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**ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)**

**NATIONAL PROFILE OF THE INFORMATION SOCIETY  
IN THE UNITED ARAB EMIRATES**

United Nations  
New York, 2009

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## ABBREVIATIONS

aeCERT	UAE Computer Emergency Response Team
AII	Arab Innovation Index
AUS	American University of Sharjah
BSI	British Standards Institution
CERT	Centre for Excellence for Applied Research and Training
DIC	Dubai Internet City
DIFC	Dubai International Financial Centre
DSO	Dubai Silicon Oasis
eHDF	eHosting DataFort
EIDA	Emirates Identity Authority
EIM	Emirates Internet and Multimedia
EMI	Emirates Media Incorporated
FOG	Fiber Optic Gulf
FNOC	FLAG Network Operations Centre
GCC	Gulf Co-operation Council
GFH	Gulf Finance House
ICT	Information and Communication Technology
IDB	Islamic Development Bank Group
IDN	Internationalized Domain Names
IFIC	Iran Foreign Investment Corporation
ISI	Information Society Index
IT	Information Technology
MOFI	Ministry of Finance and Industry
MoH	Ministry of Health
NGN	Next Generation Network
NAP	Network Access Point
PPP	Public Private Partnerships
RTA	Road and Transportation Authority
SMBs	Small and Medium Businesses
TECOM	Technology E-Commerce & Media Free zone
TRA	Telecommunications Regulatory Authority
VoIP	Voice over Internet Protocol
WHO	The World Health Organization

## Introduction

Information and Communication Technology (ICT) development has been an important ingredient in the growth strategy of the GCC countries, in general, and the United Arab Emirates, in particular. As a region, the countries delivered impressive results in the Network Readiness Index (NRI) of the Global Information Technology Report 2008-2009. The report indicates that nearly all countries in the region made it within the top half of the NRI, showing an increasing tendency in leveraging ICT to improve economic development and increase global competitiveness.

The United Arab Emirates has led the region's strong performance in the NRI as the country has been ranked one of the top three among a list of 134 global economies in the category "Importance of ICT to government vision of the future," while placing fifth in "Government prioritization of ICT," 11th in "Government procurement of advanced technology products" and 32nd in "e-Government Readiness Index."

The United Arab Emirates is a union of seven sovereign sheikhdoms, formed when the British withdrew from the Gulf in 1971. With a relatively small area (83,600 sq km), the population has reached 4.8 million as estimated by the CIA Factbook. The United Arab Emirates' per capita GDP is on par with those of some West European nations (\$40,000 in 2008).<sup>1</sup>

The national government is a federation with specified powers delegated to the United Arab Emirates government and other powers reserved to member emirates, which explains the huge difference in accepting and utilizing ICTs in the different emirates. Dubai, followed by Abu Dhabi, is considered the most advanced of the seven Emirates. The 2008 Gross Domestic Product reached \$270 billion in 2008.<sup>2</sup>

The United Arab Emirates is one of the most technologically sophisticated countries in the Middle East. At the heart of the growing information technology market, the United Arab Emirates IT sector grew from \$6.9 billion in 2003 and \$9.5 billion in 2005, to more than \$11.4 billion in 2008; this figure is expected to rise to \$14.8 billion by 2011, according to research conducted by economic and financial analysts Global Insight.<sup>3</sup>

The country has achieved significant accomplishments in building the foundations for an information/knowledge-based society. By providing an enabling legal and regulatory framework combined with the existence of national data and advanced communications infrastructure, important progress has been made in diversifying the economy away from full dependence on petroleum exports. This has stimulated commercial success among a wide variety of businesses, including global, regional, local SMEs, and locally based international companies such as Etisalat, Du, the Thuraya Satellite Telecommunications, and well-capitalized indigenous government supported telecommunication companies, and world-class, free trade zones.

Identified as the regional ICT hub, Dubai is a leading city in adopting bleeding edge technology. The Dubai Technology E-Commerce & Media Freezone (TECOM), which was established in 2000, has more than 900 companies (mainly from IT and Telecom sectors) with more than 5000 knowledge workers. TECOM is also home to Dubai Internet City, Dubai Media City, and Dubai Knowledge Village. The United Arab Emirates has fared very well on the front of technology according to the World Economic Forum's Arab World Competitiveness Report 2007. The technological readiness ranks the United Arab Emirates 27th on a world scale in Information and Communication Technology (ICT). The technological readiness, which is a sub-component of the Global Competitiveness Index, measures firm-level technology absorption, laws

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<sup>1</sup> CIA Factbook 2009, <https://www.cia.gov/library/publications/the-world-factbook/geos/ae.html>.

<sup>2</sup> CIA Factbook 2009, <https://www.cia.gov/library/publications/the-world-factbook/geos/ae.html>.

<sup>3</sup> Gulf News, The UAE Will Spend \$15 billion on IT by 2012; September 20<sup>th</sup>, 2008, [http://archive.gulfnews.com/indepth/gitex2008/more\\_stories/10246514.html](http://archive.gulfnews.com/indepth/gitex2008/more_stories/10246514.html).

relating to ICT, foreign direct investment (FDI) and technology transfer, mobile telephone subscribers, Internet users and personal computer. The 2008 Growth Competitiveness Index, which is a composite of macroeconomic environment, state of public institutions, and technology readiness, has shown that the United Arab Emirates has consolidated its position as one of the most competitive economies in the region, moving up by six positions in the Global Competitiveness Report 2008-2009, released by the World Economic Forum.

Overall, the country improved its ranking across all pillars of the Growth Competitiveness Index (GCI), with a more stable macroeconomic environment and a better assessment of the quality of the educational system. The country's institutional environment remains a competitive advantage, characterized by a low regulatory burden (5th), high public trust in politicians (8th), and reliable police services.<sup>4</sup>

The United Arab Emirates enjoys a competitive economy due to maintaining a business-friendly environment coupled with good infrastructure and internationally competitive labor cost. The introduction of competition into the United Arab Emirates telecommunications market and the continued demand for additional services by a sophisticated domestic and expatriate market will continue to grow the market for ICT products and services. During this economic and financial crisis, telecommunication companies in the United Arab Emirates are likely to represent a source of growth for the country. Etisalat, the United Arab Emirates state-controlled telecommunications provider, is cash-rich and is actively looking to expand its services and make acquisitions. Telecoms operators enjoy "stickier" demand than most consumer service providers and Etisalat's relative domination of its home market, the second-largest Arab economy, means that it is likely to continue to be a cash cow.

The United Arab Emirates infrastructure and the indigenous companies are world-class and implement the latest technology and services. In addition to commercial activities, considerable success has been made in integrating information and communications technologies into governmental processes. Most government ministries have interactive on-line presence, and a national initiative is under way to increase the number and breadth range of services available on-line. These efforts have resulted in the United Arab Emirates being ranked highest among all ESCWA member countries in the e-government readiness by the United Nations, and the highest on the Arab Innovation Index published by INSEAD. The United Arab Emirates continues to lead the Middle East's information and communication technology (ICT) readiness index.

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<sup>4</sup> WEF, Global Competitiveness Report 2008-2009.

## I. THE ROLE OF THE GOVERNMENT AND ALL STAKEHOLDERS

### A. NATIONAL INFORMATION SOCIETY POLICIES AND E-STRATEGIES

Internet came in the United Arab Emirates in the year 1995 and there has been no looking back after that. The way usage of ICT tools are promoted in the country is commendable, thanks to the many governmental initiatives. According to the latest Survey of United Nations on e-Government, 2008, the country has achieved the 32nd rank for its e-Readiness amongst 192 UN member countries across the world. Among the GCC member countries, the United Arab Emirates leads in terms of web measurement, a rating of the online presence of national websites and selected ministries including health, education, welfare, labor and finance; while it was ranked 12th worldwide. While an explicit national plan of action for building the Information Society has been published only in 2005,<sup>5</sup> the ongoing commitment of the United Arab Emirates to developing a robust ICT sector is clear. Many international indicators point to the United Arab Emirates accomplishments in this regard, in addition to the many initiatives undertaken by the government to boost ICT infusion and diffusion in the country. The United Arab Emirates has taken a quantum leap during the past 17 years in the direction of liberalizing its economy and diversifying it away from the oil-based sector. The 2008-2009 Networked Readiness Index, a joint project by INSEAD and the World Economic Forum, which evaluates the relative level of ICT development in 134 countries, ranked the United Arab Emirates 27<sup>th</sup>. Sound economic management has contributed to stabilizing the macroeconomic environment and strengthening public institutions. The United Arab Emirates has embarked on a number of multibillion-dollar technology-based projects, notably the Dubai Media City, Dubai Internet City, and Knowledge Village, with the aim of creating innovation clusters. The country is up two positions at 27<sup>th</sup>, from 2007-2008 ranking almost closing the gap with Israel. As already mentioned, the government's push for ICT diffusion and usage has been impressive in recent years, as reflected by the country's 9<sup>th</sup> and 16<sup>th</sup> position in the government readiness and usage Index categories, respectively. The country realizes its largest improvement from 2007 in the environment component, going up seven places to 32<sup>nd</sup> in this dimension. The business environment is assessed as being quite ICT conducive (24<sup>th</sup>), with an impressive 1<sup>st</sup> and 2<sup>nd</sup> place for the extent and effect of taxation and for total tax rate, respectively, and little red tape (5<sup>th</sup> for the burden of government regulation). The challenge for the country in increasing its innovation potential in the years to come has to do with the quality of its higher educational and research system, which is assessed as being fairly poor and does not seem to provide local businesses with a sufficiently large qualified labor pool (75<sup>th</sup> for the availability of scientists and engineers).<sup>6</sup>

Still, areas of concern, though, include educational accomplishment, in particular at the primary and secondary levels. These need to be dealt with on a priority basis by decision makers. This is being somehow addressed at the level; Etisalat expects Abu Dhabi, for instance, to be fully connected by fibre optic cables this year and hopes to have 90 per cent of United Arab Emirates homes online by the end of 2011. On the other hand, data is definitely going up, and while it represents 20 per cent of Etisalat's revenues currently, it is expected to represent 50 per cent, during the 2009-2012 time period.

In 2009, the Index of Economic Freedom, a joint project by the Heritage Foundation and the Wall Street Journal, ranked the United Arab Emirates 54<sup>th</sup> worldwide, the 6<sup>th</sup> among the Arab states after Bahrain (16<sup>th</sup>), Oman (43<sup>rd</sup>), Qatar (48<sup>th</sup>), Kuwait (50<sup>th</sup>), and Jordan (51<sup>st</sup>).<sup>7</sup> This index 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. The various measures and incentives created by the government have helped the country move steadily and consistently into the direction of an information/knowledge based society.

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<sup>5</sup> "2006-2010: General Policy for ICT in the UAE"

<sup>6</sup> The Global Information Technology Report, 2008-2009, INSEAD.

<sup>7</sup> Heritage Foundation/Wall Street Journal, the Index of Economic Freedom, 2009.

The United Arab Emirates consistently ranks very highly when measured by the criteria provided in documents such as the WSIS plan of action, the UNDP human development report, and the information society index( ISI). While the United Arab Emirates present development is not specifically tuned to the metrics provided in these documents, their achievements in areas such as telephone and mobile penetrations, personal computers and Internet diffusion and infusion and societal integration of ICT perform very well under these indicators of achievement. The latest feather in the cap of the United Arab Emirates is its ranking as the country that is positioned to become the region's innovation hub, according to the Arab Innovation Index which measures the degree to which Arab companies are responding to the challenge of innovation. The report finds that the United Arab Emirates is four times more likely than its closest rival, Egypt, to become the dominating innovation influence in the Arab world. The report resulted from a collaboration between Moutamarat, the French business school INSEAD, and consultant PricewaterhouseCoopers.<sup>8</sup>

The United Arab Emirates also ranks second among the Arab countries on: high-speed monthly broadband subscription, the lowest cost of broadband, the availability of government online services, and secure Internet servers. It ranked third on the total broadband and Internet subscribers rate. Internationally, the United Arab Emirates ranks first worldwide on the cost of mobile telephone call (along with Egypt, Italy and Hong Kong), and on residential monthly telephone subscription. These achievements on the regional and international levels in the ICT sector are a result of the competitive market environment, international best practices, solid regulatory systems, and governance.

#### B. PUBLIC/PRIVATE PARTNERSHIP (PPP) OR MULTI-SECTORAL PARTNERSHIP (MSP)

Based on a legislative mandate provided at the level in resolution number 631/1, the United Arab Emirates is pursuing a deliberate path to incorporate ICT in government services. This plan originally called for approximately 90 per cent of government services to be available by telephone (including fixed and mobile lines) and Internet services by the end of 2007. This goal has been achieved according to plan. Commercial partners who assisted in the implementation of these efforts include Oracle and Microsoft. A number of public private partnerships (PPP) initiatives have been undertaken by the government and various private sector entities such as HP, Microsoft and Intel; the latest is Intel Teach to the Future Initiative with the Abu Dhabi Government; Intel® Teach to the Future is a worldwide effort to help both experienced teachers and Pre-Service teachers integrate technology into instruction to develop students' higher-level thinking skills and enhance learning. Teachers participating in this initiative receive extensive training and resources which help them promote the use of effective technology in the classroom. The training provides new approaches to align teaching lessons with educational learning goals and standards. In addition, the program integrates the use of Web page design, the Internet, and student projects as a medium to powerful learning. The pilot program in the United Arab Emirates commenced in Abu Dhabi Education Zone in September 2006, was evaluated back in 2007-early 2008 and started implementation in spring 2008.

