ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA (ESCWA)

NATIONAL PROFILE OF THE INFORMATION SOCIETY
IN THE KINGDOM OF BAHRAIN

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Table of Contents

National Profile of the Information Society in the Kingdom of Bahrain - 2011

Introduction

The Kingdom of Bahrain believes that the ICT sector is not just an important sector in its own right, but an enabler of continued economic growth, innovation and competitiveness. As a result, the Kingdom of Bahrain has taken several steps to improve this sector.

This report will highlight the recent development accrue in the ICT sector in the Kingdom of Bahrain.

1. THE ROLE OF THE GOVERNMENT AND ALL STAKEHOLDERS
A. NATIONAL INFORMATION SOCIETY AND E-STRATEGIES

The ICT strategy in the Kingdom of Bahrain is focusing on telecommunication regulation and policies as means to stimulate network deployment and infrastructural upgrades and to control service rates. Thus, the liberalization of the telecom sector remains a priority. Accordingly, the Second National Telecommunications Plan[1] of Bahrain, which was adopted in 2008, aims at improving the institutional framework of telecommunication regulation in order to make telecommunications services "increasingly available and internationally more competitive in terms of the range of services offered as well as prices."[2] It encourages competition[3] in both infrastructure and access services. The strategy intends to promote competition by minimizing market entry barriers and maximizing economic efficiency in the use of scarce resources, in particular the electromagnetic spectrum and the access to land.

Moreover, the National e-strategy of Bahrain is focusing on customer protection[4] for both consumers and businesses. It states that consumers and businesses should reap the benefits of the development of telecommunications technologies, both in terms of the services they consume and the capabilities they need, to realize their personal and business potential.

High-level deliverables of the existing e-strategy of the Kingdom of Bahrain
- ICT strategy exists
- First National Telecommunication plan was adopted in 2003
- Second National Telecommunication Plan was adopted in 2008
- Telecommunication Regulatory Authority (TRA)[5] هيئة تنظيم الاتصالات – is the official agency in charge.
- Excellent pace of implementation

Beside the national e-strategy there are several sectoral plans such as e-government strategy and health information and communication technology strategy. Brief summary of those two sectoral plans are below. Information on application delivered from those plans available on section 7 later in this report.

- *E-government strategy*: The e-government strategy for the Kingdom of Bahrain is focused on ensuring effective delivery of government services to citizens, residents, businesses and visitors (customers). The e-government strategy is summed up by:" Delivering Customer Value through Collaborative

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[1] Source: Decision No. (8) of 2008, Regarding the Second National Telecommunications Plan Approval, www.tra.org.bh

[2] Source: Decision No. (8) of 2008, Regarding the Second National Telecommunications Plan Approval, P3, www.tra.org.bh

[3] Source: Decision No. (8) of 2008, Regarding the Second National Telecommunications Plan Approval, P3, www.tra.org.bh

[4] Source: Decision No. (8) of 2008, Regarding the Second National Telecommunications Plan Approval, P3, www.tra.org.bh

[5] www.tra.org.bh

Government[6]". The concept of collaborative government goes beyond government as much as it also includes the private sector and the non-government sector.

In order to ensure that the success of the vision can be measured and monitored, the strategy clearly defined its expected outcomes and targets.

An action plan (strategic priorities) has been identified for implementation on 2007-2010 to ensure achieving targets. Strategic plans include channel enhancement, service enablement, and implementation of key enablers.

- *Health Information and Communication technology strategy:* The Ministry of Health (MOH)[7] Information and Communication Technology Strategy (ICT) is defined to cover the MOH as a corporate policymaker as well as administrative directorates and health service providers in hospitals, clinics, and health centers. It works in parallel with the Ministry of Health Strategic Direction and Framework for Action, in addition to focusing on innovative ideas to support the issues created from uncertainty in areas such as Health insurance, Human Resource Management, Materials Management, Drug management and cost containment.

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

The Second National Telecommunication Plan reinforced the role of TRA as an independent regulator and required TRA, along with other authorities where necessary, to involve the user, both residential and business (private sector), in developing regulatory policy and address users' concerns. One example is the TRA consultation meeting held to discuss the effective and efficient way in implementing the infrastructure for the new property with the business sectors.

Another example for the cooperation with the private sector is the agreement between eGovernment Authority (eGA)[8] and CrediMax for kiosk project to enhance access to eGovernment services which are currently available online. CrediMax[9], is the Bahrain's leader in card business. The kiosks aim to deliver eGovernment Services, are to be located in key strategic locations all over the Kingdom of Bahrain. One aspect of CrediMax role in this project is to facilitate the acceptance of card payments through these kiosks, besides providing the kiosks themselves.

C. ROLE OF NON GOVERNMENT ORGANIZATION

Non-government organizations (NOGs) are engaged in many projects to develop the Information Society in the Kingdom of Bahrain. One of the most important role plays by the NGOs is the capacity building in the ICT field. One of the program has been introduced is the women technology empowerment through the Bahrain Women's Union, Bahrain Internet Society (BIS)[10] and Tamkeen. The aim of this program is to provide ICT training to 900 women and provide e-Learning opportunities to 5,500 females covering a wide cross-section from all districts of Bahrain and combining all age-groups.

Another example of the engagement is the announcement of the made of the "The New Bahrain Council for Child Internet Safety" by TRA, government agencies, lawmaker and non- NOGs. This council will to help to promote and ensure online safety for adults and children.

On the individual level, NOGs such as BIS or Bahrain Information Technology Society (BITS)[11] strive to serve the community of Bahrain by spreading awareness on the benefits of Internet and ICT. Those societies try to do that by conducting hands-on training for citizens on Internet and Computers fundamental, conducting generic and specialized seminars, workshops and forums, organizing awards to encourage the innovative and effective use of technology, provide advisory to entities on technology related matters. In order to facilitate the awareness of their program and communicate will more people these societies has used the Blog, Facebook, Twitter.

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[6] Source: http://www.ega.gov.bh/downloads/resources/Strategy-English.pdf - page6
[7] www.moh.gov.bh
[8] www.ega.gov.bh
[9] www.credimax.com
[10] www.bis.org.bh
[11] www.bits.org.bh

2.   ICT INFRASTRUCTURE
A. MARKET STRUCTURE AND REGULATORY LANDSCAPE

Until 2002 Bahrain Telecommunication Company (Batelco)[12] controlled Bahrain's telecommunication market as it had a monopoly. In 2002 a decision was passed to free the market.

In 2003, the Kingdom of Bahrain embarked on a process of liberalization of telecommunication sector. To do so, the First National Telecommunications Plan was established the policy of the government to create a free telecommunications market environment that would be increasingly attractive to the private sector.

While the Second National Telecommunications Plan sets out the requirements of the government for the further development of the sector over the years 2008-2010. It sets out the policies for the regulation and development of the telecommunications sector.

By 2004, the telecommunications sector in the Kingdom of Bahrain was fully liberalized. All the milestones laid out in the legislation had been met and each step had been reached within the legal deadlines, as shown in the table below.

Table 2: The Progress Towards Liberalization the Telecom Sector (2000-2004)

Year	Services Provided
2002	- The bringing into effect of the Telecommunications Law - The creation of a telecommunications regulator called the Telecommunications Regulatory Authority (TRA), headed by a General Director
2003	- A second license to provide Mobile Services - Opening the Value Added Services and Internet Service Provision sectors for competition - Establishing the Bahrain Internet Exchange
2004	- Opening the National Fixed Service sector for competition - Opening the International Facilities and International Services sectors for competition opening the VSAT, Paging and PAMR sectors for competition

Therefore, by the end of 2009, Batelco shares the fixed-line market with fourteen other operators providing international calling services using international direct dial, carrier pre-selection or prepaid calling cards. Competition has accelerated in the broadband market during 2008 and 2009 with the launch of WiMAX services by two alternative operators. In the mobile market Batelco and a subsidiary of Zain[13] of Kuwait

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[12] www.batelco.com
[13] www.bh.zain.com

have been joined by a third operator - Viva[14] Bahrain owned by STC of Saudi Arabia launched services in March 2010 into the market.

Table 3: Telecommunication Market Structure

Service	Market Structure
Mobile services	Competitive
Fixed-line services	Competitive
Internet services	Competitive

B. PENETRATION of ICT SECTOR
1- *Fixed Line*

By the end of 2009, there were about 237261 fixed lines. The number of fixed line grew by 8% between 2008 and 2009. The residential and business fixed lines were representing 61.6% and 38.4% respectively.

Table 4: Fixed Lines Market Indicators, 2006-2009[15]

Indicator	2006	2007	2008	2009
Fixed PSTN	194,196	202,469	206,301	202,444
Fixed Wireless	-	1,072	14,085	35,177
Total	194,196	203,541	220,386	237,621
No. of Residential Fixed Line	122,343	116,951	130,121	146,384
No. of Business Fixed Line	71,853	86,590	90,265	91,237
Penetration Rate[16] (%)	20%	20%	20%	20%
Percentage of Households which have a fixed line[17]	NA	74%	78%	83%

2- *Mobile Telephone*

At the end of 2009, there were about 1.4 million mobile subscribers in Bahrain. Thus, the penetration rate in Bahrain was 120%. The mobile market in Bahrain remains predominantly prepaid. Prepaid subscribers represented 82.5% of mobile subscribers at the end of 2009.

Table 5: Mobile Telephone Market Indicators, 2006-2009[18]

Indicator	2006	2007	2008	2009
Prepaid Subscribers	756,268	923,702	1,210,163	1,156,196
Postpaid Subscribers	151,165	192,277	230,619	245,778

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[14] www.viva.com.bh

[15] Source: Telecommunication Market Indicators, December 2010, http://www.tra.org.bh

[16] The penetration rate is based on TRA population estimation for the year 2009.

[17] The number of households is based on TRA extrapolation for the year 2007, 2008 and 2009 based on 2006 data for its own analysis.

[18] Source: Telecommunication Market Indicators, December 2010, http://www.tra.org.bh

Total Mobile Subscribers	907,433	1,115,979	1,440,782	1,401,974
Mobile penetration as a percentage of Total Population[19]	94%	107%	130%	120%

1- Internet Service

- Internet Penetration Rate:

At the end of 2009 there were about 162, 000 internet subscribers divided as 158,335 broadband subscribers which it is represent 97.7%, and 3480 dial-up subscriber which around 2.3%. The numbers of total internet subscribers grow by 41.3% between the year 2008 and 2009 due to growth of internet residential subscribers.

Table 6: Internet Market Indicators, 2006-2009[20]

Indicator	2006	2007	2008	2009
Dial-up Subscribers	21,466	6,425	4,508	3,480
Broadband Subscribers	38,628	73,563	109,994	158,335
Total Subscribers	60,094	79,988	114,502	161,815
Internet Penetration[21]	6%	8%	10%	14%
Broadband Penetration [22]	4%	7%	10%	14%
Number of Residential Fixed Broadband subscribers	34,858	62,699	85,419	149,581
Percentage of Households that have Fixed Broadband	30%	39%	51%	85%

- Broadband Tariffs[23]: Broadband prices in Bahrain have been declined over the past two years (2008 & 2009) by up to 50%. However, it is still significantly higher than the European average.

- Internet Bandwidth[24]: According to The Global Information Technology Report 2009-2010, the internet bandwidth in the Kingdom of Bahrain is 25.44 (Mb/s) per 10,000 for the year of 2008.

2- Internet Service Provider

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[19] The penetration rate is based on TRA population estimation for the year 2009

[20] Source: Telecommunication Market Indicators, December 2010, http://www.tra.org.bh

[21] The penetration rate is based on TRA population estimation for the year 2009

[22] The penetration rate is based on TRA population estimation for the year 2009

[23] Source: 2010 Price Benchmarking of Telecommunication Service in Arab Country Study.
http://www.tra.org.bh/en/PriceBenchmarking.asp

[24] Source: www.networkedreadiness.com

By the end of 2009, there were 12 active internet providers.

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

The second national telecommunication plan has set an objective to work towards Bahrain becoming a regional centre for telecommunications innovation with businesses and consumers benefiting from enhanced performance and access to the latest services, as well as from lower prices. Such an environment should assist telecommunications providers develop innovative services both for the Kingdom as well as regionally. Moreover the plan has emphasize that could be done by stimulating the private sector investment in telecommunications and to develop the promising capabilities of entrepreneurs by the government.

To do so the government has continue reviewing administrative procedures and reduce redtape in order to open the possibilities for investment, creativity and entrepreneurship.

Below are some steps achieved on that field:
- Establishment of a National Broadband Network for the Kingdom of Bahrain: The Government of the Kingdom of Bahrain has taken the decision to make available on an open access basis, on fair and reasonable prices, capacity on the fibre-optic network of the Electricity and Water Authority[25] (EWA) utilizing those fibres that are in excess of the direct needs to the EWA (the "Network") in order to increase Government effectiveness and assist in accelerating economic diversification into non-oil sector. The Government of the Kingdom of Bahrain has decided that Bahrain Internet Exchange (BIX)[26] shall be the organization responsible for overseeing all operational aspects of the network. Once operational the network shall be operated on a non-discriminatory open access basis and the charge for services provided over the network shall be uniform and non-discriminatory as well as fair and reasonable.
- Establish a Telecommunications Technical Office (TTO) to work, on behalf of the telecommunications sector, with the Central Planning Unit of the Ministry of Works[27] on infrastructure issues. The TTO has responsibility for a range of processes, from obtaining permits and providing information about an area to advising on the guidelines and dealing with emergency cases.
- Develop the national frequency plan on 2009 in order to reflect national policy on the use of the radio spectrum.

D. ICT CONNECTIVITY

Today all schools, colleges and government entities are electronically connected via various means. This is done because of the full coverage of electricity and the network all around the Kingdom of Bahrain.

E. INTERNET INFRASTRUCTURE

Internet connectivity within Bahrain is provided by three primary physical paths: connectivity to Saudi Arabia over the King Fahd Causeway, and dual connectivity to the UAE over the
Fiber Optic Gulf (FOG) and FLAG/Falcon cable systems.
Three international service providers (Emirates Telecom, Flag, and Tata) currently offer
Internet transit services to Bahrain over these paths to the world's autonomous systems.
- Zain (Vodafone MTC) and the Bahrain Internet Exchange (BIX) both purchase Internet transit directly from Emirates and Tata.
- Batelco purchases transit directly from Flag and Tata.
- Lightspeed now purchases transit directly from Flag alone.
- Mena and 2Connect purchase some direct transit from Tata, and some from the BIX.
- The twelve other autonomous systems in the Kingdom all purchase transit directly from the BIX.

