

ESCWA



UNITED NATIONS
Economic and Social
Commission for Western Asia

Distr.
GENERAL

E/ESCWA/ICTD/2003/11/Add.6
7 November 2003
ORIGINAL: ENGLISH

PROFILE OF THE INFORMATION SOCIETY IN THE KINGDOM OF BAHRAIN

2003

Note: This document has been prepared by the Central Informatics Organization in the Kingdom of Bahrain, commissioned by ESCWA, and reproduced without formal editing. The opinions expressed are those of the author and do not necessarily reflect the views of ESCWA.

CONTENTS

Page

Introduction	1
I. LEGAL AND REGULATORY FRAMEWORKS	1
A. Telecommunication Regulatory Authority (TRA).....	1
B. E-Commerce Law	2
II. ICT INFRASTRUCTURE.....	2
A. Telecommunication	2
B. Internet Penetration.....	3
C. PC Penetration	3
D. Mobile and Telephone Penetration.....	4
E. TV Penetration.....	4
F. Cost of Internet use in Bahrain	5
III. ICT CAPACITY-BUILDING	9
A. Computers in Schools.....	9
B. Infrastructures and Facilities.....	9
C. Educational Institutes.....	12
IV. BUILDING THE ICT SECTOR.....	12
A. IT Players.....	12
V. APPLICATIONS IN GOVERNMENT ESTABLISHMENTS	13
A. Ministry of Commerce & industry.....	13
B. Ministry of Interior	13
C. Ministry of Finance and National Economy.....	13
D. Ministry of Electricity and Water	13
E. General Directorate of Customs & Ports	13
F. Civil Services Bureau	13
G. Bahrain Duty Free.....	13
H. E-Government.....	14
I. E-Government High Level Schedule.....	14
J. E-Government Strategy Model.....	15
K. Bahrain E-Government Readiness.....	16
L. Cost of E-Government.....	17
M. E-Government Responsibility.....	17
VI. APPLICATIONS IN EDUCATION	18
A. Ministry of Education.....	18
VII. APPLICATIONS IN COMMERCE AND BUSINESS	19
A. E-Banking.....	19

CONTENTS (continued)

	<i>Page</i>
VIII. APPLICATIONS IN HEALTHCARE	19
A. Ministry of Health.....	19
IX. DIGITAL ARABIC CONTENT	19

LIST OF TABLES

1. Cost of Internet Use in Bahrain	5
2. no title.....	6
3. No title.....	6
4. More information	7
5. No title.....	7
6. No title.....	9
7. Number of Schools with design and Technology Labs and Number of Computers In those Labs – Academic Year 2002/2003.....	10
8. Number of Schools with Learning Resources Centers (LRCs) and Number of Computers in those LRCs by Type of Schools and Sex – Academic Year 2002/2003	10
9. Number of PCs at the Ministry of Education Schools.....	11
10. Ratio PC-to-Student	11
11. Information and Communications Technology (ICT) at Ministry of Education Expenditure	11
12. Number of IT students at the University of Bahrain	12
13. Top E-Government Countries	17
14. E-Government Country Ratings for GCC	17

LIST OF FIGURES

1. Internet User Penetration vs PC Penetration in the GCC, August 2002.....	3
2. Percentage of Housing Units by Number of Personal Computers, 2001	4
3. GCC Countries ranked by PC Penetration, August 2002.....	4
4. Percentage of Housing Units by Number of TVs, 2001.....	5
5. High Level Schedule of E-government Infrastructure Program.....	14
6. Bahrain e-Government Program.....	15

LIST OF ANNEXES

I. Information society indicators.....	22
II. List of main stakeholders.....	24

INTRODUCTION

The Government wants Bahrain to be at the forefront of development in the new global economy. In order to get there, Bahrain must establish the best environment for an information society in the region. Electronic access to government services will become increasingly important to citizens and by 2005 Bahrain plans to have the majority of public services available online.

Bahrain has featured high in the e-Government ranking reports published by the UN Division for Public Economics and Public Administration (UNDPEPA) and the American Society for Public Administration (ASPA) as well as in an independent report published by Brown University.