#### C. ROLE OF NON GOVERNMENTAL ORGANIZATIONS

Non Governmental Organizations working to help diffuse ICT in the United Arab Emirates are almost non existent; however, a number of public sector entities are involved in concrete projects moving the United Arab Emirates closer into the maturity stage of an information/knowledge based society. Most of these projects are centered on educational institutions and governmental sectors such as the K-12 educational system of public schooling (Intel Teach to the Future Initiative); Higher colleges of technology, Cisco initiative at a number of universities (United Arab Emirates university and American University of Sharjah); Microsoft initiative with the computer literacy driving license (University of Sharjah); and Oracle Educational initiative (American University of Sharjah).

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<sup>8</sup> Arab Innovation Index, 2006, [http://www.moutamarat.com/main/pdf/ABIR\\_VII.pdf](http://www.moutamarat.com/main/pdf/ABIR_VII.pdf).

A pilot project PPP initiative was launched in Abu Dhabi in September 2006, where the Abu Dhabi Education Council partners with private international education companies such as the Center for British Teacher for Education (CfBT), Intered/Sabis, Mosaica and Nord Anglia. All operators are required to abide by curriculum standards designed by Tafe Global, the New South Wales department of Education and Training. Introducing ICT is part of the project requirement. ICT training is required for all teachers, students, and administrators under this project. It started with grades K-5, rolled in Middle School grades in 2007, and Grades 10-12 in 2008. Still the Emirate needs to have an inspection body to check if every student, teacher, and administrator is doing enough to incorporate ICT into their activities.

## **II. ICT INFRASTRUCTURE**

### **A. INFRASTRUCTURE**

While the federal Government has not drawn up a comprehensive national strategy for its information society until 2008, very advanced strategies have been in place and have been implemented at the local (emirate) level, particularly in Dubai and Abu Dhabi. The United Arab Emirates has a modern telecommunications infrastructure, especially when compared to other countries in the region. It has frequently been referred to as the “most wired” state in the Middle East.<sup>9</sup> United Arab Emirates residents have relatively unhindered access to all modes of communications that Western, advanced nations do. May be it is worth mentioning here, that discrepancies exist between population living in the cities and those living in rural areas; however, local governments are trying to narrow the gap by enacting training and development programs in rural areas; a case in point is the host of various educational and training programs undertaken in 2008 and 2009 by the Emirate of Sharjah in areas such as Kalba and Dhaid. Another case in point is the establishment of a Satellite Campus for the University of Sharjah in some of rural areas.

The telecommunication infrastructure has been owned and operated as a monopoly by Etisalat until 2006, when Du, a new competitor, came into the market. After years of generating excess revenues and returns via national monopoly, Etisalat is currently faced with a competitive operating environment for the first time. While the United Arab Emirates owns a majority stake at 60 per cent of Etisalat, individual United Arab Emirates nationals own 40 per cent of the company. The Corporation is ranked by Financial Times as one of the top 500 companies in the world in terms of market capitalization and the sixth largest in the Middle East. In its recent ranking the Financial Times ranks Etisalat 140 among the Financial Times’ top 500 Corporations (AMEInfo, 2008). In 2000, Etisalat initiated a subsidiary ISP called Emirates Internet and Multimedia (EIM). Since that time, Etisalat created e-Company, which resells all Internet and data transport services. Furthermore, and because of the impressive infrastructure capacity of the United Arab Emirates, several other regional ISPs purchase communication services from the Etisalat Network.

Abu Dhabi, the capital of the United Arab Emirates, will become the world's first fully connected capital with etisalat's eLite – the advanced optical fibre communication network, based on the fibre to the home (FTTH) technology. Etisalat confirmed it has reached the final stage of completion of this project, scheduled to be completed in the beginning of the third quarter of 2009. With eLite connecting all the households in Abu Dhabi, the city will become world's first 100 per cent FTTH connected capital. Etisalat is also in the process of connecting Dubai and Sharjah through eLite.

The regulatory body of ICT in the United Arab Emirates is the Telecommunications Regulatory Authority (TRA) which was established according to the United Arab Emirates Law by Decree No. 3 of 2003 – Telecommunications Law. The main objectives of the TRA may be summarized as ensuring adequacy of telecommunications services throughout the United Arab Emirates; achieving enhancement of services, both in terms of quality and variety; ensuring quality of service and adherence to terms of licenses by licensees; encouraging telecommunications and IT services within the United Arab Emirates; promoting

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<sup>9</sup> <http://www1.american.edu/carmel/lr2962a/infra.html>.

and enhancing the telecommunications sector within the United Arab Emirates; promoting and developing the telecommunications sector in the United Arab Emirates by training, development and the establishment of relevant training institutions; resolving any disputes between the licensed operators; establishing and implementing a regulatory and policy framework; promoting new technologies; ensuring that the United Arab Emirates becomes the regional ICT hub; developing the country's human capital; and encouraging ICT research and development.

The United Arab Emirates has a comparatively high telephone penetration rate. Within the United Arab Emirates Etisalat has a fixed exchange line capacity of 1.4 million telephone lines – 100 per cent digital – of which around 50,000 are ISDN in addition to the leased circuits. The number of fixed-line telephone connections increased from 1,136,000 lines in 2003 to 1,325,000 in 2007, which represents a penetration of 28 lines per 100 inhabitants. The United Arab Emirates also boasts one of the highest rates of mobile line distribution in the ESCWA region with Penetration in the mobile market surpassed 6,372,000 lines or 166 per cent in 2007, leaving no room for operators to further take advantage of the market. However, this is not the end of the growth; future growth in mobile subscriptions will come from growing population and increasing number of expatriates. High quality Internet services are available, featuring ADSL, ISDN, Frame relay, ATM, leased line, and satellite options. Basic dial-up service costs \$0.486 per minute for peak usage and \$0.27 for off-peak usage. The total bandwidth available for the country has increased from 1.024 Gbps in 2003 to 2.680 Gbps in 2005 to 10 Gbps in 2006. Combined with a personal computer dissemination estimated at 16.2 per cent, growing at a projected average rate of 14 per cent per year, the Internet services available have enabled the growth of the information/knowledge based society in the United Arab Emirates. An additional example of this trend can be seen in the growth of registered domains under the national country code. These registered domains have increased from 12,261 in 2004 to 54,871 in 2007. The number of internet subscribers has grown from 660,000 in 2006 to 875,000 in 2007, with an increase of 32 per cent over 2006.

In January 2008, Etisalat announced the completion of the first phase of its Fiber-to-the-Home (FTTH) deployment, which will eventually cover the entire country. This new fiber network will meet current customer needs more efficiently and will help to meet future requirements for ultra-high bandwidth applications, in addition to offering a significantly enhanced experience for its business and residential customers. FTTH Technology enables better service delivery in key areas such as high-speed Internet Service (HSI), bringing customers speeds of up to 60 Mbits/s, telephony, IPTV (Advanced digital TV), and other high-bandwidth online experiences such as gaming and Video On Demand (VOD). Furthermore, in line with the increasing education and business in the region, the demand for Internet services has also increased in recent years. Although dial-up subscriptions currently dominates the Internet market, Etisalat projects broadband subscribers to account for nearly 65 per cent of Internet subscribers in coming few years.<sup>10</sup>

Further investment in the telecommunications network is a continuing priority for the national government. In 2006, expenditures of \$2.5 billion were devoted to expansion, improvement and maintenance of the infrastructure (IDC, 2006). The United Arab Emirates is currently spending \$11.4 billion on Information and Communications Technology (ICT), and that figure is set to rise to \$14.8 billion by 2011, according to research conducted by economic and financial analysts Global Insight.<sup>11</sup> The country has been a leader in the MENA region when it comes to spending on ICT, according to the report. Of the overall industry, IT spend alone in the United Arab Emirates will reach \$2.3 billion in 2012, with a continuous annual growth of 23.9 per cent, International Data Corporation (IDC), a research firm, said in a recent report.<sup>12</sup> In the coming years, IDC expects IT services spending in the United Arab Emirates to continue to expand rapidly, fuelled by a strong economy, a maturing IT market and increased foreign investment. In

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<sup>10</sup> Etisalat touts FTTH.(FTTX), January 2008. <http://www.highbeam.com/doc/1G1-174194759.html>

<sup>11</sup> <http://www.tradearabia.com/news/newsdetails.asp?Sn=BANK&artid=149638>.

<sup>12</sup> IDC report, United Arab Emirates IT Services 2008-2012.

2007, IT services spending in the country surged 41 per cent to nearly \$791 million. Meanwhile, the largest area of spending in the United Arab Emirates ICT market, according to the research, is within the consumer sector. The spending in the segment will surge to \$6.8 billion in the next three years, moving up from the 2009 \$5.3 billion. The United Arab Emirates is also currently spending nearly \$1 billion on ICT in the communications, energy and utilities, and government sectors, with each rising to \$1.2 billion by 2011.

As part of this expansion of services, an ambitious project, inaugurated in 1998, has been implemented which aims at delivering voice, high-speed data, and broadcast television to consumers through a single cable-based modality. The Fiber Optic Gulf (FOG) project consists of a 1,300-kilometer long fiber optic cable link between the United Arab Emirates, Qatar, Kuwait and Bahrain. FOG links the United Arab Emirates to Kuwait via Qatar and Bahrain, and it has a transmission capacity of 10 Gbps (billions of bits per second) per fiber pair and SDH technology will enable the system to accommodate enormous volumes of traffic, making possible broadband ISDN, Internet, Video-On-Demand and other new services. The Fiber Optic Link Around the Globe Cable System (FLAG) project connects Europe to South Asia via the United Arab Emirates. The FLAG Network Operations Centre (FNOC) is set up in Fujairah, which positions it in the midpoint of the cable system. The other cables that connect the United Arab Emirates are South East Asia –Middle East – Western Europe 3 and 4 cable systems (SEA-ME-WE3 and SEA-ME-WE4). The total length of the SEA-ME-WE3 and SEA-ME-WE4 cables is approximately 39,000 km and 20,000 km respectively, while their capacities are 40 Gbps and 1280 Gbps.<sup>13</sup>

Etisalat serves over 6.37 million mobile customers in the United Arab Emirates, with a penetration rate of over 166 per cent in 2007. In 2008, Etisalat announced revenues of \$7.12 billions and net profits of \$2.36 billion (Etisalat Yearbook, 2009). The company also offers fixed line services over the next generation network (NGN), and has been migrating sections of its users onto the advanced network. By establishing NGN, Etisalat will be able to offer voice, video, and data over one single source, enabling true Triple-Play functionality SMS 2 Fax & SMS 2 e-mail is a unique and convenient way to send SMS text messages to a fax number and to an e-mail address. The facility allows GSM customers (post-paid & prepaid) to send a text message with a maximum of 160 characters from their mobile to a fax number and to an e-mail address.

Mobile telephony has made giant stride in the United Arab Emirates in a relatively short time, beating fixed-line telephony. The telecommunication sector in the United Arab Emirates has undergone extensive development. At the end of 2001, there were 1.9 million GSM users indicating 62 per cent penetration rate, which is comparable to the most advanced countries in the world. In 2008, the Mobile penetration rate jumped to 166 per cent. Similarly, a 28 per cent fixed line penetration rate and 58 per cent Internet penetration rate place the country squarely at the top of the list, and among leading nations worldwide in telecommunications. In absolute numbers, the United Arab Emirates accounts for slightly more than 14 per cent of mobile phones in the Arab world.

In 2007, Etisalat announced the Ebtikar Card System, which is a major card manufacturer and related service provider catering mainly to the needs of telecommunications operators in the local and regional markets. Its factory produces a wide variety of prepaid scratch smart memory card, and GSM SIM cards. The company just announced (April 2009) that it is teaming up with Nokia-Siemens to provide convenient access to advanced mobile Internet based services in the Middle East. The United Arab Emirates will be the first country in the Middle East and Africa to roll out this service during second quarter of 2009; using this service, customers will be able to enjoy advanced services like Mobile gaming and Ovi maps<sup>14</sup> on Etisalat's widespread and reliable network which covers the whole United Arab Emirates for 2G and 2.5 G, and 99 per cent of populated areas for 3.5G networks. Etisalat introduced the latest developments in manufacturing cards and the latest technology implemented in manufacturing WASEL and GSM cards, all of which reflect

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<sup>13</sup> <http://www.seamewe4.com>

<sup>14</sup> Ovi Maps is the new name for the application previously known as Nokia Maps. The new version adds a number of new features including weather information, premium POIs and, in selected countries, safety camera information.

