United Nations
Economic and Social Commission for Western Asia (ESCWA)

NATIONAL PROFILE FOR
THE INFORMATION SOCIETY IN IRAQ

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The land between the Tigris and Euphrates rivers occupied by Iraq has been continuously inhabited since the civilizations of ancient Mesopotamia. In the seventh and eighth centuries, Baghdad became the centre of the Abbasid caliphate. In 1258, the Mongols captured the capital. The Ottomans took the city in 1534-1535 and held on to it for nearly 400 years.

From 1921 to 1932 the British, under a League of Nations mandate, set about creating the institutions of government. When Iraq gained formal independence following the end of the British mandate in 1932, the Baghdad authorities lack of legitimacy led them to rely on the army to maintain control. Increasing bloodshed and instability culminated in the military coup of 1958. From 1968 to 2003, the Baath Arab Socialist Party ruled Iraq. A US-led war began on March 20th, culminating in the fall of the regime on April 9th.

The combination of the fertility of the Mesopotamian plains and the location of the government in its capital city has led to rapid population growth in Baghdad province. Ever since the adoption of state planning policies in the 1960s, which were designed to develop industry and to manage the agricultural sector, there has been a general and accelerating trend of migration to urban centres from less prosperous rural areas. Baghdad and its surrounding province accounted for more than 31% of the population at the time of the 1997 census. Some 75% of Iraq's population now resides in towns. The urban population grew by approximately 5% a year between 1960 and 2000[1].

The surface area of Iraq is 441,839 sq km, including 924 sq km of territorial waters. The population is 24.51m according to International Monetary Fund (IMF) 2002 estimate. Population of main provinces according to 2003 Economist Intelligence Unit estimates is: Baghdad 8,172, Nineveh 2,131, Basra 2,059 and Babil 1,208.

Until the 1980s, Iraq, the second largest oil producer in the Gulf, was one of the most promising countries in the Middle East. It was characterized by its long-term plans for development of different sectors including economy, agriculture, communications and especially education and healthcare systems[2]. During the last two decades, Iraq suffered from wars, sanctions and occupation that slowed down the development wheel. The first Gulf War (1980-1988) left Iraq with a heavily damaged infrastructure. In those years, Iraq allocated insufficient funds for civil communications. The sanctions imposed on the country between 1990 and 2003 worsened the situation by further damaging the infrastructure. Prior to 2003, Iraq Telecommunications and Post Company (ITPC), a government owned monopoly which is part of the Ministry of Transport and Communications, and the Ministry of Information were responsible for the provision of telecommunications services and Internet access with heavy monitoring from security and intelligence departments. Immediately after April 2003, Iraq went through a "free for all" admittance for international access for voice and data through satellite access. Since then, Iraq has been facing regulatory, reconstruction and development challenges. Beyond security, Iraq particularly needs to strengthen governmental institutions, restore infrastructure and provide core human services. The rehabilitation and development of the infrastructure is a necessary condition for the improvement of quality of service and enhancement of the country's economic competitiveness. However, policy and institutional issues must be addressed.

In March 2004, the Iraqi Communications and Media Commission (ICMC) were established with a mandate to regulate broadcasting and telecoms. Iraq is considered to be a challenging market. In fact, despite the complicated political transition, the introduction of GSM services proved successful and Iraq became a

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[1] Economist Intelligence Unit, Iraq Country Profile, 2004

[2] "Interim Strategy Note of the World Bank Group for Iraq ", Report No. 27602, World Bank 2004.

booming market.[3] According to Madar Research, for Iraq to catch up with the rest of the region, it should spend on ICT around $6.4 billion annually until 2008[4].

The profile presents an overview about the current state of Iraq. It highlights developments in the ICT sector and focuses on the country's Information Society challenges and developments. It is based on resources published by the International Telecommunications Union (ITU), the Arab Advisors Group, the Economist Intelligence Unit, the World Bank and many other Internet resources.