Bahrain has a single telecommunications company and it has a monopoly over virtually all telecommunications, data transmission and Internet services in Bahrain. As part of Government's policy to liberalize the telecom sector, Telecommunication Regulatory Authority (TRA) has awarded a second license to MTC Vodaphone in April 2003. The current level of telcom services in Bahrain is adequate for the current needs of the country but major improvements must be introduced if Bahrain is to become an Information Society. Internet, PC, Telephone and TV Penetrations are considered to be one of the highest in Bahrain as compared to all other countries in the GCC. This will greatly contribute and will act as a major impetus in realizing Bahrain Government's vision of an e-Society. Bahrain has already passed e-Commerce law which will act as a legal framework for constituting an information society.

Kingdom of Bahrain has already got many ingredients in place for building an information society in the near future. The Government Data Network and Central Population Register (CPR) will provide the foundation where as the e-Government applications will provide an electronic gateway for the citizen services. The development in the educational and health sectors will accelerate the momentum in terms of human resources. The relatively small geographic size and population will expedite the development processes. The recent political reforms and move towards democracy will provide transparency and more efficiency in the utilization of funds. One of the major drawbacks is that there is no single executive body to coordinate the move towards the information society. However the strategies of the ministries and government organizations, Telecommunication Company and all other stakeholders are expected to converge to a single vision of developing an intelligent and digital kingdom through the efforts of Economic Development Board, e-Commerce Committee and the Central Informatics Organization.

I. LEGAL AND REGULATORY FRAMEWORKS

A. TELECOMMUNICATION REGULATORY AUTHORITY (TRA)

Government has sought an extended and value oriented set of services for consumers and business users within Bahrain in the telecom sector. New Telecommunications Law seeks to rapidly create a free market environment and stipulates to provide stability by a clear national policy framework, encapsulated in a National Telecommunications Plan. The Telecommunications Regulatory Authority (TRA) has been formed to ensure that the National plan is realized. TRA plans to establish a regulated free telecom market by 2004. The nine licenses and schedule of issue for liberalizing the market is given below:

- (a) Internet Service Provider License (As soon as possible)-Provision of Internet Services, excluding voice services, by means of a licensed telecoms network;
- (b) Value Added Services License (As soon as possible) -Provision of Value Added Services by means of a licensed telecoms network;
- (c) Mobile Telecommunications License (Q2, 2003)-Provision of mobile telecommunications service by its own network;

- (d) VSAT/ Public Access Mobile Radio Service/Paging Licenses (All Q1, 2004)•International Facilities License (Q1, 2004)-Termination/landing/establishment of international connectivity and obligation and right to connect to other Bahrain licensed networks;
- (e) National Fixed Service License (Q3, 2004)-Provision of national fixed voice and data services by its own network;
- (f) International Services License (Q3, 2004)-Provision of international voice and data services.

B. E-COMMERCE LAW

An eCommerce law, which lays down the legal foundation for electronic transactions, has been approved recently by the Government there by providing the legal foundation for e-Commerce. The law follows the advanced law guidelines from North America, European Union, Hong Kong and Singapore and adapts them to the Bahraini environment. It will recognize digital signature and other means of electronic verification and identity authentication. It will also establish the framework for conducting e-Business and other forms of contracting and transacting over the Internet, while preserving contractual rights and obligations. The law, will build confidence and boost e-Commerce in Bahrain, and help speed up the e-Government process.

II. ICT INFRASTRUCTURE

A. TELECOMMUNICATIONS

Bahrain has a single telecommunications company which is Batelco and it has a monopoly over virtually all telecommunications, data transmission and Internet services in Bahrain. The MTC Vodaphone, the new telecom operator will enter the market by end of 2003.

The current level of Batelco services in Bahrain is adequate for the current needs of the country but major improvements must be introduced if Bahrain is to become a Information Society. A world-class telecommunications infrastructure is a key enabler to growth in IT, especially in the era of convergence of telecommunications and information technology.

The telecommunications infrastructure in Bahrain is comparable in certain features to global standards, yet there are many aspects that lag global standards. The main features of the telecommunications services available in Bahrain include the following:

- (a) Total digital network including digital switches and inter-exchange fiber optical links;
- (b) Digital international circuits to all business and financial centers in the world;
- (c) A purpose-built environment (Facility Management Center) for the installation and a 24-hour management of customer telecommunications equipment;
- (d) Availability of advanced services including ISDN, ATM, LANConnect, Frame Relay and VSAT;
- (e) Immediate provision of GSM mobile and Internet services, with roaming to over 50 countries;
- (f) Mobile fax and data service through the GSM network;

The following are some of the areas where the current telecommunications infrastructure falls short of global standards:

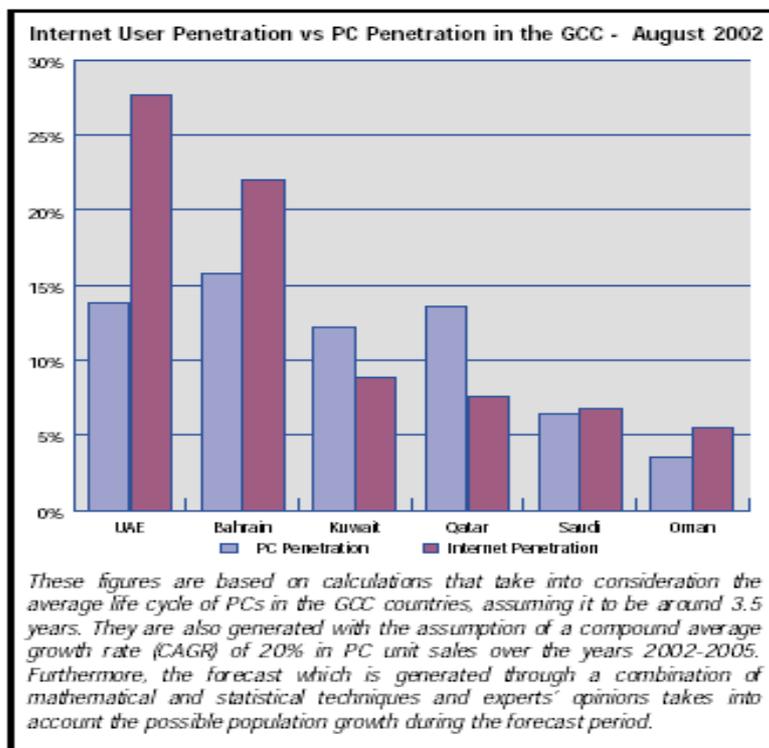
- (a) Limited bandwidth;
- (b) High prices;
- (c) Limitations of service;
- (d) Monopoly of provider.

Plans are underway to open the telecommunications market in Bahrain to competition. Government has recently set up a new autonomous body called Telecommunication Authority to regulate the telecom sector. A license to the second provider is already granted in April 2003. This will allow specialized international telecommunications and IT companies to capitalize on a well-established infrastructure that will continue to develop as technology evolves. Furthermore, an e-Commerce Committee and a Telecommunications Committee have been created to ensure that all necessary aspects of these sectors are discussed, examined and implemented where appropriate.

B. INTERNET PENETRATION

Internet penetration in Bahrain is second highest in the Arab World. The number of Internet users in Bahrain is estimated at 150,000 users. According to 2001 Census Results Published by the Directorate of Statistics, Central Informatics Organization, out of total 105686 households in Bahrain 19191 households are connected with the internet.

Figure 1. Internet User Penetration vs PC Penetration in the GCC, August 2002



Source: Madar Research Group

C. PC PENETRATION

Personal Computer penetration in Bahrain is the highest percentage-wise in the Arab world. According to the Census 2001 results, out of 105686 households 35255 households had at least one PC at home. This accounted for a 33.36% of households having at least one PC at home. (Please see figure 2).