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[25] www.mew.gov.bh
[26] www.bix.bh
[27] www.works.gov.bh

3. . ACCESSIBILITY TO INFORMATION AND KNOWLEDGE
A. PUBLIC DOMAIN INFORMATION

The e-government strategy for the Kingdom is focused on the provisioning of services to customers, and in this respect will work towards electronic enablement of all key services. Therefore the success of e-government lies not only in creating an e-government but also making the people to whom it is intended for to use it.

Within this, the e-government strategy of Bahrain had envisaged a comprehensive marketing and awareness strategy for the programme. The e-government is conducting comprehensive marketing and awareness programme in order to ensure that citizens are not only kept abreast of the introduction of e-Services, but also reap the benefits in full by using the new channels more often than conventional channels.
Therefore, the e-government authority is conducting marketing and awareness campaigns through advertisements in print, audio and visual media and campaigns for sensitizing the public on the e-government programmes. eGA is providing all support to various ministries also in developing and implementing various marketing campaigns for the various e-Services.

The e-government marketing strategy is provided below:
-        Above the line (ATL): the e-government authority has use the help of Mass media extensively reach out to the customers in which regular radio and TV programmes aimed at various section of the population.
-        Below the line (BTL): the e-government also conduct large campaigns like road shows, exhibitions, banners, cutouts and advertisements through the print media.
-        Direct marketing: The e-government authority has taken up a very comprehensive strategy of going direct to the people and communicating about the programme. For example, the stalls in major shopping malls has been set up, conducted road shows etc for the people.

The marketing campaign includes 6 key components, each of which is carefully address as follow:
1. Target audience
2. Channel (media mix) selection
3. Message development based upon audience skills and education
4. Timing
5. Development/approval process
6. Feedback/review

For instance the e-Gate campaign was focused towards the immigration and emigration user and therefore the campaign was addresses at the airports with banners about the e-Gate. While the educational services of schools like exam results were marketed among the parents, and student community.

eMagazine is another way followed by e-government authority to reach people. This magazine is publishing a bimonthly highlighting the major e-Government initiatives across the globe as well as the activities happening in the Kingdom and GCC. Beside the hard copy the e-Magazine[28] has a website which provides online subscription, access to previous copies through archives, online reading facility etc.

eGA is also publishing an e-Newsletter targeted at the ministries and government institutions of the Kingdom. The objective of this newsletter is to create awareness among all government employees on the e-Government activities.

B. ACCESS TO INFORMATION AND PUBLIC INFORMATION
As part of the e-government strategy, 200 key services have been identified for delivery through electronic channels(e-government portal, national toll free contact centre, mobile gateway and common service centre).

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[28] www.emagazine.gov.bh

These form part of the more than 300 services provided by 32 government agencies. The 200 services have been identified based upon criticality of service (citizen demand and importance) and feasibility of electronic delivery. In addition, procedural information, forms and status checking for all services can be provided electronically and are not part of the 200 services. Currently a few of the identified 200 services are electronically enabled and are provided through departmental websites, while a few more are available through the eGovernment Portal[29].

C. MULTI-PURPOSE COMMUNITY PUBLIC ACCESS POINTS

Currently there are 7 public libraries in the Kingdom of Bahrain providing its services free of charge to the public and include the following sections:

-       Hard copies of books and periodicals distributed according to Dewey Decimal Classification System to the ten sections of Chairperson of human knowledge, while tracking the alphabetical order of titles for Arabic and foreign periodicals by subject matter.

-       Section for the Blind: this section has been introduced with a purpose of integrated the special need groups in the society, therefore this section include group of books devoted to this category and written in a Braille way.

-       Information Technology section: This section has provided the information using the modern technology such as the educational and cultural DVD and Internet service.

By the end of 2009, the total visitors for the public libraries reached to 100793 persons, while the total number of borrowers was 86146 persons. The following table shows the number of visitors and borrowers during 2009[30].

Public Library	Visitors	Borrowers
National Bank of Bahrain Public Library	230,908	11,470
Isa Town Public Library	22,456	45,491
Jidhafs Public Library	20,309	6,232
Sitra Public Library	13,890	10,264
Hidd Information Center	10,255	2,715
Arad Public Library	2,631	3,631
Riffa Information Center	7,344	6,434
Total	100,793	86,146

4.   ICT CAPACITY BUILDING
A. ICT IN EDUCATION AND TRAINING

Institute of Public Administration (BIPA)[31] was established by Decree No. 65 for the year 2006 promulgated by His Majesty the King, Hamad bin Isa Al-Khalifa, on 28th June 2006. The Institute aims to develop public administration and training in ministries and government institutions and contribute in qualifying and training the staff of these ministries and institutions.

Within the e-government vision and strategy, BIPA has introduced an e-training programme format on 2010. The aim of the e-training is to provide courses that can be deployed and access by all learners as and when required. BIPA provide its e-training programme through an Integrated Learning Management System (iLMS).

B. TRAINING PROGRAMMS FOR CAPACITY BUILDING IN THE USE OF ICT

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[29] www.bahrain.bh
[30] Source: Annual Report 2008-2009, Ministry of Education
[31] www.bipa.gov.bh

The government of Bahrain understands the importance of capacity building in the use of ICT. As a result, the governments' ministries and agencies provide hundreds of training programs each year.

One of the active government agencies in this field is the eGA which its strategy focuses on service, service levels and sustainability "projectization" and not on software and hardware. Capacity building in the context of this strategy, refers to the need to adjust policies and regulations, to strengthen institutions, to modify working procedures and coordination mechanisms, to increase the skills and qualifications of people, to change value systems and attitudes in a way that meets the demands and prerequisites of implementing the e-government strategy of the Kingdom.

The eGA has undertaken massive wide capacity building initiatives both at the ministry level as well as for the citizens.

The ministry wide initiatives target the employees thereby enhancing their capabilities to build and operate a sustainable e-government. As a result the authority had conducted a training need analysis in all the ministries and has come out with the consolidated list of training requirements for sustaining e-government. The various capacity building initiatives for the government employees include the following:
- eGovernment awareness programmes
- Basic computer literacy for all employees with certification like ICDL
- Customer care training for front office staff and common service centres
- Project management training for selected staff in all ministries
- Business Process Reengineering training
- Specific IT skills for the IT people in all ministries
- Leadership training for directors and above to ably lead the e-government programs.

eGA has tied up with multinational vendors across the globe for providing the training. It has also adopted various innovative methods of training to reach the entire Bahrain government employees. It has adopted Training of Trainer (ToT), eLearning, micro-learning etc. methodologies to train the employees.

Moreover, the eGA has tied up with Microsoft in providing basic computer education to all needy in the Kingdom. An elaborate plan has been prepared. 700 citizens have already been trained in the year 2009. This initiative, offered free of charge to Bahraini nationals, is conducted in partnership with Microsoft and the Bahrain Internet Society (BIS). Microsoft is financially sponsoring a number of the courses in coordination with the eGA and BIS, as well as providing the course curriculum free of charge. The training is administered by a group of Microsoft certified IT professionals, and is based on a curriculum designed by Microsoft to provide the foundation for teaching basic to intermediate technology skills in a hands-on manner in order to help individuals gain the skills for today's "knowledge economy" and broaden digital inclusion. The first stage of the training programs, which include 18 hours of training in basic computer skills, Microsoft Office, internet and email, and 8 hours on using the eGA National Portal

Another good example is the Ministry of Education (MOE)[32], in which by the end of academic year 2008-2009, 136[33] of its staff were benefited from the ICDL program and by the end of academic year 2007-2008, 3307[34] of its teachers had benefited from the same program.

5. Building confidence and security in the use of ICTs
A. USE OF ELECTRONIC TRANSACTIONS AND DOCUMENTS

Kingdom of Bahrain is working on setting up appropriate and integrated legal frameworks able to drive the use of e-transactions. In this regard, selected initiatives from are highlighted below.

1. Electronic Transaction Law

There are three interrelated piece of legislation on this aspect. Enacted in 2002, the Electronic Transaction

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[32] www.moe.gov.bh
[33] Source: Ministry of Education, Annual Report , Academic Year 2008-2009,www.moe.gov.bh
[34] Source: Ministry of Education, Annual Report, Academic Year 2007-2008,www.moe.gov.bh

Law has, among other, sanctioned the legality of electronic transaction, the recognition electronic signatures, etc.

In 2001 a determination No.3 for the year 2001, on the formation of the organizing committee of e-commerce has been issued to form the committee with the ultimate objective to introduce the laws on electronic transactions. In 2002, the legislative decree No.28 of 2008 with respect to electronic transactions has been enacted to provide, among others:

- The conditions for and legal acceptability of electronic transactions;
- The recognition of electronic data from evidence view point;
- The recognition of electronic signatures;
- The sufficiency of electronic display and/or archiving as an acceptable method of displaying or storing the original documents;
- The effectiveness of electronic communications;
- The conditions and pre-conditions for establishment of certification service providers;
- The conferment of power to regulate the registration and usage of .bh top level domain name to the Minister of Transportation; and
- The matters incidental to all the above, including the punishment for commission of offences or not compliance.

According to the Electronic Transaction Law, the penalty will be applied in the following cases:
- Copies or otherwise obtains possession of, or recreates in bad faith, the signature creation device of another person without the authorisation of that other person;
- alters, discloses or uses the signature creation device of another person without the authorisation of that other person or in excess of lawful authorisation;
- creates, publishes, alters or otherwise uses a certificate or an electronic signature for a fraudulent or other unlawful purposes;
- mispresents a person's identity or authorisation in requesting or accepting a certificate or in requesting suspension or revocation of a certificate;
- publishes a certificate, or otherwise makes it available to anyone likely to rely on the certificate or on an electronic signature that is verifiable with reference to data such as codes, passwords, algorithms, public cryptographic keys or other data which are used for the purposes of verifying an electronic signature, listed in the certificate, if the person knows that:
▪ the Certification Service Provider listed in the certificate has not issued it;
▪ the subscriber listed in the certificate has not accepted it; or
▪ the certificate has been revoked or suspended, unless its publication is for the purpose of verifying an electronic signature created before such revocation or suspension, or giving notice of revocation or suspension.

In 2006, the law, by virtue of the legislative decree No.28 of 2008 with respect to electronic transactions, has been amended, in addition to re-conferment of the authority to the Minister in charge of transportation, to affect some changes and include further details on matters related to the assignment of domain names and IP addresses.

However, while the laws are providing basic needs on electronic transaction matter, it does not include some aspects that will prove essential as the electronic transactions flourished and especially when such kind of transactions will be offered as preferred alternatives in getting government services. It does not, for example, explicate the legal acceptability and basic regulations on electronic cash, or any other method to affect electronic payment. Neither does it specify if virtual services and/or considerations are acceptable as much as their counterparts outside the virtual world. These are but among the aspects that need to be considered to promote electronic transactions among the people and businesses.

2. Regulations on Electronic Signature

In pursuance to the provisions of the Electronic Transaction Law, two sets of Regulations on Electronic Signature had been enacted. The first set is meant to regulate the commercial entities intend to offer services

on electronic signatures. The other is meant to appoint one government organisation to act as a Certification Service Provider to provide such services to both the government sector and the public at large.

Article 6 of the Electronic Transaction Laws of year 2002 expresses legal recognition of electronic signatures.

The Electronic Transactions Laws of year 2002 in articles 16, 17 and 18 laid down high level conditions for the establishment, operation and cancellation of certification service providers. In pursuance to that two resolutions have been passed, respectively, on the conditions for establishment of certification service providers within the Kingdom and to appoint the Central Informatics Organisation[35] (CIO) to be the government body with such authority:

-         Resolution of the Minister of the Ministry of Commerce No.4 for the year 2004, on the accreditation of certification service providers and supervision of their work, and

-         Resolution of Cabinet Affair No. (68) for the year 2006, on the provide the service certificates by Central Informatics Organization

3. Government Electronic Activities

Appropriate deployment of ICT plays the important role in the success and efficiency of the government ministries/organisations. That is acknowledged as the Electronic Transaction Law includes the mandate for the relevant government organisation to set the rules and procedures regulating the government electronic activities. Another aspect that the Electronic Transaction Laws had seen necessary, as specified in article 4, is for the relevant government authority to lay down regulations governing government electronic activities by way of resolution to be issued by the minister in charge of that authority. In 2006 the Resolution of the Minister of Cabinet Affair and the President Central Informatics Organization No (2) for the year 2006, on the Public Entities' Technical Requirements to accept Dealing with Electronic Activates has been passed.

The scope of the Resolution is drawn within the provision of the Electronic Transaction Laws that gives rise to that, which includes the issues of forms, prohibition to run unauthorized programs or commands, specific conditions relating the usage of electronic signatures for official purposes, that computer system must be trustworthy, and some basic rules relating to official electronic correspondence.

While the resolution, as is, meets the requirements set out in the Electronic Transaction Laws and the objectives the laws aim to achieve, the government should consider taking further steps, such as laying down standards and policies with regard to the computer system across ministries or government institutions, setting minimum requirements as standard of computer system trust-worthiness, etc.

Within this resolution, two more resolutions have been developed. One specially designed to the deal with the Labour Market Regulatory Authority (LMRA)[36][37] and the other one is for E-government Authority[38].

B. ONLINE AND NETWORK SECURITY.

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. Since the CIO maintains the shared ICT infrastructure like the legacy systems of the Government of the Kingdom of Bahrain and the Government Data Network CIO has created an Information Security Section which is responsible for the development and implementation of Security Standards, Practices, Policies, Projects, solutions and equipments to protect the above mentioned ICT infrastructure and the service delivery channels. On the next phase CIO will implement a sophisticated Security Operation Center to cover other ministries as well.

