ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)

NATIONAL PROFILE OF THE INFORMATION SOCIETY IN THE KINGDOM OF BAHRAIN

United Nations

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Introduction

The Kingdom of Bahrain was formed when the British withdrew from the Gulf in 1971. Being the smallest Arab state with an area of 665 sq km, the population has reached 0.74 million as estimated in 2006 (UNDP). Bahrain's per capita GDP is on par with those of some European nations ($22,706 in 2006), the 2006 Gross Domestic Product reached US$ 16 billion.

The Kingdom of Bahrain appreciates the importance of leveraging Information and Communication Technology for the development of an Information society in Bahrain and has therefore, undertaken a comprehensive programme to implement eGovernment in a phased manner.

As a part of this programme, major projects such as the Government Data Network (GDN), Smart Card and eGovernment Portal have been launched to facilitate the digital interaction between the government and the customers (including citizens, residents and businesses). The Kingdom is committed to leveraging ICTs which has led to a high degree of intra-ministerial computerization and a superior ICT infrastructure. Currently, the Kingdom is focusing on service delivery to its citizens in order to optimally utilize the infrastructure that has been created, and at the same time to graduate to the next level in the eGovernment arena. The need for the development of common standards, policies and a higher degree of coordination amongst ministries towards the achievement of common national goals have already been realised thus an Enterprise Architecture framework is being developed for the Kingdom.[1]

As a testimony to the significance accorded to eGovernment, the Kingdom engaged international consulting firm, PricewaterhouseCoopers to develop a comprehensive strategy and an implementation plan for three years to implement the recommendations of the strategy. The eGovernment strategy has been approved and the implementation of the recommendations of the strategy is currently underway. It is also important to develop capabilities in various government institutions so that current and future eGovernment initiatives would be implemented with minimum wastage of time and effort, yielding the desired benefits. Priority and feasibility planning of the provisioning of various services is critical to channel limited resources in the right direction. Additionally, as technology investments and their proposed returns are always questioned, effective monitoring and evaluation of each and every project is imperative to ensure every endeavour delivers the expected outcome.

The enormity of the above demands a sound institutional mechanism in order to successfully implement all the recommendations in the envisaged period of three years. Therefore, an institutional mechanism has been put in place for the implementation of the strategy. The institutional mechanism aims at centralized planning and decentralized implementation. The institutional structure is detailed below:

1. Two inter ministerial committees:
   - Supreme Committee for Information and Communication Technology (SCICT) headed by the deputy Prime Ministry and consisting of ministers from various ministries to provide direction and for decision making.
   - Technical Committee for Information and Communication Technology (TCICT) which acts as a technical committee to the SCICT
2. An independent eGovernment Agency to ensure that the program is managed properly and accumulate the high calibre resources that are needed centrally.
3. Ministries have been given ownership for the various initiatives. However, depending on the level of eReadiness and resources available with the ministry, eGovernment agency will provide adequate support for ensuring the success of the initiative.

Though the strategy implementation is still in its early stages, the approach undertaken by the Kingdom is showing results in the form of awards for its projects both nationally and internationally. Some

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[1] E-government strategy for Bahrain, 2006

of the notable awards being the ICT for Development (i4d award) won by the smart card project at a prestigious international conference in India and the eContent award and Layla Fakhro award won by the national eGovernment portal.

I. THE ROLE OF THE GOVERNMENT AND ALL STAKEHOLDERS

A consultative approach was undertaken to develop the eGovernment Strategy for the Kingdom. Special care has been taken to involve all the stakeholders in this process – government departments, decision makers, residents and businesses as well as international best practices. The vision of the Kingdom was captured through a series of one-on-one interviews with the decision makers. The strategy has been devised based on the requirements and plans of not only the ministries but also on the feedback received from businesses and residents through national surveys. International best practices and UN eGovernment readiness rankings were also examined to ensure that the strategy matches up to the best eGovernment implementations across the world.

A. THE NATIONAL INFORMATION SOCIETY POLICIES AND e-STRATEGIES

The eGovernment strategy[2] for the Kingdom of Bahrain mainly aims at ensuring effective delivery of government services to citizens, residents and businesses. The Kingdom considers the recipients of government services as 'customers' and not 'beneficiaries'.

This connotes the fact that the strategy looks at the citizens and businesses as customers with specific and unique needs and requirements. There exist two key implications of the customer concept namely: "Customers have 'choices' and demand 'services'"; and "Customers demand 'value for money'". The former refers to the customers having various needs and differing requirements in terms of how these needs are to be serviced. They increasingly want the duration of time needed to solve a problem or remedy a situation. The latter implication refers to the customers that are not willing to pay for basic services that are part of standard governance responsibilities of the government. In fact, in this case, even if the government is capable of extending the service delivery model through innovation, the willingness of customer to pay is driven by value for money. Therefore, the efficiency of government is crucial and the Kingdom will need to continuously seek ways to reduce cost for availing government services.

In summary, the e-government strategy states that the kingdom considers "Delivering Customer Value through Collaborative Government". The concept of collaborative government goes beyond government, by also including the private sector and the non-government sector as well. The Kingdom is committed to leveraging the complementary skills of the private and non-government sector to deliver services to customers.

Telecommunications Market Liberalization and Legislation

The Government has been liberalizing the telecommunications market since the enactment of the Telecommunications Act. Among other important milestones, two Mobile Service Providers and three Fixed Service Providers have been licensed to compete with the incumbent service provider STC.

B. PUBLIC PRIVATE PARTNERSHIP (PPP) AND MULTI-SECTOR PARTNERSHIP (MSP)

The Kingdom of Bahrain has been a leader in the Middle-East in terms of partnering with the private sector to deliver benefits to the general populace. The SCICT which spearheads the eGovernment program regularly invites private sector participation while the TCICT has members from the business chamber, Non Governmental Organizations and the private sector. A good example of this is the development of the

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[2] E-government strategy for Bahrain, 2006

national eGovernment portal[3] in partnership with Batelco. With respect to the telecommunications sector, the Telecom Regulatory Authority (TRA) has set out its policies after extensive consultations with the private sector. A Voice of Business survey was conducted and expectations and aspiration of businesses in Bahrain were captured even while drafting the eGovernment Strategy. The Kingdom has graduated to a level where major projects such as customs and ports are being conducted on a BOT (Build Operate Transfer) model.

C. THE ROLE OF NON GOVERNMENTAL ORGANIZATION

Additionally, a strong ecosystem of organizations such as the Bahrain Internet Society (BIS)[4], Bahrain IT Society (BITS)[5] etc. exists. It plays a salutary role towards the creation of an Information Society in Bahrain. BITS is represented on the TCICT and its eContent awards have helped to develop competition amongst the ministries in terms of sophistication in services and websites thereby raising the profile of eGovernment. BIS and BITS regularly undertake programs to increase awareness regarding the ICT and improve the ICT skills of the populace thereby helping in the move towards the establishment of an Information Society.

II. ICT INFRASTRUCTURE

A. INFRASTRUCTURE

Bahrain enjoys the highest ICT use among the Arab World according to the ICT Use Index report issued by Madar Research[6]. The Use Index covers four ICT parameters: PC installed base, number of Internet users, mobile phones and fixed lines. The table 1 below shows the country ranking and the corresponding ICT use Index.