Figure 2. Percentage of Housing Units by Number of Personal Computers, 2001

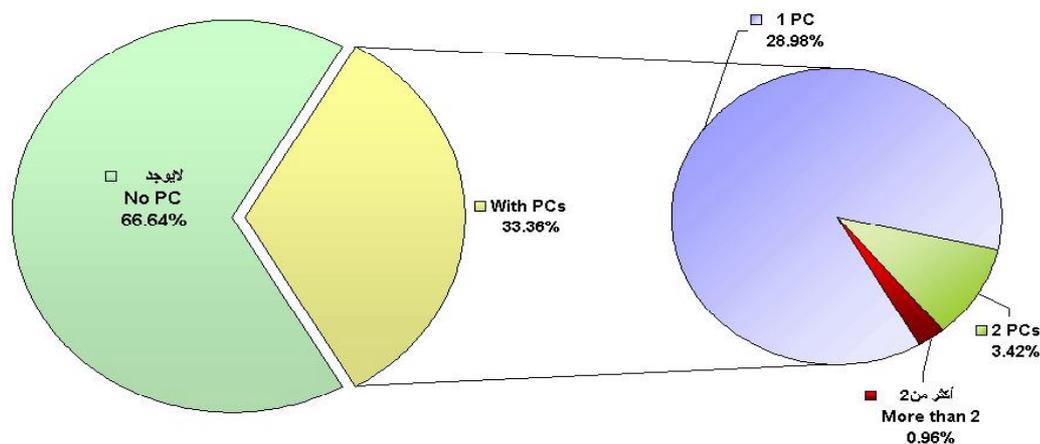


Figure 3. GCC Countries ranked by PC Penetration, August 2002

GCC Countries Ranked by PC Penetration - August 2002					
Country	PC Installed Base	PC Penetration	Internet Users	Internet Penetration	Internet Users per PC
Bahrain	107,000	15.74%	150,000	22.06%	1.40
UAE	450,000	13.85%	900,000	27.69%	2.00
Qatar	107,000	13.54%	60,000	7.59%	0.56
Kuwait	280,000	12.17%	205,000	8.91%	0.73
Saudi Arabia	1,500,000	6.38%	1,600,000	6.81%	1.07
Oman	95,000	3.52%	150,000	5.56%	1.58
Total	2,539,000	7.64%	3,065,000	9.23%	1.21

Source: Mabr Research Group

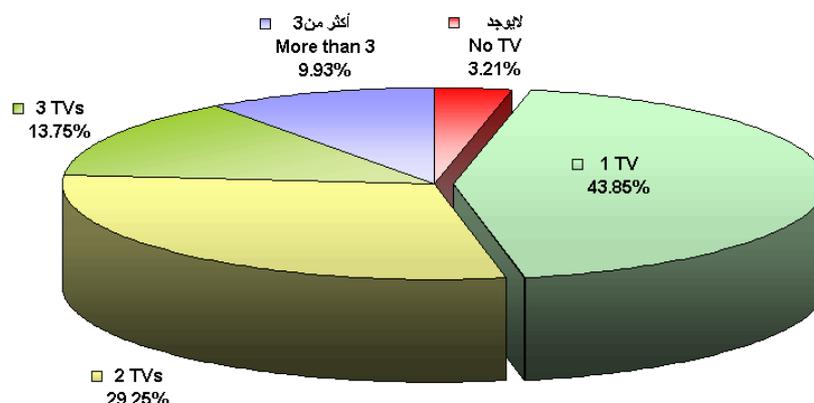
D. MOBILE & TELEPHONE PENETRATION

More than 50% of households and 100% of businesses have a fixed-wire phone connection. The numbers of fixed line telephones are 175,000 and mobile phones are 390,000.

E. TV PENETRATION

Census 2001 result also indicates one of the highest TV penetrations in the Kingdom. Out of 105686 total households 102289 households (96.79%) had at least one TV at home. Batelco is planning to introduce Internet through cable TV very soon. This will create easy and inexpensive means to access ICT in most of the homes.

Figure 4. Percentage of Housing Units by Number of TVs, 2001



Source: www.inet.com.bh

Note: (a) 1 USD = 378 BD;
(b) 1 BD = 1000 Fils.

Table 1. Cost of Internet use in Bahrain

Dial-up				
inet dial up	Registration & setup fee	Monthly Subscription	Usage per minute	Notes
Student	Free	BD 3	Fils 7	Includes 1 e-mail account
Residential	BD 5	BD 3	Fils 7	
Business	BD 10	BD 6	Fils 7	Includes 2 e-mail accounts
Dial ISDN				
inet dial up	Registration & setup fee	Monthly Subscription	Usage per minute	Notes
Student	Free	BD 3	Fils 15	Includes 1 e-mail account
Residential	BD 5	BD 3	(per channel)	Does not include ISDN line
Business	BD 10	BD 6	Fils 15 (per channel)	
Dial direct				
inet dial up	Registration & setup fee	Monthly Subscription	Usage per minute	Notes
With assigned IP Address & Modem	BD 27	BD 20	Fils 7	Includes 5 e-mail accounts

1. *Inet 900*

The Internet with no Monthly fees, no Registration fees and total flexibility. The freedom to use the Internet at your convenience.

For local users, the usage per minute is 15 fils a minute, which will simply be added to the phone bill of the line you are dialing from for the usage only per minute for using the service.

The service can be accessed by anyone, at anytime and from anywhere, all you need is a computer, a modem, Internet explorer and telephone line.

2. Inet Prepaid

The smart way to surf the Internet with everything totally under control. inet Prepaid Service enables individuals to access the Internet through their PCs using Batelco inet Prepaid Calling Cards at a premium rate. Users will not have to subscribe to inet Service in order to use the Internet service. Users do not receive bills as Charges will be made against the prepaid card, which contains User I.D, and password.