1. *Policies and strategies*

ICTs have become a priority for development in the region with the exception of few countries, including Iraq. Presently, Iraq's top priority is establishing security that is a precondition for sustainable development[5]. Prior to 2003, Iraq was mobilizing its oil revenues towards military and security expenditures to preserve the regime rather than provide Iraqis a better quality of life that ICT may offer. Currently, the situation has changed, though the emphasis on ICT is not yet visible, the ICT sector should become as important as Oil[6]. The new Iraqi government expects the country to be a challenging market during the coming years. It is exerting considerable efforts in awarding many contracts for reconstruction and improvement of the telecom network. Resources are being invested on the infrastructure rather than the applications[7]. The annual expenditure on ICT is estimated to reach "$6.4 billion in the coming few years and will have triple-digit growth rates in areas such as cellular phones and Internet services"[8].

National Information Society policies and strategies

In the years before 2003, the National Commission for Computers and Informatics (previously the National Computer Centre) that was established as far back as 1972, was responsible for the formulation and monitoring of national IT plans. In 2004, the commission was dissolved and the ICMC was established. However, until the newly formed government in May 2005, ICMC has not been active. Currently, the huge reconstruction efforts in Iraq and the number of contracts awarded to industry leaders for telecommunications and IT indicates that an initiative for a national ICT policy is likely to be underway but not visible. An e-government initiative in the Ministry of Technology is being formulated with lack of support and coordination from other ministries.

Involvement in WSIS objectives

Building the Information Society in Iraq is not an easy task especially after wars, sanctions and the present political instability. Iraq has not been active in the region's effort of the WSIS process and it was poorly represented, or absent, in many of the events that took place in ESCWA and LAS.

Progress towards fulfillment of national policies and strategies

In October 2003, three contracts were awarded to build three mobile networks covering the northern, central and southern regions[9]. Since April 2003, fixed lines have been restored back to the pre-war state especially in Baghdad where 240,000 lines, out of a total of 540,000, were put back into operation[10]. In February 2004, the US Agency for International Development (USAID) and the Coalition Provisional Authority (CPA) announced the addition of 13 new telephone switches and an international satellite gateway,

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[3] Arab Advisors Group, Strategic Research Workers, "Iraq's cellular market: Booming despite the political strife".

[4] http://www.ameinfo.com

[5] "Interim Strategy Note of the World Bank Group for Iraq ", Report No. 27602, World Bank 2004.

[6] "Telecoms in the Middle East", Paul Budde Communications, 2004.

[7] Compiled by ESCWA from various sources.

[8] John Mason, "Iraq to spend More Than $6 billion in IT development", Electronic news (North America) 49, no. 28 (2003), http://www.ebsco.com/home/default.asp

[9] Ibid.

[10] "Telecoms in the Middle East", Paul Budde Communications, 2004.

to the 14 existing switches of ITPC in Baghdad. The newly installed switches are controlled by the new Network Operations Center at "Al Mamoun", the largest telecommunications hub in the country[11].

In addition, the country initiated a number of projects to improve the development of its infrastructure. One of these projects considered, is the establishment of a 70,000km fibre optics line and a microwave network linking north to south and east to west[12]. In November 2003, Jordan telecom and ITPC completed the installation of a fibre optic line that connects Jordan and Iraq.

Iraq is planning to contract private sector companies to introduce wireless local loop technologies (WLL) for both voice and data in rural areas. WLL will enable new operators to bypass existing wireless networks and deliver Public Old Telephone Service (POTS) and data access. WLL is a system that connects subscribers to the public switched telephone network (PSTN) using radio signals as a substitute for copper for all or part of the connection between the subscriber and the switch[13].

Iraq is planning to install around 1 million lines in the coming 18 months. It is expected that 600,000 lines would be awarded to two operators during the first year followed by the remaining 400,000 lines within 18 months[14].