Table 1. ICT Use Index of Arab Countries in for 2004-2005

Country	End 2004 - ICT Use Index	End 2005 - ICT Use Index
Bahrain	1.68	1.90
UAE	1.66	1.84
Qatar	0.20	1.59
Kuwait	1.33	1.41
Saudi	0.80	1.05
Jordan	0.57	0.91
Tunisia	0.61	0.82
Oman	0.56	0.81
Lebanon	0.57	0.64
Morocco	0.43	0.61
Algeria	0.29	0.57
Libya	0.28	0.57
Palestine	0.47	0.56
Syria	0.32	0.43
Egypt	0.31	0.40
Iraq	0.15	0.33

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[3] http://www.e.gov.bh

[4] http://www.bis.org.bh/

[5] http://www.bits.org.bh/

[6] Madar Research Journal, July 2006

Yemen	0.11	0.20
Sudan	0.09	0.13
Total	0.36	0.51

Source: *Madar Research*

Personal Computer penetration in Bahrain is very high. According to the preliminary results of the Household Expenditure and Income Survey (2005-2006), approximately 70% of households have one or more personal computers and approximately 14.6% of all households have at least one laptop/notebook computers at home. Almost all households (98.3%) have at least one television and 76.2% has one or more radio/audio cassette recorder. The chart below shows the penetration level of some of the information society devices.

Figure 1 - Household Expenditure and Income Survey (2005-2006)
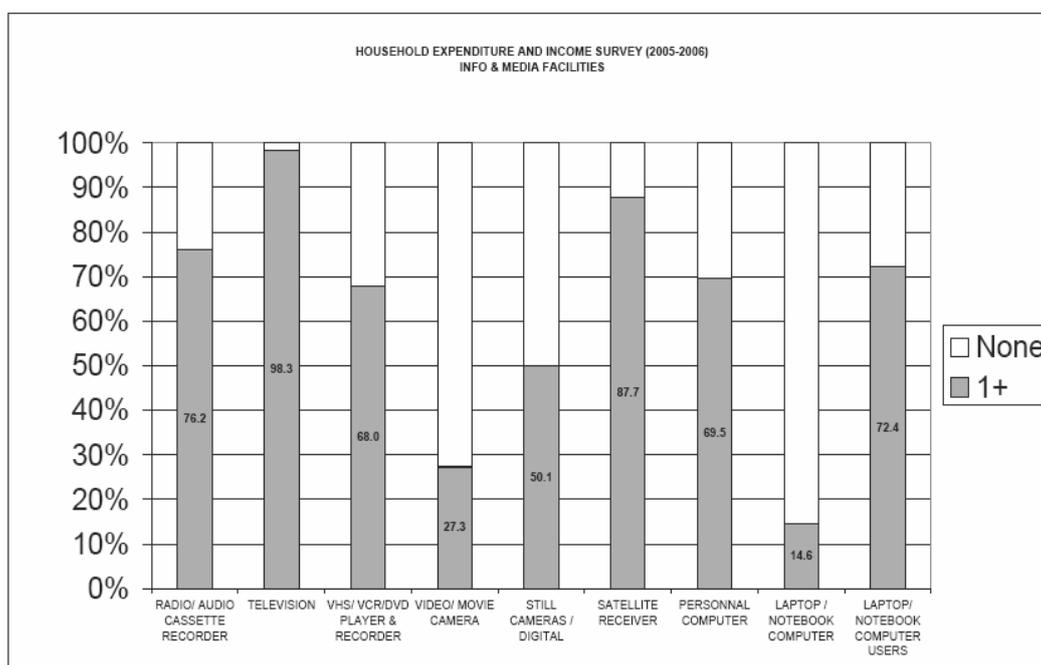
Source: Central Informatics Organization

B. INVESTMENTS IN ICT INFRASTRUCTURE AND DEVELOPMENT OF NEW SERVICES

The Kingdom of Bahrain has the most vibrant and liberal regulatory environment in the Arab world. Bahrain was amongst the first countries in the region to end the monopoly of the sole telecom operator (Batelco[7]). Bahrain has already granted 22 Internet Services Provider (ISP) licenses, 2 National Fixed Wireless Services (NFWS) licenses, 2 Internet Exchanges (IX) licenses and 8 National Fixed Service licenses thereby ensuring huge investments in the modernization of its ICT infrastructure.

The Government sector has its own intranet – Government Data Network which is capable of handling Data, video and voice. The bandwidth available through the same is being upgraded.

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[7] www.batelco.com

C. ICT CONNECTIVITY

Bahrain has amongst the highest internet penetration and broadband penetration rates in the Arab world. Over the past few years, the proactive measures undertaken by the TRA aimed at making the internet at home more affordable.

Table 2: Telecommunication subscribers' data

	Prepaid Cellular Mobile Telephone Subscribers	Postpaid Cellular Mobile Telephone Subscribers	Total Cellular Mobile Telephone Subscribers	Main Telephone Lines	Internet Subscribers
Number of Customers as of 31 January 2007	764,789	152,322	917,111	195,261	61,344

Source: TRA[8]

Note:
- Subscribers data are updated at the beginning of each month.
- For confidentiality reasons, subscribers' data are published 6 months out of date.

The Nielsen Company on behalf of the Telecommunication Regulatory Authority (TRA) has recently conducted a survey titled "Understanding Telecommunications Usage in Bahrain". The results of the study show as per the following chart that around 2/3rd of households have a fixed line.

Subscription status

66% Subscribed to Fixed line

Not subscribed to Fixed line

34%
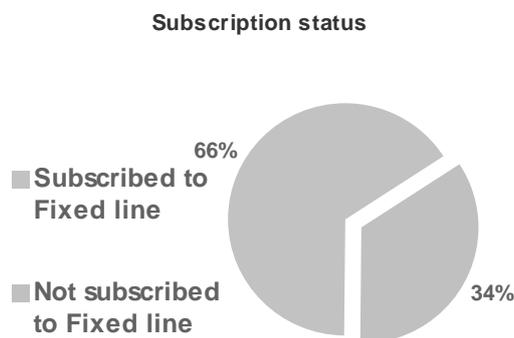
Source: Nielsen Company, Understanding Telecommunications Usage in Bahrain, 2007

In addition, the study shows that 99% of the people in Bahrain have a mobile telephone with 11% having even two or more.

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[8] http://www.tra.org.bh/en/marketCurrentYear.asp

No of Mobile Connections

■ Two or More	11
■ One	88
■ None	1

Mobile Connections
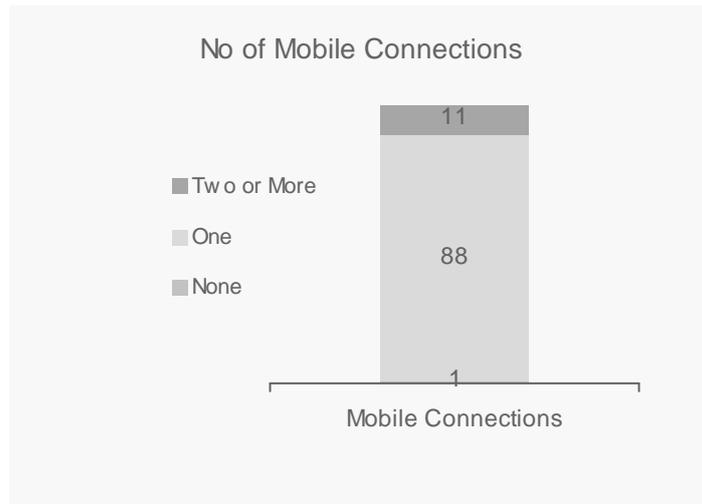
Source: Nielsen Company, Understanding Telecommunications Usage in Bahrain, 2007

The survey data corresponds to TRA's published statistics on the number of mobile subscribers, which shows that the percentage of mobile subscribers to the overall population has increased to 108% in 2006 as shown below.