Etisalat's success in offering best services for its customers. The new SIM card has an EEPROM memory capacity of 64 KB and it supports GSM functionality. These features make it an ideal SIM card platform to migrate from 2G to new 3G services. As the new SIM card complies with both GSM and 3G requirements, all the mobile services offered today can be accessed with this new card. The card enables the operator to offer a wide range of value added services such as m-commerce, m-banking, as well as information, entertainment, and gaming services. The 3G is a multi-application and multi-standard card supporting both ETSI and ISO standards. This makes it easy to implement different types of services on a single card. 3G cards offer an open application toolkit platform to develop new applications and services.<sup>15</sup>

The Government is also increasing all activities relating to the dissemination and spread of awareness through supporting national media and conferences. Finally, almost all local and national daily newspapers have a dedicated section for spreading public ICT Knowledge. The main problem, however, and based on observation, the percentage of readership is minimal.

#### B. INITIATIVES/PROJECTS FOR ICT INFRASTRUCTURE AND DEVELOPMENT OF NEW SERVICES

ICT infrastructure is remarkably developed in the United Arab Emirates as evidenced by its ranking on the Information Society Index (ISI) developed by IDC; the new feather on the cap of the United Arab Emirates is the introduction of competition in 2006 through the establishment of a new telecommunications provider, *du*; that has increased competition and will, eventually, lead to an economically efficient telecommunications industry. In addition, the major development in the legal and regulatory environments will create an environment, which will entice and attract foreign ICT investments.

As an initiative that will promote ICT in the region, the United Arab Emirates developed an ICT fund to provide targeted funding and advisory services to companies, organizations, business incubators and individuals to empower them to develop the innovation and knowledge capital of the United Arab Emirates ICT sector with their research, education and entrepreneurship. The Fund promotes entrepreneurship and improves linkage between industry and academia to ultimately promote the involvement of United Arab Emirates nationals in scientific and technology research to foster self-reliance of the United Arab Emirates in technology. The ICT Fund is a new venture dedicated to advancing the sector both regionally and globally and shares the United Arab Emirates' commitment to innovation and progress in R&D projects as well as support education and training in the field. Just this past April (2009), the ICT Development Fund signed an agreement with Khalifa University for Science, Technology and Research (KUSTAR), establishing the UAE Advanced Network for Research and Education; by which the ICT Fund provides the funding for KUSTAR to manage. The UAE Advanced Network for Research and Education is a dedicated advanced network connecting academic and research institutions at speeds typically Multiple times faster than commercial Internet. It facilitates research collaboration by providing access to databases and supercomputers. It is also used for teaching through rich multimedia content and high-definition video conferencing.

A number of 28 sites of public universities, colleges, and schools will be connected to this advanced network, consisting of the United Arab Emirates University, Zayed University, Higher Colleges of Technology, KUSTAR, and Institutes of Applied Technology. In the following stages, other public and private research institutions in the United Arab Emirates will connect to the network.

Injazat Technology Fund E.C. is a USD 50 million venture capital fund operating in compliance with Shari'a principles and targeting technology companies within the MENA region under the motto "From the region for the region". The Fund was initiated by the Islamic Corporation for the Development of the Private Sector (ICD), an affiliate of the Islamic Development Bank Group (IDB), and by Gulf Finance House (GFH), in partnership with Dubai Islamic Bank (DIB), Saudi Economic and Development Company (SEDCO), and Iran Foreign Investment Corporation (IFIC).

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<sup>15</sup> Wireless New Federation, Nokia and Etisalat Collaborate to Boost Advanced Internet Based Services in the UAE, April 2009.

Injazat was founded on the idea that it takes teamwork, experience, strategic thinking, and resources to turn early stage ventures into solid companies. The Fund strives to add experience and expertise to invention in order to support technological companies in the regional marketplace. Injazat frequently takes active roles as the lead investor, contributing the necessary resources and management support that are vital to a young company's growth. The Fund is committed to creating strategic business partnerships, which facilitate and foster success in business. Injazat invest intellectually and financially in people with the vision and drive required to turn growth companies into accelerating companies. Injazat's portfolio includes 8 companies: AOME, Broad Link Research, Ducont FZ LLC,<sup>16</sup> Ejada,<sup>17</sup> Omnix Media Networks,<sup>18</sup> Promedia,<sup>19</sup> Rubicon,<sup>20</sup> and Specialized Technical Services (STS) Group.<sup>21</sup>

### C. ICT CONNECTIVITY

The United Arab Emirates had been an regional leader in ICT connectivity; almost all schools, private and public are wired;<sup>22</sup> schools and universities administer exams online; college applications and payments are done online; possibly an area where the United Arab Emirates can improve on is the development of community centers. Unfortunately, these are missing and adding them would offer a great service especially to the marginalized segment of the population; mainly the expatriate communities. In addition, ubiquitous computing and wireless services are abound; in May 2007, commuters started to reserve taxis using the short message service (SMS) from their mobile phones; to facilitate the implementation of this initiative, the Road and Transportation Authority (RTA) will install small boards with location code numbers and a taxi sign on them. Another development at the RTA is the mParking initiative; RTA's mParking service is a new value-added service that will allow motorists to pay for their virtual parking permit using their Etisalat mobile phones by simply sending an SMS in a pre-defined format, thus eliminating the need to walk to the Payment Display (P/D) Machines and search for coins. The mParking service also alerts the motorist via an SMS prior to virtual permit expiry and if needed the motorist can extend his/her parking period from his/her office or home without having to walk to his/her vehicle.

### D. INTERNET INFRASTRUCTURE

Investment in the telecommunications network is a continuing priority for the federal government; in 2004, a total investment of \$371.662 was made in telecommunications and in 2006, a total of \$2.5 billion were invested in IT related projects. Emirates Internet Exchange (EMIX) – an Etisalat division – is the first Network Access Point (NAP) in the Middle East offering IP transit connectivity to ISPs in the region. EMIX is developing its network to meet the future requirements of ISPs in the region by increasing its total bandwidth to cater for customer demand when required. The Network is connected across the globe via Fiber Optic links to Europe, Far East, and USA through SEA-ME-WE-3, SEA-ME-WE-4 and FLAG cables. EMIX has recently established its 7<sup>th</sup> POP in Germany, which has hugely benefited its customers accessing the Web in general and European contents in particular. EMIX presently has Pops strategically located across the globe in Abu Dhabi, Dubai, New York, London, Amsterdam, Singapore, and Germany. It has plans to establish further Pops in Asia and America. EMIX present backbone bandwidth is approximately 20.0 Gbps (Gigabit per second); and currently has 129 fully redundant STM-1 links on various transnational cables, linking it with various Tier-1 IP Access providers around the world. This bandwidth does not include

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<sup>16</sup> <http://www.ducont.com>

<sup>17</sup> <http://www.ejada.com.sa>

<sup>18</sup> <http://www.omnix-group.com>

<sup>19</sup> <http://www.promediasystems.com>

<sup>20</sup> <http://www.rubicon.com.jo>

<sup>21</sup> <http://www.sts.com.jo>

<sup>22</sup> [http://www.tra.gov.ae/ICT\\_sector\\_uae.php](http://www.tra.gov.ae/ICT_sector_uae.php).

its huge private peering links. The division is in process of activating additional links, to cater for the rising demand for Internet bandwidth.<sup>23</sup>

The increase in bandwidth and the upgrade of equipments which have warranted such significant investments in infrastructure have been done with a view to ensure an unmatched quality of service and a world class Internet experience to consumers in the United Arab Emirates. This capacity expansion with increased links to major global Internet hubs will benefit customers by helping to avoid disconnection to the Internet in the event of any disruption and ensure that traffic is re-routed to other links if disruptions occur in a particular link/path.

Arabic Domain name System (ADNS) is essential for the proliferation of Arabic content in the Internet. Being convinced that supporting the Arabic language in domain names requires researching and addressing a number of questions related to Arabic linguistics and the domain name tree structure, the United Arab Emirates is participating in an important initiative in the region, the IDN (Internationalized Domain Names) initiative, especially those dealing with the testing of Arabic domain names. The United Arab Emirates Network Information Center (UAEnic)<sup>24</sup>, the authority that manages domain name registration under the .ae domain, started working with counterparts authorities in the region (namely in Saudi Arabia, Qatar, and Oman) and to develop Arabic domain names allowing Arab Internet users to type in Arabic URL to access local web pages. Additional Arab countries have joined this initiative as well (Tunisia, Egypt, Syria and Jordan) and more countries are expected to join in the future. The proposed solutions are to be compatible with international standards and rules adopted by the IETF, and in particular the set of IDN standards as defined in RFC 3490, 3491, and 3492.

In March 2009, the United Arab Emirates Ministerial Council for Services passed a proposal put forward by the Telecommunications Regulatory Authority (TRA) on the United Arab Emirates domain on the internet in Arabic (Emarat). The proposal is part of the TRA's strategy to chalk out a national plan for running and managing internet in Arabic language. It falls in line with the new approach of the Internet Corporation for Assigned Names and Numbers (ICANN) to create equivalent domains in languages other than English.<sup>25</sup>

The United Arab Emirates domain in English is ae. The United Arab Emirates domain in Arabic will contribute to increasing the number of surfers to Arabic sites and further promote and strengthen the United Arab Emirates' identity.<sup>26</sup>

### **III. ACCESS TO INFORMATION AND KNOWLEDGE**

#### **A. PUBLIC DOMAIN INFORMATION**

The United Arab Emirates government is strongly committed to raising people awareness of the benefits of information and communication technologies, and of giving access to all people to information and knowledge almost instantaneously. Individuals, organizations, and communities should benefit from access to knowledge and information. Ministries such as Labor have implemented the system of e-signature, e-work permits, etc.

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<sup>23</sup> <http://www.emix.ae>.

<sup>24</sup> <http://www.nic.ae>.

<sup>25</sup> UAE Telecommunications Regulatory Authority, March 11<sup>th</sup>, 2009, <http://www.tra.ae>.

<sup>26</sup> Ministerial Council passes UAE domain in Arabic posted on <http://www.tra.ae> on March 2<sup>nd</sup>, 2009.

A prime indicator of the movement towards an information/knowledge society is the information society index (ISI).<sup>27</sup> Some of the GCC countries have emerged as forerunners in the Arab region and are among the 50 top information technology (IT) users in the world, based on the ISI classification issued by the United States' IDC Group. In its global Information Society Index (ISI) for 2006, the World Times/IDC ISI ranks the United Arab Emirates 32nd, and Saudi Arabia 47th overall out of 53 countries, 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, 2008). 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 53 countries in information technology readiness. The 53 countries included in the ISI index account for more than 98 per cent of total IT investment in the world. 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.

## B. ACCESS TO INFORMATION AND PUBLIC INFORMATION

The United Arab Emirates is committed to transforming the society into an information/knowledge base society; as such the computer penetration rate as well as the Internet diffusion rate is comparable to those of developed countries in Western Europe. The federal government is also increasing all activities related to the dissemination of knowledge and the spread of awareness through supporting national media and conferences.

The e-Library<sup>28</sup>, launched by the National Media Council in February 2009, is a government supported initiative whereby its services are provided through collaboration between Dubai eGovernment and Dubai Municipality – Public Libraries section. It integrates all Dubai libraries (currently nine) and acts as a unified interface through which the user can search for publications and documents through the available databases such as Dubai Municipality, Dubai Police, Civil Defense and others. It is worth noting that, in April 2009, the Department of Health and Medical Services - Government of Dubai, has also launched a Medical E-Library containing a wealth of Medical related documents and publications accessible to its staff and customers.

In February 2009, the United Arab Emirates National Media Council (NMC) launched a new online resource of books on the United Arab Emirates and related subjects. The main objective of this initiative is to make a greater volume of up-to-date information on the United Arab Emirates available to both national and international readers, free of charge, utilizing the latest E-books technology.

At the present time 'netizens' can access the 2009 UAE Yearbook in English and French editions, together with a smaller guide on the country, UAE at a Glance, and a major book on the United Arab Emirates' wildlife, The Emirates - A Natural History. Arabic editions of these titles have already been uploaded to the site. Each year the National Media Council supports the publication of the UAE Yearbook; UAE at a Glance and an accompanying DVD and the 2009 editions are thus part of an ongoing program. Whilst previous books have been available for downloading as PDF files or for reading in an earlier version of an E-book program, the introduction of the greatly improved E-reader software has enabled a significant

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<sup>27</sup> ISI, 2008; World Times and IDC.

<sup>28</sup> The UAE National Media Council launches online E-Library service, February 17<sup>th</sup>, 2009, [http://www.uaeinteract.com/docs/National\\_Media\\_Council\\_launches\\_online\\_E-Library\\_service/34313.htm](http://www.uaeinteract.com/docs/National_Media_Council_launches_online_E-Library_service/34313.htm).

leap in functionality of the electronic library and opened up the possibility of creating many more E-books on the website.<sup>29</sup>

Notwithstanding the development on this front, more work is still needed, on providing access of the technology to the majority of the population.

### C. MULTI PURPOSE COMMUNITY PUBLIC ACCESS POINTS

Free access to the Internet is readily available in schools, universities, and public libraries; however, a lot needs to be done to accomplish a high level of infusion and diffusion in this area. Some initiatives undertaken by the TRA; such as the ICT Development Fund established in 2005 are very promising. The Fund, the first of its kind in the Middle East, has the target goals to develop the ICT industry, foster R&D, encourage capacity building, and enhance education and training in the field of ICT. Moreover, this initiative will sponsor and organize ICT-related events and partner with leading international R&D institutions. The Fund will be financed by payments from the primary licensed operators in the amount of 1 per cent of their revenues. Other sources of income may include government and/or private grants, returns from ICT Fund investments, potential income from patents and other intellectual property derived from ICT Fund projects, in addition to any other sources approved by the TRA. The new agreement between the United Arab Emirates Telecommunications Regulatory Authority (TRA) initiatives – and Khalifa University for Science, Technology and Research (KUSTAR), establishing the UAE Advanced Network for Research and Education; by which the ICT Fund provides the funding for KUSTAR to manage.

