National Profile of the Information Society in the Kingdom of Bahrain - 2013

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INTRODUCTION

In the twenty-first century the Kingdom of Bahrain has begun to shift its economy toward what is called the digital economy. Therefore, several efforts have been embarked up.

This report will highlight the recent efforts accrue in the information and communication technology (ICT) sector in the Kingdom of Bahrain.

1. THE ROLE OF THE GOVERNMENT AND ALL STAKEHOLDERS

A. NATIONAL INFORMATION SOCIETY POLICIES AND E-STRATEGIES

The ICT strategy in the Kingdom of Bahrain is focusing on the telecommunication sector. The vision for the telecommunications sector is to play an enhanced stimulation and enabling role in the development of Bahrain, both economically and socially. To fulfill the vision there must be investment in improved infrastructure and capabilities, the removal of remaining barriers to fully efficient supply markets, and modernization of legal and regulatory environments. Initiatives in telecommunications must be exploited in other areas of the economy through focused innovation and entrepreneurship, particularly in those areas that are most directly enabled by telecommunications, which together may comprise the Information and Communications.

Along with that vision, the government of Bahrain instigated a process of liberalization of the Telecommunications sector by means of the Telecommunications Law of 2002, together with the First National Telecommunications Plan. The Law established an independent regulatory body called the Telecommunication Regulatory Authority (TRA)[1] with a mandate to introduce and ensure competition within the sector, and to enhance and protect the interests of users of telecommunications services.

The Second National Plan set policy objectives to increase competition, investment and broadband usage, promote convergence and protect consumer interests.

By 2012, the Third National Telecommunications Plan[2]for the years 2012-2015was issued in compliance with Article 15 of the Telecommunications Law, which was promulgated by Legislative Decree No.48 of 2002.The Third National Plan is to continue the emphasis of the second National Plan but with greater investment, innovation and competition focuses.

Certain policy and strategic measures have been raised. A summary of the Third National Plan elements and policy strategic measures are provided in the table below.

TABLE 1:
SUMMARY OF THIRD NATIONAL TELECOMMUNICATIONS PLAN[3]

No.	Issue	Government Assessment	Policy and Strategic Measures
1	Mobile service disadvantages	Inability of mobile services providers to create infrastructure that complies with Long Term Evolution (LTE) standards.	1. Provide LTE under competitive conditions. 2. Review all radio spectrum that has been designated within the National Frequency Plan.

Table 1 (continued)

No.	Issue	Government Assessment	Policy and Strategic Measures

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[1] Additional information on the Telecommunication Regulatory Authority is available from www.tra.org.bh
[2] Source: http://www.tra.org.bh/EN/pdf/ThirdNationalTelecommunicationsPlanEnglish.pdf

2	International supply disadvantages	Elements of the supply process may have to be addressed to enhance the competitive position of Bahrain.	1. Supply of capacity on international connectivity links at competitive prices. 2. Establish of independent free market in the supply of international capacity and services.
3	Ultra fast broadband	Bahrain will be severely disadvantages if it too is not provided with secure ultra fast broadband fiber optic infrastructure.	1. Create a fixed national Broadband Network (NBN), providing wholesale services to licensed operators on a non-discriminatory basis. 2. Construct NBN using fibre-optic cables and associated technologies. 3. Create NBN in an economically optimum manner.
4	Internet eco-system	Eco-system is in some instance inefficient.	Identify measures that will encourage further use of Bahrain eco-system facilities, eliminate unjustified costs, barriers and ensure the enhancement of standing of Bahrain.
5	Effective competition	Ultimate advancement to a position where all relevant markets can be predominantly governed by the application of ex-post regulation, in the context of competition assurance legislation, is hampered by certain imbalance.	1. Take actions that should be supported by regulatory, institutional and legal framework. 2. Take actions which may extend to separation of business elements and units of licensees. 3. Ensure that proper economic incentives exit for investment by all suppliers in markets.
6	Sector definition and governance	The close and inter-dependent relationship between telecommunications and elements of the supply of ICT products and services, together with broadcasting.	Create a coordinated governance framework.
7	Digital security	Rising digital threat posed to Critical National Infrastructure (CNI) within the Kingdom.	1. Instate mechanisms that provide a continuous security posture review. 2. Improve regional and global collaboration in digital security. 3. Put in place the necessary early warning and outreach mechanisms of digital threats. 4. Put plans in place to response and recover from disasters which support by sufficient communication and testing processes on an ongoing basis.

Source: Bahrain, Council of Ministers (2012).Resolution No. (39) of the year 2012:promulgating the Third National Telecommunications Plan.Available from www.tra.org.bh/en/pdf/ThirdNationalTelecommunicationsPlanEnglish.pdf.

The national ICT strategy for Bahrain is summarized in table 2 below, indicating the status of the existing strategy, year of adoption and pace of implementation.

TABLE 2:
STATUS OF THE NATIONAL ICT OF BAHRAIN

ICT strategy exists	*Yes*
Year of adoption and latest update	*2012*
Government agency in charge	*Name in English: Telecommunication Regulatory authority* *Name in Arabic:* هيئة تنظيم الاتصالات
Pace of implementation	*Excellent*

Beside the Third National Telecommunication Plan, selected sectoral plans for building the information society are highlighted below:

(*a*) *E–Government Strategy[4] (2012-2016)*

In this connected world, it is imperative for citizens, businesses and society to interact seamlessly with the government, via channels that are accessible to all. With this thought in mind, the Kingdom of Bahrain developed its first e-government (eGov) strategy, covering the period of 2007-2010, with the aim to bring the government closer to its people. The strategy translated into the establishment of 4 eGov channels and more than 200 e-services. A new Economic Vision 2030 for the Kingdom of Bahrain was then launched in October 2008, striving to ensure the future economic sustainability of the Kingdom. To contribute to the realisation of this Economic Vision a new eGov strategy (2012-2016) was commissioned.

Within, a new eGov vision has been put in place which is "Achieve next generation Government excellence by delivering high quality services effectively, valuing efficiency, advocating proactive customer engagement, nurturing entrepreneurship, collaborating with all stakeholders and encouraging innovation".

Along with a new eGov mission encapsulates the new vision : "To realise the Kingdom of Bahrain eGov vision by defining and managing implementation of relevant strategies, setting and monitoring compliance to policies and standards, facilitating transformation of services and advocating incubation of next generation concepts, all in close collaboration with government entities and effective partnership with the private sector".

To meet the new eGov mission and realise its benefits, a set of key strategic objectives have been developed targeting various stakeholder groups and catering to their needs and preferences, as follow:
1. Increased society participation and engagement.
2. Increased partnerships and private sector ICT readiness.
3. Improved national e-literacy and government IT skills.
4. Heightened protection of information and user rights.
5. Higher performing, collaborative, integrated, and efficient government.
6. Comprehensive and effectively managed quality service offering.
7. Enhanced eGOV channels and user experience with increased service uptake.
8. Greater innovation and entrepreneurship

To achieve the key objectives a comprehensive Environment-Readiness-Usage (ERU) framework has been implemented which addresses the following:
1. Environment addresses country-wide factors like ICT and regulatory environments, government collaboration and social engagement to help drive customer service-oriented, efficient and effective government.
2. Readiness addresses government capabilities through its people, processes, governance and technology to deliver solid infrastructure.
3. Usage addresses not only customer-focused services but also interaction channels for better user experience.
4. To bridge the gap between the current and target states, more than 90 projects across Environment, Readiness, and Usage dimensions have been designed providing clear and measurable benefits. A sample of ERU projects with timeline outlined on table 3 below.

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[4]   Bahrain (2012), Summary: national e-government strategy 2016. Kingdom of Bahrain, 2012, Avaialble from www.ega.gov.bh/wps/wcm/connect/1f75f0004af9c3b2b84cb978e38c6a11/eGov%2BStrategy_Brochure_Eng.pdf?MOD=AJPER ES.

TABLE 3:
SAMPLE OF ERU PROJECTS WITH TIMELINE OUTLINED

ERU Projects	Timeline
Environment	
• National Broadband Agenda	2014-2016
• eLiteracy Campaign	2014-2016
• ICT Education Strategy	2014-2016
• eGov Innovation Programme	2014-2016
• eLaws and eRegulation Update	2012-2013
• Society Engagement Campaign	2012-2013
• eParticipationProgramme	2012-2013
• Gov Leadership Engagement Plan	2014-2016
• Return on eGov Investment (ReGI) Analysis	2014-2016
• Public-Private Partnership Strategy	2014-2016
• International Partnership Programme	2014-2016
• Business ICT Adoption Strategy	2014-2016
Readiness	
• Knowledge Management	2014-2016
• eGov Capabilities Management Programme	2014-2016
• eGov Change Management Programme	2014-2016
• eGov Policies & Standards	2012-2013
• IT Planning & Management Toolkit	2014-2016
• Smart PMO Toolkit	2014-2016
• Service Transformation Toolkit	2014-2016
• Entity IT Strategy	2014-2016
• Legal Case Management	2014-2016
• eProcurement*	2014-2016
• Customer Relationship Management (CRM)	2014-2016
• Special Data Infrastructure (SDI) Consolidation	2014-2016
• Document & Record Management	2012-2013
• Open Data Platform	2014-2016
• IT Shared Service Rationalisation	2014-2016
• National Data Center Consolidation	2014-2016
• Government Data Network Expansion	2014-2016
• eGov Performance Management	2014-2016
• Next Generation Mobile Platform	2014-2016
• eGov Interoperability Framework	2014-2016
• ERP Consolidation	2014-2016
• Information Security Programme	2014-2016
• ID & Access Management	2012-2013
• Government Cloud Computing Strategy	2014-2016
• Business Continuity Programme	2014-2016
• Location-Based Services Platform	2014-2016
• Internet of Things Strategy	2014-2016
• Green IT Strategy	2014-2016

Table 3(continued)

ERU Projects	Timeline
Usage	
• eGov Portal Enhancement	2012-2013
• Mobile Channel Enhancement	2014-2016
• Contact Centre Enhancement	2012-2013
• Service Kiosk Enhancement	2012-2013
• Government Service Centres	2014-2016
• Multi-Channel Management	2014-2016
• Customer Service Quality Certification Programme	2014-2016
• Service Portfolio Management	2012-2013
• Static Information Services	2014-2016
• Entity eServices Charters	2014-2016

Source:

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

PPP and MSP play an important role in the development of the Information Society. Below are two examples:

1TRA dialogue with key stakeholders

In a step to achieve transparency in TRA operations and processes, the TRA always publishes its decisions, work plan, telecommunication plans, etc for public consultation in thus creating dialogue with its stakeholders. A best practise in this regards is the ultra fast broadband issue discussed in the third national plan. The government had an open dialogue and discussion with the incumbent operator regarding the existing infrastructure in the ground and the deployment of fiber-based access network in order to avoid inefficient duplication of fixed infrastructure.To address this issuea detailed study, based on the guidelines set by the government has been done. Bahrain Telecommunication Company (Batelco)[5] and other key stakeholders were key members in this study.