Mobile subscribers Growth in Kingdom of Bahrain (2002 - 2006)

Year	Number of mobile customers	Penetration
2002	300,829	45%
2003	390,253	57%
2004	649,764	81%
2005	767,103	94%
2006	907,433	108%
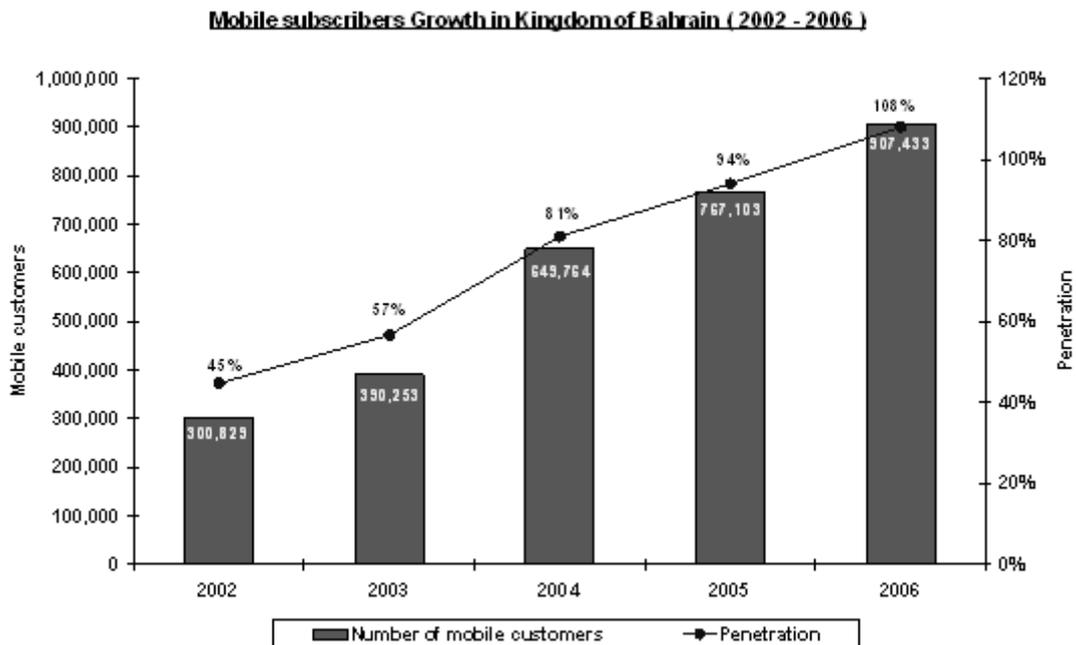
Source: TRA, www.tra.org.bh, 2007

The survey also shows that 53% of households surveyed have got internet connection.

%of Household having Internet

■Have Internet

■Do not have
Internet

53%

47%
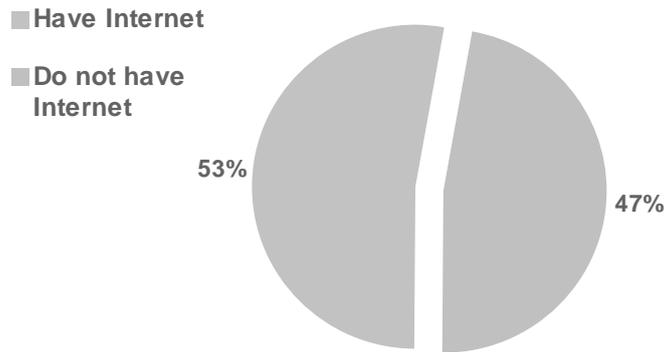
Source: Nielsen Company, Understanding Telecommunications Usage in Bahrain, 2007

According to TRA's statistics, although the number of internet subscribers has only increased by 14% from 52,756 to 60,094 subscribers over the last two years (2004-2006), the ratio of broadband subscribers has increased from 20% in 2004 to 64% in 2006 of all internet subscribers.

Internet subscribers in Kingdom of Bahrain (2004 - 2006)

			2004				2005				2006	
Dial-up	42,438	44,183	39,742	35,665	33,477	33,340	30,192	28,867	25,500	27,667	24,554	21,466
Broadband	10,318	11,615	13,020	14,956	16,420	18,086	19,204	21,432	22,592	24,447	25,936	38,628

☐Broadband   ■Dial-up
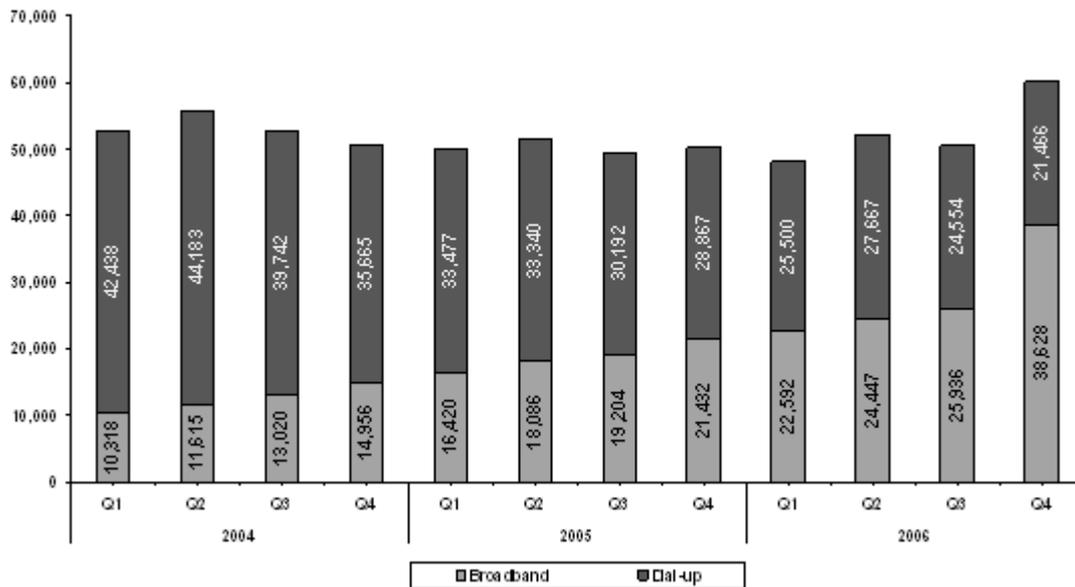
Source: TRA, www.tra.org.bh, 2007

The following chart shows that 256 or 512 Kbps seems to be the most popular packages among broadband subscribers.

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Braodband packages subscribed

■ Broadband 256 - BD10 p/month	39
■ Broadband 512 - BD25 p/month	30
■ Broadband 1Mb - BD40 p/month	20
■ Broadband 2 Mb - BD60 p/month	2
■ Don't know	9
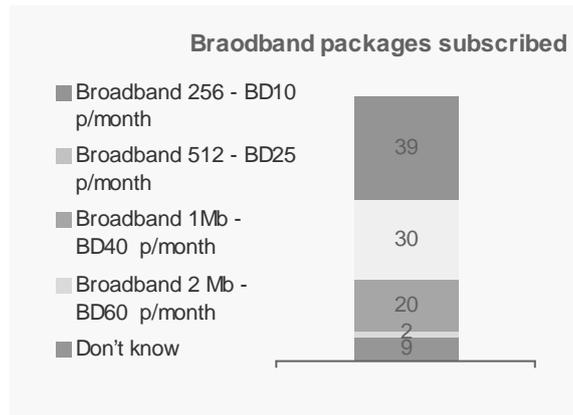
Source: Nielsen Company, Understanding Telecommunications Usage in Bahrain, 2007

On the business side, 66% of companies use broadband or any form of data services, with 512 Kbs (10GB) being the most common package and only about 18% still have dialup INET service.