C.   PRIVACY AND DATA PROTECTION
a. Laws addressing privacy and data protection.

Currently there are not separate laws addressing the privacy and data protection. However, there are several draft laws that have been tabled in the parliament. They are:

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[35] www.cio.gov.bh
[36] www.lmra.bh

[37] Resolution of the Minister of Labour No.73 of 2007
[38] Resolution of the Minister of Cabinet Affair No. 9 of 2009

i.   The freedom of information laws; and

ii.   The data protection laws.

iii.   The computer crimes laws. This law is criminalize certain acts where the computer is the subject of a crime (e.g. viruses, warms, trojan horses, logic bombs, denial of services attacks, hacking) and the computer is the object of a crime. The offences of this law are as follows:

- Unauthorized access: interference with data or system causing damage (include damaging, altering, rendering useless, obstructing, denying access, …etc), interference with data or system causing serious damage (e.g. health, public utilities, physical injury, medical diagnosis or tests)
- Unauthorized interception of data: threatening to cause damage to computer data or system (extortion)
- Misuses of devices (e.g. program or password) used to commit any of the computer crimes.
- The offence extends to possession, production and procuring.
- Child pornography (Why only child pornography?)
- Forgery
- Fraud

These drafts of laws have been prepared in response to some incidents that call for the attention to have the matter properly addressed by way of legislation. The draft of computer crimes laws was prepared in 2004, the draft of the freedom of information law was proposed in 2005 while the draft of the data protection laws was put forward recently to balance the effect that may come with the introduction of the freedom of information laws.

    b. Initiatives or guidelines with respect to privacy and data protection.

EMV (Europay international, Mastercard International, Visa international) Compliance: During 2009, the Central Bank of Bahrain (CBB)[39] worked with retail banks to successfully introduce EMV 'Chip and Pin' technology for all credit and debit card transactions. EMV technology provides customers with improved security when using their cards, as it combines an advanced configuration of the embedded 'smart' Chip, linked with a Personal Identification Number ("PIN") which customers are advised to use to authorize all point of sales transactions, including those at ATMs and 'customer present' merchant based transactions. In addition, the points of sales terminals throughout Bahrain have been upgraded to provide customers with the facility to use a PIN number, rather than the previous method of a card swipe supported by a signature. This security technology is considered to constitute best practice in the financial industry, and it is used in many other counties. By adopting these best practices, the reputation of the financial industry in Bahrain is further enhanced.

All banks have already introduced the new cards, and these have been distributed to customers.

D. COUNTERING MISUSE OF ICTs

By 2010, The TRA has conducted a study called "Roadmap for the Future" in order to ensure a safer online environment for the Kingdom of Bahrain.

It is recommended that:

1. Set out a Kingdom's child e-safety strategy.

2. The proposed legislative child protection framework be introduced and implemented in respect of the online luring clause.

3. Training for police officers and prosecutors should be introduced to ensure effective implementation of the new legislation.

4. The implementation of cybercrime legislation.

5. Internet Service Providers (ISPs) and TRA should play an active role in providing safety and technical advice on computer protection to adult Internet users.

6. A comprehensive internet safety training programme to be developed for both the private and public school sectors as part of the curriculum.

7. Young people should be consulted on the most appropriate and effective means of delivering the program, and on program design.

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[39] www.cbb.gov.bh

8. Schools should introduce a designated e-safety staff function to ensure that programs are delivered on a rolling basis in each school, and that outreach safety advice work is undertaken with parents.

9. Schools and NGOs should play an active role in working with parents to raise awareness about Internet safety and about the nature of young people's online behaviour.

10. A far reaching media campaign should be organised to deliver safety messages that appeal to different audiences.

The government will try to implement the above recommendation gradually.

6. ENABLING ENVIRONMENT
A. LEGAL AND REGULATORY ENVIRONMENT
1. Intellectual Property

- International Agreements

Bahrain has joined the World Trade Organization (WTO). Following its membership in the WTO and the ratification of a number of international trade agreements as follows:

- WIPO Convention, since June 1995;
- Paris Convention (Industrial Property), since October 1997;
- Berne Convention (Literary and Artistic Works), since March 1997;
- PCT (Patents), since March 2007;
- PLT (Patent Law Treaty), since December 2005;
- Madrid Protocol (Registration of Marks), since December 2005;
- Nice Agreement (International Classification of Goods and Services), since December 2005;
- TLT (Trademarks), since March 2007;
- WCT (WIPO Copyright Treaty), since December 2005;
- WPPT (WIPO Performances and Phonograms Treaty), since December 2005;
- WTO: Member and Signatory to TRIPS Agreement, since January 1995.

- Local Legislations

Government commitment towards providing 'comfortable virtual zone' is also shown by many numbers of Intellectual Property related legislation that have been enacted recently. One of the adverse effects technology has introduced is that it can be easily deployed to breach the intellectual property rights of others. The infringement can be affected effortlessly, sometime unintentionally. In order to draw the lines as to what one can and cannot do with others' intellectual property rights, these legislations[40] have been introduced:

- Law No. (14) for the year 2006 amending some provisions of Law No. (1) for the year 2004 on patents and utility models
- Law No. (16) for the year 2006 amending some provisions of Law No. (16) for the year 2004 on the Protection of Geographical Indications
- Law No. (16) for the year 2006 amending some provisions of Law No. (16) for the year 2004 on the Protection of Geographical Indications
- Law No. (12) for the year 2006 amending some provisions of Law No. (7) for the year 2003 on Trade Secrets
- Law No. (1) for the year 2004 on patents and utility models
- Decision of the Minister of Information (2) for the year 2007 on the system behavior under the financial rights of the author and owners of related rights
- Law No. (7) for the year 2003 on Trade Secrets
- Law No. (22) for the year 2006 on the protection of copyright and related rights
- Law No. (5) for the year 2006 on the designs of integrated circuits
- Law No. (11) for the year 2006 concerning the trademark
- Law No. (19) for the year 2005 approving the accession of the Kingdom of Bahrain to the Patent Law Treaty and the Regulations

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[40] Unofficial translation

- Law No. (44) for the year 2005 approving "B - C - T" on the patent system to the Gulf Cooperation Council for the Gulf States and the Regulations
- Decision of the Minister of Industry and Trade Decree No. (54) of 2006 issuing the executive regulations of Law No. (1) for the year 2004 on patents and utility models
- Law No. (16) for the year 2004 on the Protection of Geographical Indications
- Law No. (35) for the year 2005 to amend Article (5) of Law No. (7) for the year 2003 on Trade Secrets

2. Telecom and Internet regulation.

Telecom and Internet Regulation: Bahrain's embrace of full telecom liberalization was swift. On October 2002, a Telecommunication Law was issued. Thus, the TRA which was established by the Telecommunications Law Section had a full control of all the regulations and rules governing the telecommunications sector in the country. The duties of TRA include protecting the interests of subscribers and users of telecommunications services, and promoting and maintaining effective and fair competition between established operators and new entrants to the telecommunications market in the Kingdom of Bahrain.

3. Software Piracy[41]: :

According to a study conducted by the Business Software Alliance the piracy rate of the Kingdom of Bahrain has dropped to 54 per cent in 2009 from 55 per cent in 2008 due to the anti-piracy effort taken by the government and industry. The table below shows the piracy rate and the commercial value of unlicensed software for the period 2006-2009.

Table 7: Software Piracy Rate & Commercial Value of Unlicensed Software in Bahrain -2006-2009

Item	2009	2008	2007	2006
Software Piracy Rate	54%	55%	57%	60%
Commercial Value of Unlicensed Software ($M)	$21	$27	$27	$23

E. Other laws

The following table shows the availability of e-transactions, e-signature and Management of PKI

e-transactions law available	Yes
e-signature law available	Yes
Management of PKI available	Yes

B. DOMAIN NAME MANAGEMENT

According to ISO 1-3166 standard domain name code, .bh (Kingdom of Bahrain) is the two-letter country code, referred to as the " Top level Domain" (TLD), in Internet terminology, assigned to the Kingdom of Bahrain by the International Corporation of for Assigned Names & Numbers (ICANN). According to the Ministerial of Cabinet Affairs order no. (3) of 2008 registration of domain names under the ".bh" TLD is managed by the Office of the Domain Name Registration which is part of theTRA

C. STANDARDIZATION IN ICT

In 2008, TRA issued a regulation on Quality of Service. This regulation obliges all licensed operators to measure and report the quality of services provided to subscribers. The services to be measured for quality include fixed, mobile, internet and Directory Enquiries (DQ). The quality of service indicators include the number of consumer complaints (e.g. billing, faults and disconnection), the resolution time (e.g. time to

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[41] Source: 2010 Global Piracy Study, Business Software Alliance

repair) and time to answer calls e.g. DQ and fault reporting. Most of the indicators are based on the (International Telecommunication Unit) ITU recommendations.

D. ICT INVESTMENTS AND GOVERNMENT-SUPPORTED FACILITATION MEASURES

Bahrain offers low entrance costs and its underdeveloped market is rich with opportunity. The Kingdom has ratified a Free Trade Agreement with the United States of America which facilitates the exchange of technology expertise. The possibilities for long-term opportunities in outsourcing for Bahrain in niche areas of software development are rich. Within the agreement each government commits to nondiscriminatory treatment of digital products and agrees not to impose customs duties on digital products. For digital products delivered on hard media (such as a DVD or CD), customs duties will be based on the value of the media (for instance, the disc), not on the value of the movie, music or software contained on the disc. The e-commerce commitments will help establish Bahrain as a leader in the Gulf Region for the further development of electronic commerce.

7. ICT APPLICATIONS
A. E-GOVERNMENT

F. ICT in public administration
- Computerizing Customs Processing

Bahrain Customs strategy will depend upon the introduction of an efficient electronic system to handle all customs formalities. Thus, the General Directorate of Customs[42] in the Kingdom of Bahrain has started on 2007 a project to computerize their customs processing. The primary objective of this project is to automate and efficiently manage all the activities of the General Directorate of Customs relating to the inwards and outwards movement of goods in the Kingdom of Bahrain. These activities will include amongst others the collection of customs duties, inspection, consent for clearance, export, transit, duty-free zones, warehousing, temporary import, refund etc. The new system will allow traders to complete the necessary customs procedures in an efficient, cost effective and speedy manner, while allowing the customs authorities to control and manage the entire process in a transparent and effective way.

The computerized system is a fully comprehensive bilingual (Arabic/English) application available for Customs officials and related external agencies that are involved in the customs clearance process such as Shipping Agents, Ports Authorities and Operators, Ministries, Consignees, Clearing Agents, and Banks. The integration will ensure that the declarations submitted by the Consignee or the Clearing Agents can be processed anytime, anywhere much quicker than the normal manual process. Various means of making payments are planned for including interfacing with local (Bahrain-based) Payment Gateways.

Currently, the import clearing process is fully computerized in the air and sea port. The main benefit from implementing this system was the drop of the time to clear the imported items from 3days to 1 day on average.

The next step will be is that the computerized system will be implemented at the rest of the Customs Ports. The remaining functionality will be gradually introduced culminating in the integration with the external systems such as Central Informatics Organization (CIO), Ministry of Commerce & Industry, Ministry of Health, Ministry of Information and the banks. Moreover, the application will manage and handle the reconciliation of accounts and transactions between Bahrain and other GCC countries simply and efficiently.

E-government solutions including:
- *G2G (Government-to-Government)interaction between local and central governments*

The Ministry of Finance (MOF) [43]is responsible for the formulation and control of the State budget. To facilitate this control the Ministry of Finance provides Oracle E-Business Suite applications to Ministries and Government Organisations for the purpose of managing their operational, financial and budgetary affairs.

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[42] www.bahraincustoms.gov.bh

[43] www.mof.gov.bh

These applications and their associated data are collectively referred to as "CFS" (Central Financial System).

The CFS system is hosted and administered by MOF. It is accessed on-line by 32 ministries. Connectivity is achieved through the Government Data Network (GDN) which is provided by the Central Informatics Organisation (CIO). In total the system currently supports around 1,300 users in 60 locations within Bahrain. The CFS applications currently in use are:

- General Ledger (GL): Within the General Ledger each Ministry is separately identified. The budgets, expenditures and revenues for each ministry are posted to the GL either from the other applications or imported from external systems. The GL is used for on-line funds checking, thus preventing ministries from overspending their budgets. The GL operates on an accruals basis for assets, goods and services and a cash basis for manpower and revenue.
- Payables (AP): AP is used for matching Invoices with purchase orders, recording Invoices and generating payments to suppliers. The invoices are entered and approved by the ministries. The payment approval and payment are controlled centrally by MOF. Payments to suppliers are made either by an CFS generated cheque or direct credit.
- Fixed Assets (FA): FA is used by ministries for recording and managing their fixed assets. FA calculates the depreciation on assets each month and posts this to the GL along with additions, retirements and revaluations.
- Cash Management (CM): CM is used by MOF for the reconciliation of the centrally held bank accounts.
- Purchasing (PO): PO is used by all ministries for creating purchase orders for goods and services. The PO's are checked by the system to ensure that budget is available and reserves the required budget amount, i.e. creates a commitment.
- Those ministries which use Inventory (see below) also use PO for creating requisitions. Requisitions can be raised for either withdrawing stock (Internal Requisition) or procuring stock (Purchase Requisitions). Internal Requisitions are also committed against the budget.
- Inventory (INV): INV provides all the required functions for receiving, managing, issuing and warehousing stock. INV also includes powerful features for planning, cataloguing, categorizing and stocktaking. INV is tightly integrated with PO.
- Order Management (OM): OM is used with Inventory and Purchasing for translating Internal Requisitions into stock issues or back orders.
- Payroll Interface and Payments System (PIPS): The (PIPS) system is a bolt-on application developed by MOF for paying the government employees' salaries. Each month the CSB sends a payroll file electronically to MOF. The PIPS system translates this file into a series of direct credit files which are verified and then passed to the banks for crediting employees' bank accounts. PIPS also generate the necessary postings to the GL. The Government's Human Resource and Payroll systems are hosted on a separate platform under the control of the Civil Service Bureau. The payroll data is periodically interfaced to the CFS General Ledger.