2Cooperation with the private sector

1.   CISCO[6] Products Unified Purchasing Agreement: In coordination with the Central Informatics Organization (CIO)[7] and Tender Board, the eGovernment Authority supervised the CISCO Products Unified Purchasing Agreement between the Kingdom of Bahrain and CISCO. According to the agreement, the Government will enjoy a considerable discount, and make a huge saving. The government will also save the time and effort needed for running tenders and setting technical specifications, a process that lasts for 6-12 months each time. Additionally, many technical and managerial staff members are now linked to the purchasing process, and many government institutions make hundreds of such purchases annually, and therefore this agreement will save millions of Bahraini Dinars every year.

2.   The proposed solution given by Gulf Business Machines[8] (GBM) to the Bahrain Internet Exchange (BIX)[9] in building the NBN.

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[5]   Additional information on the Bahrain Telecommunication Company is available from www.batelco.com
[6]   Additional information on CISCO is available from www.cisco.com
[7]   Additional information on Central Informatics Organization is available from www.cio.gov.bh
[8]   Additional information on Gulf Business Machines is available from www.gbm4ibm.com
[9]   Additional information on Bahrain Internet Exchange is available from www.bix.bh/

C. ROLE OF NON GOVERNMENTAL ORGANIZATION

The role of non-governmental organizations (NOGs) confine is to spread the awareness of the ICT through organizing forums or training courses.

2. ICT INFRASTRUCTURE
A. MARKET STRUCTURE AND REGULATORY LANDSCAPE

By the end of 2012, the telecommunication market in Bahrain was totally competitive.

TABLE 4:
TELECOMMUNICATION MARKET STRUCTURE

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

Source:

There were 20 active operators offering national fixed service, international calls service, mobile service, internet service, lease line service and other data services. The table below shows the number of licenses for each service.

TABLE 5:
NUMBER OF ACTIVE LICENSES FOR TELECOMMUNICATION SERVICE

Service	Number of License
National fixed	10
International calls	15
Mobile	3
Internet	14
Lease Line	12
Other data service	5

Source: Telecommunication Regulatory Authority

B. PENETRATION OF ICT SERVICES

Table 6 below shows main indicators of the penetration rate for some ICT services for the years 2009-2012.

TABLE 6:
MAIN INDICATORS OF THE PENETRATION RATE FOR SOME OF ICT SERVICES FOR THE YEARS 2009-2012

Indicator	2012	2011	2010	2009
Population	1,235,000	1,195,020	1,228,543	1,178,415
Fixed Line Service				
Number of Fixed Line subscribers	261,360	248,479	227,353	237,621
Fixed Line Penetration Rate	21%	21%	19%	20%
Mobile Service				
Total Mobile Service Subscribers	2,123,903	1,693,650	1,567,745	1,401,974

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Mobile Penetration Rate	172%	142%	127%	119%
Internet Service				
Total Internet Service Subscribers	1,086,335	290,371	204,197	161,815
Internet Service Penetration Rate	88%	24%	17%	14%

Source: Telecommunication Regulatory Authority

Fixed Line
By the end of 2012, there were about 261360 fixed lines. The number of fixed line grew by 5.2 per cent between 2011 and 2012.

Mobile Telephone
At the end of 2012, there were about 2.1 million mobile subscribers in Bahrain. Thus, the penetration rate in Bahrain was 120 per cent.

Internet Service
Internet Penetration Rate:
At the end of 2012 there were about 1 million internet subscribers.

Internet Service Provider
By the end of 2012, there were 14 active internet providers.

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

1. Transit Point:

In early 2013, two fiber optic cable landing points were operational, namely- the FALCON which connects the GCC with India and Fiber Optic Gulf, which links Bahrain with the UAE and Kuwait. Two more cables are slated to come online by the end of 2013. The two new international fiber optic cables landing points will open up opportunities to obtain higher capacities and speeds for lower cost.

2. Bahrain National Broadband (BNB) Network Project:

While 2012 marked the formal start of the BNB project, the government first floated the idea of creating such a network in 2012 when the TRA noted that a NBN would be a "strategic national assets". The government announced the plan in 2012 and expects it to be developed by 2015.The NBN will involve the laying of fiber optic cabling to Bahrain homes, schools and businesses, thus providing a high-speed broadband network which will deliver flexibility, scalability and complex applications in the Kingdom.

The objectives of the NBN are as follows:
1.   Enhancing the telecom infrastructure to a great extent.
2.   Enhancing the country's broadband infrastructure in line with the national transformational plan to invest in a high speed and cost-effective broadband network that addresses the specific needs of key sectors.
3.   To reduce international internet connectivity rates for the customers.
4.   To provide high speed internet at low-cost deliver data transfer speed up to and beyond 1 gigabyte per second (Gbps) to business and 100 megabytes per second(Mbps) to residential premises.
5.   To increase the quality of the internet connection in the kingdom of Bahrain.

D. ICT CONNECTIVITY

The government of Bahrain has decided to make available, on an open access basis, free public Wi-Fi zones in all of the most vibrant locations in the Kingdom in order to improve mobile accessibility specifically and increase internet connectivity generally.

The project is community focused, created to spread the availability of free wireless Internet access in the Kingdom of Bahrain. The Bahrain Internet Exchange (BIX) will act as the direct Wi-Fi service provider, and will provide equipment, setup, and support completely free of charge. BIX expects a high degree of success based on its plan to key in on business and governmental entities with a growing need for free public Wi-Fi.

The objectives of the free public Wi-Fi zones project are:
1.   Improving mobile accessibility to internet.
2.   Increasing the number of wireless access devices at universities, libraries, hospitals, parks, other government sites, and tourist locations.
3.   Enhancing public interaction within communities through technology.

E. INTERNET INFRASTRUCTURE

Bahrain's connected to the Internet through five submarine cables namely FALCON, FLAG FALCON, FOG, GBI, TGN and one terrestrial path (King Fahd Causeway). Bahrain has three national Internet Exchange Point (IXP) Licenses as well as the use of Emirates Internet Exchange (EMIX), United Arab of Emirates Internet Exchange (UAE-IX) and Qatar Telecom Internet Exchange Point (Qtel-IXP) as a regional Internet Exchange Centres.

The incumbent national network terminated by copper or fiber plus some Other Licensed Operators (OLOs) own fiber deployments in specific areas (Nuetel)[10]. Beside those fiber based the business services delivered over fiber. The initial incumbent passive optical network (PON) deploy in green field and areas with high copper attenuation.

The broadband network infrastructure includes fixed broadband delivered over copper (xDSL), Fiber Passive Optical Network (PON) and WiMax. The WiMax covers 99 per cent of the population.
Mobile broadband is available via3G and LTE. Currently, mobile services covers 99 per cent of the population. 3G service is implemented and the 4G service is being deployed in 2013. Other means of Internet delivery includes Wi-Fi hotspots provided in malls and coffee shops. As of June 2012, the International Internet bandwidth is 21Gbps.

Preparatory work have been performed by Licensees for the adoption of Internet Protocol version 6 (IPv6). TRA hosted a Ripe IPV6 workshop in 2012 and at least twolicensees advertised IPv6 in global routing tables.

3. ACCESSIBILITY TO INFORMATION AND KNOWLEDGE

A. PUBLIC DOMAIN INFORMATION

The National Library, which was opened in 2008 at ShaikhIsa Cultural Center[11], has undertaken some initiatives in digitalizingthe library, namely:
1.   The National Library Portalis an interface that provides access to library resources and services through a single access and management point for users.
2.   Bahrain's library portal[12], launched in December 2012, links the indexes of the three largest local libraries, namely the National Library at Isa Cultural Center, the University of Bahrain (UOB) Library[13] and the Arabian Gulf University Library[14]. The Kingdom of Bahrain's Library portal includes more than 1,000,000 book titles and university theses.
3.   Database: it is available in library use only Gale Academic one file database. It's a comprehensive and up-to-date resource for academic researchers. Home to nearly 14,000 indexed journals.

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[10]   Additional information on the Nuetel is available fromwww.nue-tel.com/
[11]   Additional information on the ShaikhIsa Cultural Center is available from www.icc.gov.bh
[12]   Additional information on the Bahrain's library portal is available from www.aruc.org/bahrain.aspx/
[13]   Additional information on the University of Bahrain Library is available from www.ac-knowledge.net/
[14]   Additional information on the Arabian Gulf University Library is available from www.agu.edu.bh/library/Default.aspx

4.   E-Merifa Database[15]: the National Library e-portal has been integrated with the E-Merifa database.

In addition the Kingdom of Bahrain is planning the Royal Digital Library. It will be the first national digital library in Bahrain with the objective to bridge the gap of digital information in Bahrain. It will also provide necessary information for citizens and the community of researchers, banking on the prowess of modern technology. The library will be connected with other digital libraries throughout the world so that it will reduce costs and save time for Bahraini researchers.

B. ACCESS TO INFORMATION AND PUBLIC INFORMATION

The Open Data Platform (www.data.gov.bh) is an important initiative by the eGovernment Authority launchedin May 2011. The primary objectives of the Data Platform are to publish datasets from ministries and government agencies in easily manipulative formats, such as spreadsheets, and make this data available to the public. The data will be published along with guidelines, terms and conditions. Channels of eParticipation are enabled to receive constructive feedback on the platform along with ideas on how the data can be used. Four critical areas have been identified as keys needed for a successfulOpen Data Platform, these areas are:
1.   The availability of the data
2.   The credibility of the data
3.   Innovative and creative ideas
4.   The application of the data

C. MULTI-PURPOSE COMMUNITY PUBLIC ACCESS POINTS

Most of the community public access points in the Kingdom of Bahrain are structured on public libraries. Each public library has equipped with computers connected to Internet.

4. ICT CAPACITY BUILDING

A. ICT IN EDUCATION AND TRAINING

The Kingdom of Bahrain has paid great attention to people that require special needs education. Thus the people with special needs like visual disabilities, hearing impairment, motor disabilities, and simple mental retardation have been integrated in all stages of education at normal school. Several ICT forms and methods have been used at the schools affiliated with the Ministry of Education (MoE)[16] as follows:
• Spokesman computers for the blind.
• Educational television for people with visual disabilities.
• Educational computers for people with visual disabilities and simple mental retardation.