% of companies susbcribing broadband packages

INET Business Dialup	11
INET Direct Dial-up	7
Business 256k (2.5GB)	10
Business 256k (5GB)	9
Business 512k(10GB)	37
Business 512 (Unlimited)	10
Business 1028 (Unlimited)	8
Don't know bandwidth	15
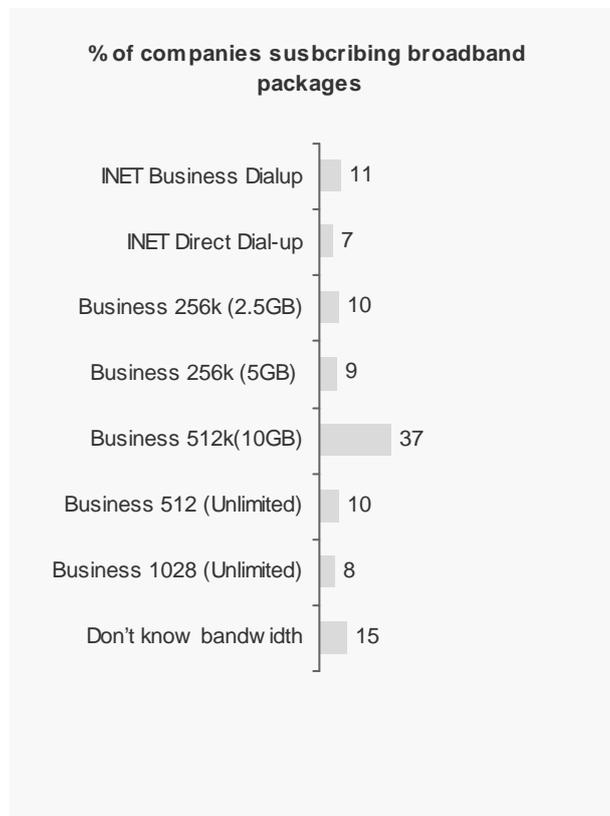
Source: Nielsen Company, Understanding Telecommunications Usage in Bahrain, 2007

D. ICT EQUIPMENT AND SERVICE

It is important to ensure that the use of ICT acts as a tool to reduce the gap between the advantaged and disadvantaged sections of the society. In this regard, the eGovernment strategy anticipates the provisioning of services through not only internet but also mobiles, toll free call centres and Common Services centres besides self-service kiosks at public places. The high penetration of the mobile phones indicates that both the mobile and toll free call centres would be useful for reaching the masses. Common Services Centres will cater to those sections of the society who are not comfortable using any electronic

channels while the self services kiosks are likely to be useful to the people who can't afford computer / internet at home or the visitors to the country.

<div align="center">E. INTERNET GOVERNANCE</div>

All the websites operating in Bahrain must register with the Ministry of Information. Pursuant to Section 41 of the Legislative Decree No. 48 of 2002 and Decree No. 47 of 2003, the Bahrain Internet Exchange (BIX) was established as a "not-for-Profit" Organization under it the Ministry of Transportation. The role of BIX is to connect Internet Service Providers, in order to increase local traffic and content, as well as reduce the cost of purchasing international bandwidth. It is a policy to encourage investors to set-up ISPs and reduce the barriers of entry into the Bahraini market. Further laws such as cyber crime law, electronic transactions law and eGovernment bylaw exist to provide adequate protection to the users.

III. ACCESS TO INFORMATION AND KNOWLEDGE

Transactional services form the apex of the evolutionary stages in the eGovernment implementation. However, world wide experience suggests that it is the informational services and procedural information which are the most popular amongst the government customers while using electronic channels. Informational services are easier to use as normally no login is required and do not raise any security concerns amongst the users as minimal / no personal information is required for the accessing such services. The Kingdom appreciates this fact and has therefore, given an impetus to provisioning information thorough the national eGovernment portal and websites of various ministries.

<div align="center">A. PUBLIC DOMAIN INFORMATION</div>

The Kingdom has put in place a comprehensive program to ensure that all the government organizations publish the data available in the pubic domain on their respective websites. The eGovernment strategy also propounds the publishing of all the procedural information and forms on the eGovernment portal and the ministerial websites. The constitution of the country, important laws and decrees, information pertaining to procurements made through the tendering process of the tender boards and other important / useful procedural information has already been made available on the internet.

Currently, most of the kingdom's ministries have online presence. In fact, they are increasingly appreciating the need for not only putting up the content on their websites but also updating it to keep it meaningful and trustworthy. A testimony to this is the rising demand for content managers and professionals related to this field amongst the government entities.

<div align="center">**Table 3: Selected official websites in Bahrain**</div>

Organization	Website
Ministry of Education	www.education.gov.bh
Ministry of Electricity and Water	www.mew.gov.bh
Ministry of Finance	www.mofne.gov.bh
Ministry of Industry & Commerce	http://www.moic.gov.bh
Ministry of Information	www.info.gov.bh
Ministry of the Interior	www.interior.gov.bh
Ministry of Labour	www.mol.gov.bh
Ministry of Health	www.moh.gov.bh
ministry of housing of website	www.mohme.gov.bh
Ministry of Tourism	www.info.gov.bh

Ministry of Transportation	www.transportation.gov.bh
Ministry of Works and Housing	www.mwh.gov.bh
Central Bank of Bahrain	www.cbb.gov.bh
Bahrain News Agency	english.bna.bh
The General Directorate of Nationality, Passports & Residence	www.gdnpr.gov.bh
Bahrain Telephone Directory	www.bahrainyellowpages.com.bh
Bahrain Center for Studies and Research	www.bcsr.gov.bh
Bahrain Electronic Visa Service	www.evisa.gov.bh
Telecommunication Regulation Authority	www.tra.org.bh

B. ACCESS TO INFORMATION AND PUBLIC INFORMATION

The Kingdom has taken proactive measures to create awareness and provide information to the socially disadvantaged groups and masses. The Ministry of Social Development routinely sends across its employees people from the underprivileged sections of the society to ensure that information pertaining to their needs is disseminated. Under the eGovernment program, social enablement initiatives have been planned to reach out to the disadvantaged and raise their awareness levels and usage skills for demanding and availing services electronically.

C. MULTI PURPOSE COMMUNITY PUBLIC ACCESS POINTS

The Kingdom is undertaking a number of steps to enhance the reach of electronic delivery of services to the general populace. Some of the steps that have already been undertaken / planned in near future:

- Post Offices in the Kingdom already offer some important services such as electricity and water bill payment, renewal of car registration, renewal of drivers' license, payment of university fees, etc. provided by various organizations. Under the eGovernment Strategy this role is proposed to be enhanced by adding to the available services and integrating the post offices as common services centers with the other channels of service delivery.
- Another initiative to enhance public access that has been planned is to install the internet enabled free kiosks at various public places where eGovernment services may be accessed.
- Additionally, a toll free national contact center has been planned to be provided even to people who don't use computers and the internet. The kiosks that have been planned will be provided with the telephone line that can get them access to the toll free contact center.
- In the next 3 years, services will also be provisioned through the mobile phone. This will help leverage Bahrain's exceptionally high mobile penetration which stands at about 150% of the population.

D. USING DIFFERENT SOFTWARE MODELS

The Kingdom understands that the technology is only a mean to improve the government's efficiency and productivity and provisioning of better quality services to the people. Therefore, all the decisions regarding the purchase / use of any technology / model are guided by the robustness of the technology and value proposition.