The UAE Advanced Network for Research & Education is a dedicated network that is connecting academic and research institutions at speeds typically many times faster than commercial Internet. Its main objective is to facilitate research collaboration among various entities by providing access to databases and supercomputers. It is also used for teaching through rich multimedia content and high-definition video conferencing. Initially, a number of 28 sites of public universities, colleges and schools will be connected to this advanced network, consisting of the United Arab Emirates University, Zayed University, Higher Colleges of Technology (HCT), KUSTAR, and Institutes of Applied Technology. In the following stages, other public and private research institutions in the United Arab Emirates will be connected to the network. The range of activities facilitated by this Network will allow individuals and organizations to push back the traditional boundaries of teaching, learning, and research methods. This Network will facilitate practical communication and collaboration between students, researchers, and institutions. It will also help educational institutions to further develop and enhance their IT infrastructure; support changing client needs through delivery of existing and new value-added services to staff, students and researchers; and it will reinforce the ties with the wider education sector while enhancing core services for the higher education sector.<sup>30</sup>

### D. USING DIFFERENT SOFTWARE MODELS

Many different software models are being used, especially by private businesses in the United Arab Emirates. Recent experimentation with Open Source operating systems and applications has started, especially in a number of educational institutions such as the American University of Dubai, the United Arab Emirates University, and a number of institutions in Knowledge Village.

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<sup>29</sup> [http://www.uaeinteract.com/uaeint\\_misc/pdf\\_2009/Arabic-UAE-Yearbook-2009/index.html](http://www.uaeinteract.com/uaeint_misc/pdf_2009/Arabic-UAE-Yearbook-2009/index.html).

<sup>30</sup> UAE creates Advanced Network for Research and Education, *Zawya*, April 5<sup>th</sup>, 2009.

## IV. ICT CAPACITY BUILDING

### A. BASIC LITERACY

Over 55 per cent of the population in the United Arab Emirates is under the age of twenty-five, with an estimated literacy rate of close to 78 per cent (CIA Fact book 2009). While there is no federal program to combat illiteracy, many local programs at the level of the individual emirates exist. The Emirate of Sharjah has been very creative in utilizing ICT to combat illiteracy through the use of computer based instructions in remote areas such as Kalba.

In general, the United Arab Emirates is characterized as a “literacy abundant country”. As of October 2008, and for the age group 15-24, the United Arab Emirates attained a literacy rate of 90 per cent, well above the world average of 87.6 per cent. As with respect to gender parity, the United Arab Emirates scored 1.07 for the age of 15 and above. The United Arab Emirates does not have a formal program where ICT is used to eradicate illiteracy; however, as already mentioned in the report, many initiatives have been undertaken at the level of the various emirates, especially in Abu Dhabi, Sharjah and Dubai.<sup>31</sup>

### B. ICT IN EDUCATION AND TRAINING

The United Arab Emirates government is very serious about the incorporation of ICT into training and education; as mentioned in the previous section, a comprehensive program to incorporate ICT into education was developed and is being implemented. While a strategy at the federal level is yet to be developed, many of the emirates have adopted their own ICT training programs, especially in the public sector. A number of partnerships between the private and the public sectors are pushing in this direction. Furthering its commitment to transform the region to a knowledge-based society; the Ministry of Education signed a cooperation pact with Microsoft Gulf in March of this year (2009). This agreement dictates the provision of providing schools with training, tailored curriculum development, access to the latest technologies and ability to empower schools to, mainly, raise the levels of ICT literacy. It also enables innovative teaching with the aim of bridging the digital divide. Cooperation between the public and the private sector will help with the goal of education reform, and it will enhance the visions in strengthening the schools with IT infrastructure as they coincides with the strategic objectives of the Ministry of Education in providing all the public schools with modern techniques through all educational levels, employing them in the educational process and utilizing them in management and work achievement. The three program areas under the *Partners in Learning* agreement that will help students and teachers move beyond the traditional learning models include: (1) Innovative Schools, which is mainly aimed at providing schools, governments and partners with resources, training, expertise, and technology blueprints that help create schools to better prepare students for life and work in the 21st century. (2) Innovative Teachers, which will provide teachers with tools, forums and resources that build communities of practice, support collaboration and access to quality content, and challenge educators to integrate ICT into teaching and learning in a meaningful way. And, (3) Innovative Students, with the main objective of empowering students to use ICT in their schoolwork and learning and email accounts for each student.<sup>32</sup>

The United Arab Emirates Government and the Ministry of Education are committed to promoting the use of ICT in education throughout the whole supply/value chain; i.e. from K-12 to vocational to higher education. In 2006, the author of this document was appointed by the then Minister of Education, Dr. Ali Al Sharhan, to chair a committee whose purpose was to draft an action plan to incorporate ICT in the K-12 educational system; the document was completed and delivered after two years, and is being implemented.

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<sup>31</sup> Please refer to Hammoud, 2006, Literacy in the Arab World.

<sup>32</sup> Ministry of Education signs agreement with Microsoft Gulf to advance innovative learning in the UAE, March 11, 2009, <http://www.ameinfo.com/188122.html>.

In addition, many educational initiatives, supported by the private sector, are being implemented; companies such as HP, Microsoft, Oracle, Cisco, and Intel have been engaged in a number of initiatives aimed at increasing awareness of the use of ICT on the social and economic fronts. Many high schools as well as colleges and universities have adopted, and mandated, the use of Lap Tops by students; Al Mawakeb School in Dubai has been a pioneer in this area mandating the use of laptops for all students in grade 9 through 12 since 2001. United Arab Emirates University in the Al Ain, Zayed University both in Dubai and Abu Dhabi and American University of Sharjah (AUS) require all students to be equipped with laptops; in addition, many universities iLean (Blackboard) as a learning management system (LMS) for examination and testing.

### C. TRAINING PROGRAM FOR CAPACITY BUILDING IN THE USE OF ICT

A number of training programs for capacity building in the use of ICT have been developed at the levels of the emirates (especially Abu Dhabi, Sharjah, and Dubai), such as the training program introduced by the Emirate of Sharjah for remote areas of Kalba and Al Thaid. A number of universities and educational institutions have been designated as training centers and testing facilities for ICDL (Zayed University and Sharjah University). Serious initiatives such as the Centre of Excellence at the Dubai International Financial Centre (DIFC) are aimed at training and developing employees ICT skills.

Vocational training outside of the traditional educational framework is also available; however, it is still fragmented. A number of public and private sector entities are developing in house ICT training programs for their employees; others, yet, outsource this function to training institutes which are abundant all around the country. Dubai Media, for instance, have mandated that by the end of 2007, all journalists have to be computer literate and are required to submit their reports electronically. All newspapers in Dubai have mandated ICT training and computer literacy.<sup>33</sup> The major challenge here is identifying scarce and needed skills and developing appropriate training programs.

## V. BUILDING CONFIDENCE AND SECURITY IN THE USE OF ICTS

### A. USE OF ELECTRONIC TRANSACTIONS AND DOCUMENTS

Building institutional mechanisms is the best tool offered to citizens to help increase confidence and trust in the use of ICTs. The United Arab Emirates has been a pioneer in the Middle East in creating a “rule of law” to govern electronic transactions. Law No 2 of 2006 includes 29 articles. The law considers any intentional act resulting in destroying or revealing secrets or republishing personal or official information as a crime.

Anyone found hacking into an information website or system shall be punished with jail term or fine, or both. The law also states that anyone found luring a male or female to commit adultery or prostitution through the Internet would be jailed up to five years and fined.

A number of creative initiatives have been undertaken to encourage the move from a paper-based into a paperless environment; an example of such initiative is the Civil Engineering Department’s (CED) Paperless Initiative of Dubai Ports, Customs and Free Zone Corporation (PCFC); the initiative was triggered when the amount of paper that was being handled had reached enormous proportions. In line with Dubai’s development, workload in CED increased manifold with a corresponding increase in “paper load”. One of the first steps CED took in this initiative was to have automation of core business processes in place, which would reduce the dependency on papers. As a result of this initiative, the CED implemented the following:

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<sup>33</sup> Private discussion of the author with media representatives.

- E-Permit, which takes care of full document handling and workflow management associated with Building Permit applications. All drawings and other documents are received as digital files and all correspondence between CED, Consultants and Clients are thru Internet and e-mail;
- E-Site: a PDA and GIS based system used by Site Inspectors visiting construction sites, who receive all relevant details including location maps online on their handheld devices with no need to carry papers;
- E-Map, which brings a wealth of Geographic information to the desktop computers of any authorized staff member of PCFC thru a user-friendly web interface;
- E-Bidding: a new product enabling effective negotiations with bidders of large construction projects, which, in addition to reducing papers, is expected to bring the contract value down. Whereas these electronic products have eliminated the use of paper within the department, the massive amount of archived information on paper that were stored in huge filing rooms are scanned and now stored in online storage systems.

Some of the direct benefits of this initiative have been:

- Reduced office space and storage spaces, which saves on rent;
- Reduced Stationary expenditure;
- Reduced Building Permit approval time from 3, 4 days to few minutes;
- Reduced time for Project Documentation from 4 days to 4 hours and comments consolidation time reduced from 21 days to 7 days.

These changes were received very well by the public; an indication of the support of the overwhelming support, the head of the CED won the Dubai Quality Group Emirates Business Women Award for the Innovation Category.

## B. ONLINE AND NETWORK SECURITY

In April, 2007, the United Arab Emirates' Telecom Regulatory Authority has tasked a new group, the United Arab Emirates Computer Emergency Response Team (aeCERT), with fighting cybercrime in the country, given the growing problems surrounding cybercrime in the region. aeCERT came online by the end of 2007, and a dedicated team began operation at the end of 2007. One of the major objectives of aeCERT is prevention of Internet crime.

aeCERT has been very active in raising awareness of IT security in the United Arab Emirates; in March 2008, aeCERT launched the next part of its twelve month National Cyber-Space Security Awareness campaign. The new program focuses on raising awareness of online threats for businesses and consumers in the United Arab Emirates. This new campaign consists of three education modules focused on email security, instant messaging and web browser security and will include best practices and tips for end users. The National Cyber-Space Security Awareness Campaign is a key factor in the aeCERT strategy and vision designed to help build and promote a safer and secure cyber culture within the United Arab Emirates, through educating general users, businesses and youth on matters relating to cyber safety.

In March 2009, the Abu Dhabi Police and the United Arab Emirates Telecommunications Regulatory Authority (TRA) signed a Memorandum of Understanding (MoU), where the TRA represented one of its initiatives, the United Arab Emirates Computer Emergency Response Team (aeCERT), which was accredited by the Ministerial Council for Services as the National CERT of the United Arab Emirates.<sup>34</sup> The aeCERT will provide specific services to enhance the security posture of Abu Dhabi Police IT infrastructure, through providing consultancy, education and awareness; advisory; monitoring and incident response; and research and analysis. Under such titles, the aeCERT is supposed to provide around 25 specific services

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<sup>34</sup> UAE Telecommunications Regulatory Authority, March 11<sup>th</sup>, 2009, <http://www.tra.ae>.

divided into four stages, with no clear implementation timelines. The first stage is to assist in the development of security policies, processes, procedures and standards; promote security awareness; coordinate national and international authorities and CERTs; issue preliminary alerts and advisories to constituents; gather information from constituents regarding incidents within their own operating environments; provide support for remediation and recovery; provide targeted timely and relevant information about the global threat landscape and emerging threats; and provide an enhanced level of service. As for the second stage, it is to disseminate security relevant information; host subject specific seminars; host information exchange meetings amongst communities of interest; specialist security training; deliver recommendations and best practice derived from relationships with representative bodies and associations; provide specialized security advice; maintain a database of Critical National Infrastructure Constituents and their high-level IT infrastructures internal function; and provide information relevant to risk analysis & security assessments. The third stage is to research and assess technologies, and produce quarterly and annual reports. The fourth and last stage is to assist in the design and implementation of Business Continuity and Disaster Recovery Strategies; support for introduction of enhanced security technologies; act as central point of contact during cyber attacks on the critical national infrastructure; provide a central repository of best practice standards and methodologies; provide early warning notification of threats, vulnerabilities and exploits; and issue countermeasure and response advice to mitigate high priority threats.

### C. PRIVACY AND DATA PROTECTION

Privacy is still a foreign concept in the United Arab Emirates culture. This is an area that has to be addressed at the federal level in order to increase trust in digital means and tools and lead to increase in online business. It is worth mentioning that Article 14 of Law No 3/2003 states that “The Telecommunications Regulatory Authority shall have the power to issue regulations, orders, resolutions and procedures in relation to use of consumer information.”