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

The Women Technology Enablement initiative was launched in 2010 by the Bahrain Women Union[17] in cooperation with Microsoft[18] and Tamkeen.[19] The latter was established in August 2006 as part of Bahrain's national reform initiatives and the Bahrain Economic Vision 2030. It is tasked with supporting Bahrain's

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[15]   Additional information on the e-Merifa database is available from www.e-marefa.net
[16]   Additional information on the Ministry of Education is available from www.moe.bh
[17]   Additional information on the Bahrain Women Union is available from www.bahwu.com/
[18]   Additional information on the Microsoft is available from www.microsoft.com
[19]   Additional information on Tamkeen is available from www.lf.bh/en/

private sector and positioning it as the key driver of economic development. The initiative offers class-based or e-learning training opportunities for development of basic ICT literacy skills as well as interpersonal skills, thus opening doors for them to find suitable employment. By the end of 2012 over 1,069 women[20]will have benefited from this programme.

5. BUILDING CONFIDENCE AND SECURITY IN THE USE OF ICTS

A. USE OF ELECTRONIC TRANSACTIONS AND DOCUMENTS

In 2006 CIO initiated the Public Key infrastructure (PKI) program to provide digital certificate services to the Bahraini citizens and residents via the Bahrain identification (ID) smartcard. In realizing the potential of PKI in e-government environment, the CIO has plans to implement PKI not only as a service to the citizens or residents of Bahrain but also to government agencies and the private sector. The next milestone was in 2007 which is the establishment of a National Certification Authority (CA) Data Center, where it can secure all root certificates signing and encryption keys, and it also saves the login to the Certificate Authority (CA) system, Registration Authority (RA), and the keys archive and repository based onsets of policiesand procedures.

In the middle of 2010 the Registration Authority (RA) system was set-up for the CA, which allowed got the full complement of digital certificate lifecycle services, such as issuing, revoking, archiving and suspension. Digital certificates can be issued for the end user, enabling the user to benefit from technology through the use of electronic signatures and added security from smartcard authentication. Also on the legal side the law on E-signature has been establishing as stated in legislative decree no.28 of 2002 for electronic transactions and legislative decree no.68 of 2006.

By using Bahrain ID smartcard with PKI:
    1.   Citizens and residents have secure email, secure login to websites, and digital signing of documents.
    2.   Government has secure email, secure login to workstations, secure login to websites, digital signing of documents and contracts, secure websites, virtual private network (VPN), and reduced operational costs related to paper printing, filing, faxing.

B. ONLINE AND NETWORK SECURITY

The computer emergency response team (CERT) has been created as part of CIO to be a government center for emergencies and disasters. In April 2013, CIO announced the preparation of a "National Plan for Integrated Electronic Strategy" to address cyber security in Bahrain. The plan aims to address and develop aspects of security in a holistic manner in Bahrain. Initiatives will be undertaken to develop regulations, policies and procedures necessary for updated and modern security systems to raise the level of protection for information in government IT networks and websites.

CIO has also started "The Security Level Assessment of e-Government Services & Websites" project. The project aims to manage information security risks to mitigate the impact of security threats, identify security vulnerabilities that may pose threats to user information, and fix security breaches to alleviate risks. In this project, all the e-Government websites are scanned with various security checking tools and programmes. This helps raise the level of information security for these websites, maintain their confidentiality, and protect them from hacking. It also provides them with the best software for fixing security vulnerabilities.

C. PRIVACY AND DATA PROTECTION

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[20]   Tamkeen (2012),*Annual report 2012*. Manama, Kingdom of Bahrain Available from www.tamkeen.bh/en/?p=Annual-Report-Finance.

1. Laws addressing privacy and data protection
Currently there aren't any separate laws addressing privacy and data protection. The following are draft laws tabled in parliament:
- The freedom of information laws; and
- The data protection laws.

Moreover, in March 2013 the parliament approved a new law, presented by the government, on protecting of state information and documents, which give slegal criminal protection to information and documentation of the State.

2. Initiatives with respect to privacy and data protection
The government of Bahrain launched the National Authentication Framework (NAF) initiative in 2011, in order to allow users to access a wide range of eServices, governmental and non-governmental systems, via a single digital identity that allows them to browse and access all available services.

The project objectives include:
- Reducing government expenditure by connecting all governmental entities through a single electronic source - the National Authentication Framework (NAF).
- Simplifying government services for citizens and residents, and saving them time and money. The NAF will provide each user an account on the eGovernment Portal to receive all eServices directly and quickly without the need for searching or entering information every time, especially since the number of eServices has considerably risen.
- The project provides users with all the information needed, such as details of last transactions made and recent eServices viewed. The system also suggests to the user other eServices that might be useful.
- The project also maintains high levels of confidentiality and security for privacy of the user.

The NAF project has a high level of internet security for user identity. It follows two out of three authentication measures. These are password and finger print identification for users, which prevent unauthorized users from accessing others' information. The first stage of the project will include eGovernment services only. In the next stage the system will be used to deliver services offered by private institutions such as Banks and Financial corporations. This will ensure that the user can locate all the eservices at a central hub.

Therefore, in April 2012, Bahrain launched the "eKey system" for providing secure access to citizens on government e-service sites under the National Authentication Framework project. The eKey system aims to offer Bahrainis more efficient and secure government services. Citizens can log in with a single authentication profile to all government e-service sites. The system requires three levels of security: password (PIN), smartcard and biometric (fingerprint) identity verification for maximum security.

D. COUNTERING MISUSE OF ICTS

1. Law addressing cybercrime
The draft law on computer crime has been tabled in parliament. However, cybercrime is explained through 27 hypertext of the decree No (28) of the year 2002 concerning electronic transactions. The electronic transaction law explains in detail the power of inspection, penalties for electronic crimes and finally the responsibility of the legal person. Furthermore, law No (58) for the year 2006, concerning the protection of society from acts of terror, explains the attacking the processing system for information and data, and applying the same penalty appears on decree No. (15) of the year 1976 concerning on organizing the penalty.

6. ENABLING ENVIRONMENT

A. LEGAL AND REGULATORY ENVIRONMENT

1. Intellectual Property

Bahrain does have laws pertaining to the protection of patents, trademarks and copyright. Bahrain has joined the Berne Convention for the Protection of Literary and Artistic Works, the Paris Convention for the Protection of Industrial Property, and the Madrid Agreement regarding the International Registration of Marks. The country's intellectual property legislation includes the Copyright Law of 1993 and the Patent, Design and Trademark Law of 1995.

(a) Patents
Patents, trademarks and designs are protected in Bahrain by virtue of the Patent, Design and Trademark Law of 1995, which is periodically amended. Protection is based on registration at the Patents and Trademarks Registration Office. The validity of a patent registration is fifteen years only.

(b) Designs
The validity of a design registration in Bahrain is five years, renewable for two further terms of five years each.

(c) Trademarks
According to the Patent, Design and Trademark Law, a trademark registration is valid for ten years from the date of filing the application. Thereafter, a trademark registration is renewable for periods of ten years each. Trademarks are defined as everything that takes a distinctive form such as names, words, signatures, characters, number, drawings, etc., if used in distinguishing products, goods or services.

Trademark rights are acquired by registration; however, a trademark application can be opposed successfully upon producing sufficient proof of the prior use of the mark in Bahrain and elsewhere around the world. Marks which are not renewed will be canceled by the Commercial Registry. Unlawfully registered marks may be canceled by a court.

Once a trademark application is filed, the trademark is examined as to its registerability. Trademark applications accepted by the Registrar are published in the Official Gazette. There is a sixty-day period open for filing an opposition by any interested party. An opposition to the registration of a trademark should be prosecuted before the Registrar by an authorized agent or the proprietors themselves within the prescribed period as from the date of publication. Such an opposition case is settled by the Registrar. In the absence of opposition, a published trademark is registered, and the certificate of registration is issued.

Use of trademarks in Bahrain is neither compulsory for filing applications for registration nor for maintaining trademark registrations in force. But a trademark is subject to cancellation and may be canceled by any party who can establish that the trademark was not actually used during the five years immediately preceding the application for cancellation or that there was no bona fide intention of using the trademark on the goods in respect of which the trademark was registered.

(d) Copyright
The Copyright Law was introduced to Bahrain's legislative system in 1993. The Copyright Law protects authors of intellectual property such as books, paintings, photographs, cinematographic, radio and television works and personally created computer software and databases and was enacted in order to combat pirating of videotapes, audiotapes, artistic work and computer software.

Ministerial Order 4 of 1993 established a Copyright Protection Office in the Ministry of Information. The Copyright Protection Office examines applications for copyright protection, accepts the deposit of works after payment of fees, and registers the transfer of copyrights. The Office is also responsible for examining international copyright agreements and implementing those which Bahrain has executed.

The Copyright Law applies to: (1) the works of Bahraini authors which are published for the first time, whether in or outside of Bahrain; (2) works of foreign authors that are published for the first time in Bahrain; and (3) works of Arab authors who are nationals of a Member State that has ratified the Arab Copyright Protection Agreement of 1958 and whose work is published for the first time in a Member State.

In general copyright is upheld for fifty years after the death of the author or, in the event of jointly owned intellectual property, fifty years after the death of the last surviving author.In the case of other materials it is fifty calendar years after the date of publication: (1) films, photographs and applied art; (2) works published under a pseudonym; (3) works which belong to a corporate entity; and (4) works first published after the author's death.

In the case of computer software, the copyright protection will lapse either fifty years after the completion of the work or forty years from the date of publication, whichever is earlier.

2. Cyber Legislation
The following cyber legislation is available in Bahrain:
- E-transactions law
- Management of PKI
- E-signature law

B. DOMAIN NAME MANAGEMENT

Batelco was the provider of the registry service. However, the Ministerial of Cabinet Affairs order no. (3) of 2008, added the responsibility of organizing the registration and management of .bh country code Top-Level Domains (ccTLD) to TRA to manage it as a national resource via the establishment of a Domain Name Registration Office (DNRO). By 2013, the TRA established an office under the Authority to manage the .bh domain space.

TABLE 7:
SUMMARY OF THE CCTLDMANAGMENT

Name of ccTLD registrar	*Name in English:.bh*
	Name in Arabic:البحرين.
URL of registrar	*(http://www.tra.org.bh)*

TABLE 8:
TOTAL NUMBER OF CCTLD REGISTERED IN BAHRAIN
FOR THE YEARS 2008, 2009, 2010, 2011, 2012.

Year	Total Number of ccTLD registered
2008	371
2009	666
2010	1077
2011	1334
2012	1542

Source:

C. STANDARDIZATION IN ICT

The Enterprise Architecture Project (EA) is aneGovernment project introduced in2009. It prevents duplication of efforts in the implementation of eGovernment projects, increases the efficiency of technology architectures and their contribution to maintain efficient exchange of information among government entities

and reduces prolonged time wasted in various government transactions and procedures.