- *E-procurement applications:* eTendering System[44] which is an electronic tendering solution facilitates the complete tendering process from the advertising of the requirement through to the placing of the contract. This includes the exchange of all relevant documents in electronic format. This service provided by Tender Board to provide a single interface to the government purchasing authorities, suppliers and the tender board and automates activities performed by the parties by integrating them on a single electronic network

- *E-government portal*[45]: It is a "One Stop Shop Portal" and is the key service delivery channel for

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[44] www.tenderboard.gov.bh

[45] www.bahrain.bh

individuals, business, government and visitors, which integrates and provides all types of vital services. The eGovernment Portal, available in Arabic and English, is aligned with Bahrain Strategic Vision 2030 to provide informational, interactive, and transactional services, including online payment facility and also to provide a platform for customers to give their feedback and participate in framing government policies and enhancing service delivery.

The Portal has been launched on 23rd, May, 2007, and it's being managed by the eGA as part of the Kingdom of Bahrain's national strategy to execute the comprehensive eGovernment programs. In the year 2008 after one year of the launch of eGovernment's program, eGovernment Authority conducted a study to rest a foundation for assessment of customer's satisfaction[46] and to identify their awareness and opinions towards the eGovernment services. 1,662 people of different income and education were investigated including citizens, residents, people from industrial, business and public sectors from all parts of Bahrain. The study showed that only 25% of the people knew that eGovernment provides some services online. Only 7% utilized the eGovernment services. (60%) of the respondents who did not use eGovernment services, attributed the reason to their lack of familiarity with the eGovernment Portal's address. The study demonstrated that a lot of the public were not acquainted with the eGovernment services due to difficulty of the website address (www.e.gov.bh); therefore the eGA adopted easier address for the eGovernment portal according to the public choice that is (www.bahrain.bh).

The eGovernment strategy of Bahrain has envisaged for increasing the uptake of services provided through electronic channels. There has been considerable increase in the uptake of electronic services in the Kingdom since the launch of the strategy implementation from April 2007. Currently there are 200 e-services available via 4 main channels. Some of the examples of high uptake services are provided below:

-       Identity Card (ID Card) appointment system: -. The citizens and residents who need to get a new card , renew the card or apply for a new one can book an appointment online through the national portal and go the designated issuing office at the appointment time for getting the card. This service in average is reserving 11,000 appointments per month.

-       Payment services:

c.   Payment of Electricity & Water bill: - The National portal offers a service for payment of electricity and water bills though the national portal. The portal provides the facility for payment with credit and debit cards. The total number of transactions till 2010, since the launch of the service in May 2007 has been reached to a hundred thousand. The total value of the payments has approached to USD 17 million.

d.   Payment of traffic contraventions: - The National portal offer service for payment of traffic contraventions. This is one of the key services used by the citizens. The total number of transactions till date, since the launch of the service in May 2007 is around 6,000. The total value of the payments is about USD two hundred thousand.

-       Pre-employment health check-up: Bahrain has about 40 % expatriates. Therefore the process of issuing Visa for expats is a major service in the Kingdom. As a part of visa process all expats need to have a compulsory health check up. The national portal provides an online health check up appointment facility. The service has reserved 350 paid appointments from the service got launched in November 2008 up to August 2009.

-       Graduate exam results. This service enables the intermediate and secondary graduate's students of the Government schools in the Kingdom of Bahrain to view their final results online. The total hits registered on the portal within the two days of release of the result are 60,000 of the total number of student result published. This is made available through the WAP and SMS as well.

-       Online Birth Certificate Request: The national portal provides a service on the portal to apply for birth certificate. The user needs to apply and pay online through the national portal for the issuance of a birth certificate for the new born. The system integrates the hospitals with CIO, the eGovernment and the Bahrain Post. The birth certificate would be sent by post to the user. Provision of unique national ID card is also provided along with the birth certificate. This is issued by CIO. The service has been utilized 5,208 times

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[46] The results of latest customer satisfaction survey is available on www.bahrain.bh and
http://www.ega.gov.bh/en/knowledgeresource.php

since its launch in end of May 2009 till August 2009.

- Online work visa application & processing: Bahrain has about 40 % expatriates. Therefore the process of issuing Visa for expats is a major service in the Kingdom. LMRA is the sole authority in the Kingdom administering and regulating the expats in Bahrain. LMRA has implemented an online visa processing system. The total new visa applications received between Jul 2008 and Dec 2008 was about 81,000 and visa renewal was about 45,000. More than 60% of the visa applications (~75,000) were submitted online[47].

Below is a brief summary of the main features available on the e-government portal.

Table 1: Summary of the main features of e-government portal

URL of e-government portal: www.bahrain.bh		
Information	General	Yes
	Laws	Yes
	Directories	Yes
Services	Static Info	Yes
	Downloadable Forms	Yes
	Interactive	Yes
e-payment		Yes
Online account		Yes
Bilingual		Yes
Citizen Participation	Blogs	Yes
	Polls	Yes
Additional Services	RSS	Yes
	Web Statistics	Yes
	Search	Yes
Other features		-

B. E-BUSINESS

Several banks working in Bahrain provide online banking services such as checking the account statement, transfer money between accounts, paying the credit cards, making utility payments. Below is a summary of availability of e-business laws in the Kingdom of Bahrain.

Table 2: Availability of e-Business Laws in Bahrain

Availability of e-banking services (yes/no)	No	Law number:	-
Availability of e-commerce law (yes/no)	No	Law number:	-
Availability of e-transactions law (yes/no)	Yes	Law number:	Legislative Decree No. 28 of 2002
Name other laws on e-services	-	Law number:	-

C. E-LEARNING

Bahrain has connected all of its schools with broadband Internet access as well as a radio and a television set for educational purposes. This can be attributed in part to policies pursued by the Ministry of Education aimed at enhancing and elevating the level of education in Bahrain by integrating ICTs. The King Hamad's School of the Future project, launched in 2004 to connect and link all schools in the kingdom to the Internet.

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[47] LMRA Annual Report 2008, www.lmra.org.bh

Student to computer ratio-year 2008	6
Percentage of schools with Internet access	100

Moreover, the Ministry of Education has provided e-Consultation tools. eConsultation is the process of enabling the 'consultative' interaction between the Ministry and the stakeholders using electronic media like internet, mobile, kiosks and conferencing facilities. The chosen media allows on-line interactive mechanism to debate, discuss, share and provide opinion about the government policies, new initiatives etc. The ministry is currently providing the following electronic tools for eConsultation:

Tools	URL link for accessing the tool
Blog	http://moe.gov.bh/bloga/
Users Blogs	http://www.moe.gov.bh/forum/blog.php
Chat Room	http://www.moe.gov.bh/chatting.aspx
Forum	http://www.moe.gov.bh/forum
Poll	http://www.moe.gov.bh/
Suggestions	http://www.moe.gov.bh/eServices_team.aspx
eComplaints	http://www.moe.gov.bh/user_complaints.aspx

D. E-HEALTH

The MOH in the Kingdom of Bahrain has introduced several ICT project within its ICT strategy in order to develop the health services provided to the public.

1. *Pre-Employment Health Automation Project at AlRazi Health Center*

The Pre-Employment checkup for expatriates working in Kingdom of Bahrain is performed upon their arrival to the Kingdom. The checkup aims to ensure medical fitness of expatriates to work in the country, and to detect infection diseases that may affect the community. The Pre-Employment tests are conducted according to the expatriate's nationality and occupation. Around 85% of the checkups are conducted at Al Razi Health Center and 15% at other health centers and private hospitals/clinics.

The Pre-Employment Health Check Automation Project (PREMPC) was initiated in June 2005. Two vendors were contracted to develop PREMPC application and all integrations to other applications and medical Equipments in order.

The implementation of the Pre-employment project was completed at AlRazi Health Centre in April 2007. Other health centers are integrated to the system through the web. The private clinics will be able in future, to interface MOH web site and enter the results of checkups to be approved by MOH.

The objectives of the project were mainly to:
- Reduces the time of medical checkup process.
- Raises efficiency of clerical work in data management.
- Enables accelerating issuance of checkup results.
- Use of data at the time of consultation improves patient services.
- Enables management of the progress of medical checkups.
- Reduces staff labor requirements. The time saved could be applied to improve the checkup area, assisting patients, etc., and thereby overall improvement of service.
- Provide information in case of claims for compensation for occupation- related diseases and use health checkups for health promotion.
- Increase efficiency of staff due to automation of tasks.
- Cost savings in the long run due to better control over revenue collection and automation.
- Improved image of the ministry in public view due to faster and more efficient processing.
- Avoidance of any possible claims or compensations due to missing or damaged documents.
- Less office space requirement for filing and storage.

2. *Document Management System*

One of the completed projects in the Administration Office in Health Information Directorate (HID) is the Document Management System. This project aimed to electronically archive the huge amount of paper documents in the office, which will result in reducing the number of physical documents storage and provide more security over them.

Document management gives users the tools to quickly and efficiently store, organize and retrieve document from a pool of documents.

The aims of this project are as follows:

E.   Importing, scanning, adding a notation, and exporting Documents.
F.   Provide storing documents using indexes and easy retrieve them.
G.   Centralized management for authentication, authorization and searching.
H.   The ability to support huge pools of data.
I.   Contains the OCR facility and the ability to index using it.
J.   Security over the package controlled by User ID and Password
K.   Security over the file cabinets and even the fields.

This all results in more easy, efficient, reliable and secure electronic medical record system that is follow the ICD10 classifications. In addition, it gives more control to users over their documents and their business workflow.

3. *MOH Web Site*

The MOH website provides many electronic services to the public besides the publishing of MOH services, procedures and helpful health information. The MOH website is bilingual, rich with content; it serves diverse audiences like patients, Bahrain citizens and residents, Health Professionals, Nurses, Allied Health workers, pharmacists and Health Institutions.

It has some electronic services that are very useful like checking appointments at Salmaniya Medical Complex Outpatient Clinics, Drugs Price List, Registration in the Doctors and Dentists Directory, applying for jobs and booking appointments in the MOH private clinics.

It has updated content through the news, workshops and conferences, Statistics, searching for any doctor in Bahrain and other informative content. The website has comprehensive content through its sub sites such as Health Education, Avian Flu, Haj Medical Committee websites and Licensure and Registration Office. Moreover, the website provides many services to its visitors like calculation of Body Mass Index and Delivery Date.

E. E-EMPLYMENT

By the end of 2010, the Ministry of Labour[48](MOL) has launched the National Employment Program on the e-Government portal for all unemployed job seekers. The program provides job seekers with a number of e-Services including "Unemployment Registration", "Training for Job Seekers", "Insurance for Job Seeker", and "Unemployed Job Search". The e-Services provided by MOL comes as part of its initiatives in providing better services for job seekers. It also reflects the keenness of the Ministry in enhancing the quality of services, in line with Bahrain's Vision 2030.

The objective of launching the National Employment Program is to facilitate government procedures for citizens and encourage them complete their transactions with the MOL electronically.

The "Unemployment Registration" service allows unemployed job seekers to register in the "Unemployment Job Search" which enables them to apply for vacancies the employers are offering across the Kingdom of Bahrain. The "Training for Job Seekers" allow the unemployed job seekers the opportunity to register electronically in the training programs offered at private institutions, licensed by the MOL.

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[48] www.mol.gov.bh

With regards to the service of "Insurance for Job Seeker" which entitles the job seekers for an allowance. Applicants will be informed about the progress of their requests status via emails. In addition, the service provides unemployed registered users the possibility to follow up their status of eligibility for unemployment insurance on a monthly basis besides tracking the status of any appeal. The employer services provide greater opportunities for registered employers who have vacant positions to upload the job vacancies and view the applications.

8. CULTURAL DIVERSITYAND IDENTITY, LINGUISTIC DIVERSITY AND LOCAL CONTTENT
A. USE OF ICT IN SUPPORT OF CULTURAL AND LINGUISTIC DIVERSITY

The Ministry of Information publishes the cultural magazine online and there is a facility to download even the archived sections. Furthermore, the Bahrain History and Archaeology Society organize some activities such as seminars and workshops and present some films about Bahrain cultures. Beside that, Bahrain History and Archaeology Society issue a magazine called " Delmon" which is concern on Bahraini History and culture.

B. LOCAL AND NATIONAL DIGITAL CONTENT DEVELOPMENT

Most of the government and non-government entities provide bilateral languages web sites.

C. ICT SOFTWARE, TOOLS, AND R&D PROGRAMMES IN ARABIC LANGUAGE PROCESSING

In 2009, the e-GA of Bahrain and United Nations Development Program (UNDP) signed a Project Document to support the creation of the Arab Center for e-Content Development headquartered in Bahrain. The aim of this center is to help grow Arab e-Content and expand its quality presence with an international standard, reaching out to a knowledge based Society by increasing its presence on the web relative to other languages, improving Arab online search engine capabilities, and building skills in the area of e-Government. The center will also audit the quality of e-Content and issue accredited certifications in this regard. Moreover, the center will serve both the private and public sector both locally and regionally, and is expected to play a major role in fostering a robust business environment and creating sustainable economic growth, in line with the objectives of Bahrain Economic Vision 2030.

As per the terms of the agreement, the e-Government Authority and UNDP will co-finance the creation of the center equally at a total cost of USD486,000.

By the end of 2010, the Arab e-Content Center has developed the framework and guidelines foe e-Content industry standards in Bahrain and they accompanying certification.

D. ARABIC DOMAIN NAMES

Arabic domain names (or 'Internationalized Domain Names' – IDNs) have not yet implemented in Bahrain, however the TRA has a plan on implementing the country-code top-level domain (البحرين.) within 2012.

9. MEDIA
A. MEDIA DIVERSITY, INDEPENDENCE AND PLURALISM

The Kingdom of Bahrain has made many achievements in the field of press and information media, which indicate in total the success of the reformative project and the plans of modernization and comprehensive development, guided by His Majesty King Hamad Bin Isa Al-Khalifa.

Many practical steps have been taken on the side of reinforcement and respect of rights and freedoms of information in general and freedoms of press in specific and at the front of which is the freedom of opinion and expression under the umbrella of the state of institutions and law.

The information policy of the Kingdom is incorporating the public approach of the Kingdom, through giving effect to the principles of maintaining freedoms and securing the freedom of opinion and expression, in a

frame of adherence to the axioms (National and Islamic), with the perspective of the importance of a word in the formation of public opinion and the enhancement of the values of democracy and reform, support of development efforts, defending the national view point towards all of the cases set up forth, and the reinforcement of the society cohere, through the spread of values and reinforcement of the social unity between citizens.