Some advanced initiatives are undertaken at the Dubai level, and are moving the emirate in the direction of meeting world standards in terms of privacy and security; such an initiative is the DIFC’s Data Protection Law which was passed in 2008.<sup>35</sup>

### D. COUNTERING MISUSE OF ICTS

Currently, cultural, religious and political considerations require that pornography, gambling, and drugs websites be blocked. The development of the regulatory environment and the institutional mechanisms in the United Arab Emirates is testament to the continuous effort of the federal government to counter the misuse of ICT. The United Arab Emirates Computer Emergency Response Team (aeCERT) is the cyber-security coordination Center in the United Arab Emirates. This is being established by the TRA as an initiative to facilitate the detection, prevention and response of cyber security incidents on the Internet. The mission of the aeCERT is to sustain a resilient and vigilant ICT infrastructure against a broader set of cyber security threats and to build a secure and safe cyber culture in the United Arab Emirates. The aeCERT will: (1) enhance the cyber security law and assist in the creation of new laws; (2) enhance information security awareness across the United Arab Emirates; (3) build national expertise in information security; (4) provide a central trusted point of contact for cyber security incident reporting in the United Arab Emirates; and (5) establish national center to disseminate information about threats, vulnerabilities and cyber incidents.

The 2006 Cybercrime Law, at a glance:

- Article No 3 states that anyone found breaking rules stipulated in Article No 2 of the law shall be sentenced to no less than one year in jail and/or fined not less than Dh 20,000;

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<sup>35</sup> DIFC Data Protection Law; <http://www.DIFC.ae>.

- Article No 4 states that anyone found forging any document of or local government shall be temporarily imprisoned and/or fined;
- Article No 5 of the law states that anyone convicted of hampering computer program or services shall be punished with a jail term and/or a fine.

This law also defines hacking and the penalty associated with this activity; the law states that anyone found fleecing money by using the internet or any high-tech means, and anyone using data of credit card or assuming the identity of another person will be sentenced to no less than one year and/or fined no less than Dh 30,000.

## IV. ENABLING ENVIRONMENT

### A. LEGAL AND REGULATORY ENVIRONMENT

Until 2006, the United Arab Emirates' telecommunications market had been effectively monopolized by a single state-controlled company, Etisalat, that operated all information and communications networks in the country, served all communications service users, and acted as the de-facto regulatory body for telecommunications. The country was bound by commitments to the World Trade Organization (WTO) to liberalize the telecommunications sector by the end of 2005, and new legislation adopted in 2004 resulted in the creation of a new "independent" regulator, the Telecommunications Regulatory Authority (TRA). A second national public telecommunications operator, Du, was established later in 2005, with its backers coming from the United Arab Emirates public sector, although it was not able to begin operating until the second half of 2006. Up to mid 2009, there are no plans to liberalize other segments of the market. In the local press, Etisalat has indicated that it is preparing for liberalization, with Internet telephony a market it is watching with particular interest.<sup>36</sup>

In May 2007, the TRA announced it is in the process of studying the legalization of activities of any VoIP (Voice over Internet Protocol) operators in the country in a phased approach. In the first phase, the permits licensed operators in the United Arab Emirates to provide VoIP services under light obligations. In the second phase, the TRA will issue a full regulatory framework. Currently the operators block illegal VoIP traffic on the Internet in compliance with TRA rules and regulations.<sup>37</sup> Up until the writing of this report, no new development has taken place on this front.

Law No. 1 of 2006 concerning Electronic Transactions and Commerce Law and Law No. 2 of 2006 (the Cyber Crime Law) were issued earlier in June 2006 under the decree of President His Highness Sheikh Khalifa Bin Zayed Al Nahyan. The new laws lay the foundation for legitimizing ecommerce and fighting misuse of cyberspace and new technologies. The federal laws reflect the United Arab Emirates government's commitment to provide legal protection for Internet related investments and ensure that the legal system meets the challenges of the digital economy. The new laws represent a bold initiative from the United Arab Emirates government. Up to the time of this writing (May 2009), very few cases (one or two) were brought before the courts under these laws, and were mainly settled outside of courts. For these laws to be effective, however, it is critical for the corporate community and the various court systems in the United Arab Emirates, including judges and lawyers, to be aware of their implications. Only then will these laws be effective.

The federal laws have introduced a number of international standards while at the same time extended the relevance of existing laws to the electronic domain. With the rising threat of cyber crimes, especially identity theft, it is important to raise awareness about the legal recourse that companies have in the event of any incident. The new legislation provides a sound platform on which to build the regulatory framework. It

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<sup>36</sup> [http://blogs.thenational.ae/beep\\_beep/](http://blogs.thenational.ae/beep_beep/).

<sup>37</sup> <http://www.arabianbusiness.com/property/article/13034-uae-to-lift-ban-on-cheap-web-calls>.

does not, however, address some aspects of e-commerce and electronic transactions such as privacy, jurisdiction, data protection, domain names, and decency. The United Arab Emirates government needs to promulgate more cyber laws to fill gaps in the existing legislation so that the legal system is able to meet the needs of the evolving digital economy.

The law also creates a business and regulatory environment in which technology-based, electronic commerce, Internet and media companies will be able to operate globally out of the United Arab Emirates with significant competitive advantages over local and regional competitors.

## B. DOMAIN NAME MANAGEMENT

Etisalat plays the key role in domain name management; for instance, Etisalat is hosting two mirror root name servers F and K in Dubai and Abu Dhabi. These servers are meant to increase the response time domain name resolution in the United Arab Emirates as well as in the region. This is a step initiated by Etisalat, to strengthen the root name server network by providing more points of mirror servers to deflect malicious attacks on the foundation of the Internet.

The TRA will lead the restructuring of the United Arab Emirates domain name industry and establish an independent .ae Domain Administration (.aeDA) to promote the .ae name space and transition to worlds' Best Practices operation for the .ae ccTLD. The .aeDA's mission is to provide secure access, stability and reliability to the domain names registered under the .ae ccTLD domain, thus ensuring their sustainable growth. The .aeDA will establish a new industry framework to redefine the roles of each involved entity and open up the competition between different registrars. In supporting the growth of the .ae ccTLD, the .aeDA will make required changes to the .ae namespace to enhance its openness and accessibility while retaining the strong cultural identity of the United Arab Emirates.

In addition, Etisalat/UAEnic is co-founder of the Arabic Domain Name Project (Trial), initiated in 2004. It is also participating along with the GCC and Arab countries in testing the Arabic characters in domain names. The system consists of Root name servers in Dubai and Riyadh on trial basis. This project was initiated in step to enable the Arab community to access websites in their native language i.e. Arabic. It was presented to ICANN in step to update the root name servers with IDNs to enable the accessibility worldwide.

## C. STANDARDIZATION IN ICT

The Arab Internet Standards Organization (InterStandards) initiative, mentioned above is a step in the right direction. This is a pioneering Arab Initiative launched with the mission of accelerating the development of online activities by developing a set of websites' quality standards which are applicable to all types of websites.

InterStandards quality standards cover website design, website security, website content, wna website advertising. InterStandards is leveraged through a strategic partnership with Dubai Internet City (DIC) who will carry it out to market as a joint initiative, and eHosting DataFort who will provide technical expertise and solutions to the standards building process

The InterStandards have five standardization modules:

1. e-design and structure module;
2. e-marketing module;
3. e-media/content module;
4. e-security module; and
5. e-solutions/Web coding module.

This initiative will help in the standardization of ICTs.

#### D. SUPPORTING MEASURES

Many institutional mechanisms are being established to help move the United Arab Emirates into a knowledge based society; in terms of innovation, the United Arab Emirates was ranked as the country most likely to become the region's innovation hub, by the Arab Innovation Index (AII) among other variables, this index assesses the level of entrepreneurship, diffusion of incubators, venture capital investments, government initiatives, etc.<sup>38</sup>

An indicative signal of the supporting measures initiated and encouraged by the United Arab Emirates government is the recent signing of a deal between the TRA and the International Multilateral Partnership Against Cyber Threats (Impact) Alliance in May this year (2009).<sup>39</sup> The TRA signed the deal on behalf of aeCERT. It is worth mentioning here that Impact Alliance is the official home for the Global Cyber-Security Agenda for the International Telecommunication Union (ITU). The details of the deal between IMPACT and TRA have not been disclosed. IMPACT is a coalition of twenty-six countries that have united to form a global cyber-security group. It was founded in Kuala Lumpur May 2008.

### VII. ICT APPLICATIONS

#### A. E-GOVERNMENT

Between 2004 and 2009, the United Arab Emirates has made important advances in bringing its 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: the political determination of United Arab Emirates leaders and the availability of pertinent resources. In this section, we will cover (1) the e-government initiative at the federal level and (2) the e- government initiative in Dubai.

The United Arab Emirates has been one of the leading advocates of e-Governance in the MENA region and globally, having been ranked among the world's top five countries in terms of transactional services during the 2008 United Nations Department of Economic and Social Affairs (UNDESA) UN e-Government Survey. The country's e-Government initiatives have played a key role in improving the rate of technology adoption as citizens and residents are being drawn in by the convenience and simplicity of the growing number of e-Services being offered.<sup>40</sup>

Of all the emirates, Dubai is the front runner in delivering e-Government solutions. The emirate offers a range of synergistic services such as Dubai.ae, mDubai, eLearn, Ask Dubai, ePay, e4all, eHost and eLibrary. These services reach out to a large section of Dubai's population, including citizens, residents, visitors and businesses contributing towards eradication of electronic illiteracy in the community. The Dubai e-Government portal<sup>41</sup> provides a single point of access for government online services offered by various departments and also provides news, events and vital information. Dubai provides mobile services through SMS for the public which includes notification and enquiry services. This service is pivotal for making important announcements and updates to customers; and the enquiry service allows customers to request information from various government departments anytime through SMS. This marks the transition from e-Governance into m-Governance.

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<sup>38</sup> Arab Innovation Index, 2006, [http://www.moutamarat.com/main/pdf/ABIR\\_VII.pdf](http://www.moutamarat.com/main/pdf/ABIR_VII.pdf).

<sup>39</sup> TRA in Partnership with IMPACT Alliance, Khaleej Times, May 25<sup>th</sup>, 2009, [http://www.khaleejtimes.com/biz/inside.asp?xfile=/data/business/2009/May/business\\_May980.xml&section=business](http://www.khaleejtimes.com/biz/inside.asp?xfile=/data/business/2009/May/business_May980.xml&section=business).

<sup>40</sup> The 2008 United Nations Department of Economic and Social Affairs (UNDESA) UN e-Government Survey, Geneva, Switzerland.

<sup>41</sup> <http://egov.dubai.ae>

In 2006, Gov3 was appointed by the Abu Dhabi Government to develop the information architecture for the Government Portal. Benchmarking was undertaken then to review six government portals, including the national portals of Canada, UK, USA and Hong Kong, plus city portals of Brisbane and Vancouver. Since then, the government of Abu Dhabi has been very active in developing its e-side; it aims at moving more than 35 per cent of all its transactions online by 2012. In 2009, only 9 per cent of the transactions are done through e-services.

The e-government project of the United Arab Emirates government was initiated by His Highness Sheikh Hamdan Bin Rashid Al Maktoum, United Arab Emirates Minister of Finance and Deputy Ruler of Dubai. E-government applications were spearheaded by the Ministry of Finance and Industry since 1997. These services are aimed to reduce bureaucracy and allow customers to complete their services at a faster rate. The following are some of the services that are running as of 2009:

### *1. Websites development*

This is the first step toward being a customer focused government. Information and services pertaining to each ministry is posted on the United Arab Emirates government's website. The general public or businesses can interact and transact their needs over these websites. This website is 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 website,<sup>42</sup> the public can navigate through the entire government and also understand the various services offered by the different ministries. Important information is always updated. Recently, this website has undergone major improvements in terms of design, look, and content. Etisalat delivered the most important project of the e-government, a unified portal for the United Arab Emirates Government.<sup>43</sup> It is has a content management system CMS, and allows all ministries and government entities to use and update their websites. The portal provides news, events and information for e-government users. Etisalat also provided the websites for all ministries and entities, using the best standards to reflect United Arab Emirates' culture and identity for each ministry or entity (i.e. <http://www.uae.gov.ae/mofi>). All these websites were linked to the portal, through a single Content Management System (CMS), were the portal information is updated automatically whenever a ministry or entity site is updated. This has improved the United Arab Emirates ranking from number 42 to 32 in the United Nations Global e-Government Readiness Report 2008, and the portal has been recognized as regional best practice.

### *2. Electronic mail (e-mail)*

Electronic mail was introduced to improve communication between employees and also to reduce paperwork in an effort to make a transition to "paperless" offices.

### *3. Financial applications*

Similar to other governments 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 in 2009 is using a central financial system 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 being decentralized. All financial processes will be re-engineered and "financial personnel" re-trained on how to operate this new system. This is a classic example where "IT" is used as a tool in re-inventing government.

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<sup>42</sup> <http://www.uae.gov.ae>

<sup>43</sup> <http://www.government.ae>

All financial processes have been re-engineered and, as of 2009, the appropriate IT applications are being evaluated. The e-dirham, which became functional and online in 2003, is a payment tool devised by the Ministry of Finance and Industry in order to facilitate collection of revenues, providing the government with a secure payment method and providing the public with a convenient payment tool. The e-dirham card which is readily available all over the United Arab Emirates not only improves the financial transaction but also provides “on-site” transfer of payments between the public and the 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 e-Dirham has its own secure payment system guaranteed by the government and the payment card can be used for any government services. This project has been very successful and the United Arab Emirates has had enquiries from many other countries in the region to implement similar systems.