The project objectives are:
- To standardize processes among government entities in the implementation of ICT projects
- To create integrated ICT infrastructures and databases that connects all government ministries and entities under one umbrella that delivers eServices
- To improve the quality and efficiency of eServices and avail them through the four different service delivery channels: eGovernment Portal, Mobile Gateway, National Call Centre, etc
- To reduce the total cost of implementing ICT projects
- To establish a common vision for the improvement of eGovernment performance through enhancing administrative procedures in all ministries, and finding new, easy ways of delivering eServices in a more simplified approach that saves time, shortens procedures, and ultimately reduces bureaucracy.

Due to the large scale and complexity of the project, it has been implemented in two main stages. The first stage covered the "AS IS" status of electronic projects in all government entities in Bahrain, while the second stage will focus on "TO BE" processes to restructure these projects in order to come up with suitable solutions. It covers application architecture, security and privacy architecture, data architecture, process architecture and technology architecture.

This vital project comprises the road map for all the measures to be taken to prepare all government ministries and entities in the Kingdom of Bahrain to keep pace with the rapid advancements in ICT.
EA standards and guidelines will enable the information systems and applications of the ministries of the Kingdom of Bahrain to achieve an effective and prudent interoperability and information exchange. These standards and guidelines will also enable the Ministries to embrace and adopt open and widely supported technical standards thus facilitating reduction in the total cost of ownership of information systems and applications.

Some of the EA standards used and applied are:
- Application:Hypertext Transfer, File Transfer, Web Service Delivery, Web Service Description, Web Service Request Registry, Web Service Interoperability, Web Service Business Repository, Client Side Scripting, Mobile Device Internet Access, Hypertext Interchange, Portlet Standards, and Real-time messaging services.
- Collaboration and Productivity: E- Mail Transport, IP Telephony, Mail, SMTP, MIME, H.323, SIP, IMAP, and POP3.
- Data: DBMS, Character Set and Encoding, Data Exchange Formats, Data Exchange between Information Systems, Data Exchange Transport Technologies, Database Connectivity and Access Technologies.
- Enterprise IT Management: Management Protocols, Monitoring and Protocol Access, and IT Service Management.
- Network: LAN/WAN internetworking, Network Transport, Wireless LAN, Network AAA, WAN, and Network Services.
- Platform: Operating Systems, Domain Name Services, Directory Services, and Web Browsers.
- Security: IP Security, Transport Security, Encapsulation security, Timestamp token, Secure Shell, Email Security, Web Services Security, Encryption, XML Security, Certificate Security, and VPN.

The EA Standards are divided in to:
- Website Standards and Guidelines: May 2012 approval
On May 2012, Supreme Council of Information and Communication Technology (SCICT), the authority in charge of ICT in public administration in Bahrain, approved a set of website standards and guidelines developed to meet the need for coherence in technical, design and navigation across all government websites. The website standards encapsulate all of the facets of Website Life Cycle (WLC) and attempt to map best practices and standards in order to facilitate consistent websites across the ministries. The primary objective of these guidelines is to ensure that Bahrain Government websites, at any level, are citizen centric and visitor friendly.

Compliance to these guidelines will ensure a high degree of consistency and uniformity in the content design, development, coverage and presentation, and further promote excellence in Government Web space of Kingdom of Bahrain.

- eServices Standards

eServices Standards are language-specific programming rules that greatly reduce the probability of introducing errors during the service development life cycle. These standards originate from the intensive study of industry experts who analyzed how bugs were generated when code was written and correlated these bugs to specific coding practices. Thus standards and guidelines offer incredible value to software/service development authorities in Kingdom of Bahrain to deliver high quality services in a manner that is cost effective and efficient.

D. ICT INVESTMENTS AND GOVERNMENT-SUPPORTED FACILITATION MEASURES

One of the government incentives to attract more investment in ICT is industrial land at Bahrain International Investment Park(BIIP)[21]offering affordable prices, 100 per cent foreign ownership, 0 per cent corporate tax (with a 10 year guarantee), exemption from import duties on raw materials and equipment, duty free access to all GCC markets (unlike Free Zones in the region), free trade access to USA, 100 per cent repatriation of capital, no recruitment restrictions, and no minimum capital is required. Siemens[22], Matrikon[23], Gulf Electronic Management System (GEMS)[24] are some of ICT companies operated there.

7. ICT APPLICATIONS

A. E-GOVERNMENT

Governments around the world are leveraging advances in Information and Communication Technologies (ICT) to enhance their service delivery mechanism so as to improve citizen satisfaction towards government.

The Kingdom of Bahrain appreciates the importance of eGovernment and has therefore, set-up SCICTand the eGovernment Authority to provide direction and decision to the developmentand implementation ofa comprehensive eGovernment strategy.The eGovernment programme, since its inception in May 2007, has achieved many milestones of success.

TABLE 9:
SUMMARY OF E-GOVERNMENT SERVICES

Name of Authority in Charge of ICT in Public Administrations	*English Name:Supreme Council of Information and Communication Technology (SCICT)* *Arabic Name:* اللجنة العليا لتقنية المعلومات والاتصالات *URL: -*
Name of e-Government authority	*English Name:eGovernment Authority* *Arabic Name:* هيئة تنظيم الحكومة الالكترونية *URL: www.ega.gov.bh*
Number of implemented government e-services	*285 (260 active, 5 seasonal,20 inactive)*
Number of planned government e-services	*40 services each year during the period 2012-2016*

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[21]   More information is available from www.biip.com.bh/
[22]   More information is available from www.siemens.com
[23]   More information is available from www.matrikon.com
[24]   More information is available from www.gemstpa.com

Below are the most recent and important initiatives and achievements classified by the sector they serve:

- G2G (Government-to-Government)
  E-Office Project (Zajel): Zajel initiative was launched on 2012 to benefit all government ministries and entities by creating a digital correspondence platform to link them to improve the workflow processes and activate communication channels while enhancing security, privacy, speed and efficiency of correspondence.

  Some of Zajel's objectives include:
  - o To improve automation of information exchange among national entities by networking them electronically through Zajel
  - o To provide a simplified and integrated interface
  - o To provide a secure email environment, as Zajel contains several layers of protection that ensure the confidentiality of correspondence according to user groups and nature of documents sent
  - o To make it possible to send/receive correspondence in real time, save information, and search it through advanced archiving systems
  - o To make it possible to receive notifications of process progress and/or delays
  - o Increase efficiency of work processes
  - o Reduce administrative costs and paperwork

  The first stage of the project comprises automating correspondence between the legislative authorities (Shura& Representatives Council), and the executive authority in the Kingdom, which will increase efficiency of communication among these authorities. Automation of documentation between the legislative and executive authorities will increase the speed of implementing projects and follow-ups between them. This highlights the strategic priority given by the government to this aspect, despite the fact that documentation cycle between the legislative and executive authorities is seen as one of the most difficult processes to streamline considering the number of entities involved. Automation will make it easier to add more processes in the future, to be introduced in the second stage.

  In its first stage, the system will cover nine entities – The Royal Court, the Court of His Royal Highness the Prime Minister, the Office of Deputy Prime Minister, Ministry of Cabinet Affairs, Ministry of Shura& Representative Councils Affairs, Legislation & Legal Jurisprudence Authority, Shura Council and Representative Council.

- G2B (Government-to-Business)
  E-Investor Project: The e-Investor project provides an integrated system for eGovernment services related to commercial registration and licensing in Bahrain. Additionally, it supports the efforts of the Ministry of Industry and Commerce in developing services of the Bahrain Investors Centre (BIC) as a single hub for providing best investor-related services in coordination with all competent government entities.

  The programme objectives include:
  - o Improving the investment systems and procedures of business start-ups
  - o Improving the coordination and partnership between public and private sector in this field to ensure delivery of high-quality service for all investors
  - o Creating an integrated database that contains all requirements, regulations and information related to commercial registration and licensing. This includes rules and regulations of foreign and local investment as well as commercial registration and the issuance of approvals and licenses from all government entities

By 2012, the implementation of this project was started by establishing a government committee includes Ministry of Industry & Commerce[25], eGovernment Authority, Bahrain Economic Development Board[26], and a number of key partners. The committee oversee the strategy implementation of the project. Moreover, a technical committee was created to manage daily operations of the project. Additionally, a consultancy firm for the project was appointed, a field survey by experts was conducted for all types of commercial registers, and a technical evaluation process started to assess all eSystems, and the procedures for 15 types of licenses were re-engineered in different government entities (Ministry of Industry & Commerce, Municipalities, Health, Environment, Civil Defence, etc.).

In order to deliver government services a National Gateway Infrastructure has been developed. The national Gateway Infrastructure is a unified electronic platform that facilitates electronic integration of government systems according to consistent standards and policies to improve eServices delivery so that each government entity can utilise any service offered by another entity.

Some of the goals that this programme tries to achieve are:
- To launch and improve eServices in record times by linking the electronic systems and applications of all government entities
- To provide integrated eGovernment services offered by government ministries and entities through a single platform to citizens, residents, public/private sectors and visitors. This is achieved through structuring of the systems of four communication channels (eGovernment Portal, Mobile Portal, eService Centres&eKiosks and the National Call Centre), keeping in mind that these channels differ in the number or nature of eServices offered through each channel

The eGovernment Authority commenced a strategic plan to offer integrated eServices from all government ministries and agencies to customers, by adopting service-specific design guidelines that suit their operational requirements with the strategic objectives of the eGovernment. In the framework of this strategy, 285 eServices(260 active, 5 seasonal, 20 inactive) provided by more than 26 government ministries and entities are now available through the eGovernment Portal and55 eServices through the Mobile Gateway. Additionally these eServices are available through 15 centers and 35 eKiosks.

The portal is the integrated point for all government services, the availability of services on eGovernment portal are indicated in table 10.

TABLE 10:
AVAILABILITY OF SERVICES ON E-GOVERNMENT PORTAL

URL of e-government portal:*(http://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		*Ar/En*
Citizen Participation	Blogs	*yes*
	Polls	*Yes*

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[25]http://www.moic.gov.bh
[26]http://www.bahrainedb.com

Social Media	Facebook	*Yes*
	Twitter	*Yes*
	LinkedIn	*Yes*
	YouTube	*Yes*
	Other	*Instagram,*
Additional Services	RSS	*Yes*
	Web Statistics	*Yes*
	Search	*Yes*
Mobile version	Support for smartphone/tablet	*Yes*
	Dedicated App (iOS or Android based)	*yes/*
Other features	Newsletter of e-government program, customer charter	

By the end of August 2013,
- Total number of visits to the eGovernment Portal, since its creation on May 2007, reached 6,154,817 visits.
- A total number of 804,957financial transactions were conducted via the portal since its creation
- The total value of financial transactions, since portal creation, reached 55,561,793 BD.