Table 2.

Denomination	Tariff	No. of Minutes
BD3	14 fils	minute 215
BD5	12 fils	minute 415
BD8	10 fils	minute 800

The normal inet prepaid service tariffs apply to inet Prepaid over PSTN and ISDN (one channel, 64K only). For usage over GSM, tariffs will include both, GSM going rate 10 fils/minute + inet Prepaid tariffs in the listed in the table.

3. Residential Speednet

Is a new faster and instantly accessible Internet access as it is “always-on”. It is based on ADSL (Asymmetrical Digital Subscriber Line) communication technology, which enables high-speed access to the Internet. Speednet service is offered at 2 speeds; 256 Kbps and 384 Kbps and at a flat monthly fee subscription requirement: minimum system requirements. The Speed Touch USB can run on multiple platforms, such as Windows 98, 98 SE, 2000, ME, XP, Mac OS 8.6, 9.0, X and Linux.

Table 3.

Speed	Registration & setup fee	Monthly Subscription	Additional Traffic Cost (BD per 1 MB)	Notes
256 kbps	BD 30	BD 40	-	- Includes 1 Email Account
384 kbps	BD 30	BD 50	-	- ADSL Modem (USB) is included in both packages
Speed Migration 256k to 384k	BD 5	BD 50	-	
Speed Migration 384k to 256k	BD 5	BD 40	-	
256 kbps (Without Modem)	BD 10	BD 40	-	
384 kbps (Without Modem)	BD 10	BD 50	-	- Includes 1 Email Account
128 kbps (Volume Based)				- ADSL Modem is not included
more info	BD 10	BD 5	0.045	- The recommended modems and suppliers are:
128 kbps with 400 MB Free (Volume Based)				1- Inma Marketing: GreatSpeed USB
more info	BD 10	BD 15	0.035 (above the monthly 400 MB)	2- A.Rashid Est: Aztech USB
Additional Filter	BD 4	-	-	3- Alcatel: SpeedTouch
Change of Number	BD 15	*	-	Existing rental charges applied
Additional USB Modem	BD 120	-	-	

4. Speednet Business

The Speednet service packages for business were designed to suit the different requirements of the business sector. Customers can choose the package they want depending on the applications and the data streams they need. The cost and savings a customer will get greatly depends on how the customer will match his/her requirement with the package made available by Batelco.

(a) Volume Based Package

This scheme is for those organizations who have a budget plan and are looking for the most affordable way to access the Internet. The tariff structure for this scheme includes an activation fee (one-off), a monthly rental and a usage fee above the designated threshold of 2 GB. Therefore, the volume usage of this package will be accumulated each month and if the total volume is above the 2GB threshold for that particular month, the extra volume will be charge at the usage-rate. Volume Based with Threshold is ideal for sole proprietorships and small shops and businesses.

(b) Flat Rate Package

This scheme ensures unlimited use of the Internet and is thus a very cost-effective solutions for organizations with heavy usage. The tariff structure for this scheme includes an activation fee (one-off) and a monthly rental. Flat Rate Unlimited is ideal for medium enterprises, internet cafes, large corporations such as banks, oil and gas companies, and IT-related firms.

Table 4. More information

Speednet Packages	Business			Education	
	Activation Fee	Monthly rental	Usage Fee (above threshold)	Monthly rental	Usage Fee (above threshold)
Volume 256 kbps/64 kbps with 2GB threshold	BD 60	BD 80	BD 0.035/1MB	BD 40	BD 0.025/1MB
Volume 512 kbps/128 kbps with 2GB threshold	BD 60	BD 120	BD 0.035/1MB	BD 60	BD 0.025/1MB
Flat 256 kbps/64 kbps	BD 60	BD 280	N/A	BD 140	N/A
Flat 512 kbps/128 kbps	BD 60	BD 450	N/A	BD 225	N/A

Note: The following value-added services are provided with each package:

- (a) 5 Free email accounts;
- (b) Free single port Ethernet ADSL modem.

(c) Fixed IP Address (for Speednet)

Fixed IP address is available for those enterprises that would like to host IP based services.

Table 5.

IP Configuration Charge (Set-up)	Monthly Rental	
	Business	Education
BD 120	BD 150	BD 75

Note:

- (a) Includes 1 fixed IP address only;
- (b) Includes Free domain Name with 20Mb WebSpace.