2. *Legal and Regulatory Frameworks*

Intellectual Property Rights, Privacy status and status of Freedom of Expression

No laws have been legislated yet to deal with privacy and security issues as related to ICT. However, Iraq is a signatory of the National Copyright Protection Law since 1971.

Telecom regulatory framework

In March 2004, the ICMC was established as an independent regulatory body. Its authority spanned over broadcasting and telecoms. ICMC is to have the sole responsibility for licensing and regulating telecoms, broadcasting, information services and other media [15].

In 2004, the Minister for Communications announced that new telecoms and media laws were passed to privatize the fixed-line network[16] and other services. Lately, Iraq has been focusing on the role the private sector could play in accelerating the development of the telecom infrastructure and especially the use of wireless technologies in voice and data[17].

Regulating the Internet

Before 2003, the Internet was subjected to strict censorship. At present, access has been significantly relaxed and several private sector ISPs have been providing services through satellite connections. Numerous Internet cafes have been set up. The government runs some, while private companies run others.

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[11] Arab Advisors Group, Strategic Research Workers, "An update on the Iraqi Telecom and Internet markets: GSM leads the pack, Communications and Middle Commission up and running".

[12] Compiled by ESCWA from various sources.

[13] http://www.iec.org/online/tutorials/wll

[14] Compiled by ESCWA from various sources.

[15] "Telecoms in the Middle East", Paul Budde Communications, 2004.

[16] Ibid

[17] Compiled by ESCWA from various sources.

Privacy and security laws and regulations for applications

Internet applications are not yet developed to address such issues. It is expected that such concern will surface in the coming years.

Other ICT-related laws and regulations

Iraq signed many rights treaties and agreements in the past. However, they were frozen after the first Gulf War and were extensively breached during the sanctions years. Iraq has been a member of the World Intellectual Property Organization (WIPO) since 1976 and has also, signed the Paris Convention for the protection of industrial property on which the WIPO was founded in January. Iraq has lately applied to join the WTO and its application is under process.

3. *ICT infrastructure*

Telephone penetration

Many challenges face the rebuilding and the expansion of Iraq's telecom infrastructure. By the end of 2002, Iraq's telecom infrastructure was in the bottom of 25% of world economies in terms of "teledensity" [18] which is a critical indicator for assessing the country's telecom network status. Particularly, between 1991 and 2001, Iraq's teledensity deteriorated from 5% to 3.1%. The country was considered among the weakest telecommunications markets in the Middle East region. After April 2003, efforts were put to rebuild the telecom infrastructure and different goals were set. One of the targets, discussed during Madrid Donors' Conference, was to increase teledensity from 3% to 10 % during 2004 and to 20% by the end of 2005. However, this is still doubtful due to the lack of security and available funds.

Before 2003, Iraq had no mobile services with the exception of the Kurdistan area that had modest GSM subscribers. Immediately after April 2003, satellite based mobile telephones, became the main source of reliable communications despite their technical limitations and high cost[19]. By July 2003, UAE-based Thuraya had 45,000 subscribers in Iraq out of its 154,000 subscribers worldwide, and the country accounted for 200,000 minutes per day of Thuraya's daily usage of 600,000. However, the introduction of GSM services paused a threat to Thuraya's usage in Iraq. Three mobile licenses for GSM digital networks were awarded to Asia-Cell, Iraqna and Atheer, who are promising coverage well before their two-year license agreement mature[20].

- AsiaCell: it is a subsidiary of Wataniya-Kuwait and winner of the GSM license for the northern region. It chose Germany's Siemens and Huawei as main suppliers for the Western and Eastern part [21]. AsiaCell expanded from Suleymania and Kurkuk, covered by 2003, to include Mosul;

- Iraqna: it is a subsidiary of Orascom Telecom-Egypt and winner of the GSM license for the central region. It signed a contract with Motorola for equipment supply. The operator currently covers Baghdad and its surroundings;

- Atheer: it is a subsidiary of MTC-Kuwait and winner of the GSM license for the southern region. It awarded Future Communications (FCCI) a contract to supply Nokia GSM core network equipment.