As an enactment of such approach, Bahraini information, with its various means, has witnessed a significant progress in the performance of its developmental and awareness mission, through the spread of the culture of law and human rights, as per the adherence to the principles of the national unity and Arabic and Islamic approach, in a manner that suits the environment of liberty and the release of the responsible freedom of opinion and expression in a way that keeps pace with the information, revolution and the advanced communication technology.

Freedom of press and expression is guaranteed in the Kingdom of Bahrain as per the principles of the national charter, which had been acknowledged on February 2001, with a contribution rate of 98.4% of Bahraini people, were it provided that "Every citizen have the right to express his opinion, by saying or writing or by any other method of expression of opinion or personal creativity" and that the "freedom of scientific research and the freedom of publication press and printing is guaranteed within the limits stated by the law". Article "23" of the amended constitution has confirmed that "freedom of opinion and scientific research are guaranteed and every human has the right to express his opinion and release it by talking, writing or else, as per the conditions and positions stated by the law, without prejudicing the bases of Islamic ideology and the unity of people and without raising differentiation or secularism.

As a result of such advance vision the ministry of culture and information[49] is practicing its role in the reinforcement of the freedom of press and the establishment of the principles of a free, democratic and responsible national information and the suggestion of information policies, planning thereof, supervising its execution and facilitating the obtainment of the information and knowledge. Such has been reflected in the actual situation of the freedom of press and information in the country, and in such respect it is referred to the following achievements:

- Firstly: the flourishing of local press:

To keep in line with the environment of political and democratic openness, the number of local newspapers has increased from only 4 local daily news papers before his Majesty the King hold power of rule in 1999, to 14 daily and weekly newspaper by the end of 2009, and they include:

- Seven Arabic daily newspapers

Akhar Al-Khaleej[50] (Gulf news) (February1976), Al-Ayam[51] (7/3/1989), Al-Wasat[52] (7/9/2002), Al-Meethaq[53] (2/5/2004), Al-Watan[54] (11/12/2005), Al-Waqat[55] (21/2/2006), Al-Bilad[56] (15/10/2008)

- Two newspapers in English language

Gulf Daily News[57] (November 1978), Bahrain Tribune[58] (3/8/1997)

- Five weekly newspapers in the two languages, Arabic and English:

AL-Ahd[59] (November 2003), Al-Naba'a (June 2008), Gulf Weekly[60] (November 2002), The weekly commercial, The economical Aswaq (8 February, 2009)

All of the above newspapers are owned by private sector.

- More than 65 weekly and monthly magazines of multiple focusing on political, cultural, social and economical interests.

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[49] www.moci.gov.bh
[50] www.akhbar-alkhaleej.com
[51] www.alayam.com
[52] www.alwasatnews.com
[53] www.almeethaq.net
[54] www.alwatannews.net
[55] www.alwaqt.com
[56] www.albiladpress.com
[57] www.gulf-daily-news.com
[58] www.bahraintribune.com
[59] www.alahdnews.com
[60] www.gulfweekly.com

- ▪ Periodical news releases of the political societies in the country (18 societies).
- Secondly: the spread of electronic press.

The Kingdom of Bahrain has witnessed the inauguration of a number of sites, forums and personal logbooks in the internet, which reflects variability and the political and cultural dynamic movement in the country. The Ministry of Information is hoping that electronic websites would play its National Information role within the frame of a responsible and professional freedom and would be keen to give effect to the charter of "sites against hates," in which signature start on 31/8/2008

- Thirdly: Modernization and development of the legislative structure in the press and publishing:

The Kingdom of Bahrain is working continuously to modernize and develop the legislative structure in the press, printing and publishing and reinforce the transparency and access of information, in a way that confirms the government adherence to the directions of the King of the country, towards the acknowledgement of a modern and enlightened law of the freedom of press. A law by decree no. 47 of year 2002 of regulating the press, printing and publishing has been issued to replace the old law issued in 1979. However, the government has referred in May 2008, to the legislative authority, genuine and positive amendments on the law of regulating the press, printing and publishing no."47" for the year 2002, the most prominent of it:

- ▪ The cancellation of the penalty of retention.
- ▪ The removal of the pre-monitoring publications.
- ▪ The regulation of the electronic press.
- ▪ The replacement of all the administrative decisions, which were in the hand of the minister of information and delegate thereof to the court.

In all cases, the ministry of culture and information undertakes to maintain freedom of press and information and keep it in conformity with the international charters and agreements, which all of them confirm the freedom of expressing the view point, provided that rights of others and their reputation is respected, and to protect the national security, public order, public health or public morals and the banning of any call for national, racial or religious hatred, which constitutes an inducement to discrimination, hostility or violence, which were openly provided by the articles (19, 20 and 21) of the International charter of the civil and political rights of the United Nations," which is joined by the Kingdom of Bahrain, and the international announcement of human rights" in its two articles 19 and 29.

- Fourthly: The provision of the professional frame to the freedom of press:

The Kingdom of Bahrain has achieved during the past years, advanced gains on the side of the professional societies concerned with defending the rights and freedoms of journalists and information's practitioners and in this regard it referred to the following:

- ▪ The establishment of the society of journalists in September 2000, which acquires the membership of the "International Union of Journalists" in December 2003.
- ▪ The declaration of "The club of foreign correspondents" at Manama in June 2005.
- ▪ The hosting of Bahrain to the headquarters of the "Gulf Press Union" in 14/5/2005.
- ▪ The hosting of Bahrain to the headquarters of "International Union for Press 2009."

B. THE MEDIA AND ITS ROLE IN THE INFORMATION SOCIETY

Media play an important role in dissemination of information in the Information Society. In Bahrain most of the public and private entities embrace the new media. Most of them develop a web site contains a lot and up to date information. Beside that, the traditional media such as radio and television has its effectiveness in information dissemination. One o the most important agencies who assist in disseminating information using both the traditional and new media is The Bahraini News Agency (BNA)[61] is an extension to the Information Affairs Authority (IAA) that was established in Riyadh 1967 by a unanimous decision of Gulf Cooperation Council's Information Ministers.

BNA was originally named Gulf News Agency. In April 1st 1978 the first official news was broadcasted

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[61] www.bna.bh

under the patronage of His Royal Highness the Prime Minister Prince Khalifa bin Salman Al Khalifa. The agency was combined with the Ministry of Information in 1985 whereas the name was adjusted to Bahrain News Agency in 2003.

Through adoption of latest technological developments and professional media publications BNA will continue to develop and fulfill the 2030 strategic vision of Bahrain. The Bahrain News Agency works in a combined mechanism through distributing local and international news in both Arabic and English languages as well as composing economic, political, cultural and social reports for BNA recipients.

And through the great effort the agency broadcasts average news ranging from 90 to 150 stories per day. A number of reporters based in several vital capitals that supply BNA with a number of reports and news articles in order to keep up with the current and rapid events.

BNA signed cooperation and news exchange agreements with a number of Arab and foreign agencies and through these agreements BNA distribute its news worldwide.

10. INTERNATIONAL AND REGIONAL COOPERATION
A. FINANCING OF ICT NETWORKS AND SERVICES

Tata and GBI both plan new submarine cable landings in Bahrain, which should increase the range of direct International transit available to domestic providers. The capacity will be increased by 300% to reach up to 20STM (2.8Gbps). As a result, the presence of these two cables is expected to reflect positively on the competition on internet prices and provide more value added services. Moreover, that will provide a backup option to prevent interruption of the internet service. This is expected to be finalized by the end of 2011.

B. INFRASTRUCTURE DEVELOPMENT PROJECTS

In November 2009, the e-Government Authority entered into two MOUs with the Strategic Council for the Global Alliance for ICT and Development (GAID), part of the United Nations Department for Economic and Social Affairs. The agreements set out the framework for the establishment of a GAID office in Bahrain, in partnership with the e-Government Authority and the creation of a number of joint programmes hosted in Bahrain including promoting e-Literacy.

C. WSIS FOLLOW-UP

In conjunction with the WSIS, TRA is going to conduct an ICT survey by mid of 2011. This survey will cover the business sectors and individuals. The main purpose of the survey is to provide comprehensive ICT indicators which is measure the ICt access and usage by individuals and ICT usage by enterprise. Thus, target number1 of WSIS targets (connect village with ICTs and establish community access points) will be meet by this survey.

D. PARTICIPATION IN INTERNET GOVERNANCE ACTIVITIES

Kingdom of Bahrain has participated in the Internet Governance Forum and ICANN.

11. BUILDING THE ICT SECTOR
A. ICT FIRMS

According to the Ministry of Industry and Commerce[62], by the end of 2010there are 567 active business entities currently operating ICT related activities[63]. The following table shows the nature of these activities.

Class[64]	Description	Number of Establishments
2211	Publishing of books, brochures and other publications	8
2212	Publishing of newspapers, journals and periodicals	14
5151	Wholesale of computers, computer peripheral equipment and software	25
5152	Wholesale of electronic and telecommunications parts and	16

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[62] www.moic.gov.bh
[63] The activities include activities on information and communication technologies and information sector.
[64] Source: ISIC rev3.1 P180-183.

	equipment	
6420	Telecommunications	255
7123	Renting of office machinery and equipment (including computers)	1
7221	Software publishing	67
7229	Other software consultancy and supply	37
7240	Database activities and online distribution of electronic content	28
7250	Maintenance and repair of office, accounting and computing machinery	25
7290	Other computer-related activities	36
9211	Motion picture and video production and distribution	47
9212	Motion picture projection	6
9213	Radio and television activities	2
Total		567

B. GOVERNMENT FACILITATION

Tamkeen [65](formerly the Labour Fund) is Bahrain's independent authority which formulates strategic and operational plans to invest in Bahraini employability. Tamkeen has introduce a Private Sector Support Programmes underpinned Tamkeen's strategy as five overarching initiatives were launched to support enterprise development and growth by focusing on Enterprise Growth Management, Finance, e-Marketplace, Business Diversification and Women Empowerment. One of the initiatives was Technical Assistance Scheme. This initiative is helping businesses in the utilisation of machinery and technology that warrants productivity improvement, 1021 enterprises were targeted in this scheme, in which by the end of 2009, 642 enterprises has benefited from such program.

In order to enhance enterprise productivity and competitiveness, Tamkeen developed this scheme, which harnesses the information technologies in enterprise operations. Private sector enterprises are enabled to take advantage of interest-free finance with the privilege of obtaining a possible discount of up to 25% on the loan's principal amount under certain conditions.

Another important programme provided by Tamkeen is the e-Marketplace, targeted 1,000 beneficiaries through its e-Tendering initiative. Aimed at enabling the private sector to make transactions over the e-Tendering system and maintained by Bahrain's Tender Board[66], the private sector is enabled to capture a larger share of government projects. Also under the e-Marketplace programme is the e-Procurement initiative spearheaded by Tamkeen that aims at creating an e-Marketplace for the purchase of goods and services of less than BD 10,000 for government entities and large enterprises, with the ultimate goal of enhancing enterprise accessibility to government purchases. In cooperation with Bahrain Petroleum Company (Bapco)[67], Tamkeen is spearheading this e-Procurement marketplace initiative which will allow small medium-sized enterprises greater access to the procurement of large and high profile companies in Bahrain.

C. CONTRIBUTION OF ICT SECTION IN THE NATIONAL ECONOMY[68]

Table 8: Contribution of Telecommunication Sector in the Gross Domestic Products (GDP) -2006-2009

	2006	2007	2008	2009[69]
Value Added of telecommunication	194.8	216.6	248.1	279.7

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[65] www.tamkeen.bh

[66] www.tenderboard.gov.bh

[67] www.bapco.com.bh

[68] The data on that section represent the telecommunication sector only.

[69] The data for 2009 are provisional

Sector –BD Million				
Growth in Value Added of telecommunication sector - %	16.1%	11.2%	14.5%	12.7%
GDP (Current Prices)-BD million	5960.26	6945.65	8328.78	7263.83
Percentage of Value Added Contribution to GDP	3.3	3.1	3.0	3.9
Telecommunication Revenue (BD million)	253	285	303	338
Telecommunication's Revenue to GDP Ratio	4.2	4.1	3.6	4.7

The table above showed that:

-     The value added of the telecommunication sector in Bahrain has grown by 12.7% in 2009[70]. Thus, the telecommunication sector contributes by 3.9 per cent out of the national GDP in current prices.

-     By the end of 2009, there were 2500employees working in telecommunication sector compared to 2469 employees in 2008[71].

-     The telecommunication sector revenue[72] has reached to BD 338 million in 2009 compare to BD303 million in 2008, which mean 11.6% growth in revenue between the 2008 and 2009. The telecommunication sector revenue to GDP ratio increased to 4.7% in 2009 compared to 3.6% in 2008.

D. R&D AND INVESTMENTS IN THE ICT SECTOR

Bahrain is undertaking a series of large-scale projects to try to establish itself as a regional hub for science and technology innovation.

Within that, it has been announced a project called @bahrain, which will consist of a technology research institute, a technology park and a 'techtainment' centre offering interactive entertainment. It will contain more than one million square metres of business, entertainment and education facilities, and promote investment in key technologies such as transport.

Furthermore, another project has been announced is the launch of a 'higher education city', a regional hub for ICT research and training, and the first Internet-based 'e-University' for Asia and the Middle East. It will host a consortium of universities from France, Germany, Italy and Sweden and accommodate 20,000–25,000 students within five years of opening. Initially it will offer four-year degrees in business studies, engineering, ICT, fine arts and humanities, and vocational training.

The regional ICT hub will be set up in cooperation with UNESCO (UN Educational, Scientific and Cultural Organisation). As well as ICT training and research in e-learning it will provide ICT support and policy consultation.

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[70] Source: National Account, 2009 Annual Report, Central Informatics Organization. www.cio.gov.bh/cio_ara/SubDetailed.aspx?subcatid=269

[71] Source: Telecommunication Market Indicators, December 2010, http://www.tra.org.bh

[72] Source: Telecommunication Market Indicators, December 2010, http://www.tra.org.bh

The e-University will include national e-learning initiatives to improve information access in the 31 member states of the Asia Cooperation Dialogue, a continent-wide forum.