Back in early 2006, and in its continuous effort to implement the strategic e-Government project the United Arab Emirates Ministry of Finance and Industry (MOFI) launched its electronic portal which aims to increase the efficiency and effectiveness of its services and information provided to its stakeholders. The e-Portal is an integrated window of information about MOFI's projects and services allowing stakeholders to conduct their business with the Ministry with flexibility and efficiency. The portal<sup>44</sup> contains a wide range of information about MOFI's projects and information and its financial services such as the performance based budgeting.

Information and services of total quality management, financial system of the government, e-Dirham, executive training, and federal government services fees, and information about the industrial sector is also included.

On April 3, 2007, a memorandum of understanding was signed between the Ministry of Finance and Industry and the United Arab Emirates Identity Authority (EIDA) to enable applicants to pay their transaction fees through the e-dirham service at all government departments. This has not been fully implemented as of the writing of this report, though. The initial plan was for the ministry to provide automatic collection machines, payment cards and the necessary electronic links, and to train employees to use the system. The service will include using the identity card as an e-wallet to pay for different services offered by ministries, government departments, and private companies that use e-dirham.

Other services that were launched with this portal are electronic housing system and intellectual property rights applications. The portal contains also the latest news of the ministry and has links to relevant international organizations such as the International Monetary Fund, the World Bank, and several other organizations.

#### *4. Electronic transaction*

Since the United Arab Emirates government has gone deep into implementing the e-government project, the Ministry of Finance and Industry started to offer online services to its customers and the public through the new electronic services which are e-procurement and eSinaee, where the customer can register, select the service, apply, fill in the forms, upload the documents and pay online using the e-Dirham card, and finally receive the services. The e-procurement provides a mechanism for government agencies and businesses to transact electronically. The Ministry is in the midst of further reviewing the “supply-chain process” within the government. By re-engineering the supply chain systems, the Ministry will eventually create a total “electronic procurement” where this application will be linked to the government financial and asset management system. The eSinaee is an application specially introduced to manufacturing entities within the United Arab Emirates. This will allow factory owners not only to have the latest information

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<sup>44</sup> <http://www.mofi.gov.ae>

regarding industrial promotion, but also to apply for tax exemption and other industrial services. The introduction of all the above services has created awareness on the importance of IT for making government administrative services more efficient and effective. More importantly, this has paved the path for the introduction of the overall e-government implementation phase, learning from what 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 and that is "IT" should be used as a tool to re-invent and reform current "management" of the government. The e-government project adds to the convenience, accessibility, and quality of interactions between the government, businesses, and the people residing in the United Arab Emirates. More importantly, e-government will improve information flows and processes within all government ministries.

Another major e-Government project was the launch of a National ID project, officially launched on July 11, 2006 with the registration of Sheikh Kahlifa, the President of the United Arab Emirates; the main objective of this initiative is to provide both national and other United Arab Emirates inhabitants with a high tech national identification card. Besides enhancing national security through the control and monitoring of traffic through United Arab Emirates ports of entry, the card also serves as a reference for governmental and private sector dealings. In other words, it is a multi-purpose card which does the work of identification like a driver's license, health card, labor card and bank card.

United Arab Emirates' Ministry of Labor's portal is another excellent example of a one-stop shop for all the transactions. It offers payment features via credit cards, online submission of forms and permits and creation of personal accounts. The website is one of the few sites which has the facility for electronic signature

As of the writing of this report, the United Arab Emirates Ministry of Justice is pursuing an e-justice program that aims to provide electronic services to ministry's staff community and the public. This e-services portal is looking at offering electronic archival, electronic payment, electronic notary, case management, electronic filing, legal research, electronic drafting and publishing of legislation.<sup>45</sup> Further development, and as part of its e-government efforts, the Dubai Public prosecution (DPP) has recently launched (January 2009) a new SMS service for both the general public, as well as lawyers and prosecutors, to enable them to find out details of specific cases.<sup>46</sup> At present, the new service is limited to the Judiciary and Public Prosecution areas but is expected to expand to other government authorities in the future. This initiative is the beginning of a new phase in the provision of judicial services in view of its role in facilitating legal procedures, reducing the time taken and minimizing general costs.

## B. E-BUSINESS

E-business transactions in the United Arab Emirates are progressing at a slow rate; a prominent exception, though, is the e-commerce marketplace Tejari.com, launched by Dubai World, and now franchised in Oman, Jordan, Saudi Arabia, Kuwait, Lebanon, and Pakistan. Tejari provides a single point of contact for an open and growing community of buyers and suppliers, permitting spot-purchasing and on-line auctions that enable participants' real-time access to new markets and greater cost savings. This leading online B2B marketplace for emerging markets, has been ranked as the eighth largest electronic sourcing platform in the world, in a Forrester research report entitled "Holistic View: The ePurchasing Software Market" (2009). However, while in 2008 Tejari achieved a 31 per cent increase globally in the number of companies who joined the Tejari Marketplace, bringing the total membership up to 200,000 businesses, and

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<sup>45</sup> Abu Dhabi to double online revenues by end of the year, Emirates Business 24/7 May 25, 2009, p.7.

<sup>46</sup> Dubai Public Prosecution adopts Dubai e-government's SMS service, April 13<sup>th</sup>, 2009, <http://www.ameinfo.com/192390.html>.

with a total transactions topping \$7.5 billion globally since its inception in 2000, this represents a small per centage of intra-regional trade.<sup>47</sup>

Another example of e-business applications is the initiative of the Dubai Road Transport Authority (RTA). Bus commuters in Dubai can now plan their journey virtually with the click of a mouse, thanks to a new portal launched by the RTA. The bilingual website,<sup>48</sup> has a link called "journey planner" which gives information such as what bus to take from location to location in Dubai, frequency of buses and the fares.

Criteria for evaluating e-government progress are levels of integration and customization of basic eservices on a single government gateway. Dubai's performance in these areas is notable. The Dubai government has a Web portal<sup>49</sup> which allows access to services of various government departments, and is working on integrating these services in order to present them on a single user-friendly or user customizable interface. The portal 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, and downloadable application forms for government services, an ePay service, as well as eJawaz which allow the users to use all public services without having to register with each relevant government department separately. ePay allows users of government services to pay all charges electronically through a single site. Dubai portal has the infrastructure required for the integration of all government services, but many government departments have not yet made full use of this infrastructure.

### C. E-LEARNING

The United Arab Emirates places special emphasis on e-learning; the many initiatives undertaken by the federal and local governments are an indication of the importance of this area. In June 2005, e-TQM (Total Quality Management) was established with the objective of facilitating quality education through the creation of an effective environment for e-learning through an electronic information network. Back in April 2004, the Dubai government signed an agreement with Microsoft Corporation for establishing an "eSchool" without papers, books, or pens to be the first eSchool in the Middle East and the second one in the world. In addition, a large number of colleges and universities adopted the hybrid model of learning combining in-class with online modes.

A number of e-learning services and initiatives have been setup by public and private entities. For instance, starting in 2004 Etisalat has been running "LearnOnline", a portal dedicated to lifelong learning by teaching languages online, among other subjects. Some of the language courses available are: English (American/British) Spanish, Italian, French, German and Dutch. On the other hand, Dubai eGovernment has setup their own on-line learning portal dedicated to IT related courses spanning topics such as ICDL, Application Development Client/Server, Communications/ Networking, and Wireless technologies to name a few.<sup>50</sup>

The Centre for Excellence for Applied Research and Training (CERT) runs a countrywide continuing education program for all nationalities. The program has been designed for professional development and personal enrichment for people with an eye for continuing education. Initial projects include 100 face-to-face instructor-led courses and approximately 100 on line courses through a Cert website.<sup>51</sup> CERT is the continuing education and applied research arm of a system servicing more than 10,000 students throughout

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<sup>47</sup> Forrester Report places Tejari in 8th spot in the world among global eSourcing vendors, Jan 11, 2009, <http://www.reuters.com>.

<sup>48</sup> <http://www.rta.ae>

<sup>49</sup> <http://www.dubai.ae>

<sup>50</sup> <http://www.ameinfo.com/69995.html>.

<sup>51</sup> <http://cert.hct.ac.ae>

the United Arab Emirates with more than 40 programs in engineering, technology, and business. The Center operates two Technology Parks in Abu Dhabi and Dubai, fostering a number of joint venture businesses and training operations through more than 20 strategic alliances with multinational technology providers like Lucent Technologies, Honeywell, and GEC Marconi. These Technology Parks were established to foster the application of the latest technology in the United Arab Emirates and to help develop the infrastructure necessary to support this technology.

The recent Arab World Competitiveness Report published in April 2007 ranks the United Arab Emirates at the top of Arab countries with its focus on world-class service in areas including finance, health care and ICT. While the United Arab Emirates excelled in many categories, the report also focused on potential problems with the biggest issues being education and lack of innovation. The United Arab Emirates scored poorly on education ranking as low as 112 out of 128 in primary education. E-learning and the infusion and diffusion of ICT in education might help alleviate this problem.

In February 2008, The United Arab Emirates Ministry of Education launched the new educational portal, which aims to help all stakeholders, including teachers, students and guardians to interact with each other. The e-Link will provide a package of services for all and make communication and follow-up easier for all stakeholders. In the first phase, e-Portal will feature all services, information, reports, meetings and activities concerning with public education. The portal will also provide integrated services, including licensing, academic accreditation, fees structure and accredited curricula and services provided by each school. With the use of e-Portal, guardians can access mark sheets and assessments as well as homework, examinations schedule, academic year calendar, including holidays. The Ministry staff members can also know the status of their salaries, evaluation and elevation without referring to their departments. The portal also includes interesting links such as e-Learning, distance education and video-conferencing learning rooms.

AMEInfo reported in May 2009 that an e-learning web portal, developed by the Western Region Education Zone (WREZ), will soon be accessible to over 65,000 Grade 11 and 12 students in the Western Region of the United Arab Emirates. The new web site<sup>52</sup> provides extra lessons for students and helps them get in touch with teachers outside of school hours, allowing teachers to explain the curriculum both verbally and visually in a question-answer and test format.

#### D. E-HEALTH

The United Arab Emirates has witnessed a rapid development in health care over the past three decades. The World Health Organization (WHO) ranked Abu Dhabi and Dubai amongst the best healthy 3 cities in the Middle East; the Ministry of Health reports that the 2005 health care services expenditures is estimated at \$4.1 billion; the Ministry has allocated AED 300 million (\$82 million) to be spent on leveraging cutting-edge information and communications technologies in the health care fields in a bid to automate transactions and healthcare government services in the country.<sup>53</sup> As part of the Ministry's strategy, among others, the following projects have been launched:

- Linking hospitals and other medical centers by an interactive IT system project;
- eRecruitment for physicians and specialists project;
- Preventive Medicine update project;
- Developing IT systems in school health centers project;
- IT medical equipment system project.

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<sup>52</sup> Refer to <http://www.wez7.com> for further information.

<sup>53</sup> Ministry of Health allocates Dh300 million to information technology (March 19, 2008); <http://www.gulfnews.com/Nation/Health/10196353.html>.

To start implementing the above mentioned initiatives, in October 2008, the Ministry of Health (MoH) has entered into a deal with Cerner Corporation, according to which fourteen hospitals and 60 clinics will implement a suite of Cerner Millennium solutions to optimize and automate paper-based processes. iCapital, a UAE-based company serves as the prime contractor for the implementations. With the Cerner Millennium solutions implemented throughout the MoH healthcare delivery facilities will automate processes in the scheduling, admissions, emergency, laboratory, pharmacy, radiology, surgery, medical records and clinical supplies departments. Nurses and physicians also will use Cerner Millennium solutions to manage and document patient care through online order entry and results notification and viewing.<sup>54</sup>

In May 2007, Dubai Healthcare City (DHCC) introduced an electronic centralized data warehouse capable of collecting, storing and maintaining patients' records required for quality monitoring, statistics reporting and planning purposes. The system, HIRAS (Healthcare Information Reporting and Analysis System), contributes to protecting the privacy of patient data in DHCC's Electronic Health Record, and makes patient records available at the touch of a button.<sup>55</sup>

The core of the e-health strategy is the new Dubai Biotechnology Park. Dubai Biotechnology and Research Park (DuBiotech), is a free zone (100 per cent tax-free and 100 per cent foreign ownership allowed) dedicated to the biotechnology industry, which was announced in 2005, is scheduled to be completed by the second quarter of 2008, but has not been completed according to schedule yet.. The park which is located on a 2.3 square kilometres is part of an initiative to create an incubator for researchers and scientists, becoming a centre for production, creativity and development in the biotechnology field with applications focusing on agro-food, health care, environment, genetics and stem cell research.

Moreover, it will house regional offices of major biotechnology and pharmaceutical companies in addition to manufacturing plants. Dubiotech will be regulated by the Ministry of Health (MoH) and aims at building cooperation with local and international organisations such as World Health Organisation, the Food and Drug Administration (FDA) and the European Medicines Agency.