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[18] http://ir04.events.pennnet.com/content.cfm?Navid=1659&Language=

[19] Ibid.

[20] Arab Advisors Group, Strategic Research Workers, "The operational landscape of GSM service in Iraq: An analysis of the three operators".

[21] "Telecoms in the Middle East", Paul Budde Communications, 2004.

The services offered are still limited to voice calls and some value added services such as free emergency numbers and voice mail on the Iraqna network that also offers international roaming for postpaid subscribers. Other services such as MMS and TV voting are still in queue.

By end 2004, the telecommunications market generated more than US$294 million in revenues. The operators in their separate regions worked to widen their subscribers base and they succeeded since there were no two competing operators in the same region. Table 1 shows the different number of subscribers related to each of the GSM providers.

Table 1. Operators in Iraq and their subscribers (2004)

Region	Operator	Prepaid	Postpaid	Total subs	% Of total
South	Atheer (MTC)	2,443	241,895	244,338	19.00%
North	AsiaCell (Wataniya)	470,447	-	470,447	36.50%
Central	Iraqna (Orascom)	426,530	147,414	573,944	44.50%
Total		899,420	389,309	1,288,729	100%

The cellular penetration between 2003 and 2004 has tremendously increased. According to the Arab Advisors Research Group, the total number of mobile subscribers in 2002 was 20,000 while it reached 105,000 and 1,288,729 in 2003 and 2004 respectively[22].

Internet backbone

Government ministries and institutions had their first access to the Internet in 1999. One year later, it was made available to the public. Internet access was subject to strict censorship with several websites blocked for what was considered indecent, anti-Islamic or anti-Arab content. In northern Iraq, however, Internet access was available through VSAT links and there were no restrictions to access. By early 2003, many Internet cafes were established. Some were private (at least 10) while the government ran the rest. Subscription to the Internet remained beyond the affordable reach of most Iraqis.

At present, access to the Internet is available through dozens of Internet cafes [23]. VSAT technology and other satellite based and wireless solutions are used for Internet connections. One example is "Tigris Net" which provided, directly after the end of war, Internet access and international calls via broadband and license free wireless connection from a satellite based hub in Baghdad[24]. The country aims at opening the Internet at the price of telephone calls that cost around 33 cents/hr[25].

ISPs and ASPs

Before 2003, the sole Internet provider was the Ministry of Culture and Information through a public company that was later attached to the Ministry of Transport and Communications. In the northern region, Kurdistan-Net ISP offered unlimited and by-the-hour Internet packages[26]. After 2003, Internet connections in the central and southern regions were destroyed while a small number of ISPs in the north continued their operations through connections established with Turkey before the war[27]. One example is Dalya-Sat ISP, a Lebanon-based company that obtained a franchise as an ISP from the ITPC.

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[22] Arab Advisors Group, Strategic Research Workers, "Iraq's cellular market: Booming despite the political strife".

[23] "Telecoms in the Middle East", Paul Budde Communications, 2004.

[24] Arab Advisors Group, Strategic Research Workers, "An update on the Iraqi Telecom and Internet markets: GSM leads the pack, Communications and Middle Commission up and running".

[25] Compiled by ESCWA from various sources.

[26] http://www.globalsecurity.org/wmd/library/news/iraq/2002/11-260402.html

[27] Arab Advisors Group, Strategic Research Workers, "An update on the Iraqi Telecom and Internet markets: GSM leads the pack, Communications and Middle Commission up and running".

GSM operators aim to launch the GPRS service in the near future[28].

Access

Cost of Internet access was unaffordable to most Iraqis. The annual subscription of home Internet access reached US$750 while the monthly salary of most Iraqis was around US$10[29]. Shortly after April 2003, many Internet cafes were established and they offered low cost Internet access through satellite connections.