B. E-BUSINESS

As part of the Central Bank of Bahrain (CBB)[27]vision to replace the paper based Automated Cheque Clearing System, the Bahrain Cheque Truncation System (BCTS) commenced its operations in cooperation with the BENEFIT Company (BENEFIT)[28] on 13th May, 2012. BCTS is an electronic system of exchanging cheques between the banks. The BCTS scans the cheque and transforms it into an electronic image that is used to be exchanged between banks rather than the physical cheque will be transmitted to the BCTS Clearing House. Therefore, implementing BCTS has a significant change compared to the previous cheque clearing processes at the banks. It seeks to reduce banks cost and effort, lead to faster cash flow were banks receive the floats of their deposit cheques within one business day rather than 2 or 3, which elevate the quality of bank customer service and finally protect the bank from many risks such as loss or damage of the cheque.

C. E-LEARNING

1. Primary and Secondary School
The Ministry of Education[29](MoE) in Bahrain looks forward to utilizing ICT in learning and teaching processes. This provides the educational foundation to support new generations of students with the necessary competencies, behaviors and highly developed skills which can help to transform the kingdom of Bahrain into a knowledge-based economy.

To achieve this goal, by 2012 the MoE introduced a comprehensive learning management system (LMS)[30] encompassed in the e-learning portal which is part of the King Hamad's Schools of the Future Project which was launched in 2004. This LMS is expected to have a positive effect on the academic performance of students, by providing a modern learning environment supported by modern technologies. This will also provide the students with better skills of research, dialogue and competition through modern technology that will enable the students to update their knowledge and skills upon local and international standards.

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[27]http://www.cbb.gov.bh/
[28]http://www.benefitco.com.bh/
[29]http://www.moe.gov.bh/en/
[30]http://eteacher.edunet.bh/

This qualitative transformation requires a comprehensive development in curricula in a graded approach in addition to training teachers on the use of the learning management system.This project will provide a suitable environment for all stakeholders to communicate and interact with each other anytime anywhere.

It is considered to be a model solution for direct and distance e-learning, due to the fact of its capability of covering a large number of users at a time. This will transform the traditional restricted environment to an open interactive environment. This is likely to aid students ininteracting with e-lessons in an audio/video format, in addition to providing live simulations of experiments. This will contribute in raising the overall academic performance of students through the utilization of capabilities provided by ICT.

Due to this transformation each student will have the opportunity to learn at his/her own pace with consideration to the individual differences in the learning abilities. This will also allow teachers to interact, monitor and evaluate the students individually. Furthermore it will develop students' personalities and enable them to be producers of knowledge instead of receivers of information. This will result in the production of creating productive, adaptable individuals in an information society based on a knowledge based economy.

This system will enable the transformation of the school book to a flexible e-book where all still images are transformed to animated pictures with explanation of the e-content.

The LMS provides the service of lecture transmission via live cameras to enable teachers to tutor all students connected to the service through audio-visual means. It also provides access to any educational site to enforce and enrich the lesson with different knowledge resources available on the Internet.

The LMS will provide opportunities for students to interact with colleagues and teachers through dialogue and exchange of information and ideas with others within the school or any other school in the world. This will provide the students with the individual learning skill where students use the trial and error approach to learning.

Furthermore MoE has taken a pioneer initiative towards applying electronic management of documents and archives. The project implementation involves the deployment of the following:
- Business Process Management (BPM)
- Document Management System (DMS).
- Correspondence System

The Project Objectives are:
- Reducing the overall paper consumption. Currently the amount of daily paper consumed by the Ministry of Education is about 2,000 sheets; this is consumed among outgoing paper-based messages, incoming paper-based messages, and other paper-based transactions. The DMS will reduce this overall paper consumption by 80 per cent, thus contributing greatly in reducing the pollution caused by all this paperwork.
- Provide a safe and easy way to retrieve documents, manage their flow, and reduce their recurrence or redundancy.
- Provide the time needed for the completion of the work.
- Promote cooperation and integration among the staff of Ministry of Education.
- Improve the business process control and tracking electronically.
- Provide tremendous financial savings.

2. Higher Education
The Royal College of Surgeons in Ireland- Medical University of Bahrain[31] has a defined policy of linking ICT and teaching programmes to improve the quality of the learning experience. All teaching is facilitated by a fully customized Virtual Learning Environment (VLE) which allows students 24 hour access to all learning material presented during lectures and tutorials. The VLE also provides many additional electronic learning resources such as online tutorials and formative assessments in order that students can learn and monitor

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[31]www.rcsi-mub.com

their own progress.

Over the years 2012-2017, the university will implement the following strategic initiatives:
1.   Increase the students' use of VLE and other technologies in teaching.
2.   Recruit an additional full-time learning technologist
3.   Establish a learning technology support unit to undertake the role of technical support, staff training, strategic development and integration of technology into teaching
4.   Increase staff skills in the use of VLE and technology
5.   Adopt a campus management system to be integrated with ICT systems including the VLE, to create an efficient student experience from the time of application to beyond graduation as alumni
6.   Improve access to electronic resources at clinical sites by exploring individual arrangements with these premises and possible partnerships with internet service providers, mobile carriers and device vendors
7.   Maintain high speed access to electronic resources
8.   Improve the Learning Resource Centre (LRC) educational and teaching resources at the university and at clinical sites
9.   Development of the learning support centre to expand language support services to assist students with lower language ability.

D. E-HEALTH

Below are two applications on e-health currently applied in Bahrain:

1. King Hamad University Hospital (KHUH)[32]
It was established by Royal Decree No. 31 of 2010, which stated that the hospital will be affiliated to the Bahrain Defense Force, provided that it will offer its services to all citizens. The hospital will also provide medical services employing best therapeutic and administrative practices as well as academic and research services, with an independent budget attached to the Bahrain Defense Force's budget. KHUH is recognized as the most technologically advanced hospital in the Middle East. It is a state-of-the-art medical and educational facility that opened in Bahrain in 2012. The hospital features centers for trauma, organ transplants and medical staff training. The facility is 66,000 square meters with acapacity of 331 beds.

KHUH was awarded 'Healthcare Deployment of the Year' in the 2012 ICT Achievement Awards for its innovation and leadership in the use of cutting edge technologies to improve the quality and efficiency of patient care in the hospital.

KHUH was established as part of a medical strategy to create an advanced hospital in Bahrain utilizing the most sophisticated information systems. The hospital soughta fully automated solution to assist in the management of the vast array of equipment in the hospital.

Within that KHUH adopted comprehensive Radio Frequency Identification (RFID) and real-time locating system (RTLS) solutions. The system's ability to track hospital assets provides automated and auditable methods of inventory management. This makes items easier to find and ensures that needed items are available in the right location at all times. Therefore, KHUH is able to reduce their costs because the technology decreases the need to over-provision for key assets. Additionally, with the rules built in to the software, the technology adds a layer of security to assets, helping to ensure items are not stolen or improperly moved around the facility. RFID technology provides centralized monitoring and alerting in the maternity ward. These capabilities improve the security of newborn babies, bringing comfort and peace of mind to mothers.

The system combines Wi-Fi RTLS with Ultra-high Frequency (UHF) and High Frequency (HF) passive

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[32]http://www.khuh.org.bh

RFID technologies and wireless sensors on a single platform[33], to track patients, staff members, equipment, medications and temperatures within the new state-of-the-art facility.

At the KHUH facility, some large items and mobile pharmaceutical carts are tagged with passive UHF RFID tags. Readers are deployed throughout the hospital above doorways and elevators to monitor the assets. The readers gather information about the movement of items and carts and transmit that information to the software. The software parses the data and monitors rules which impose restrictions on certain assets. The software alerts relevant staff members if a rule is broken or if a pharmaceutical cart follows an unexpected route.

Since January 2013, newborn babies and mothers are given wristbands with passive UHF RFID tags. Readers consistently monitor all hospital exits to ensure the safety of newborns. If a reader detects an infant's RFID tag, the system will output a signal to lock the door and initiate an alarm and flashing light. However, if the reader registers the tag of the infant's mother in the read field, the outputs are negated. At the same time, if a maternity ward nurse's RTLS tag is picked up by an RTLS reader also positioned above the door, the system is configured to negate the alert.

To ensure medications and equipment arrive safely at the hospital from the KHUH warehouse, pallets of goods are tagged with passive UHF RFID chips. Dock doors at both the warehouse and the hospital are equipped with the readers, registering each pallet as it leaves the warehouse and arrives at the hospital. Management is alerted if the goods do not arrive at KHUH in a predetermined amount of time.

The hospital is employing 1,200 RFID tags on such assets as IV pumps, ultrasound equipment and wheelchairs. Each tag transmits its ID number to KHUH's Wi-Fi nodes, enabling the RTLS Controller software to determine that item's location to within approximately 2.5 meters (8.2 feet). The location data is sent to the system platform, which displays that information via staff members' computer screens located throughout the 66,000-square-meter (710,000-square-foot) hospital, and in business reports when needed.

Each employee wears the tag, enabling the software to provide that individual's whereabouts within the facility to authorized users.

A temperature-tracking component of the system comprises tags attached inside refrigeration units deployed within various sections of the hospital, including the morgue and the kitchen. That temperature data is sent to the Symphony system, which can then issue alerts in the event that the temperature falls outside of a predetermined acceptable threshold.

When maintenance becomes necessary for a piece of equipment, a staff member presses a button on the tag attached to that asset, which places a request to the clinical engineering team that manages maintenance and repair. A member of that team arrives onsite and uses a PDA to indicate which process is being conducted on that object.

In addition tags are attached to keys used to unlock cabinets containing controlled drugs. If the keys leave the authorized zone within the hospital, programmed in the software—such as accidentally being carried out by an employee leaving for the day—an alert is displayed for the staff, managers and security team before the keys actually exit the facility.

2. I-SEHA
By 2011, the Ministry of Health (MoH)[34] launched the I-SEHA program, which aim to implement a National Health Information Systems that applies the latest techniques on health services of the MoHto improve services for patients and increase the efficiency of the quality and speed of delivery best available globally in pursuit of the paperless health services for citizens and residents of the Kingdom. Moreover, the program is

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[33] Source:http://www.rfidjournal.com/articles/view?10157/4

[34]http://www.moh.gov.bh

aimed at providing MoH executives with a reliable source of information that can be utilized to develop evidence based plans and strategies to improve the health system.

The program will include comprehensive electronic medical patient data that contains the merits of the case, in addition to treatment history and an access to patient results of laboratory and radiological images, which will:

- Enable the physician speed diagnosis and make the best decisions,
- Provide the ability to request medicine through an electronic link to the pharmacy, and give the ability to check the availability of the medication in the hospital stores.
- Reduce potential medical errors due to the prescribed medication.

The system has the ability to raise medical warning automatically by examining the effectiveness of medicines and other pharmaceutical incompatibility with foods or sensitivity of the patient.

On the other hand, the patients will be:

- Able to book and confirm appointments by e-mail or web access,
- Access their medical records electronically, that will ensure better continuity of care.