12. MILLENNIUM DEVELOPMENT GOALS – MDG
A. PROGRESS TOWARD ACHIEVING THE MDG

During the past few years, Bahrain has been able to develop its perspective of the MDGs by making them more suitable to the specifics of Bahrain as a country with a high level of developments. It has also been able to make the MDGs framework part of the element of policies, interventions and activities on more than one national, regional and international level, with the Kingdom taking practical steps towards converting the MDGs from an international framework on paper to concrete practices. The below section highlight the process towards achieving the MDGs:

Goal1: Eradicate Extreme Poverty and Hunger

There is no such problem as people living in extreme poverty; the portion of living in extreme poverty is equal to zero[73] in the case of Bahrain, and the same applies to hunger.

As to the goal of achieving full and productive employment decent work for all, including women and young people, employment issues remain among priorities to Bahrain. In this respect, the unemployment rate is 4%[74] which is low. Moreover, a continuous and steady improvement was recorded in wages for Bahrainis increasing gradually from BD 424 in the second quarter of 2002 to BD 684 in the second quarter of 2010[75].

Goal 2: Achieve Universal Primary Education

Education in the Kingdom of Bahrain is compulsory. Children enrolled at either public or private school when they reach school age. The Ministry of Education provides free education for all Bahraini and non-Bahraini studying at public school for the three stages of education. Thus, the second goal of MDGs has been achieved since 2000, in which the enrollment ratio in the primary school reached to 99%[76].

Although the level of achievement for the literacy rate among the young people has been reached, in which Bahrain has witnessed a remarkable fall in the rate of adult illiteracy (15-44 years) which according to the latest report issued by UNESCO stood at 2.46%[77], which is lower than what it was in the 2001 census, 2.7%[78].

Goal3: Promot Gender Equality and empower Women

As for Bahrain, equality in education in the only indicator in this goal that has been achieved since 1996, as

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[73] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P21. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[74] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P22. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[75] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P22. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[76] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P25. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[77] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P26. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[78] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P26. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

the female-male ratio is 1 in the basic education and 1.04 in the secondary school[79]. However, the level of the progress in the indicators related to economic and political participation for women stands below the required level.

<center>*Goal 4: Reduce Child Mortality*</center>
<center>*Goal 5: Improve Maternal Health*</center>
<center>*Goal 6: Combat HIV/ AIDS, Malaria and other Diseases*</center>

Primary health care in the Kingdom of Bahrain is considered the cornerstone of health care. The Ministry of Health provides services through 22health centres which provide a set of preventive services that include all services available to mothers and children during pregnancy and post-natal. This in addition to the regular examination of children and providing the necessary immunization to them.

Regarding AIDS, statistics provided by the National AIDS Committee, show that the total number of HIV carries among Bahrainis since 1986, when the first case was discovered until the year 2008, totalled 343 cases[80]. Despite the limited cases in Bahrain, yet AIDS remains the focus of attention and follow-up by the Government.

As for malaria, not a single death recorded in Bahrain since 1995. All record cases were among expertise, are discovered during the medical examination conduct among arrival to the country, and the adopted policy in this case is to deport them. There has been no risk to malaria transmission locally since 1980, and the Government is regularly and vigilantly watching possible mosquito breeding places.

Regarding tuberculosis, the death rate due to this disease has drooped by more than two third between 1996 and 2006, from 1.5 cases per 100,000 of population to 0.3 cases. All cases discovered were given proper treatment at 100% as of 1999[81].

<center>*Goal 7: Ensure Environment Sustainability*</center>

As far as Bahrain is concerned, the portion of the people living in hoses connected to safe drinking and basic sanitation network is 100% [82]of the population and has achieved many years ago, while there is no actual problem defined as "slums" with its entailed environmental and national dimension.

The environmental challenges facing Bahrain are colossal and this makes them one of the priorities for the Government as well as for civil societies. The most important challenges are the followings:

- The population density in Bahrain is about 1500 persons per square kilometre. This population density constitutes a pressure on the limited natural resources and on the various utilities and services.

- Bahrain's topography is flat and low, and it is therefore vulnerable to the danger of large areas being submerged if the sea level rises due to climatic change.

- The economic growth pattern over the past few decades, represented in real estate expansion at the expense of all types of arable and non-arable land, at the expense of the sea and fisheries, all contribute to the main pressures on natural resources, which are made more acute by the limited size of the Kingdom as previously mentioned.

- The other economic sectors and the increase number of motor vehicles owned by residents and expatriates, which crowd the limited areas of the country.

Bahrain's experience in this field includes some successful one such as taking various precautions against the

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[79] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P29. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[80] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P34. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[81]Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P34. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

[82] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P36. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

potential rise in sea level in the future, by imposing more stringent conditions on reclamation and on projects overlooking the sea.

However, there are successful experiments particularly in the treatment of chemical waste and hospital waste and in taking various precautions against the potential rise in sea.

<div align="center">Goal 8: Develop a global partnership for development</div>

The kingdom of Bahrain is keen to establish joint co-operation with other countries in the financial and economic field, by singing a number of bilateral and collective agreements which would provide the legal framework for these relations. These agreements include, but not limited to, the agreements to encourage and protect investments, avoidance of double taxation and free trade agreements. In 2009, 13 bilateral agreements and memorandum of understanding has been signed with 8 counties on the above mentioned fields[83].

<div align="center">

B. USE OF ICT FOR ACHIEVING THE MDGs

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The Ministry of health has paid due attention to employing Information Technology to suit its strategies, particularly in the field of prevention and primary health care. The main idea is based on building an interconnected system of information to serve health services and provide electronic health services by linking all hospitals, health centers and clinics of the Ministry of Health through an integrated central health system and provide programs that care for patients and citizen's affairs.

One of the most prominent applications in this respect is the project to test expatriate workers to prevent the spread of imported diseases and the use of information system in generalizing the immunization of children and following-up on their vaccination in a timely manner. Both schemes are strongly connected to the Fourth, Fifth and Sixth MDGs related to health.

The scheme of testing expatriate workers is implemented by subjecting all immigrant workers to a compulsory health check before they arrive in the country and at all entry points. It aims to monitoring the cases of communicable diseases in particular, in addition to determining the fitness and suitability of workers to the duties for which they have been recruited. The system was implemented in mid 2006 in cooperation with Ministry of Health, Ministry of Interior and the Labour Market Authority Regulatory (LMRA). Through this co-operation the databases of the three authorities have been linked together to implement the scheme.

Towards this end, a list of medical tests have been drawn up for each category of immigrant workers to suit their type of work and the potential risks of such diseases that they may contact of transmit. The medical testing system has been linked with the system used by LMRA, in order to expedite and facilitate the setting of appointments for medical test for the worker upon arrival at Bahrain International Airport. In addition, electronic have been made to ensure confidentiality, security and the timely recording and retrieval of the information pertaining to the medical tests as needed.

As to the immunization of children, it is based on the effective and simple use of data from different sources in order to ensure the full immunization of children from age of two months until they are one year old and ensure that they are given all the immunization they need.

This is all carried out by linking the data of health centers, maternity centers, hospitals and Central Informatics Organization (CIO) by following-up all the steps right from the birth of the child until he gets all immunizations. Simply put, this is done as follows:

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[83] Source: Central Informatics Organization and UN. Review of the progress of the Millennium Development Goals in the Kingdom of Bahrain: A national Perspective, 2010. P41. http://www.undp.org.bh/Files/2010MDGProg/2010MDGBHRPROGRESS.pdf

- A pregnant woman receives health care at her local health centers, where a health file is kept for her and all ordinary health services available at the center are provided to her with likely transfer to specialized centers or hospitals, if needed.
- When the time comes, birth takes place at the hospital or at the maternity center. The birth details related to the newborn and his family are recorded, including the date of birth, the health condition of the infant, and the family residential address. This information is communicated to the CIO, which in turn adds it to its databases.
- Shortly after the birth, the family visits the CIO to register the infant and obtain registration certificates.
- The CIO notifies the local health center at the family's residential areas of the birth, its date, and the appointment for the first health visit by the infant two months after the birth.
- In case the family does not visit its local health center, and based on the information available to them, the concerned officials at the local health center contact the family to inquire about the delay and to remind it of the need to make the visit.
- In case of repeated absence, the health center sends a health worker to the family house to verify the situation and provide the immunization needed to the infant at home.
- In case of the family change its address, the concerned parties notify the new local health center of the information it needs to follow up the condition of the child at the new location.

All the process is automated, and it is done automatically. It means ensuring that health follow-up covers children and provided 100% immunization against fatal diseases.

ANNEX 1:

Core ICT Indicators

Table 1 - Indicators on ICT infrastructure and access

Core indicator		Definitions and notes	2008	2009	2010
A1	Fixed telephone lines per 100 inhabitants	*Fixed telephone lines per 100 inhabitants* is calculated by dividing the number of fixed telephone lines by the population and thenmultiplying by 100. *Fixed telephone lines* refer to telephone lines connecting a subscriber's terminal equipment to the public switched telephone network (PSTN) and which have a dedicated port on a telephone exchange. This term is synonymous with the terms"main station"and"Direct Exchange Line" (DEL) that are commonly used in telecommunication documents. It may not be the same as an access line or a subscriber. The number of ISDN channels and fixed wireless subscribers are included.	20%	20%	NA
A2	Mobile cellular telephone subscribers per 100 inhabitants	*Mobile cellular telephone subscribers per 100 inhabitants* is obtained by dividing the number of mobile cellular subscribers by the population and thenmultiplying by 100. *Mobile cellular telephone subscribers* refer to users of portable telephones subscribing to apublic mobile telephone service using cellular technology, which provides access to the PSTN. This includes analogue and digital cellular systems, including IMT-2000 (Third Generation, 3G). Post-paid and prepaid subscribers are included. Prepaid subscribers are those that have used theiraccount within a reasonable period of time. This period (e.g. 3 months) should be	130%	120%	NA

		indicated in a note. Inactive users, which refers to owners of a prepaid card that have not made or received a call within the last 3 months, should be excluded.			
A3	Fixed Internet subscribers per 100 inhabitants	*Fixed Internet subscribers per 100 inhabitants* is obtained by dividing the number of fixed Internet subscribers by the population and then multiplying by 100. *Fixed Internet subscribers* refer to the total number of Internet subscribers with fixed access, which includes dial-up and total fixed broadband subscribers: cable modem, DSL Internet subscribers, other fixed broadband and leased line Internet subscribers.	7.3%	6.8%	NA
A4	Fixed broadband Internet subscribers per 100 inhabitants	*Fixed broadband Internet subscribers per 100 inhabitants* is obtained by dividing the number of fixed broadband Internet subscribers by the population and thenmultiplying by 100. *Fixed broadband Internet subscribers* refer to users of the Internet subscribing to paid high-speed access to the public Internet (a TCP/IP connection). High speed access is defined as beingat least 256 kbit/s, in one or both directions. Fixed broadband Internet includes cable modem, DSL, fibre and other fixed broadband technology (such as satellite broadband Internet, Ethernet LANs, fixed-wireless access, Wireless Local Area Network, WiMAX etc.) Subscribers with access to data communications (including the Internet) via mobile cellular networks are excluded.	6.9%	5.6%	NA
A5	Mobile broadband subscribers per 100 inhabitants	*Mobile broadband subscribers per 100 inhabitants* is obtained by dividing the number of mobile broadband subscribers by the population and thenmultiplying by 100. *Mobile broadband subscribers* refer to subscribers to mobile cellular networks with access to data communications (e.g. the Internet) at broadband speeds (here defined as greater than or equal to 256 kbit/s in one or both directions) such as WCDMA, HSDPA, CDMA2000 1xEV-DO, CDMA 2000 1xEV-DV etc, irrespective of the device used to access the Internet (handheld computer, laptop or mobile cellular telephone etc). These services are typically referred to as 3G or 3.5G and include: -Wideband CDMA (W-CDMA), an IMT-2000 3G mobile network technology, based on CDMA that presently delivers packet-switched data transmission speeds up to 384 kbit/s and up to 2 Mbit/s when fully implemented. It is known as	1.5%	1.6%	NA

		Universal Mobile Telecommunications System (UMTS) in Europe. -High-speed Downlink Packet Access (HSDPA), an upgrade to W-CDMA to allow downlink data transmission at speeds of typically 8-10 Mbit/s. It is complemented by High-Speed Uplink Packet Access (HSUPA), which offers uplink speeds of around 5 Mbit/s. -CDMA2000 1xEV-DO (Evolution, Data Optimised), an IMT-2000 3G mobile network technology, based on CDMA that delivers packet-switched data transmission speeds of up to 4.9 Mbit/s.			
A6	International Internet bandwidth per inhabitant (bits/second/inhabitant)	*International Internet bandwidth per inhabitant* is obtained by dividing the amount of bandwidth (in bits/second) by the population. *International Internet bandwidth* refers to the capacity which backbone operators provide to carry Internet traffic. It is measured in bits per second.			
A7	Percentage of population covered by a mobile cellular telephone network	*Percentage of population covered by a mobile cellular telephone network* refers to the percentage of a country's inhabitants that live within areas served by a mobile cellular signal, irrespective of whether or not they choose to use it. Note that this measures the theoretical ability to use mobile cellular services if one has a cellular telephone and a subscription.	100%	100%	100%
A8	Fixed broadband Internet access tariffs (per month), in US$, and as a percentage of monthly *per capita* income	*Fixed broadband Internet access tariffs* are the lowest sampled cost in US$ per 100 kbit/s per month and are calculated from two different broadband prices, low and high speed monthly ISP charges. *Low speed monthly charge* refers to a typical 'entry-level' broadband lower-speed connection (download speeds of 256 – 1,024 kbit/s). *High speed monthly charge* refers to a faster and typically more expensive offer. Monthly charges do not include installation fees nor modem rentals. The l*owest sampled cost in US$ per 100 kbit/s* is the most cost-effective offer for a country based on the criterion, the 'lowest cost per100 kbit/s'. The cost per 100 kbit/s is calculated by dividing the monthly subscription charge in US$ by the theoretical download speed, and then multiplying by 100. *As a percentage of monthly per capital income* refers to the lowest sampled cost in US$ per 100 kbit/s divided by the average monthly gross national income *per capita* (World Bank, Atlas method, current US$) and expressed as a	-	-	-

		percentage. To ensure international comparability, this indicator is compiled by ITU.			
A9	Mobile cellular prepaid tariffs, in US$, and as a percentage of monthly *per capita* income	Mobile cellular prepaid tariffs are based on the methodology of the *OECD monthly low-user basket*[84] (version 2001), includes the cost of monthly mobile usage for 25 outgoing calls (on-net, off-net and to a fixed line) in predetermined ratios plus 30 SMS messages. *As a percentage of monthly per capita income* involves dividing the price of themonthly low user basket by the average monthly gross national income *per capita* of the country. To ensure international comparability, this indicator is compiled by ITU.	-	-	-
A10	Percentage of localities with public Internet access centres (PIACs) by number of inhabitants	*Percentage of localities with public Internet access centres (PIACs)* is computed by dividing the number of localities with at least one PIAC by the total number of the country's localities and then multiplying by 100. A *public Internet access centre (PIAC)* is a site, location, or centre of instruction at which Internet access is made available to the public, on a full-time or part-time basis. PIACs include telecentres,digital community centres, Internet cafés, libraries, education centres and other similar establishments, whenever they offer Internet access to the general public. All such centres should have at least one public computer for Internet access. *Localities* can refer to a country's villages, towns, cities or enumeration areas used by the national statistics office for survey purposes. Note that this indicator is used to measure the WSIS target "*to connect villages with ICTs and establish community access points*" by 2015.	-	-	-

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[84] For definition, see: http://oberon.sourceoecd.org/vl=15177325/cl=12/nw=1/rpsv/sti2007/ge11-1.htm.