According to Madar Research, Internet penetration rate in Iraq remained low 1.77 % despite the high growth rates in the number of Internet users, which reached 450,000 by the end 2004.

PC dissemination

Sanctions imposed on Iraq during 1990-2003 prohibited the country from importing computers with more than minimal processing power. This led to a decrease in PC penetration rate. At end 2004, Madar Research estimated PC penetration at 1.89% and it was forecasted to reach 6.96% in 2008[30].

4. *ICT Capacity-building*

Awareness and dissemination

The government of Iraq stressed the importance of ICT and attempted to introduce it in different sectors especially in education. However, the country still lacks a national ICT awareness programme, which is difficult to initiate in the present unstable situation. After April 2003 the government through the aid of USAID and other international donors carried out training programmes to their Iraqi personnel to introduce them to computers and their applications. Al Quds School for Computers, a training school for IT training for civil servants is presently contemplating the introduction of the International Driving License (ICDL) certification for civil servants.

Computers in schools

In the 1980s, the government introduced computer awareness and teaching in many secondary schools in several cities in Iraq. Hardware was specially assembled and supplied by a local electronic company jointly owned by the government and the private sector. This programme covered over 500 schools.

Recent reconstruction efforts led to the rehabilitation of over 2,405 schools, training of 33,000 secondary school teachers and the distribution of 8.7million textbooks[31]. It is not yet clear if the Ministry of Education has yet formulated its plan for IT education for schools and at what level.

Vocational training

Vocational training in Iraq is the responsibility of the Ministry of Education through its technical schools that are spread throughout Iraq. The Ministry of Education also grants licenses to other ministries, NGOs and private sector training schools that allow them to conduct certified training courses in different disciplines.

A good portion of training in these schools is related to IT. Both inside and outside Iraq, IT vocational training gained popularity as a vehicle for employment opportunities in recent years.

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[28] Ibid.

[29] "Telecoms in the Middle East", Paul Budde Communications, 2004.

[30] Profile of the Information society in the Republic of Iraq, E/ESCWA/ICTD/2003/11/Add.11.

[31] http://www.noticias.info/Archivo/2004/200410/20041020/20041020_36827.shtm

University education

Iraq's higher educational system consisted of 22 universities, colleges and technical institutes. Most of them offer courses in ICT related disciplines. The universities libraries suffered from the lack of reference material and scientific and technical journals and especially from students who resort to the black market. After April 2003, many universities closed due to insecurity. Lately, many universities resumed their courses.

After April 2003, two important projects were initiated. The first was a donation from the first lady of Qatar. She donated $15 million to assist Iraqi universities in the reconstruction process to provide textbooks, laboratory equipment, Internet access centres and standalone PCs. UNESCO is managing the project. The other initiative was a project funded by UNDG Iraq Trust Fund and executed by UNESCWA in partnership with UNESCO and Cisco to establish 5 Regional Networking Academies and 50 Local Networking Academies in several universities and colleges throughout Iraq. The project that started in 2004 expects to be completed in the middle of 2007.

Research, Development and Innovation in ICTs

Most of the research and development activities in pre 2003 used to be carried out in Iraqi universities, the National Computer Centre and the Ministry of Industry and Minerals and the Military Manufacturing Commission. During the years of sanctions, most researchers were involved in outdated research problems due to the absence of contact with the outside world. At the present time, universities are not in a much better shape after most of their outdated facilities were destroyed or looted in the days that followed the invasion. Most of these facilities are not yet recovered, nor has reconstruction been fast enough to provide an alternative. Lack of qualified academics and researchers with experience to conduct research is also a serious issue.