E. FREE AND OPEN ACCESS TO SCIENTIFIC KNOWLEDGE

Bahrain Chamber of Studies and Research (BCSR) has developed an electronic library which is available to everyone. Most of the resources on the digital library are provided free of cost and only need a

one time registration. Civil Services Bureau (CSB) has undertaken a project to develop eLearning courses for the government employees so as to facilitate the employees in upgrading their skill sets at a time and place of their convenience.

IV. ICT CAPACITY BUILDING

Bahrain has emphasized the importance of developing local skill for the promotion of the Information Society. Therefore computer labs have been deployed throughout the educational system. The national university provides training in ICT related majors. In addition, vocational training is available through institutions such as the Batelco Training Center, Bahrain Training Institute, and a local office of the India-based Birla Institute of Technology. It is important to note the contribution of distance education programs through the Arab Open University, which reported 302 students for 2002/03.

A. ICT IN EDUCATION AND TRAINING

Computers in schools

The Ministry of Education[9] has applied information and communication technology (ICT) in the teaching process of the primary education. Initially, this project was applied in 8 primary schools since 2001/2002 but during the 2002/2003 period it was expanded to 47 primary schools for boys and girls. In 20 schools computer laboratories have been equipped with computers, computer teachers and technicians in each school. The number of PCs in Bahrain Schools exceeded 7,500, were available for all students at all stages. Every School in Bahrain has at least 3 Computers connected with the Internet (Ministry of Education, 2003) with the aim of reaching 12 connected PCs for each school.

In 2001, The Ministry of Education put forward an ICT Plan, and in collaboration with UNESCO, Bahrain Government formed a National Taskforce headed by H.E. the Minister of Education as a focal point to implement the recommendations of UNESCO. One of the most important outcomes is the King Hamad's Schools of the Future Project. The aim of the project is to invest in the developments of ICT in the educational field to elevate the standards of education. The first phase of the project provides 11 schools with advanced ICT infrastructure benefiting over 11,000 students and teachers. In addition, e-learning services and digitization of school text books has been undertaken as a part of this project.

Vocational training

Most notable in the field of Vocational training is the Shaikh Khalifa Bin Salman Technology Institute which was inaugurated in 2003/2004, aiming at providing advance-developed training programs for industrial secondary teachers and students in various technical fields. The Institute also provides courses for all the social groups in order to improve their technical skills. Use and spread of PC's in vocational training is high as it adheres to the highest international standards.

University education

The University of Bahrain[10] has boosted its use of the Internet from mere dissemination of information to a two-way communication. Students can select their courses, and apply for admission and registration using online forms. However, the university's bilingual (Arabic, English) website has yet to offer online payment facility for courses. The university, however, is planning further ICT development and Internet integration to bring more of the learning and administrative processes online, such as e-courses that the university is currently developing.

The University of Bahrain boasts more than 35 computer laboratories and over 1,000 computers distributed throughout the university. Its two campuses (Isa Town and Al-Sukair) are linked via a 128K

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[9] http://www.education.gov.bh/
[10] www.uob.bh

leased line with another 128K line connecting the Al-Sukair campus to the Internet. All buildings in each campus are linked via a 128K line using a star topology. An Ethernet network running TCP/IP and IPX, called UOB, interconnects the central computer configuration. It consists of 35 servers running Novell NetWare, Windows NT and Unix[11].

The Arab Open University[12] (AOU) is another significant factor in the digital migration of education in Bahrain since it is based on distance learning. AOU students use the Internet as the main channel for accessing teaching material and assignments, as well as for interacting with instructors and holding discussions with their classmates. The university is headquartered in Kuwait, but it is building a virtual campus in Bahrain, which started to accept distance learners in four initial study areas as of October 2002.

B. RESEARCH AND DEVELOPMENT

Very little information is available on local efforts at innovation in the ICT sector. Due to small market size, little research in the computer science field is occurring outside the academic context. But, it is important to note that innovative solutions to technological problems are envisioned and implemented in Bahrain. The achievements of the country in eGovernment and Arabic Content stand as examples in this area.

However, R&D in the industrial sector of Bahrain has achieved considerable advancements. An outstanding example is the Aluminum Bahrain (ALBA) Company, one of the biggest Aluminum producers in the world, which has created a center of green innovation and the winner of the ICC/UNEP Millennium Business Award for Environmental Achievement. The Center is considered to be one of the most technologically advanced Environmental R&D facilities in the world.

V. BUILDING CONFIDENCE AND SECURITY IN THE USE OF ICT

A. USE OF ELECTRONIC TRANSACTIONS AND DOCUMENTS

The Kingdom has a national eGovernment portal and all the ministries have their own websites. The ePortal provides transactional services along with payment facilities through both credit cards and debit cards. Similarly, there are some ministerial websites that provide transactional capabilities most notably that of Ministry of Industry and Commerce, Municipalities and Agricultural Affairs etc. Other ministries are trying to build such capabilities. The eGovernment strategy recommends about 167 services for electronic enablement and delivery. These developments have made it mandatory for the Kingdom to undertake measures to boost confidence and trust in data privacy and security to increase the uptake of electronic services.

B. ONLINE TRANSACTION SECURITY

The Kingdom has made several regulatory interventions detailed below in order to ensure the legality and security of the electronic transactions. Some of the most prominent efforts, in this direction, outside of those discussed above are detailed below:

eTransaction law[13]

This law not only provides legal validity to electronic records and electronic signatures, but also mentions that the electronic records should not be discriminated vis-à-vis paper records. The law stipulates that each ministry needs to explicitly declare its willingness to accept electronic signatures and records before actually starting to accept them. Ministry of Commerce and Industry and the Central Informatics

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[11] National Profile For The Information Society In Bahrain 2005

[12] www.aou.org.bh

[13] E-transaction law, http://www.commerce.gov.bh/mocsite/la_elaw.asp?pageg=resource

Organisation (CIO - www.cio.gov.bh) are the only two agencies that have made this declaration to this date. Other ministries are also expected to follow this lead in the near future.

eGovernment By-law (Decree No. (2) Of 2006)

Details the technical provisions regarding electronic signatures and records such as format of electronic records that will be accepted. Means of sending electronic records etc. should be declared to ensure that there is no confusion in the kind of type of electronic documents and the medium for communication of these electronic documents.

Cyber Crime Law

This law exists to ensure that any kind of cyber crimes are punished and accounted for.

In addition to the above, payments for transactional services may be made through credit card and / or debit cards. Both the payment gateways are from the private sector and use internationally accepted security standards and guidelines.

C. COUNTERING MISUSE OF ICT

Though the Kingdom does not have a separate data protection / privacy law, however, the provisions for ensuring the protection of data and maintaining privacy of an individual are built in different laws and the government organizations strive hard to protect individual's data and privacy.

Government Data Network (GDN) has been established as a secured intranet communication link for all government organizations. The presence of a secured infrastructure for ministries to exchange data and information is a further assurance to users regarding the significance accorded to the security by the Kingdom.

As part of the eGovernment Strategy, courses have been identified for the judiciary and police to ensure that they receive proper training and orientation to apprise them of the various forms of cyber crime and assist them in making informed decisions / judgements as and when cyber crimes are to be dealt with.

D. PRIVACY & DATA PROTECTION – PUBLIC KEY INFRASTRUCTURE

Appreciating the need for the generation of trust amongst the users of electronic services, the Kingdom has undertaken establishment of a PKI infrastructure as a priority. The same will be operational before the end of the year 2007. Additionally, the smart cards that are being issued to the residents provide digital signatures to the holder and in this way, in a short span of time every resident in Bahrain will have the facility for digitally signing any document.