Table 2 - Indicators on access to, and use of, ICT by households and individuals

Core indicator		Definitions and notes	2008	2009	2010
HH1	Proportion of households with a radio	The *proportion of households with a radio* is calculated by dividing the number of in-scope households with a radio by the total number of in-scope households. A *radio* is a device capable of receiving broadcast radio signals, using popular frequencies, such as FM, AM, LW and SW. It includes a radio set integrated in a car or an alarm clock but excludes radios integrated in a mobile phone, a digital audio player (MP3 player) or in a computer.	-	-	-
HH2	Proportion of households with a TV	The *proportion of households with a TV* is calculated by dividing the number of in-scope households with a TV by the total number of in-scope households. A *TV* (television) is a stand-alone device capable of receiving broadcast television signals, using popular access means such as over-the-air, cable and satellite. It excludes TV functionality integrated into another device, such as a computer or a mobile phone.	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
HH3	Proportion of households with telephone	The *proportion of households with a telephone*(fixed or mobile) is calculated by dividing the number of in-scope households with a telephone (fixed or mobile) by the total number of in-scope households.			
	Proportion of households with fixed telephone only	The *proportion of households with a fixed telephone only*is calculated by dividing the number of in-scope households with a fixed telephone only by the total number of in-scope households. A *fixed telephone line*refers to a telephone line connecting a customer's terminal equipment (e.g. telephone set, facsimile machine) to the public switched telephone network (PSTN) and which has a	78%	83%	
		dedicated port on a telephone exchange.This term is synonymous with the terms main station or Direct Exchange Line (DEL) that are commonly used in telecommunication documents. It may not be the same as an access line or a subscriber. The number of ISDN channels and fixed wireless subscribers is included.			
	Proportion of households with mobile cellulartelephone only	The *proportion of households with a mobile cellular telephone* only is calculated by dividing the number of in-scope households with a mobile cellular telephone only by the total number of in-scope households. A *mobile cellular telephone* refers to a portable telephone subscribing to a public mobile telephone service using cellular technology, which provides access to the PSTN. This includes analogue and digital cellular systems, as well as IMT-2000 (3G). Users of both post-paid subscriptions and pre-paid accounts are included.	-	-	-
	Proportion of households with both fixed and a mobile cellular telephone				

Core indicator		Definitions and notes	2008	2009	2010
HH4	Proportion of households with a computer	The *proportion of households with a computer* is calculated by dividing the number of in-scope households with a computer by the total number of in-scope households. A *computer refers to* a desktop or a laptop computer.It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants or TV sets.	-	-	-
HH5	Proportion of individuals who used a computer (from any location) in the last 12 months	The *proportion of individuals who used a computer* is calculated by dividing the total number of in-scope individuals who used a computer from any location in the last 12 months by the total number of in-scope individuals. A *computer refers to* a desktop or a laptop computer.It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants or TV sets.	-	-	-
HH6	Proportion of households with Internet access at home	The *proportion of households with Internet access at home* is calculated by dividing the number of in-scope households with Internet access by the total number of in-scope households. The *Internet* is a world-wide public computer network. It provides access to a number of communication services including the World Wide Web and carries email, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer−it may also be by mobile phone, PDA, games machine, digital TV etc.). Access can be via a fixed or mobile network.	-	-	-
HH7	Proportion of individuals who used the Internet (from any location) in the last 12 months	The *proportion of individuals who used the Internet*is calculated by dividing the total number of in-scope individuals who used the Internet (from any location) in the last 12 months by the total number of in-scope individuals. The *Internet* is a world-wide public computer network. It provides access to a number of communication services including the World Wide Web and carries email, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer−it may also be by mobile phone, games machine, digital TV etc.). Access can be via a fixed or mobile network.	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
HH8	Location of individual use of the Internet in the last 12 months	The proportion of individuals who used the Internet at each location can be calculated as either: the proportion of in-scope individuals or the proportion of <u>Internet users,</u> using the Internet at each location. Access to the Internet is not assumed to be only via a computer – it may also be by mobile phone, games machine, digital TV etc. Individuals should be asked about all locations of Internet use (that is, the survey question used by countries should specify multiple responses[85]). Note that, except for mobile access, the locations are associated with the equipment used e.g. a PC installed at work or at an Internet café.	-	-	-
	Home		-	-	-
	Work	Where a person's workplace is located at his/her home, thenhe/she would answer yes to the home category only.	-	-	-
	Place of education	For students. Teachers and others who work at a place of education, would report 'work' as the place of Internet use. Where a place of education is also made available as a location for general community Internet use, such use should be reported in the *Community Internet access facility* category.	-	-	-
	Another person's home	The home of a friend, relative or neighbour.	-	-	-
	Community Internet access facility	Internet use at community facilities such as public libraries, publicly provided Internet kiosks, non-commercial telecentres, digital community centres, post offices, other government agencies (such as schools); access is typically free and is available to the general public.	-	-	-
	Commercial Internet access facility	Internet use at publicly available commercial facilities such as Internet or cyber cafés, hotels, airports etc, where access is typically paid (i.e. not free of charge).	-	-	-

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[85] Some countries may ask about location of use as a series of yes/no questions, each referring to one location of use.

Core indicator		Definitions and notes	2008	2009	2010
	Any place via a mobile cellular telephone	Use of the Internet at any location via a mobile cellular telephone (including handheld devices with mobile phone functionality).	-	-	-
	Any place via *other* mobile access devices	Use of the Internet at any location via other mobile access devices, e.g. a laptop computer or handheld device that uses wireless access (at a WiFi 'hotspot') or a laptop computer connected to a mobile phone network.	-	-	-
HH9	Internet activities undertaken by individuals in the last 12 months (from any location)	The proportion of individuals who undertook each activity can be calculated as either: the proportion of in-scope individuals or the proportion of Internet users who undertook each activity. Note that these activities are restricted to private purposes and therefore exclude activities such as purchasing over the Internet undertaken as part of a person's job. Individuals should be asked about all Internet activities (that is, the question used by countries should specify multiple responses. Activities are not mutually exclusive. Access to the Internet is not assumed to be only via a computer – it may also be by mobile phone, games machine, digital TV etc.	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
	Getting informationab out goods or services		-	-	-
	Getting information related to health or health services	Includes information on injury, disease, nutrition and improving health generally.	-	-	-
	Getting information from general government organizations	*General government organizations* should be consistent with the SNA93 (2008 revision) concept of general government. According to the SNA "… the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and to engage in non-market production." (General) government organizations include central, state and local government units.	-	-	-
	Interacting with general government organizations	Includes downloading/requesting forms, completing/lodging forms on line, making on-line payments and purchasing from government organizations. Itexcludes getting information from government organizations. *General government organizations* should be consistent with the SNA93 (2008 revision) concept of general government. According to the SNA "… the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and to engage in non-market production." (General) government organizations include central, state and local government units.	-	-	-
	Sending or receiving e-mail		-	-	-
	Telephoning over the Internet/VoIP	Using Skype, iTalk, etc. Includes video calls (via webcam)	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
	Posting information or instant messaging	Posting messages or other information to chat sites, blogs, newsgroups, online discussion forums and similar; use of instant messaging.	-	-	-
	Purchasing or ordering goods or services	Refers to purchase orders placed via the Internet whether or not payment was made on line. Orders that were cancelled or not completed are excluded. Includes purchasing products, such as music, travel and accommodation bookings, etc. via the Internet.	-	-	-
	Internet banking	Includes electronic transactions with a bank for payment, transfers, etc. or for looking up account information. Excludes electronic transactions via the Internet for other types of financial services such as share purchases, financial services and insurance.	-	-	-
	Education or learning activities	Refers to formal learning activities such as study associated with school or tertiary education courses as well as distance education involving on-lineactivities. (A more narrow interpretation is likely to be less meaningful as it could include a range of activities such as using the Internet to search for information.)	-	-	-
	Playing or downloading video games or computer games	Includes file sharing games and playing games on line, either paid or free of charge.	-	-	-
	Downloading movies, images, music, watching TV or video, or listening to radio or music	Includes file sharing and using web radio or web television, either paid or free of charge.	-	-	-
	Downloading software	Includes downloading of patches and upgrades free of charge.	-	-	-
	Reading or downloading on-line newspapers or magazines, electronic books.	Includes accessing news websites, either paid or free of charge. Includes subscriptions to on-line news services.			

Core indicator		Definitions and notes	2008	2009	2010
HH1 0	Proportion of individuals with use of a mobile cellular telephone	The *proportion of individuals with use of a mobile cellular telephone* is calculated by dividing the total number of in-scope individuals with use of a mobile cellular telephone by the total number of in-scope individuals. A *mobile cellular telephone* refers to a portable telephone subscribing to a public mobile telephone service using cellular technology, which provides access to the PSTN. This includes analogue and digital cellular systems, as well as IMT-2000 (3G). Users of both post-paid subscriptions and pre-paid accounts are included. *Use of a mobile cellular telephone* does not mean that the telephone is owned or paid for by the person but should be reasonably available through work, a friend or family member, etc. It excludes occasional use, for instance, borrowing a mobile phone to make a call.	-	-	-
HH1 1	Proportion of households with access to the Internet by type of access (narrowband, broadband (fixed, mobile))	This indicator should be calculated as the proportion of in-scope households with Internet access that use each type of access service, for instance, the proportion of households with Internet access that use a broadband service as their means of access. It is expected that countries will collect data at a finer level than 'narrowband' and 'broadband'. The categories chosen by countries should allow aggregation to total narrowband and total broadband, as well as fixed and mobile broadband, as defined below. As households can use more than one type of access service, multiple responses are possible.	62%	85.9%	-

Core indicator		Definitions and notes	2008	2009	2010
	Narrowband	*Narrowband* includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and *i-mode*.	-	-	-
	Fixed broadband	*Fixed broadband* refers to technologies such DSL (Digital Subscriber Line) at speeds of at least 256kbit/s, cable modem, high speed leased lines, fibre-to-the-home, powerline, satellite, fixed wireless, Wireless Local Area Network and WiMAX.	-	-	-
	Mobile broadband	Mobile broadband access services include *Wideband CDMA* (W-CDMA), known as *Universal Mobile Telecommunications System* (UMTS) in Europe; High-speed Downlink Packet Access (HSDPA), complemented by High-Speed Uplink Packet Access (HSUPA); CDMA2000 1xEV-DO and CDMA 2000 1xEV-DV. (See A5). Access can via any device (handheld computer, laptop or mobile cellular telephone etc.).	-	-	-
HH12	Frequency of individual use of the Internet in the last 12 months (from any location)	The *frequency of individual use of the Internet* can be calculated as: either the proportion of in-scope individuals or the proportion of <u>Internet users, using</u> the Internet with each frequency. It is recommended that countries collect this information in respect of a typical period; therefore, respondents should ignore weekends (if they only use the Internet at work) and breaks from their usual routine, such as holidays. Access to the Internet is not assumed to be only via a computer – it may also be by mobile phone, games machine, digital TV etc.	-	-	-
	At least once a day	Once a working day for respondents who only (or most frequently) use the Internet from work.	-	-	-
	At least once a week but not every day			-	-
	Less than once a week		-	-	-
Reference indicator					

Core indicator		Definitions and notes	2008	2009	2010
HHR 1	Proportion of households with electricity	Electricity is not an ICT commodity, but is an important prerequisite for using many ICTs. It is therefore included in the core list as a reference indicator. Electricity access may be by a grid/mains connection, or from power generated locally (including at the dwelling). Local power includes electricity generated by a fuel-powered generator, or from renewable resources such as wind, water or solar. It excludes sole use of energy storage devices, such as batteries (though these may be used to store electricity from other sources).	100%	100%	100%

Table 3 - Indicators on use of ICT by businesses

Core indicator		Definitions and notes	2008	2009	2010
B1	Proportion of businesses using computers	The *proportion of businesses using computers* is calculated by dividing the number of in-scope businesses using computers during the 12-month reference period by the total number of in-scope businesses. A *computer* refers to a desktop or a laptop computer. It does not include equipment with some embedded computing abilities such as mobile cellular phones, personal digital assistants or TV sets.	-	-	-
B2	Proportion of persons employed routinely using computers[86]	The *proportion of persons employed routinely using computers* is calculated by dividing the number of *persons employed routinely using computers* (in all in-scope businesses) by the total number of *persons employed* (in all in-scope businesses). *Persons employed* refer to all persons working for the business, not only those working in clerical jobs. They include short-term and casual employees, contributing family workers and self-employed persons, who may be paid or unpaid.	-	-	-
B3	Proportion of businesses using the Internet	The *proportion of businesses using the Internet* is calculated by dividing the number of in-scope businesses using the Internet by the total number of in-scope businesses. The *Internet* is a world-wide public computer network. It provides access to a number of	-	-	-

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[86]Note that this indicator is not equivalent to the employment weighted indicator 'proportion of persons employed working in businesses with a computer'.