5. *Building the ICT sector*

ICT firms

Prior to 2003, ICT firms in Iraq were mainly assembly factories in the government sector that were able to produce electronic domestic appliances and low power PCs for the schools project. There was also a modest production facility for small exchanges and telephone sets. The private sector has not been active with the exception of small shops that provide office services and sell PCs and accessories to government departments and individuals that can afford such luxury. Pirated software is also available in a large scale in these shops.

At present, the situation has not changed drastically, with the exception of shops that now sell satellite TV equipment and ISPs that provide Internet and voice services.

Investment in ICTs

Foreign investment was prohibited in pre 2003 Iraq. Currently, there is great interest in the investment in the telecommunications market at regional and international level. With the exception of the three GSM operators, nothing of significance has yet taken place. It is expected that the WLL networks that will be launched in the coming months will provide a good opportunity for investment.

Government facilitation

Taxation on ICT equipment is modest. There are no import/export facilitations directly related to ICT products.

Export of ICT equipment/software

Domestic electronic equipment such as TV radio and telephone sets is assembled in the Electronic Industries Company (EIC). Before 1991, EIC signed an agreement with Olivetti of Italy to assemble a

bottom line PC with production capacity of 6000 units per year. Production volumes hardly met local demand and there was no capacity for export. In addition, most of the models selected for assembly soon became obsolete and were uncompetitive technically and economically.

EIC is presently assembling TV sets, radios and small exchanges. These products constitute a small percentage of the local demand. The main advantage is the availability of good after sales support.

6. Applications in government establishments

E-procurement Applications

A number of e-procurement initiatives have been launched and maintained by a number of ministries such as the Ministry of Electricity and the Ministry of Industry. The International Reconstruction Fund Facility (IRFFI)[32], maintains one of the more prominent e-procurement initiatives for Iraq Both the World Bank Iraq Trust Fund and the United Nations Development Group Iraq Trust Fund provide online procurement facilities within IRFFI to a variety of projects. These facilities start with the invitation to bid and end with the awarding of the contract in question to the selected bidder. The projects cover numerous sectors such as education, health care, ICT, and construction.

Another e-procurement initiative is launched by Tejari Iraq towards the beginning of 2004. Tejari Iraq provides common ground to bring together buyers and suppliers over a wide range of products and services[33] and has the advantage of being fully arabized[34]. Note that the Iraqi government and local Iraqi organizations have not implemented similar e-procurement services yet.

Computerization of public administration

Iraq was a leading country in the Middle East in the introduction of computers. The first computer system that was introduced in government institutions dates back to 1966. Unlike many similar projects in the region, computer systems in Iraq were fully programmed, maintained and operated by Iraqis. Several government organizations followed to install relatively sophisticated systems and by 1979, Iraq was amongst the few countries in the region with almost totally endogenous IT staff.

The first blow to the computerization process came soon after the Iraq-Iran war when the government introduced in 1983 a curb on IT spending. The curb remained in effect until 1988. Two years after, Iraq invaded Kuwait and sanctions were imposed on importation of computers and software. ICT was undergoing paradigm transformation in all these difficult years. The spread of PCs was growing fast.

The introduction of client/ server platforms and networking as we know it nowadays all took place. Iraq was not allowed in those days to procure substantial hardware, software and communications systems. Many government organizations had to continue using outdated systems, manual systems, or converted their heavy applications into standalone PCs. On the eve of the invasion, Iraq had mainly legacy systems with outdated hardware with no substantial network, nor Internet applications. Nevertheless, these outdated IT centres could not escape destruction and looting.

In the last two years, not much has happened to implement large government or community based applications. It remains to be seen how the applications sector develop in the coming months to meet the demand of government organizations, and other sectors of the economy.

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[32] http://www.irffi.org/

[33] http://www.kallman.com/Outreach/images/e-Procurement.pdf

[34] http://www.tejari.com/

e-government plans

In March 2004, Italy and Iraq signed an agreement to strengthen e-government cooperation. The Italy's Innovation and Technologies Ministry announced that the agreement is a part of a project aimed at creating an intranet for some 30 ministries and state institutions.