In 2006, Etisalat continued its strategic partnership roles with many local and government entities in rolling out ICT solutions and eService initiatives. A case in point is Etisalat partnership with the General Authority of Health Services in Abu Dhabi to reengineer their operations and install an IP network connecting all five major hospitals and over fifty five clinics in the Emirate of Abu Dhabi.

Part of the country's strategy unveiled by Sheikh Mohammed the week of April 15, 2007, the Ministry of Health (MoH) inaugurated its first one-stop MoH help stop in Dubai; 30 more centers are scheduled to open within a year all over the country; these centers will be connected to hospitals, healthcare centers and medical district offices with fully computerized counters handling pharmacies, purchases, human resources, evaluation of exams of doctors, nurses and lab.

Another success was the development and management of Messaging Solution. The solution aims to provide a fully managed secure, reliable and scalable messaging service to all Ministries and other entities, accessible through multiple channels with the following objectives: (1) To have Standard Email Policies implemented across all Ministries/Entities; (2) Centrally enforce Security Standards and Policies for the infrastructure; (3) Avoid duplication of resources and activities at various Ministries to manage messaging infrastructure; (4) Consolidation of investment by individual Ministries for infrastructure; (5) Reduced total cost of ownership; (6) To provide unique identities for employees within Government for official email communication; (7) To grow steadily or exponentially without disruption of service.

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<sup>54</sup> <http://www.ameinfo.com/171955.html>.

<sup>55</sup> Healthcare city launches electronic database; <http://www.moh.gov.ae/en/NewsDetails124.aspx>

In December 2008, the United Arab Emirates Ministry of Health awarded an \$85 million contract to Cerner for a national electronic patient records system. Under the large-scale national project Cerner will install its Millennium EPR and clinical solutions at 12 hospitals and 60 clinics in the Northern Emirates; as well as providing a national single electronic patient record.<sup>56</sup> In addition, Cerner Millennium systems will be used to optimize and automate currently paper-based clinical processes and records. Implementation of the system would take three to five years to complete. The Health Authority Abu Dhabi has also already brought in a system that requires insurance claims to be filed electronically, and plans to introduce more elements in the coming months.

#### E. E-EMPLOYMENT

A number of public and private sector entities offer the option of online recruitment. Some of these place more emphasis on e-employment than others. Dubai eGovernment, for instance, a pioneering initiative in the region to provide online services, promote iRecruitment service, the online recruitment portal supported by Department of Government Information and Resource Planning which provide opportunities for all national graduates and job seekers. Other entities offering this functionality are Dubai Airport Free Zone Authority, Dubai Civil Defense, Dubai Courts, Dubai Police, Dubai Public Prosecution, Entrepreneur's Forum, Financial Audit Department, Department of Naturalization and Residency, Government Information Resources Planning Department in the Ruler's Court, Department of Finance and Etisalat.

This form of recruiting seems to be well accepted by job seekers in the United Arab Emirates; a poll conducted by bayt.com in January 2007 revealed that over 22 per cent of polled applicants found their last job through an internet job site such as bayt.com compared to 11 per cent through a recruitment company and 30 per cent through a newspaper advertisement. With more and more traditional recruitment companies posting the bulk of their jobs on local jobsites such as bayt.com, the number of online jobseekers look is on the rise.<sup>57</sup>

### VIII. CULTURAL DIVERSITY AND IDENTITY, LINGUISTIC DIVERSITY AND LOCAL CONTENT

#### A. USE OF ICT IN SUPPORT OF CULTURAL AND LINGUISTIC DIVERSITY

The United Arab Emirates has made ICT one of its most important priorities as a basis for encouraging cultural diversity and increasing local content. A number of digital Arabic content initiatives have been undertaken. Launched in 2000, as an initiative of the Abu Dhabi Cultural Foundation, Alwaraq.com is the first comprehensive free Arabic Digital library. The website contains in excess of one million pages of the most important Arabic classical books, plus some important books of the world heritage. This digital library evolved over time and now it has a powerful text search engine.

#### B. LOCAL AND NATIONAL DIGITAL CONTENT DEVELOPMENT

An example of increasing local content is the move by the largest corporations and foundations in the country to launch their web sites in Arabic. All of the governmental sites in the country are in Arabic and the majority is also available in English. In addition, the official approval of the proposal which was put by the Telecommunications Regulatory Authority as part of a national strategy to manage Arabic language on the internet, will pave the way for future inclusions of UAE domain addresses in Arabic (Emarat). The Internet Corporation for Assigned Names and Numbers (ICANN) extended top-level domain names in July of 2008, approving the introduction of Internationalized Domain Names (IDN) written in Arabic scripts. This decision

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<sup>56</sup> [www.ameinfo.com](http://www.ameinfo.com)

<sup>57</sup> <http://blog.bayt.com/?s=january>

to introduce Arabic domain names will contribute to increasing the number of surfers to Arabic sites and further promote and strengthen the United Arab Emirates' identity.<sup>58</sup>

The country is extremely serious about Arabization; two initiatives are worth mentioning here; the first is that of the Emirates Centre for Strategic Studies and Research (ECSSR) whereby books on the region written in foreign languages are being translated to Arabic and digitized; one of the author's books, *The Diffusion of E-commerce in Developing Economies: A Resource-Based Approach* has been chosen and was translated from English to Arabic; it will be available by the end of July 2009. The other initiative is the one undertaken by HH Sheikh Mohammad Bin Rashid Foundation, and it also aims at translating and digitizing relevant books to Arabic.

It is believed that bilingual websites will serve both the Arab region and the world at large; this move is pivotal both to private and public sector entities and corporations to ensure continuous communications with all these entities' stakeholders.

### C. ICT TOOLS AND R&D PROGRAMS

A number of initiatives have been undertaken to promote public/private partnerships especially in research and development; it is still very early to tell if these programs will bear fruit. One important initiative is the Mohammed Bin Rashid Foundation's *Tarjem Programme* which seeks to develop the translation process in the Arab World by translating foreign works into Arabic and vice versa. The Foundation's main priority is to translate key cultural contributions published in neighbouring countries to foster cultural understanding. The Foundation will also work to develop the level of information transfer from knowledge-producing countries, especially in North America, Scandinavian countries and East Asia. A network of Arab intellectuals, academics and experts in different fields are in charge of the selection process and the development of the translation strategy, in accordance with the development needs of the region.

## IX. MEDIA

### A. MEDIA INDEPENDENCE AND PLURALISM

Emirates Media Incorporated (EMI) plays an important role in development of the media in the United Arab Emirates. As the largest and most diversified media corporation, not only in the United Arab Emirates but throughout the Arab world, EMI has interests in all branches of media – television, radio, print, publishing and distribution, and the Internet. While the United Arab Emirates government has given up formal control over EMI, the corporation remains partially dependent on government funding. Nevertheless, EMI enjoys administrative and editorial independence and functions very much as a private company.

Most printed media incorporate the latest information technology modules; given the United Arab Emirates' diversified populations, a mix of TV viewing content is required to address the need of the various language based and ethnic groups. Therefore, E-Vision is the only regional source to offer over 250 TV channels, in 21 different languages, ranging from sports to movies, from music to documentaries and kid's channels. The product line-up includes 15 premium packages from all the major TV providers like Showtime, Orbit, ART, Pehla, Firstnet, TFC, PInoy Plus and many more, in addition to E-Vision Basic package Viewing content was localized by introducing Dubai and Abu Dhabi live stock market quotes and adding to the popular e-Masala Movie schedule. In addition, E-Vision is strategically placed to make the most of the convergence of telecommunications and TV entertainment services; in the first quarter of 2009, Etisalat has announced it has reached 500,000 residential broadband subscribers, bringing the country's broadband penetration rate to 11.4 per cent. This is above many international benchmarks, and to achieve further growth in the market, the company will invest in areas such as IPTV, technical support and mobile

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<sup>58</sup> UAE Introduces Arabic Domain Names, March 2009. <http://www.idnnews.com/?p=9123>.

broadband. In addition, Etisalat recently announced the availability of fixed line broadband services offering download speeds of up to 8Mbps and 16Mbps for customers that are connected to its fibre-to-the-home network (FTTH). The company aims to connect the entire city of Abu Dhabi to its next generation network by third quarter of 2009 and is also preparing to provide its domestic customers with mobile broadband services using HSPA+, enabling theoretical download speeds of up to 20Mbps.<sup>59</sup>

This past month (May 2009), E-Vision expanded the functionality of its e-junior Web portal, with the addition of a video upload service. The new service, which is installed on the ejunior.ae website, enables UAE-based users to upload and view video content produced both externally and in-house by the e-junior production team. The broadcaster's push to be the first to market with HDTV services received a timely boost following Etisalat's announcement earlier that it planned to connect every home and office in the United Arab Emirates to its eLite optical fibre communication network by 2011.

The Emirates News Agency (WAM) provides news in Arabic and English, together with pictures and news video clips. It has invested in cutting-edge information and communications technology and now makes extensive use of the Internet through a bilingual news website.<sup>60</sup>

Fair gender portrayal in the media is essential; as long as media portrays women in traditional, or stereotyped roles, they will be responsible for giving a distorted image and inaccurate picture of people's lives. Media in the United Arab Emirates had started to give a fair share of coverage to women's issues; the appointment of some prominent women to government and ministerial jobs is also helping in shedding the light on women issues.<sup>61</sup>

## B. THE MEDIA AND ITS ROLE IN THE INFORMATION SOCIETY

There are fifteen national newspapers published in the United Arab Emirates, eight in Arabic and seven in English. In addition, many regional and international newspapers circulate freely in the country. At the latest count, there were 174 magazines and journals (69 in Arabic and 105 in English) published by local and national organizations; and many of the publications produced in the United Arab Emirates have active websites.

The United Arab Emirates has numerous indigenous television channels broadcasting in Arabic and English, with many focusing on Arab culture and identity, others on business and sport. Many of the United Arab Emirates' television broadcasts are available internationally, via satellite. Emirates Cable TV and Multimedia (E-Vision), the only digital cable TV service provider in the United Arab Emirates, provides over 70 channels, including a variety that offer programming in more than 14 languages and premium packages from ART, Showtime and B4U. There are also many radio stations broadcasting in Arabic and English.

The quality of programming is high and covers a wide range of ICT related topics; many newspapers have a dedicated section dealing with information technology and telecommunications issues. Many radio programs are also available on the Internet. Dubai Media City (DMC) has become an international centre for media-based operations. It is now a successful media community with a highly developed infrastructure that hosts broadcasting companies, TV channels and numerous associated media production companies and freelancers. Major global companies in DMC include CNN, CNBC, MBC, Reuters, Sony, Bertelsmann, BMG, the Associated Press and McGraw Hill. CNN runs its Arabic news website and regional news bureau from DMC.

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<sup>59</sup> Etisalat reports 500,000 residential broadband subscribers; March 11, 2009.  
[http://www.telegeography.com/cu/article.php?article\\_id=27641&email=html](http://www.telegeography.com/cu/article.php?article_id=27641&email=html).

<sup>60</sup> <http://www.wam.org.ae>

<sup>61</sup> The UAE government has four women Ministers and two women ambassadors both appointed in Europe.

## X. INTERNATIONAL AND REGIONAL COOPERATION

### A. FINANCING OF ICT NETWORKS AND SERVICES

The government of the United Arab Emirates represented by Etisalat, and lately, du, has done a significant job in financing the ICT Networks and offering ICT services. In March 2009, SmartSat, a \$500 million joint venture and the region's first private company specialised in the satellite industry, announced a groundbreaking project that will send into orbit the Arab World's first private satellite; this initiative that will help broadband and broadcast service providers add more value to their satellite-enabled services and ultimately ensure better quality offerings for end-users in the region. The SmartSat satellite will primarily target the region's internet service providers (ISPs), GSM providers, broadband technology solutions providers, television stations, Ministries, military agencies and companies dealing with data systems among others. This project will enable users to tailor broadband packages that satisfy specific market segment demands and subsequently optimize business opportunities. With the satellite's powerful signals and two-way links, SmartSat will be able to support the MENA region broadcasters, home satellite providers, news organisations, satellite conference centres and other content providers with regular programming or on-demand requirements, enabling high-definition viewing at home or for live, in-studio broadcasts.<sup>62</sup>

### B. INFRASTRUCTURE DEVELOPMENT PROJECTS

A number of international and regional initiatives are under way in the United Arab Emirates; especially the ones signed through the GCC countries. A leading initiative is the GCC cooperation on the biometric smart ID project. Most GCC countries have adopted the chip-based national ID cards allowing their citizens to use them instead of passports while traveling within the GCC zone. In the United Arab Emirates, the Emirates Identity Authority (EIDA)<sup>63</sup> is in charge of issuing these mandatory, secure, high-tech cards and have started to issue these cards at the beginning of 2008; up until the time of the writing of this report (May, 2009), there were 1.2 million cards issued in the United Arab Emirates; the registration started with United Arab Emirates nationals and continuing with other residents. Holders of the ID card will soon be able to use it as an e-gate at airports.<sup>64</sup>

As mentioned in this report, international and regional cooperation are also being facilitated by the United Arab Emirates Telecommunications Regulatory Authority (TRA). The Telecommunication Regulatory Authority (TRA) was set up by the United Arab Emirates government decree No. 3 of 2003. The TRA is a regulatory body that oversees the telecom sector and the licensees in the United Arab Emirates in accordance with the terms of Legislative Decree no.3 of 2003, and implements the instructions of the Supreme Committee for Telecommunications. The Authority is an independent body and its duties include ensuring telecom services are available to all provinces of the country, assuring that the licensed operators fully follow established rules and regulations, protecting the interests of subscribers, developing telecom sector and helping to implement the best and most advanced technologies.