I-SEHA includes health application systems, infrastructure and management of all functions of the implementation of the project falls under the strategy of the MoH for technical Informatics and communication in accordance with a solution based on the Build-Own-Operate-Transfer (BOOT) model:

- Building &providing: the vendor will be responsible to build and provide a working system. This will entail the development, installation and customization of any module, and also the provision of the necessary hardware.
- Ownership: the vendor will own the system and provide a service to the MoH. As such the vendor will be responsible for performance, operation and maintenance of all equipment and applications.
- Operating the system: the system will be operated by both the vendor and the MoH personnel. The usage of the system by the MoH personnel (eg. medical doctors) will not be outsourced and will remain within the MoH responsibilities.
- Transfer: the Outsourcing model should have the option of transferring the system ownership from the vendor to the MoH.

I-SEHA will optimized the usage of the existing information technology in the other Government Organizations such as Government Data Network (GDN), Financial Management Information System (FMIS), and Human Resource Information System (HoRISon). Also, to achieve the integrity of the governmental system, integration between those systems and MoH system is taken into account.

All implemented application will adhere to National Data Services (NDS) guidelines in sharing data taking in consideration the patient medical record privacy and confidentiality.

The scope of I-SEHA program covers the replacement of the existing Health Information System in Salmaniya Medical Complex, King Hamad General Hospital, MoH peripheral hospitals & all health centers with a modern, intelligent & integrated clinical and administrative systems that will assists in the daily operations and clinical practice, moreover, it will provide real time online analytical decision support tools for analyzing retrospective Information.

E. E-EMPLOYMENT

Jobs4Bahrainis.com[35] was launched in 2010 as a unique and interactive portal fully dedicated to encourage Bahrainis into the workforce. The portal provides a platform for Bahraini nationals to connect with international and local employers based in the Kingdom of Bahrain looking to build on their existing work force with the addition of skilled nationals.

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[35]http://www.jobs4bahrainis.com

Jobs4Bahrainis.com vision intends to be the first port of call for local, regional or international employers seeking to enhance its workforce with qualified Bahraini job seekers either making their debut into the job market, or looking for a career progression and development.

Its mission is to serve as an effective conduit between potential employers and local Bahraini talent and expertise in-line with the Kingdom's Bahrainisation efforts and Vision 2030.

Jobs4Bahrainis.com is designed to promote Bahrainis as the employees of choice by showcasing a community of available talent and skills. The portal offers:
- A comprehensive CV database and job vacancy upload capability
- Searchable databases for employers and job seekers
- A virtual safe space for matchmaking of employers with Jobseekers
- Access to Training Programs for both employers and Jobseekers
- Access to Tamkeen support programs for both employers and Jobseekers
- A business newsfeed providing the latest economic and business updates on Bahrain's economy.

In April 2013, Jobs4Bahrainis.com powered by Tamkeen[36] to enhance the employment prospects of quality Bahraini nationals. Tamkeen was established in August 2006 as part of Bahrain's national reform initiatives and Bahrain Economic Vision 2030, and is tasked with supporting Bahrain's private sector and positioning it as the key driver of economic development. Tamkeen's two primary objectives are: 1) Fostering the creation and development of enterprises, and 2) Providing support to enhance the productivity and growth of enterprises and individuals. Under each of those objectives, a number of mechanisms and programs have been identified based on detailed studies of the labour market to identify current and future gaps for individuals and enterprises and how to address them.

Under the terms of Jobs4Bahraini's agreement with Tamkeen, a 100 per centof the costs, previously charged to companies and job seekers to use the site, will be met by Tamkeen.Jobs4Bahrainis.com is committed to further developing local human skills and resources through a plethora of career-oriented events, complimentary career services and training opportunities to enhance the ability of Bahraini candidates to meet the demands of the local labour market in a global economy.

Jobs4Bahrainis.comis providing the following services to the companies:
- Advertise unlimited number of current vacancies on Jobs4Bahrainis.com for 12 months
- Company logo display by each job post
- Search through the database of Jobseekers to match make your employee requirements
- Filter CV's to your requirements
- Rank, and short list candidates CVs
- Contact Jobseekers through a secure mechanism
- Access to Training programs
- Access to Tamkeen's site for employer support programs
- Technical support to assist your on-line advertising
- Exposure in local media.

On the other hand, Jobs4Bahrainis.com is committed to the development of local human resources. In this section, you can find a variety of resources to help you start looking for a job and which will give you advice and tips to strengthen your position as a successful job seeking candidate.
- CV Templates
- CV Writing Tips
- Interview Tips,

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[36] http://www.lf.bh

- Top Interview Questions,
- How to Write a Cover Letter.
- Career Quiz
- Education & Training

Jobs4Bahrainis.com powered by Tamkeen is committed to providing information which will help users to decide on their ongoing educational and training needs, such as education and training establishments together with information about courses, programs and opportunities available both within Bahrain and internationally.

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

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

The Kingdom of Bahrain believes in the importance of history for building civilization. Therefore, by July 1982Bahrain issued Al-Wathiqa Magazineto to record Islamic history with special focus on the history of the Kingdom of Bahrain and the Arabian Gulf. Over the past 30 years the magazine has published many historical research and studies in Arabic and English.

Due to the growing demand from researchers and readers interested in history, Isa Cultural Centre has digitalized the existing issues of Al-Wathiqa magazine. By December 2012,the digital issues of Al-Wathiqa Magazine have been launchedon E-Ma'arifa"e-knowledge" Database. This step emphasizes the care of Isa Cultural Centre in heritage and culture of Bahrain through keeping up with the requirements of the digital world in order to provide the knowledge.

B. LOCAL AND NATIONAL DIGITAL CONTENT DEVELOPMENT

With a continuous aim to make the use of eServices easier and more convenient, the eGovernment Authority is in the process of launching several smart phone based applications on Android and iTunes which will grant the user easy access to some of the eServices at any place, any time. By the end of July 2013, there are 13 applications ready to use.

Furthermore, theKingdom of Bahrain, through the eGovernment Authority sponsors the Arab eContent Award[37] in association with the Bahrain Internet Society (BIS) and World Summit Award (WSA).The main objective is to promote and encourage creativity in the Arab eContent domain and to outline the collaboration between the countries in the region regarding its field to reach an international level. Through this award, participants will be evaluated with the same published international standards set by WSA.

The Arab eContent Award is part of the World Summit Award (WSA), it implements the vision of the World Summit Award and shares the awareness for the need for local digital content. According to the rules and regulations set by the WSA Board of Directors, 150 United Nations member countries including 22 Arab countries were eligible to compete in the Arab eContent Award 2011 through their inventive eContent projects.

The Arab eContent Award consists of 8 categories:
- eGovernment& Institutions: Delivering complete services in public administrations to individuals, businesses and organizations combined with organizational change in order to significantly improve services and democratic processes and strengthen support to public policies; fostering quality and efficiency of information exchange; empowering citizens and public services clients.

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[37]http://www.bea.bh/

- eHealth& Environment: Developing the client-centred model of health care where stakeholders collaborate, utilizing ICT, including internet technologies to manage health issues as well as the health care system; meeting the needs of citizens, patients, healthcare professionals, healthcare providers, as well as policy makers.

- eLearning& Education: Serving the needs of learners to acquire knowledge and skills for a complex and globalizing world; transforming schools, universities and other educational institutions through interactive, personalized and distributed learning resources; creating active e-learning communities and target models and solutions for corporate training as well as life-long learning.

- eEntertainment& Games: Supplying digitized entertainment products and services; entertaining the user in this world's variety of languages and its cultural diversity; supporting movement from one-way to two-way, from single to multiple players, interactive entertainment and the synergy between analogue and digital platforms.

- eCulture& Heritage: Preserving and presenting cultural heritage in line with the challenges of the future; demonstrating valuable cultural assets clearly and informatively using state-of-the-art technology; developing the diversity of cultures and sub-cultures and the multilingual nature of societies.

- eScience& Technology: Fostering global collaboration in key areas of science, and the next generation of applications and infrastructures that will enable it; providing measures to promote and demonstrate scientific processes and make them accessible to citizens; scientific projects articulated through new media.

- eBusiness& Commerce: Support and optimization of business processes; creation of new business models in e-commerce and m-commerce, business to business, business to consumers, internet security and other areas; supporting SMEs on the marketplace; using ICTs for buying and selling as well as servicing customers and collaborating with business partners.

- eInclusion& Participation: Measures supporting integration of the global information society; bringing least developed countries into the knowledge society; reducing "digital divides" between technology-empowered and technology-excluded communities and groups such as rural areas and women; bridging society and strengthening social and political participation of individuals and groups through ICTs.

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

Promotion by governments, through public/private partnerships, of technologies and R&D programmes in such areas as: (No Info Available- Delete)
- translations; machine translation tools
- electronic dictionaries; terminology and thesauri
- multi-lingual search engines; content referencing
- optical character recognition-OCR
- general and application software
- deployment and use of OSS

D. ARABIC DOMAIN NAMES

According to the three years' work plan of the TRA (2013-2015), the launch of (البحرين.) IDN registry will be in 2015.

9. MEDIA

A. MEDIA DIVERSITY, INDEPENDENCE AND PLURALISM

Bahrain's mass media have made remarkable progress with the promotion of "responsible" freedom of expression as an essential part of the political and democratic reform process spearheaded by His Majesty King Hamad bin Isa Al Khalifa since his accession to power in 1999 and aims at modernization of media systems both institutionally and technically in order to keep abreast of the information and IT revolution. Indices showing the development of the media field in Bahrain can be reviewed as follows:

1. Media freedom

- The number of newspapers in Bahrain has risen from 4 Arabic and English dailies in 1999 to 12 dailies and weeklies in 2012.

  o   Five Arabic daily newspapers:Akhbar Al-Khaleej[38] 1976; Al-Ayam[39] 1989, Al-Wasat[40] 2002; Al-Wattan[41] 2005 Al-Bilad[42] 2008.Two other newspapers were established namely: Al-Methaq May 2004 and Al-Waqt Feb. 2006 however they stopped for financial reasons.

  o   Two English daily newspapers namely: Gulf Daily News (GDN)[43] 1978, Daily Tribune[44] 1997.

  o   Five weeklies: Al-Ahd 2003; Al-Naba 2003; Aswaq 2009, Al-Tijjariya and Sports Kingdom.

- By 2012, the number of magazines has gone from 25 up to 65 weeklies and monthlies having various inclinations: economic, societal, entertainment, variety in addition to tens of magazines which have been licensed by other governmental bodies inside the Kingdom.

- By 2012, the Information Affairs Authority (IAA)[45] has been licensed to more than 818 news bulletins to government ministries and institutions, political societies, NGOs and sports clubs, religious organizations, advertisers, community centers, trade union associations, regional offices, private and public educational institutions, charity funds, etc.