It was reported that the broadband system that is to be adopted uses an advanced laser based technology and it has been selected for its operational efficiency and high-level security. The intranet will have a supplementary satellite back-up system. Many Italian technicians helped in the implementation of the project and at the same time more than 40 Iraqi government technicians were trained as part of the project's agreement. The project constitutes part of a wider programme for the introduction of e-government in developing countries. The project was promoted by the United Nations and the G8. The Italian Foreign Ministry is financing the first phase of the project with an investment of US$3.2 million[35]. Available information indicates that the infrastructure has been completed but no applications are yet developed to use the infrastructure.

The Fourth Annual Global E-Government Study published in September 2004[36] by Taubman Center for Public Policy at Brown University, has surprisingly ranked Iraq in 10th place – above Hong Kong, the United Kingdom and most of Europe – up dramatically from its 185th standing among 198 nations in the 2003 study. No clear reasons were mentioned to substantiate this high ranking. Iraq gained 10 percentage points over its previous year's score to reach a value of 34.0 despite the exceptional political and security situation that the country is going through.

Brown University's assessment placed Iraq ahead of many other countries known for their highly elaborate, comprehensive and advanced online presence. Accordingly, Iraq topped the Arab list in the study, while Madar Research believes that Iraq would realistically rank below many Arab states.

Computerization of customs processing

Customs authorities in Iraq are still exploring the possibility of introducing modern procedures and technologies to address issues of trade facilitations. Several countries in the ESCWA regions, such as Lebanon, Jordan and possibly Syria, have opted for the implementation of UNCTAD based software for manifest management called ASYCUDA. It appears that Iraq is looking into this trend with the intention to implement the same system.

Computerization of taxation and revenue management systems

Despite the several attempts for the computerization of the taxation process including the collection of information about the taxpayers and the amounts paid, no data were reported with respect to this issue.

7. *Applications in Education*

e-learning

The Iraqi Networking Academy Project that is funded by UNDG Iraq Trust Fund and is being implemented by UNESCWA may be considered as an example for e-learning in networking technology. ESCWA partnered with Cisco Systems to introduce CCNA courses in selected universities in Iraq. The first phase of the project consists of establishing Regional Networking Academies in four universities in Baghdad, Basra and Mosul. Each one of these universities will be responsible for the establishment of 10 Local Networking Academies. The second phase consist of establishing one additional Regional Academy in Erbil in the Kurdistan area. At the end of the project 5 Regional Academies and 50 Local Academies will be operational to train and graduate over 1000 students throughout Iraq. The total project cost is over $6 million in three years.

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[35] http://www.itworld.com/Tech/2987/050114italyiraq/

[36] Global E-Government, 2004, Centre for Public Policy, Brown University, United States.

e-school projects

Many projects related to the Education sector in Iraq have been approved and, currently, they are at various stages of implementation[37]. The UNICEF is the implementing agency of a project entitled "Strengthening Primary and Intermediate levels of education". The budget of the project is US $ 34.2 million. On the other hand, UNESCO considered the implementation of four different projects that are "In-Service training for teachers", "Strengthening Vocational Education", "Literacy and life skills development" and "Protecting Iraqi cultural heritage" estimated at US $ 2.3 million, US $ 2.7 million, US$ 2.2 million and US$ 2 million respectively. The UN-HABITAT also considered a project called "Rehabilitation of school buildings" with a total approved budget reaching US$ 17.5 million. Finally, ESCWA considered the Iraqi Networking Academy Project already mentioned above.

Virtual universities

No virtual universities exist in Iraq.

8. *Applications in Commerce and Business*

Extent and maturity of e-commerce and e-business applications

E-commerce and e-business applications are still not available in Iraq. In November 2003, foreign banks were invited, for the first time since the nationalization of the banking sector in 1964, to consider investment and partnership in local banks in Iraq. It is expected that banks will start looking for e-banking applications as in other countries of the region. Recent news from Iraq announced that the first credit card is to be introduced in Iraq for the first time in the coming few months.