VI. ENABLING ENVIRONMENT

Provision of an enabling environment is crucial in order to mobilize resources and create a climate conducive to the acquisition and dissemination of ICT. Moreover, a trustworthy, transparent and non-discriminatory legal, regulatory and policy environment constitute essential bases for cooperation between the public and private sectors. As a manifestation of this realization, following steps have been taken by the Kingdom to create a salutary environment for the establishment of an information society.

A. LEGAL AND REGULATORY ENVIRONMENT

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

While Bahrain has previously struggled with intellectual property issues, recent advancements in enforcement have brought about improvement in this area. Piracy of audio/visual materials has been greatly curtailed. However, challenges remain in the field of software piracy. A 2003 study by the Business Software Alliance found that 64% of installed software was illegally obtained, comprising a total loss of USD $16 million.

Bahrain has taken active measures to adopt a legal framework for the support of the Information Society by modernizing its legal system, protecting intellectual property rights, and adopting international conventions on trade and economy (see Table 2). Bahrain is a member of the World Trade Organization (January, 1995), Gulf Cooperation Council (May1981), and the Greater Arab Free-Trade Area (February 1997). In addition to these multi-lateral trade agreements, the country has also pursued trade accords on an individual basis with other nations. The most recent example is the United States-Bahrain Free Trade Agreement (14 September 2004). This agreement, which was supported by the International Intellectual Property Alliance, contains several provisions increasing support for trade and intellectual property rights, and increased penalties for violations.

Table 4: International agreements signed by Bahrain for IPR protection[14]

Name of the Agreement	Time of signing
World Trade Organization	2004
Paris Convention	1997
TRIPS	1997
Copyright Law	1995
Trademark Law	1991
Patent Law	1977

Telecom regulatory framework in the country

Legislative Decree 48 of 2002 was issued on the 23rd of October 2002 to promulgate the Telecommunications Law and the establishment of the Telecommunications Regulatory Authority (TRA). With the purpose of liberalizing the telecommunications market in the country, the Telecommunication Law also defines the role of TRA regulator.

A number of regulations have been issued in Bahrain, mainly by the TRA. The most important of these regulations are (in chronological order):

- 30 April 2005: Access Regulation (regulation No.1 of 2005): Purpose: To provide a framework for access obligations and the requirements for the publication of a reference access offer by licensed operators that are declared to hold a dominant position in a relevant market;
- 8 November 2004: Mobile Phone Jammers Regulation (Regulation No. 4 of 2004): Purpose: Regulating the use of mobile phone jammers in the Kingdom of Bahrain;
- 28 September 2004: Telecommunications Mergers and Acquisitions Regulation (Regulation No. 3 of 2004): To provide a framework for the treatment of mergers and acquisitions by the Telecommunications Regulatory Authority;
- 2 August 2004: Accounting Separation (Regulation No. 2 of 2004) Purpose: Sets out requirements for accounting separation by licensees;
- 14 June 2004: Carrier Pre-Selection (Regulation No. 1 of 2004): Purpose: To is to mandate the basis for the implementation of carrier pre-selection in Bahrain;

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[14] Telecommunication Regulation Authority, Bahrain

- 29 October 2003: Ownership Regulation Purpose: Defines certain parameters related to the ownership of telecommunications licensees.

Regulating the Internet

All the websites operating in Bahrain must register with the Ministry of Information.
Pursuant to Section 41 of the Legislative Decree No. 48 of 2002 and Decree No. 47 of 2003, the Bahrain Internet Exchange (BIX) was established as a "not-for-Profit" Organization. The role of BIX is to connect Internet Service Providers, in order to increase local traffic and content, as well as reduce the cost of purchasing international bandwidth. It is a policy to encourage investors to set-up ISPs and reduce the barriers of entry into the Bahraini market.

Privacy and security laws and regulations for applications

No identifiable laws specific to privacy and security exists in Bahrain. However, almost all official and quasi-official internet sites directly related to Bahrain (Either with or without the country code .bh) have a disclaimer and privacy policy. The laws and regulation relating to the obligations of ISPs and Telecoms, do not clearly indicate the obligations of these groups to either protect the privacy of users or obligations to report certain personal information to governmental authorities as a standard practice. The constitution and General Laws of Bahrain do not deal with issues of privacy of personal information or security of personal information.

Other ICT-related laws and regulations

Some of the other important laws and regulation that have already been mentioned in another section above include eTransactions law, eGovernment Bylaw, cyber crime law, etc.

B. SECURE STORAGE AND ARCHIVAL

The Kingdom has established a data center at CIO for the storage of mission critical data and applications. The Data Center hosts all the important databases such as Central Population Registry, Immigration, Traffic and Licensing data etc. A DR site at Ministry of Finance is also maintained to ensure the retrieval of data in case of an unfortunate eventuality.

C. DOMAIN NAME MANAGEMENT

Bahrain uses gov.bh domain name. The national eGovernment portal of Bahrain in agreement with the rest of the GCC countries has selected the e.gov.country extension which gives the national portal the following URL – www.e.gov.bh.

D. STANDARDIZATION IN ICT

The eGovernment strategy envisions integrated services delivery and sharing of information amongst government organizations to provide better quality of services to the customers. A critical requirement for this is to adherence to a common set of policies and standards. In this regard, an Enterprise Architecture handbook has already been developed. This is the first step towards the creation of a comprehensive Enterprise Architecture for the Kingdom which is planned to be established before the end of the year 2007.

E. SUPPORTING MEASURES

In order to encourage growth in this field, the government has utilized ICTs to adopt a fast-track service for streamlining the regulatory and bureaucratic challenges for entrepreneurship. As part of this initiative, the Commerce Ministry has launched a one-stop-shop for business services. Relevant ministry approvals, licenses and permits can be obtained in an environment which stresses customer service. The

increases in efficiency provided by their e-Government initiative, the amount of time needed to secure government approval have been greatly reduced. Furthermore, relevant fees can be paid on line at any time.

Government facilitation.

This business-friendly attitude has resulted in effectively stimulating commercial growth. According to the Ministry of Commerce, the economy as a whole saw 4,597 new business incorporated in 2003, compared with 3,553 in 2003. This increase represents 29% growth. Fostering competition is also a national priority to stimulate economic growth. Previously, the national telecommunications carrier, Batelco, held a monopoly over telecommunications services. However, a deliberate campaign to introduce private-sector competition has started to show results. A recent analysis of the cellular market reveals that MTC-Vodafone currently holds 16% market share. This arrangement has delivered benefits such as lower tariffs and an advanced 3G communications network for the citizens of Bahrain.

In addition to its efforts in e-Government, the Kingdom of Bahrain has pursued a policy of economic diversification and promotion of commercial activity. To accomplish this goal the country has sought free trade agreements within the GCC region, and with other nations, including the United States. In order to highlight employment creation, special economic incentives for small and medium-sizes enterprises employing local nationals have been introduced:

- A subsidy of USD$11,925 annually for a period of three years for each citizen employed in pioneering industries, USD$7,950 for downstream industries, and USD$2,650 for existing industries;
- 50% rebate on electricity fees for all industries;
- 100% of rental fees for land in Government industrial areas for the first five years;
- 100% rebate of customs duties for all industries in an initial five-year period;
- 10-20% tariff protection for pioneering industries, subject to National Committee on tariff protection approval[15].

VII. ICT APPLICATIONS

Bahrain has made rapid stride in leveraging ICT in different spheres. Some of the major areas where the use of ICT has made a perceptible difference include the following.