- Freedom of circulation of publications and audio-visual items. By 2011permission given to the entry of 78,027 book titles from various fields of knowledge at the rate of 1,642,392 copies imported under these book titles. Also an approval to 215 applications for printing local publications from Bahraini authors in addition to permitted the circulation of 27,147 audio-visual items, electronic games and software and issued 1,642 licenses to carry out sundry media activities from the Bahrain Investors Center which reflect the boom in the quantity of publications and the volume of media business under the reform project of His Majesty the King.

- Since the launching of His Majesty's reform project in 1999, no journalist has been jailed nor has any newspaper or media institution been closed for any reasons other than financial.

- The establishment of many professional media associations namely the Bahrain Journalists Association (BJA) established in 2000, Joined International Journalists Union in December 2003, Foreign Correspondents Club in July 2005, launching of the GCC Journalists Union in May 2005 based in Bahrain. IAA intends to create a fully equipped Media Center with latest state-of-the-art technologies to become a permanent office for such media organizations.

- Bahrain Journalists Association's inauguration of the Professional Code of Ethics on January 20th, 2012 reliant upon draft prepared by IAA. The code of ethics consolidates the freedom of speech and constructive opinion in developing the community, boosting the spirit of intimacy and national unity, unification of the body of journalists in order to upgrade newspaper and media work and to ensure professional ethics and morals, protect the rights of journalists, the community under the rule of law.

2. Development of the audio-visual media

- A rise in the number of Bahraini TV channels to 6 channels namely: the main channel, foreign channel, sports channel1, sports channel2, the Holy Koran and Bahrain International which were launched in December 2011 and work according to latest technologies of transmission and quality in order to meet viewers' aspirations.

- A rise in the number of radio stations to eight radio stations namely: general radio Bahrain transmission, Holy Koran Radio, Bahrain FM, Shabibya Radio, Music Radio, Pop Music Radio, Hindi Radio, English Broadcast Radio (Radio Bahrain) in addition to voice transmission of Bahrain TV channel as well as foreign channel on Radio waves.

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[38]www.akhbar-alkhaleej.com/
[39]www.alayam.com/
[40]www.alwasatnews.com/
[41]www.alwatannews.net/
[42]www.albiladpress.com/
[43]www.gulf-daily-news.com
[44]epaper.dt.bh/
[45]http://iaa.bh

- The Kingdom retransmitted Arab and foreign radio programs in cooperation with Arab and world countries through FM waves: Emirates FM, Radio Monte Carlo, BBC, MBC FM etc.
- Attracting Arab and Foreign Radio and TV corporations in which on February, 2012 two memoranda of understanding -MoU-have been signed which turning Bahrain into the headquarters of the Arab news channel and the high executive management of Rotana group with effect as from December 12, 2012.

TABLE 11:
MEDIA OUTLETS, NUMBER AND OWNERSHIP IN BAHRAIN

Media outlets	Number	Language(s)	Ownership			
			Private	Mixed	Government	Foreign
News papers	12	Arabic/English	(1)			
Magazines	65	Arabic/English	(2)			
News agency	1				(3)	
Radios	1 outlet with 8 stations				(4)	
Televisions	2 outlet, one of them with 6 channels, one still not transmitted yet		(5) Not transmitted yet		(6)	

3. Upgrading media legislation

Kingdom of Bahrain is committed to upgrading legislation and laws regulating the press and media sector, whether conventional or electronic, as per international conventions and in cooperation with the legislative power and pioneering foreign institutions. Among the most important legislation are:

- The amendment of law-decree number 47 for 2002 concerning the regulation of press, printing and publication so as to grant more freedom to journalism and media work.
- Set up Higher Authority for Media and Communication by decree number (47) for the year of 2013. The authority shall prepare a draft National Plan for Media and Communication, proposal controls and rules necessary to promote the profession of media and communication, in order to achieve the higher interest of the nation and maintains the unity of the community , express an opinion on the draft laws concerning the media and communication, set the standards of supervision and control over media content and advertisements in various media and communication in order to ensure compliance with the provisions of the constitution and the law and those responsible for media and communication compliance with those standards, ensure that media and communication international conventions and covenants relating to the promotion of the role of women in society and the protection of the rights of the child, receive complaints relating to media content and work to reconcile between the relevant parties, put the rules on the conditions of production and programming of radio and television programs during election campaigns in coordination with the competent authority of the referendum and election and finally cooperate with the media and communication institutions abroad in order to benefit from their experience and keep up with the use of modern technologies in the field of media and communication.
- A draft bill of law regarding the audio-visual media which organizes the rules and regulations pertaining to broadcasting and rebroadcasting of audio-visual programs, and the creation of the Audio-Visual Information Authority which shall acquire its corporate entity and shall be affiliated under the Minister both financially and administratively, and whose duty shall be to develop audio-visual media sector in the Kingdom and boost investments in it.
- A draft ministerial resolution on electronic publications.
- A comprehensive media draft law includes the integration of draft laws and ministerial resolutions prepared by IAA by amending law-decree number 47 for 2002 concerning the regulation of press and publication referred by the cabinet to the legislative power since May 2008, alongside other draft law on

organization of audio-visual and electronic media and news bulletins. The comprehensive media draft law aims to guarantee the freedom, pluralism and independence of mass media as well as protect social rights and other supreme national interest. The draft law cancelled criminal responsibility pertaining to publication crimes, including mainly imprisoning journalists, which will further promote press and media freedom. The law is expected to be in place by mid of 2014.

4. Qualifications and encouragement to media personnel:
The Kingdom of Bahrain is keen to improve the competence and performance of its staff through organizing various training courses and workshops, in cooperation with highly prestigious Arab and international media establishments for example with CNN, AOP, BBC, MBC, Reuters, TWofourt54, the French National Audio-visual Institute, etc..

The Kingdom of Bahrain has always been committed to honouring distinguished works of active journalism and media. Thus, the IAA in Bahrain has launched the Social Media Award 2012 in its first edition awarding prizes to the top 30 international social media users according to the following considerations: responsibility, creativity, contribution, confidence, credibility, compliance with professional ethics and morals. IAA intends to develop the award as from the year 2013 to cover throughout the GCC countries.

5. Consolidating media relations abroad
The Kingdom of Bahrain paid a great attention to the activation of MoUs signed with foreign media corporations and organizations in addition to opening media attaché offices in a number of countries in the year 2011 namely: Egypt, USA, UK, France and Belgium. Moreover, specialized forums and conferences have been organized in the field of journalism, the media and intellectual property, etc. to reflect the developments which portray the true facts behind the actual situation and reform accomplished in the Kingdom at various regional and international functions.

In recognition of the Kingdom's achievements in terms of press and media freedom, His Majesty King Hamad bin Isa Al Khalifa received the Arab Media Creativity Award 2010 from the Arab Media Forum which coincided with the events of "Manama the Capital of the Arab Press for 2012" in the period 28-29 February 2012.

The Kingdom of Bahrain is working on attracting international satellite stations and specialized media establishments in the media city set to be constructed after finalizing the needed legal and administrative procedures. It also seeks to promote local, Arab and foreign investments in the media field in partnership with the private sector and in conformity with the Economic Vision 2030.

B. THE MEDIA AND ITS ROLE IN THE INFORMATION SOCIETY

The Kingdom of Bahrain is aware of the media's role in the information society. Therefore, inJuly 2013, the Kingdom of Bahrain launched a five year strategic plan in media and communication. The five-year strategic plan (2013- 2018) seeks to support professionalism in media practice and production, enhance national unity, ensure security and stability, spread a spirit of harmony and tolerance and contribute to the spreading of awareness and knowledge throughout the community.The strategy has two other major issues involving highlighting the kingdom's reforms, achievements and modernization drive to local and international public opinion and making the media and communication sector an attractive field for investment.

The strategy comprises 45 initiatives and projects that will be implemented gradually in accordance to priority, over the next five years. Some of the initiatives implemented in 2013 include conducting a nationwide survey of the media and communication sector in the Kingdom, drafting the law for media and communications, establishing the Higher Authority for Media and Communications and building new studios in line with the latest audio visual media production.

Plans include building institutional capacities for the media sector by setting standards for media work according to international standards, establishing an advanced government communications system, forming

a wide network of media relations abroad and making the media and communication sector an attractive field of investment that will contribute to the diversification of the kingdom's national income.

Under the income-boosting objective, Bahrain plans to set up a city for audio-visual industries, a city for film production, a city for digital production and a city for the book publishing industry, to organize events regionally and internationally and to encourage positive competitiveness among local television and radio stations.

The strategy includes enhancing the performance of the official news agency, the Bahrain News Agency (BNA)[46] through upgrading its status and widening its agreement with Arab and international agencies. News will be published in the languages of the United Nations as well. The BNA will also use the latest broadcasting technologies and will develop its services to include audio, video and live transmission. It will set up its own research and information department to support the process of production and boost the level of news and reports.

C. CONVERGENCE BETWEEN ICT AND THE MEDIA

The third National Telecommunication Plan will also have a direct impact on the uptake of broadband technology, as it will facilitate the roll-out of a high-speed broadband network at attractive prices.

Faster broadband speeds will allow operators to offer advanced services such as internet protocol television, video on demand, home surveillance, etc. Operators can also introduce experience-based pricing and charge premium rates for faster download speeds. Consumers would not only benefit from faster speeds and better quality of service, they would also have access to more innovative products and services at affordable rates. The increase in competition would eventually benefit all consumers by the provision of better-quality service at more affordable prices.

The BNA has an ongoing strategy of development through the use of special advanced devices that enable audience to deliver Bahraini radio and TV worldwide online via the internet. Moreover, the BNA provides its services through smart phones and devices.

10. INTERNATIONAL AND REGIONAL COOPERATION

A. FINANCING OF ICT NETWORKS AND SERVICES

In building the NBN the government of Bahrain prefers to play a limited role and instead rely on the private sector. Additionally effort will be made to avoid duplication of fixed infrastructure. The TRA has been working with Batelco and other private sector companies as well as public utilities to avoid overlap coverage. The government has committed around BD26million (US$68.42 million) to develop of Internet infrastructure over the next five years.

A. Infrastructure development projects (No information found)
- Current implemented and future planned projects supported or financed by international or regional organizations.
- Governmental efforts to market ICT projects and raising its national priority, when requesting for international cooperation and assistance on infrastructure development projects from developed countries and international financial organizations.