Availability and quality of e-banking

No e-banking services are available in Iraq at present.

Maturity of regional ATM and banking networks

Neither ATM, nor e-banking networks exist in Iraq at present.

Maturity of Bank to Bank financial transfer system

Iraq, nowadays, lacks centralized management and an integrated system for making and clearing payments[38]. Private banks that established links with international and regional banks have only allowed transferring funds.

9. *Applications in Healthcare*

Databases for national healthcare

To our knowledge, no substantial health care system has been implemented in Iraq.

Telemedicine and medical use of teleconferencing

Previously, there were no applications for telemedicine or teleconferencing in the Iraqi healthcare sector, however, after the 2003 war, the situation changed. For instance, the Italian military has opened a telemedicine centre at the Tallil Airbase hospital in Iraq. The centre is available to both Italian soldiers and for local humanitarian needs. It allows medical workers in Iraq to transfer clinical data and images between the hospital of Tallil and the Celio Military Hospital in Rome. Its satellite earth station is based on ESA

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[37] http://www.uniraq.org/clusters/cluster1.asp.

[38]http://www.stanford.edu/~johntayl/taylorspeeches/Financial%20Reconstruction%20in%20Iraq%20(11%20February%20 04).doc

Telecom funded technology. The center was inaugurated on May 26 2004 at the Tallil Airbase. It is located approximately at 310 kilometers southeast of Baghdad and 20 kilometers southwest of the city of Al Nasiriyah[39].

Maturity and implementation of Health Care Information Technology Systems

Health care services were offered at very low cost in certain hospitals, which did not even have computerized systems to keep track of patient's records and for the dissemination and management of pharmaceuticals.

In April 2003, USAID awarded Abt. Associates Inc. an initial $10 million contract to assist in stabilizing and strengthening the health system in post-conflict Iraq[40].

10. *Digital Arabic Content*

Arabic vs. English content on the Web for national use

Arabic is the official language of Iraq. In addition Kurdish has in recent years become recognized as the official language of the Kurdistan region in north Iraq.

Several websites have been created on Iraq since 2003. The majority of these created sites publish content in Arabic and English and cover, not only, political issues but also social and cultural issues. Iraq is a very popular topic on the Internet and there exists a large volume of content related to Iraq on the net.

Local creation of software products in Arabic

Development of Arabized software and applications were skillfully developed by IT professionals in Iraq before the advent of Microsoft Arabic versions of Windows. Since then, Arabic is no longer an issue in general and commercial applications thanks to the leading international software companies that provided adequate Arabic support within their products. However, Arabic processing of complex texts that falls in the category of computational linguistics is still limited to amateur research projects in limited number of computer science departments in a number of universities in Iraq.

Obstacles for its development and ways for removing them

Several obstacles exist that adversely affect the development of the ICT sector. Most important is the security issue. Other factors include the present poor infrastructure and lack of training of professionals that can address restructuring and knowledge management in ministries, organizations and other large and medium size enterprises.

For the telecom sector the regulatory commission has to start assuming its role in regulating telecom services. It should also role out standards to be followed by service providers. Telephone penetration in Iraq is well below what it should be. Innovative ideas are needed to speed up the penetration growth, particularly in rural areas.

Internet penetration and absence of broadband access to subscribers must increase. The TLDN, iq, should be restored and the government should use its influence to speed up the ICANN process in the recovery of iq.

The government should formulate an ICT strategy in the near future followed by a plan of action, in line with WSIS recommendations. One of the most important elements of the proposed plan should pay attention to curriculum review of university courses related to ICT and ICT applications.

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[39] http://www.esa.int/esaTE/SEMH2R2VQUD_index_0.html

[40] http://www.abtassociates.com/Page.cfm?PageID=16169