Core indicator		Definitions and notes	2008	2009	2010
		communication services including the World Wide Web and carries email, news, entertainment and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile phone, games machine, digital TV etc.). Access can be via a fixed or mobile network.			
B4	Proportion of persons employed routinely using a computer with access to the Internet[87]	The *proportion of persons employed routinely using a computer with access to the Internet* is calculated by dividing the number of *persons employed routinely using a computer with access to the Internet* (in all in-scope businesses) by the total number of *persons employed* (in all in-scope businesses).	-	-	-
B5	Proportion of businesses with a web presence	The *proportion of businesses with a web presence* is calculated by dividing the number of in-scope businesses with a web presence by the total number of in-scope businesses. A *web presence* includes a website, home page or presence on another entity's website (including a related business). It excludes inclusion in an on-line directory and any other web pages where the business does not have control over the content of the page.	-	-	-
B6	Proportion of businesses with an intranet	The *proportion of businesses with an intranet* is calculated by dividing the number of in-scope businesses with an intranet by the total number of in-scope businesses. An *intranet* refers to an internal communications network using Internet protocols and allowing communication within an organization (and to other authorized persons). It is typically set up behind a firewall to control access.	-	-	-
B7	Proportion of businesses receiving orders over the Internet	For international comparability, the *proportion of businesses receiving orders over the Internet* is most simply calculated by dividing the number of in-scope businesses receiving orders over the Internet by the total number of in-scope businesses.Alternatively, output can be presented as the proportion of in-scope businesses using the Internet. *Orders received* include orders received via the Internet whether or not payment was made on line. They include orders received via websites, specialized Internet marketplaces, extranets, EDI over the Internet, Internet-enabled mobile phones	-	-	-

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[87]Note that this indicator is not equivalent to the employment weighted indicator 'proportion of persons employed working in businesses with Internet access'.

Core indicator		Definitions and notes	2008	2009	2010
		and email. They also include orders received on behalf of other organizations – and orders received by other organizations on behalf of the business. *Orders received* exclude orders that were cancelled or not completed.			
B8	Proportion of businesses placing orders over the Internet	For international comparability, the *proportion of businesses placing orders over the Internet* is most simply calculated by dividing the number of in-scope businesses placing orders over the Internet by the total number of in-scope businesses.Alternatively, output can be presented as the proportion of in-scope businesses using the Internet. *Orders placed* include orders placed via the Internet whether or not payment was made on line. They include orders placed via websites, specialized Internet marketplaces, extranets, EDI over the Internet, Internet-enabled mobile phones and email. *Orders placed* exclude orders that were cancelled or not completed.	-	-	-
B9	Proportion of businesses using the Internet by type of access (narrowband, broadband (fixed, mobile))	This indicator should be calculated as the proportion of in-scope Internet-using businesses that use each type of access service, for instance, the proportion of Internet-using businesses that use a broadband service as their means of access. It is expected that countries will collect data at a finer level than 'narrowband' and 'broadband'. The categories chosen by countries should allow aggregation to total narrowband and total broadband, as well as fixed and mobile broadband, as defined below. As businesses can use more than one type of access service, multiple responses are possible.	-	-	-
	Narrowband	*Narrowband* includes analogue modem (dial-up via standard phone line), ISDN (Integrated Services Digital Network), DSL at speeds below 256kbit/s, and mobile phone and other forms of access with an advertised download speed of less than 256 kbit/s. Note that narrowband mobile phone access services include CDMA 1x (Release 0), GPRS, WAP and *i-mode*.	-	-	-
	Fixed broadband	Fixed broadband refers to technologies such as DSL (Digital Subscriber Line) at speeds of at least 256kbit/s, cable modem, high speed leased lines, fibre-to-the-home, powerline, satellite,	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
		fixed wireless, Wireless Local Area Network and WiMAX.			
	Mobile broadband	Mobile broadband access services include *Wideband CDMA* (W-CDMA), known as *Universal Mobile Telecommunications System* (UMTS) in Europe; High-speed Downlink Packet Access (HSDPA), complemented by High-Speed Uplink Packet Access (HSUPA); CDMA2000 1xEV-DO and CDMA 2000 1xEV-DV. Access can be via any device (mobile cellular phone, laptop, PDA, etc.)	-	-	-
B10	Proportion of businesses with a local area network (LAN)	The *proportion of businesses with a LAN* is calculated by dividing the number of in-scope businesses with a LAN by the total number of in-scope businesses. A *local area network* (LAN) refers to a network connecting computers within a localized area such as a single building, department or site; it may be wireless.	-	-	-
B11	Proportion of businesses with an extranet	The *proportion of businesses with an extranet* is calculated by dividing the number of in-scope businesses with an extranet by the total number of in-scope businesses. An *extranet* is a closed network that uses Internet protocols to securely share a business' information with suppliers, vendors, customers or other businesses partners. It can take the form of a secure extension of an Intranet that allows external users to access some parts of the business' Intranet. It can also be a private part of the business' website, where business partners can navigate after being authenticated in a login page.	-	-	-
B12	Proportion of businesses using the Internet by type of activity	The proportion of businesses that undertook each activity can be calculated as: either the proportion of in-scope businesses or the proportion of Internet-using businesses that undertook each activity. For international comparability, output is most simply presented as the proportion of in-scope businesses undertaking each activity, for instance, the proportion of businesses using the Internet for sending or receiving emails. An alternative presentation is the proportion of business Internet users undertaking each activity. The *Internet* is a world-wide public computer network. It provides access to a number of communication services including the World Wide Web and carries email, news, entertainment	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
		and data files, irrespective of the device used (not assumed to be only via a computer – it may also be by mobile phone, games machine, digital TV etc.). Access can be via a fixed or mobile network. Businesses should be asked about all Internet activities (that is, the question used by countries should specify multiple responses). Activities are not necessarily mutually exclusive.			
	Sending or receiving e-mail		-	-	-
	Telephoning over the Internet/VoIP, or using video conferencing	Using Skype, iTalk, etc. Includes video calls (via webcam)	-	-	-
	Use of instant messaging, bulletin boards		-	-	-
	Getting information about goods or services		-	-	-
	Getting information from general government organizations	*General government organizations* should be consistent with the SNA93 (2008 revision) concept of general government. According to the SNA "… the principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and to engage in non-market production." (General) government organizations include central, state and local government units.	-	-	-
	Interacting with general government organizations	Includes downloading/requesting forms, completing/lodging forms on line, making on-line payments and purchasing from, or selling to, government organizations. It excludes getting information from government organizations.	-	-	-
	Internet banking	Includes electronic transactions with a bank for payment, transfers, etc. or for looking up account information.	-	-	-
	Accessing other financial	Includes electronic transactions via the Internet for other types of financial services such as share	-	-	-

Core indicator		Definitions and notes	2008	2009	2010
	services	purchases, financial services and insurance.			
	Providing customer services	Customer services include providing on-line or emailed product catalogues or price lists, product specification or configuration on line, after sales support, and order tracking on line.	-	-	-
	Delivering products on line	Delivering products on line refers to products delivered over the Internet in digitized form, e.g. reports, software, music, videos, computer games; and on-line services, such as computer-related services, information services, travel bookings or financial services.	-	-	-
	Internal or external recruitment	Including having details of vacant positions on an intranet or website.			
	Staff training	Includes e-learning applications available on an intranet or from the WWW.			

Table 4 - Indicators on the ICT (producing) sector

Core indicator		Definitions and notes	2008	2009	2010
ICT 1	Proportion of total business sector workforce involved in the ICT sector (expressed as a percentage)	*ICT workforce* (or ICT employment) consists of those persons employed in businesses that are classified as belonging to the ICT sector. *Total business workforce* represents all persons engaged in domestic production in the business sector. In a national accounts framework, employment can be measured in terms of headcounts, jobs, full-time equivalents (FTE) or hours worked.	-	-	-
		For countries using ISIC Rev. 3/Rev 3.1 (or national equivalents), the ICT sector is defined per the OECD's 2002 definition. This can be found in Box 1 and is discussed in detail in OECD (2007).			
		For countries using ISIC Rev. 4 (or national equivalents), the ICT sector is defined per the OECD's 2007 definition. This can be found in Box 2 and is discussed in detail in OECD (2007).			
		The total business sector is defined on an activity (industry) basis per ISIC Rev. 3.1 as divisions 10−67 and 71−74. It therefore excludes: agriculture, hunting, forestry and fishing; real estate activities (because a significant proportion of the value added of the latter consists of imputed rent of owner-occupied dwellings); and, community, social and personal services (which consists mainly of non-market activities such as			

Core indicator		Definitions and notes	2008	2009	2010
		public administration, education and health services). For countries using ISIC Rev. 4, the total business sector is not so easily defined. It will most likely include the equivalent divisions 05 to 36, 41-66, 69-82 and 95. Discussions are ongoing on whether it should include some industries that were not included in the Rev. 3.1 definition of the total business sector (divisions 37-39, 90-93 and 96).[88]			
ICT 2	ICT sector share of gross value added (expressed as a percentage of total business sector gross value added).	*Gross value added* for a particular industry represents its contribution to national GDP. It is sometimes referred to as GDP by industry and is not directly measured (but is estimated in a national accounts framework). In general, it is calculated as the difference between production (gross output) and intermediate inputs (the energy, materials and services required to produce final output). See also Table 7. Definitions of the ICT and total business sector are per ICT1.	-	-	-

Table 5 – Indicators on international trade in ICT goods

Core indicator		Definitions and notes	2008	2009	2010
ICT 3	ICT goods imports as a percentage of total imports	*ICT goods* are defined per the OECD's 2003 ICT goods classification, based on the 1996 and 2002 Harmonized System classification. It can be found in UNCTAD (2007). Other concepts are per the *UN COMTRADE* database e.g. re-exports and re-imports are not netted out, and data are presented in US dollars (converted by the UN from country currencies).	2.3%	-	-
ICT 4	ICT goods exports as a percentage of total exports	*ICT goods* are defined per the OECD's 2003 ICT goods classification, based on the 1996 and 2002 Harmonized System classification. It can be found in UNCTAD (2007). Other concepts are per the *UN COMTRADE* database e.g. re-exports and re-imports are not netted out, and data are presented in US dollars (converted by the UN from country currencies).	0	0	0

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[88] See draft ISIC Rev. 4: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27.

Table 6 - Indicators on ICT in education

Core indicator		Definitions and notes	2008	2009	2010
ED1	Proportion of schools with a radio used for educational purposes (by ISCED level 1 to 3)	Schools offering **radio-based education** as a percentage of the total number of schools in the country for each ISCED level (1-3).	100%	100%	100%
ED2	Proportion of schools with a TV used for educational purposes (by ISCED level 1 to 3)	Schools offering **television-based education** as a percentage of the total number of schools in the country for each ISCED level (1-3).	100%	100%	100%
ED3	Proportion of schools with a telephone communication facility (by ISCED level 1 to 3)	Schools with telephone communication facilities as a percentage of the total number of schools in the country for each ISCED level (1-3). Note that the facility should be directly associated with the school. For instance, a mobile phone which is owned by an individual working at the school would not constitute a school *telephone communication facility*.	100%	100%	100%
ED4	Student-to-computer ratio (by ISCED level 1 to 3)	Average number of students per computer in schools that offer computer-assisted instruction (CAI) by each ISCED level (1-3).	6		
ED5	Proportion of schools with Internet access, by type (by ISCED level 1 to 3)	Schools with access to the Internet as a percentage of the total number of schools in the country for each ISCED level (1-3).	100%	100%	100%

Core indicator		Definitions and notes	2008	2009	2010
ED6	Proportion of students who have access to the Internet at school (by ISCED level 1 to 3)	Total number of students with access to the Internet in schools as percentage of the total number of students in schools offering internet-assisted instruction in a given country by each ISCED level (1-3).	-	-	-
ED7	Proportion of students enrolled by gender at the tertiary level in ICT-related fields (for ISCED levels 5 and 6)	Number of students currently admitted in ICT-related fields[89] by gender as a percentage of all students enrolled in educational institutions in a given country by gender for ISCED levels 5 and 6 (combined).	-	-	-
ED8	Proportion of ICT-qualified teachers in primary and secondary schools	Number of primary and secondary teachers who have received ICT training, expressed as a percentage of the total number of teachers at these levels of education.	-	-	-
Reference indicator					
EDR1	Proportion of schools with electricity (by ISCED level 1 to 3)[90]	Schools with electricity as a percentage of the total number of schools in the country for each ISCED level (1-3).	-	-	-

Classificatory variables:

The main classificatory variable used for the ICT in education indicators is the 1997 version of ISCED (the International Standard Classification of Education, maintained by UNESCO). ISCED recognizes several levels of education as follows:

- ISCED 1 – Primary education or first stage of basic education;
- ISCED 2 – Lower secondary or second stage of basic education;
- ISCED 3 – Upper secondary education;
- ISCED 4 – Post-secondary non tertiary education (programmes that lie between the upper-secondary and tertiary levels of education);
- ISCED 5 – First stage of tertiary education (not leading directly to an advanced research

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[89] ICT-related fields include computer science, computer engineering, information and communication technology, information systems, multimedia systems, ICT management, system support and software development, informatics, etc. These are represented by ISCED97 Fields of Study 48-Computing, together with elements of 21-Arts (audio-visual, media production and design) and 52-Engineering (electronics and automation). These fields involve substantial work in understanding the technical aspects of ICT rather than a more generic or basic use of ICT.

[90] Since electricity is not specifically an ICT commodity, but an important prerequisite for using many ICTs, it is not included in the core list, but included as a reference indicator. International studies reviewed by UIS revealed that the lack of electricity is suchasignificant barrier in many developing economies that monitoring trends of its provision is as relevant as monitoring the supply and use of ICT.

qualification); and
- ISCED 6 – Second stage of tertiary education (leading to an advanced research qualification).