A. E-GOVERNMENT

eGovernment Solutions

The Government has already created an advanced infrastructure. Now, the focus is on provisioning services by leveraging the same. Some of the notable steps in this direction are as outlined below:

- A national eGovernment portal was launched over a year ago. The same has been revamped and re-launched with added features and better user interface.
- Online payment facility has been made available on the national eGovernment portal and on some important ministerial websites such as those of Ministry of Industry and Commerce, Municipalities etc.
- One stop shop has been launched by the Municipalities. Applications for building permits can be made only online by the registered builders. This system will be extended to individuals also in due course.
- Services such as traffic contravention payments, payment of electricity and water bills, education results and scholarships, application for eVisa, Renewal of Commercial Registration, appointment for Central Population Registry (CPR) cards etc. are already available online.

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[15] Arab Advisors Group, February, 2005, Bahrain Communications Projections Report.

- Informational services such as directory of government officials, procedural information regarding select services, stats checking for select services etc. are also available on various ministerial web sites.
- Almost all the government organizations have a website where useful information has been published online.

eProcurement applications

All the procurement for government agencies above the value of BD 10,000 is routed through Tender Board. The Tender Board has already started the implementation of an eTendering solution to leverage ICT for making the procurements faster and more efficient. The eTendering solution is expected to be implemented by the end of 2007. After the stabilization of the system, work on further upgrading of the system to an eProcurement system will be undertaken as enunciated in the eGovernment Strategy.

B. E-BUSINESS

Bahrain is amongst the most important business centers in the Middle East. In order to maintain that status, the Kingdom has taken pioneering steps to support and foster eBusiness. The eGovernment Strategy envisages a separate G2B gateway with automation of over 40 services related to businesses.

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

Being the financial hub of the Middle East, Kingdom of Bahrain has devoted substantial effort and resources to the development of a national banking infrastructure. These efforts have succeeded in developing a robust and growing banking sector serving national, global and regional customers. At present, banking services comprise approximately 17.5% of Bahrain's GDP.

In addition to banking services, the government has aggressively pursued the creation of an enabling environment for business activity. The Bahrain Chamber of Commerce and Industry (BCCI[16]) website, has won world-wide acclaim through the World Summit Award as one of the top five e-content portals. The World Summit Award recognizes outstanding creative accomplishments in fields within the context of the World Summit on the Information Society. From a functional perspective, the site offers a broad range of information and assistance, with over 50,000 company records, regulatory statistics, and legal information. It acts as a single portal for enabling commercial development within the Kingdom.

With the motto - Boosting business, building Bahrain, the government has created a web portal to further facilitate the growth of commerce within the country. This site provides web hosting services, eMarketing solutions, email functionality to corporate clients. In addition, hardware and software products are also available.

E-Banking

The infrastructure density of electronic banking in Bahrain is the most developed in the GCC. Bahrain ranks third among GCC countries in terms of payment card density. According to statistics available with the Bahrain Monetary Authority (BMA), the number of credit cards exceeds 157, 000 while those for debit cards exceeds 550,000[17].

Emerging technological trends in the telecommunication sector have seen banks offering multiple 24 hour banking services in the form of phone and mobile phone banking. Bahrain is the first country in the GCC to migrate all its banks from the old X.25 networking technology to the SWIFT Net IP based network popularly known as the Benefit network. Almost al major banks offer both phone and mobile phone banking services.

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[16] www.bahrainchamber.org.bh
[17] Central Bank of Bahrain and nation wide survey conducted during the eGovernment strategy formulation

Internet Banking

Bahrain's banking sector has witnessed a transformation in banking delivery channels, as banks increased their IT budgets to accommodate changing IT banking trends. Almost all banks have functional websites. Most banks offer both retail and corporate Internet banking facilities. Online payments may be made through the debit cards using the benefit network while Batelco and Credimax provide online payment facilities for credit cards. Payments for government transactions and services can also be made online for the electronically enabled services using both credit cards as well as debit cards at no extra cost to the customers.

Maturity of regional ATM and banking networks

ATM network of Bahrain is also set to be linked with Iran, following the signing of an agreement in May 2004 between Bahrain Monetary Agency and Bank Markazi Jomhouri Islami Iran.

C. E-LEARNING

e-Schools

Almost all schools in Bahrain have computers and an internet connection. The Ministry of Education has taken a major e-Learning and school automation project under "the King Hamad's schools of the Future Project." Under the first phase, 11,000 students and 1000 administrative staff from over 11 schools have been the beneficiaries. As a part of this project all the content is being digitized and will be made available to students online. The project has also lead to the creation of a website that facilitates teachers, students and parents to avail services online.

e-learning market

According to Madar Research, e-learning market (including both the academic and corporate e-learning market) in Bahrain was worth US$3 million in 2004 and is expected to reach $9 million by the end of 2009 at a Compounded Average Growth Rate (CAGR) of 25 percent. The major segment of the above market is for academic e-learning as the Ministry of Education is initiating major e-learning projects in the public education system of the country. CSB's efforts with the assistance of UNDP for the development of eLearning solutions for the government employees will also play a major role in this high growth rate.

Virtual Universities

While the Kingdom of Bahrain does not host any locally initiated distance learning options, the strong telecommunications infrastructure makes courses of study such as those available at the Arab Open University an option for its citizens.

D-HEALTH

Databases for national healthcare (volume, coverage, online/offline availability, and updates)

The Ministry of Health is spearheading the single most ambitious and costly project in the eGovernment drive in Bahrain. Running at a cost of BD20 million ($53 million), and approved in September 2001, the Strategic Health Information System will allow clinics, physicians and health officials to share healthcare related information and have instant access to tens of thousands of updated medical records over an intranet, which is also connected to the Internet. The project, launched in April 2002, will pass through four phases over a period of six years.

Phase one, which was completed in 2003, focused on setting up a new infrastructure and basic health information services. A tender has already been issued for the Core Health IT project that will migrate the present proprietary legacy database to new technology and enable the provisioning of services online.

The Ministry of Health maintains a comprehensive website - www.moh.gov.bh. The website has a wealth of information including directories and electronic forms are available for downloading as well as

online submission. Additionally, the eGovernment portal also offers health related services such as appointments, drug prices etc. Additionally, the ministry has partnered with Microsoft's to create a Center of Excellence, which provides facilities for health-related training, research and education.

The aggressive adoption of IT in improving health administration is also evident in a number of hospitals in Bahrain. The Bahrain Defense Force (BDF) Hospital, for instance, implemented the Oracle collaboration suite in early 2004. One of the key incentives behind the project, according to BDF, was the capability of the application to consolidate the hospital's communication requirements around a single server, thereby reducing costs and lessening the impact on network bandwidth.

Telemedicine and medical use of teleconferencing

Bahrain Specialist Hospital stands as a center of excellence in the Arabian Gulf connected digitally through telemedicine to the most reputable medical centers. State of the art medical equipment and systems, housed in the purposely designed hospital according to the high JCAHO standards coupled with highly qualified staff has ensured this formidable reputation for the institution.

Maturity and implementation of Health Care Information Technology Systems

The government of Bahrain has focused on integrating ICTs into the health care system with great effectiveness. In addition to the Strategic Health Information System, a National Health Information Database, investments in modern infrastructure are ongoing. With a total cost of nearly $45 million USD, the Bahrain Specialist Hospital is an example of this campaign. This state-of-the-art hospital has laboratory facilities capable of locally handling nearly 95% of all laboratory needs. In addition to these technologies, the hospital has deployed functionality to support on line patient consultations through its website.

