
6.1 Scientists and engineers in R&D		N/A	
6.2 R&D expenditure (% of GNI)		N/A	
6.3 ICT related university graduates per year		1791	
7. ICT government and business environment			
7.1 e-readiness index		High	
7.2 e-government index		High	
7.3 IPR enforcement		High	
7.5 Compliance with WTO		High	
7.6 Basic telecom agreement		No	
7.7 Reference paper			
8. Laws and regulations			
8.1 Patent law		Available	
8.2 Trademark law		Available	
8.3 Copyright law		Available	
8.4 IT Agreement		N/A	
8.5 e-Commerce law		In Progress	
8.6 e-Signature law		In Progress	
8.7 Piracy rate		N/A	
9. ICT Policy			
9.1 ICT strategy		Available	
9.2 ICT Plan of action		In progress	
9.3 National initiatives		Many	