B. WSIS Follow-up (Waiting for the information from the source)
- Survey the preparation of national action plans to support the fulfillment of the goals indicated in WSIS declaration of principles (Geneva 2003) and the RPoA for building the information society, taking into account the importance of regional cooperation.
- Identify regional projects for building the information society. Although some proposed projects are regional in scope, the majority has national components and some include specific pilot projects.
- Evaluate and regularly assess the magnitude of the digital divide, in both its domestic and international

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[46] http://www.bna.bh/

dimensions, and track the global progress in the use of ICTs to achieve internationally agreed WSIS goals.
- Survey the availability and development of tools providing statistical information on the Information Society, with basic ICT performance measurement indicators (internationally comparable) and analysis of its key dimensions.
- Identify success stories:
    • Availability of website on best practices and success stories (experience-sharing), based on a compilation of contributions from all stakeholders, in a concise, accessible and compelling format.
    • Availability of projects, which exchange knowledge, experiences and best practices on policies and tools designed to promote the Information Society at regional and sub-regional levels.

C. Participation in Internet Governance activities(Waiting for the information from the source)
- Involvement in the Internet Governance Forum (IGF) process;
- Involvement in ICANN's policy making and public consultations.

11. BUILDING THE ICT SECTOR

A. ICT FIRMS

According to the Ministry of Industry and Commerce[47] there were 704 active business entities operating ICT related activities by the end of 2012.

B. GOVERNMENT FACILITATION

Tamkeen provides professional consulting services to raise their performance, and facilitates access to financing to bridge the enterprise financing gap. In addition, Tamkeen is also supporting and contributing to other national initiatives which enhance investments in Bahrain.

In April 2013[48], Tamkeen expanded the "Techania" scheme, one of the many business support schemes under its flagship Enterprise Development Support Programme, to cover high-tech Information and Communication Technology (ICT) solutions. The main purpose of this step is to enable Bahraini enterprises to upgrade their existing ICT infrastructure, in line with Tamkeen's ongoing efforts to enhance the capabilities of the private sector and boost the productivity and efficiency of businesses in Bahrain.

As with the other schemes under the Enterprise Development Support Programme, Tamkeen will subsidize 80 per cent of the cost of these technologies up to BD 15,000 for small enterprises and 20,000 for medium and large enterprises. The subsidy amount is to be counted against the available balance for the enterprise under the "Techania" scheme.

The ICT technologies covered under the scheme include both hardware and software - such as fixed workstations and modern telephone systems - provided they directly relate to the core business activity. Portable devices – such as mobile phones, tablets, and laptops - which can be utilized for personal usage are strictly excluded.

Another private sector support programme by Tamkeen is the ICT Finance Scheme, which offers SMEs low interest financing to help them obtained ICT solutions to build their capabilities and improve their competence. By the end of 2012[49], 51enterprises have benefited from this programme.

C. CONTRIBUTION OF ICT SECTOR IN THE NATIONAL ECONOMY

Some indicators of contribution of ICT sector in national economy for the period of 2009-2012 are shown in table 11.

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[47] www.moc.gov.bh
[48] Source:http://www.bna.bh/portal/en/news/557236
[49] Source: Tamkeen, Annual Report 2012, http://www.lf.bh/en/?p=Annual-Report-Finance

TABLE 12:
CONTRIBUTION OF ICT SECTOR IN NATIONAL ECONOMY

Indicator	2012[50]	2011	2010	2009
Value Added of telecommunication and related activities[51] – (BD Million)	344.3	332.0	319.8	289.6
Growth in Value Added of telecommunication and related activities	3.7%	3.8%	10.4%	13.9%
GDP- Current Prices[52] (BD million)	11416.1	10920.6	9668.2	8624.8
Value Added of telecommunication and related activities Contribution to GDP	3.0%	3.0%	3.3%	3.4%
Export of telecommunication and related activites[53] services (BD Million)	240	235.6	300.6	278.4

Source:

Notes:

D. R&D AND INNOVATION IN THE ICT SECTOR

The UOB has established a UOB Mobile Research Lab[54] to develop mobile applications.

E. INVESTMENTS IN THE ICT SECTOR

Injazat Technology Fund is a US$ 50 million Venture Capital Fund operating in compliance with Sharia'a principles and targeting technology companies within the MENA region under the motto "From the region, For the region". Injazat was founded with the idea that it takes teamwork, experience, strategic thinking, and resources to turn early stage ventures into great companies. The Fund strives to add experience and expertise to invention in order to support brilliant technology companies in the regional marketplace.

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[50] The data for 2012 are provisional
[51] Source: National Accounts Bulletin 2012, Central Informatics Organization, www.cio.gov.bh
[52] Source: National Accounts Bulletin 2012, Central Informatics Organization,www.cio.gov.bh
[53] Source: Statistical Bulletin, May 2013, Central Bank of Bahrain, www.cbb.gov.bh
[54] www.mobileresearchlabs.com/

ANNEX 1:

Core ICT Indicators

Table 1 - Core indicators on ICT infrastructure and access

Core indicator		Definitions and notes	2010	2011	2012
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 then multiplying 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.	19%	21%	21%
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 then multiplying by 100. *Mobile cellular telephone subscribers* refer to users of portable telephones subscribing to a public 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 their account within a reasonable period of time. This period (e.g. 3 months) should be 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.	127%	142%	172%
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.	-	-	-
A4	Fixed broadband Internet subscribers per 100 inhabitants	*Fixed broadbandInternet subscribers per 100 inhabitants* is obtained by dividing the number of fixed broadband Internet subscribers by the population and then multiplying 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.			
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 then multiplying 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 *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[55]* (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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[55] For definition, see: http://oberon.sourceoecd.org/vl=15177325/cl=12/nw=1/rpsv/sti2007/ge11-1.htm.

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

Core indicator		Definitions and notes	2010	2011	2012
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.	-	-	-
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	-	-	-
		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 cellular telephone 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	2010	2011	2012
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.	-	-	-
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 Internet users, 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[56]). 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				

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[56] 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	2010	2011	2012
	Work	Where a person's workplace is located at his/her home, then he/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).	-	-	-
	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 <u>Internet users</u> 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	2010	2011	2012
Getting information about 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)	-	-	-
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.	-	-	-

Core indicator		Definitions and notes	2010	2011	2012
	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-line activities. (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.	-	-	-
HH10	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.	-	-	-
HH11	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.	-	-	-

Core indicator		Definitions and notes	2010	2011	2012
	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 Internet users, using 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					-
HHR1	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).	-	-	-

Table 3 - Core indicators on use of ICT by businesses

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	Core indicator		Definitions and notes	2010	2011	2012
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[57]		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 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[58]		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	-	-	-

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

[58]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	2010	2011	2012
		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._x000D_*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 and email. They also include orders received on behalf of other organizations – and orders received by other organizations on behalf of the business._x000D_*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._x000D_*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._x000D_*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._x000D_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._x000D_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._x000D_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, fixed wireless, Wireless Local Area Network and WiMAX.	-	-	-

Core indicator		Definitions and notes	2010	2011	2012
	Mobile broadband	Mobile broadband access services include *Wideband CDMA* (W-CDMA), known as *Universal Mobile Telecommunication*s *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 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		-	-	-

Core indicator		Definitions and notes	2010	2011	2012
	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 services	Includes electronic transactions via the Internet for other types of financial services such as share 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 - Core indicators on the ICT (producing) sector

Core indicator		Definitions and notes	2010	2011	2012
ICT1	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 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).[59]			
ICT2	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 – Core indicators on international trade in ICT goods

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

Core indicator		Definitions and notes	2010	2011	2012
ICT3	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).	-	-	-
ICT4	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).	-	-	-

Table 6 - Core indicators on ICT in education

Core indicator		Definitions and notes	2010	2011	2012
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).			
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).			
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*.			
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).			
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).			
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[60] 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)[61]	Schools with electricity as a percentage of the total number of			

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[60] 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.

[61]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

Core indicator		Definitions and notes	2010	2011	2012
		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 qualification); and
- ISCED 6 – Second stage of tertiary education (leading to an advanced research qualification).

Table 7 - Core indicators on ICT in government

Core indicator		Definitions and notes	2010	2011	2012
EG1	Proportion of persons employed in central government organizations routinely using computers	The proportion of persons employed in central government organizations routinely using computers is calculated by dividing the number of persons employed in central government organizations, who routinely use computers, by the total number of persons employed in central government organizations. The result is then multiplied by 100 to be expressed as a percentage. An optional indicator may be calculated separately for male and female persons employed (or other individual characteristics).			
EG2	Proportion of persons employed in central government organizations routinely using the Internet	The proportion of persons employed in central government organizations routinely using the Internet is calculated by dividing the number of persons employed by central government organizations, who routinely use the Internet, by the number of persons employed by central government organizations. The result is then multiplied by 100 to be expressed as a percentage. An optional indicator may be calculated separately for male and female persons employed (or other individual characteristics).			
EG3	Proportion of central government organizations with a Local Area Network (LAN)	The proportion of central government organizations with a Local Area Network (LAN) is calculated by dividing the number of central government organizations with a LAN by the number of central government organizations. The result is then multiplied by 100 to be expressed as a percentage.			
EG4	Proportion of central government organizations with an	The proportion of central government organizations with an intranet is calculated by			

suchasignificant barrier in many developing economies that monitoring trends of its provision is as relevant as monitoring the supply and use of ICT.

Core indicator		Definitions and notes	2010	2011	2012
	intranet	dividing the number of central government organizations with an intranet by the number of central government organizations. The result is then multiplied by 100 to be expressed as a percentage.			
EG5	Proportion of central government organizations with Internet access, by type of access	The proportion of government organizations with Internet access, by type of access is calculated by dividing the total number of central government organizations with Internet access (by each type of access and 'any' access) by the total number of central government organizations. The result is then multiplied by 100 to be expressed as a percentage. Note that the sum of percentages of each type of access is likely to exceed 100, as many central government organizations will have more than one type of access service.			
EG6	Proportion of central government organizations with a web presence	The proportion of central government organizations with a web presence is calculated by dividing the number of central government organizations with a web presence by the number of central government organizations. The result is then multiplied by 100 to be expressed as a percentage.			
EG7	Selected Internet-based services available to citizens, by level of sophistication of service	Unlike indicators EG1 to EG6, this indicator refers to both central and state/provincial levels of government. This is necessary to ensure international comparability as the services selected may be offered by different levels of government across countries. Because the approach taken to measuring Internet-based services is relatively untested5 and because responses may be somewhat subjective, the indicator is initially considered to be 'experimental'. The indicator is weighted by population in order to show the significance of government Internet-based services at the national level. The indicator is expressed in terms of the percentage of a country's population that is theoretically able to access each Internet-based service. Note that this does not refer to whether a citizen has the equipment or knowledge necessary to access those services, whether s/he needs to access those services or whether s/he directly benefits (for example, most of the services are not relevant to children). The ability to access each service will usually be linked to the relevant jurisdiction, for example, a citizen residing in a particular state will theoretically be able to access Internet-based services offered by that state government, though may not need to, wish to, or be technically capable of doing so.			

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