E-EMPLOYMENT

The Ministry of Labour[18] is responsible for labor and employment related matters for all Bahrainis and expatriates. The ministry has developed a new website that is interactive and offers a host of eServices. Some of the employment related services envisaged to be offered through the web site are:

- Unemployment Registration: This service allows unemployed Bahraini's to be registered with the government. Their CV's are stored in databases and all unemployment related benefits such as help in getting jobs, unemployment allowance etc. are made available to those registered. This service has been available on the national eGovernment portal for over a year now.
- Job matching: This eService allows the candidates to upload / create their CV's which is made visible to the employers online. Candidates may be contacted by the employers directly. This service is available for Bahraini nationals only.
- Civil Service Bureau, the government arm dealing with HR and services related matters for the government, is developing an application to allow all government job aspirants to apply online. The ministries will then be able to view the candidates online and contact them.
- Additionally, under the eGovernment strategy, Government to Employee services have been identified as a key focus area and during the next year projects such as the eLearning initiative, allowing employees to manage their leaves online and the employee appraisal system are likely will leverage ICT to improve the productivity and efficiency of government employees.

On the other hand, the newly established Labour Market Regulatory Authority (LMRA), is the central organization responsible for foreign workers in Bahrain. Employers in Bahrain can apply for foreign workers' visa online and manage their official transactions such as renewal and cancellation of a work visa, paying fees, etc... In addition, employers can track their application online through LMRA's website (www.lmra.bh).

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[18] www.mol.gov.bh

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

Appreciating the linguistic diversity within the Kingdom, a multi-lingual approach has been employed to provide information to both Arabic and non-Arabic speakers. Beginning with the national eGovernment Portal, the Kingdom of Bahrain has provided for both Arabic and English content at almost all the government websites. This effort has been so successful, that web sites such as those of Bahrain Chamber of Commerce and Industry have won international recognition.

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

ICT is being utilized by the government organizations such as the Ministry of Information and Bahrain Chamber of Studies and Research[19] to further Bahraini culture. The Ministry of Information publishes the cultural magazine online and there is a facility to download even the archived sections. Similarly, the BCSR offers its digital library for all registered members and will also start with sales of digital and traditional content before the end of 2007 through the eGovernment portal and its own website.

B. LOCAL AND NATIONAL DIGITAL CONTENT DEVELOPMENT

Bahrain has proactively pursued the generation of Arabic content on the web. A notable example of these efforts can be seen in the portal for women's issues[20], this site features broad ranging material dealing with issues of women's employment, health, empowerment, and parenting as well as issues specific to expatriates. The site is intended to serve both local nationals and women in the entire Arab world.

Arabization of software is mainly conducted as part of in-house activities and as part of the localization process by solution providers. Most local activities revolve around arabizing websites for local companies.

Neither legal nor regulatory hurdles exist in Bahrain for the creation of software products. However, the relatively small size of the population and the lack of real demands in the local market contribute to the slowness in this field. Although Bahrain has achieved considerable success towards computerization and other Arabization efforts in the field of eGovernment services, most of these developments were conducted by the governmental or quasi-governmental agencies.

IX. MEDIA

Bahrain has a vibrant and strong media. The media has been a supporter of the introduction of eGovernment to provision better services to the customers. The newspapers routinely publish informative features on ICT and interviews with key government functionaries regarding the various aspects of ICT to create awareness and address apprehensions. Media is taken seriously; a testimony to this is the fact that many ministries routinely answer the queries / complaints published in newspapers' letters section. Bahrain News Agency has set up a news portal[21] with local and international news feeds available 24/7, in addition the website support RSS feeds.

eGovernment Strategy also envisages a healthy relationship with the media to ensure that the general populace is made aware of the efforts of the government in leveraging ICT for development and creation of Information society. Further, the interviews and other features that reach people from various medium assist in eliminating apprehensions caused due to misinformation.

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[19] www.bcsr.gov.bh
[20] www.womengateway.com
[21] http://english.bna.bh

X. MILLENIUM DEVELOPMENT GOALS - MDG

The Kingdom of Bahrain, has endorsed the United Nations Millennium Declaration, and is determined to continue honoring its national, regional, and international responsibilities, with a view to achieving the common objectives set out in the Charter of the United Nations and the Millennium Declaration. Furthermore, Bahrain's aspirations to achieve and surpass the Millennium Development Goals is a sign of its commitment to continuing development and bodes well for a future in which all citizens can enjoy comprehensive economic and social development in a stable, secure and open environment. The Kingdom of Bahrain continues to be a regional leader in human rights, democracy and development, and has consistently confirmed its pioneering role in free trade and economic openness. In continuation of the above tradition, Bahrain appreciates the role of ICT as an important catalyst in achieving the MDG, not only in furthering communication and exchange of information, but also in support of specific development initiatives. The following captures Bahrain's status in this regard.

A. PROGRESS TOWARD ACHIEVING THE MDG

Bahrain is a welfare state and the high amount of government expenditure in people's welfare and development such as free health and education for all citizens, has ensured a high Human Development Index (HDI) of 0.859 and was ranked 39 out of 177[22]. The Kingdom of Bahrain has made significant progress towards achieving the MDG[23]s, and is potentially on track on all of them. Some of the progress achieved by Bahrain is highlighted below:

Table 5 – Overview of MDG Progress in Bahrain

Target	Progress towards achieving the MDGs - 2006
Goal 1 - Eradicate extreme poverty & hunger	Bahrain does not suffer from extreme poverty (people living on less than one US dollar per day)
Goal 2 - Achieve universal primary education	Bahrain has already achieved the goal of 100% net enrolment rate in the primary school
Goal 3 - Promote gender equality and empower women	Visible advancements of women in various areas and sector, has been achieved, In 2006, a woman was elected to parliament in Bahrain for the first time in the nation's history.
Goal 4 - Reduce child mortality Goal 5 - Improve maternal health	Bahrain is on track to meet the 2015 target of reducing child and maternal mortality. Even currently, Child and Maternal mortality rates are relatively low, close to the level recorded in advanced economies
Goal 6 - Combat HIV/AIDS, malaria & other diseases	Bahrain has been able to maintain a low prevalence of HIV/AIDS cases
Goal 7 - Ensure environmental sustainability	The Kingdom has placed high priority on the environmental management of natural resources; it faces particular challenges in the coastal areas

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[22] Human Development Report - 2006

[23] UNDP Bahrain - Millennium Development Goals Report 2007

- ICT's may be used for the development of proper monitoring systems of distribution and follow-up of the government cash-assistance programme; (redirection of a portion of this handout fund to self-supporting programs.) not sure what this means.
- ICT may be utilized to enhance the capacity of the national statistical authorities to monitor progress towards achieving and/or maintaining the level of MDG's.
- Education and awareness on gender issues, elimination of stereotypes and false perceptions and promotion of female entrepreneurship can be cost effectively and easily disseminated through the use of electronic channels.

XI. WORLD SUMMIT ON THE INFORMATION SOCIETY

Bahrain is actively working towards the achievements and realization of the WSIS Objectives. Particular interest in elevating the level of ICT infiltration in the education is given to improve all levels of education. The deregulation of telecommunication sector, high level of eGovernment services and high level of freedom to access information over various media are all strong indicators of Bahrain's involvement. Finally, Bahrain various ICT NGO's and societies are actively involved in activities related to the realization and of the WSIS objective. In May 2005, Bahrain Hosted the Global ICT Summit. The event was the first of its kind in the region and attracted international attention to the developments taking place in Bahrain.

However, at the moment, there is no website available at the regional level to share the lessons and good practices. As a remedial step in this direction, under the eGovernment program, an essential condition of sign off on any project is the lessons learnt document to capture the leanings from the project to ensure effective knowledge management. These documents will provide ready content for contribution from Bahrain as and when such a website comes up at the regional level.

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