### C. WSIS FOLLOW-UP

It is not clear whether the United Arab Emirates had a formal regional plan for action as defined by the United Nations, however, as mentioned above, a national plan of action for building an information/knowledge based society has been formulated in 2006; the number of initiatives leads one to believe that the country is on the right track with respect to transforming the country into a knowledge based society. The role of the Telecommunications Regulatory Authority<sup>65</sup> and the United Arab Emirates Statistical

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<sup>62</sup> [http://www.uaetoday.com/mee\\_dtls.asp?pid=5521](http://www.uaetoday.com/mee_dtls.asp?pid=5521)

<sup>63</sup> [www.emiratesid.ae](http://www.emiratesid.ae)

<sup>64</sup> ID Cards can be used as e-gates, Gulf News, May 8<sup>th</sup>, 2009. <http://www.gulfnews.com/nation/Government/10311928.html>.

<sup>65</sup> <http://www.tra.ae>

Office cannot be underestimated; given that these two entities were established in the past two years, it is still unclear to us how they will deal with the surveying, tracking and publication of ICT performance measurement indicators.

A number of websites are available, though, and serve as knowledge sharing portals; the United Arab Emirates government newly constructed website is a good source of information; the Dubai e-government Website is a showcase; the ecommerce success story of Tejari; the Bayt.com website for e-employment; the newly developed website for the Emirates ID Authority (EIDA) are examples in point. As mentioned above, though, more centralized, formal, and structured efforts should take place to track the progress toward the WSIS goals and objectives.

## **XI. MILLENNIUM DEVELOPMENT GOALS**

### **A. PROGRESS TOWARD ACHIEVING THE MDGs**

As mentioned in the report above, an explicit national plan of action for building the Information Society has been developed and announced in 2006, and as such official/centralized information does not exist; however, the ongoing commitment of the United Arab Emirates to developing a robust ICT sector is clear. As indicated in the report, many international indicators point to the United Arab Emirates accomplishments in this regard, in addition to the many initiatives undertaken by the government to boost ICT infusion and diffusion in the country.

It is extremely difficult to measure the country's progress in achieving the Millennium Development Goals; however, all indications lead one to believe that the country is moving in this direction. These include the change in the industry structure with the creation of a new telecommunication company, Du, in addition to Etisalat; the establishment of a telecommunications authority at the federal level (TRA), the high levels of mobile and internet diffusion rates in the country; the commitment to Arabization from the top political leadership, among others.

### **B. USE OF ICT FOR ACHIEVING THE MDGs**

As mentioned above, since there is no structured approach to measuring the progress towards achieving the MDGs, it is extremely difficult to identify how ICT can help in reaching these objectives.

However, given the fact that the 2005-2006 world rank of the United Arab Emirates on the Digital Opportunity Index is 37 (second after Bahrain, with a rank of 35, among the Arab countries),<sup>66</sup> and the fact that the United Arab Emirates continues to lead the region in the Utilization index, the role of ICT in moving toward the MDG targets is not to be underestimated.

Since there is no direct, structured strategy to deal with achieving the MDGs, most of the initiatives and projects mentioned in the report lead directly or indirectly to achieving the MDGs.

## **XII. BUILDING THE ICT SECTOR**

### **A. ICT FIRMS**

The main promoter of ICT in the United Arab Emirates is the government. On a the competitive landscape the country is moving in the appropriate direction by allowing new players, such as Du. Etisalat is still in the lead, though; as the country's sole telecommunications company for 30 years, Etisalat has developed strengths that are difficult to duplicate, not least of which is a customer base much larger than the

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<sup>66</sup> Beyond WSIS: Making a Difference Globally (2006); <http://www.itu.org>

population of the United Arab Emirates. Du has been doing very well, however, with a market share of 30 per cent in April 2009.<sup>67</sup> In the two years since the launch of Du, one can clearly state that it considered to be a true competitor to Etisalat. In the first three months of 2008, Etisalat captured about 250,000 and du 180,000 new subscribers; for the first quarter of 2009, it is du that is reporting 250,000 new customers, compared with Etisalat's 50,000; this means 80 per cent of the marginal market has decided to go with du. If this continues, du could have a 50 per cent share of the market by this time next year and, consequently, Etisalat will no longer be the United Arab Emirates' number one mobile operator.<sup>68</sup>

The choice by Du to position itself as a low-cost, value-for-money operator may have seemed a little out of place in the untroubled days of early 2007, when money was not an issue for the majority of residents in this country, and where marketing was filled with the language of the rich promising luxury, lifestyle and products for discerning customers. Currently, value-for-money is the name of the game and is this what du is driving through. Aside from pricing, Du benefits from one of the best free-marketing campaigns any company can have: its status as a new entrant breaking a long-running monopoly.

The new standing of Du, as a justifiable competitor rather than a irritating underdog, means the character and nature of competition between the two companies will be transformed in the near future. Both will concentrate progressively more on capturing and retaining the best customers and appealing to the most valuable customers from the other side to switch and try their service.

In a nutshell, the United Arab Emirates government has created conducive regulatory environments and institutional mechanisms, and provided the physical infrastructure necessary to increase the likelihood of success within the ICT sector. United Arab Emirates corporations such as Etisalat and, most recently, Du, are indeed value adding economic citizens of the country. The government is also providing financial and training to SMEs through various mechanisms.

## B. R&D AND INVESTMENT IN THE ICT SECTOR

Efforts of research and development in the communication and information sectors are concentrated in research centers and universities where most United Arab Emirates universities make basic and applied research in the field of communication and computers in the existence of mature Faculties of Computers Science and Management Information Systems. In addition to the major universities, as of May 2009, there are tens of colleges and universities in Dubai Knowledge Village, most of these are satellite campuses to well known European, Australian and American Educational institutions. A number of universities are established at the Centre of Excellence in Dubai International Financial Centre, these include London School of Business, Duke University, and Cass Business School, among others. A new research centre is being established at DIFC, and is expected to be operational in 2010; the main objective of this centre is to help develop the knowledge base of the region.

Dubai Internet City (DIC) provides a strategic and cost effective platform for ICT companies targeting emerging markets in a vast region extending from the Middle East to the Indian subcontinent, and from Africa to Central Asia. Launched in the year 2000, DIC now features a dynamic international community of ICT companies including global giants like Microsoft, Cisco Systems, IBM, HP, Dell, Siemens, Sun Microsystems, Computer Associates, PeopleSoft and Sony Ericsson. Many small and medium businesses (SMBs) and promising entrepreneurial ventures are also part of the community. The cluster comprises companies from a variety of sectors - Software Development, Business Services, Web Based and e-Commerce, Consultancy, Sales and Marketing, and Back Office. DIC provides an environment that attracts all elements of the ICT value chain, and has developed several programs that can be leveraged by the

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<sup>67</sup> <http://www.arabianbusiness.com/554062-telecom-firm-du-posts-q1-profit-of-128m>.

<sup>68</sup> Etisalat signs up 10,000 BlackBerry subscribers in one month, May 6<sup>th</sup>, 2009.  
[http://www.telegeography.com/cu/article.php?article\\_id=28313](http://www.telegeography.com/cu/article.php?article_id=28313).

community to explore and expand channel development opportunities. Companies are privy to an advanced Metro Ethernet broadband infrastructure and a range of business-enabling services including government transactions. DIC also has the world's largest commercial IP Telephony network. Currently, Dubai Internet City (DIC), the eight-year-old IT and telecoms free zone, is evaluating a proposal to boost research and development, which will increase its attractiveness as a regional marketing hub. The proposal, part of DIC's growth plans, could include the creation of a fund which would focus on investing in knowledge initiatives to create talent pools and regulatory changes. Dubai Internet City houses some 850 firms, including global giants like GE, Intel, Samsung and Huawei, who mainly use it as a marketing and sales hub for the Middle East, Africa and South Asia. A small amount of software development also takes place there. In October 2008, DIC commissioned a white paper on the state of ICT in the MENA region. Conducted by A.T. Kearney, one of the world's leading management consultancies in the ICT industry across IT and telecom segments, the study analyses the immense opportunities that lie in the IT service market for small and medium size businesses (SBMs) in the region today, especially in the hardware and packaged software segments.<sup>69</sup> This paper identifies key success factors for SMBs operating in the ICT sector in the region, providing an overview of the most common entry strategies and the general entrepreneurial environment. It also explores emerging market opportunities within the GCC market including Egypt, Jordan and some areas of Africa.

Dubai Silicon Oasis (DSO) is another example whereby it is operating as an incubator comprising state of the art office towers, R&D and industrial zones, and educational institutions providing a dynamic commercial and social environment. The Oasis has an IP library; high-speed Internet access; high end IT infrastructure; efficient transport and distribution facilities; and state of the art telecommunications infrastructure. Facilities there include a Microelectronics Innovation Center; fabrication plants, and R&D laboratories.

Dubai Silicon Oasis is a 100 per cent government owned Technology Park that was completed in 2006. Its 7.2 sq km master-planned community strategically located in Dubai is the only free zone designed as an integrated community which includes the construction of 560 residential villas. With the aim to attract global semi-conductor manufacturers to relocate to Dubai, it is part of Dubai Government's vision to transform the emirate into a knowledge economy. "If everything works out as planned, we would attract between \$2 to \$4 billion in total investment at the DSO. We have already signed up with 80 companies which will soon go up to 100 in the coming months and bring in between 1,000 to 1,500 qualified professionals, designers and engineers at the DSO."<sup>70</sup> Last year, DSO had signed up with LSI Logic, a \$2 billion company to invest in DSO. According to Gulf News, DSO is in negotiations with four major semi-conductor players to have a presence here, while 10 smaller manufacturers are in the pipeline. DSO is an innovation-driven technology community, housing microelectronics- and opto-electronics related enterprises, a state-of-the-art Microelectronics Innovation Centre, fabrication plants, research and development centers and specialized academic institutions and residential areas.

Dubai Biotechnology and Research Park (Dubitech) is another centre of excellence in biotechnology, bridging research, education, and industry through national and international collaboration to create, develop and advance research and development in the region. Its vision to foster biotechnology education, training and industry support and offer highly developed multifaceted infrastructure and facilities.

An indication of the high investment in R&D in ICT is the ranking of the United Arab Emirates as the top innovator on the Arab Innovation Index. This index is developed by INSEAD with the support of Moutamarat and PricewaterhouseCoopers.

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<sup>69</sup> Dubai Internet City commissions industry white paper for Middle East and Africa region, AmeInfo, October 15, 2008.

<sup>70</sup> Jurgen Knorr, chief executive of Dubai Silicon Oasis Authority.

### C. CONTRIBUTION OF ICT SECTOR IN THE NATIONAL ECONOMY

ICT contribution to the national economy is still minor; this might be due to the shortage of local content that plagues the Arab world; in June 2009, a poll of search engine users in the United Arab Emirates revealed that six out of 10 Internet users are more likely to turn to Google's global search portal<sup>71</sup> rather than the national version.<sup>72</sup> The Arab World has 5 per cent of the world's population but only 1 per cent of its online content.<sup>73</sup>

The United Arab Emirates government takes substantial dividend payments from its stake in Etisalat, however, with a royalty fee of 50 per cent of pre-tax profit. Etisalat is the second largest contributor to the United Arab Emirates federal government budget after oil revenues. Further, the ICT fund of 1 per cent of gross revenues from the operators in the United Arab Emirates is accumulating to around AED 400 million (\$109 million).<sup>74</sup>

The value of the ICT market is expected to reach \$2.4 billion (Dh8.8 billion) by 2011 from \$1.5 billion (Dh5.50 billion) in 2006. In addition, several major initiatives coupled with regional trade and economic liberalization are expected to boost IT growth in the United Arab Emirates. IT in particular has become a driving sector for growth in the United Arab Emirates. The regional hub is leading the adoption and development of new technologies.<sup>75</sup>

### D. GOVERNMENT FACILITATION

As mentioned previously in this report, the government of the United Arab Emirates has been an avant-garde in creating the necessary environment, both institutional and regulatory, and in facilitating the adoption and implementation of ICT in small and medium-sized enterprises (SMEs). Most notable is the United Arab Emirates' e-government portal which was ranked by the United Nations Department of Economic and Social Affairs as the world's fifth in terms of transactional services and 12th in terms of Web measurement.<sup>76</sup>

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<sup>71</sup> <http://www.google.com>

<sup>72</sup> <http://www.google.ae>

<sup>73</sup> UAE Internet users prefer global Google, <http://www.thenational.com>, June 1, 2009.

<sup>74</sup> <http://comm.ae/2009/03/20/a-new-dawn-for-mvnos-in-the-middle-east/>.

<sup>75</sup> <http://www.czechtradeoffices.com/en/united-arab-emirates/news/uae-s-ict-sector-to-hit-dh8-8b-by-2011-13896/>

<sup>76</sup> "the ICT e-volution" <http://www.ameinfo.com/159937.html> .