5. inet Dedicated Access Services

Batelco's inet Dedicated Access Service offers around the clock, reliable Internet access from a static IP address. The service includes eight IP addresses and a virtual domain.

inet Dedicated Access Service runs on a high-speed Internet connection through a reliable network. Its many features include a domain name to facilitate an on-line presence; multiple IP addresses providing the ability to host services such as mail, web, and proxy servers, and firewalls. The inet Dedicated Access Service operates seamlessly and transparently with other applications such as Virtual Private Network (VPN).

Who Should Use inet Dedicated Access Service?

This dedicated access service is suitable for modern businesses and organizations of all sizes, offering fast Internet access to networked workstations:

- (a) Financial institutions, universities, schools, businesses;
- (b) Organizations and service companies that provide on-line services.

Why inet Dedicated Access Service?

(a) High Speed

inet Dedicated Access Service offers speeds from 32Kbps to 2Mbps, assuring fast network response time and quicker transfer of files.

(b) Greater Reliability

The technology and the networks behind inet Dedicated Access service ensures reliable exchange of information.

(c) Online Presence

inet Dedicated access Service offers a continuous, round-the-clock internet presence which allows you to maximize your business opportunities by offering online services.

(d) Choice of Access

Both leased line and frame relay connectivity is available.

(e) Global Reach

The service allows businesses to extend their operations globally in a seamless and efficient manner. It also offers an easy bandwidth upgrade path as the business and its requirements grow.

(f) Customer Support

The professional team of customer support engineers ensures that your network connections perform at optimum levels without services outages. Helpdesk assistance is available from 7am to 7pm Saturday to Thursday, and from 9am to 7pm on Friday.

(g) Other value added services

A host of related services are available to enhance the inet Dedicated access Service. They include:

- Customer premise equipment;
- Domain name registration;
- Web hosting;
- Banner and e-mail advertising;
- Consolidate invoicing;
- Global Internet Access (one ISP around the world);
- Email boxes with your own company email domain.

Table 6.

KBPS	BD	Monthly rental (BD)	
		Business	Education
64	200	450	225
128	200	675	227.5
256	200	1050	525
512	200	1600	800
1024	200	2400	1200
2048	200	3700	1850

III. ICT CAPACITY-BUILDING

- (a) Awareness and dissemination (such as national ICT awareness programmes, dissemination of the International Computer Driver Licence, ...);
- (b) Computers in schools (extent of computer use in teaching/administrative tasks, teacher training, review of education programmes to introduce ICT as a tool and a subject, ...).

A. COMPUTERS IN SCHOOLS

- (a) The Ministry of Education in Bahrain provides free education for all Bahraini and non-Bahraini students in public schools;
- (b) Since the 1980's, the Ministry of Education in Bahrain has been concerned with the application of new educational technologies to improve teaching-learning methods and approaches and to acquaint students with modern technological tools. Computer labs were introduced on experimental basis at the time.

B. INFRASTRUCTURE AND FACILITIES

- (a) In 1997/1998 the Ministry of Education (MoE) in Bahrain looked forward to introducing Information and communication Technology (ICT) on a wide scale in the education sector, so as to fulfill its mission in preparing the citizen of tomorrow for participating efficiently and effectively in the overall development process;
- (b) In this context, the Internet is to be used as a means for teaching study subjects, establishing contacts at the local and international levels and enhancing self-learning in both formal and informal education.

1. MoE Schools Internet Connectivity (2002)

- (a) All 30 secondary schools in Bahrain are connected to the Internet via Frame Relay;
- (b) In 52 Intermediate schools the IT Infrastructure consists of 56 Kbps Dial-up Modem with a user name/password authentication for each school;
- (c) There are 114 Primary schools in Bahrain each having a 56 Kbps Dial-up Modem with a user name/password authentication;
- (d) Computers introduced to the Ministry's schools are used as a teaching-learning tool as well as to teach computer science;
- (e) Plans to eradicate, administrators, and teachers' computer illiteracy have been implemented since 1998/99.

Table 7. Number of Schools with Design and Technology Labs and Number of Computers in those Labs - Academic Year 2002/2003

Type/Level of Schools	Sex	No. of Schools	No. of Schools which have Design and Technology Labs	No. of Computers
Primary/Intermediate	M	14	4	16
	F	7	3	10
	T	21	7	26
Primary	M	57	50	221
	F	55	47	199
	T	112	97	420
Total	M	71	54	420
	F	62	50	209
	T	133	104	446

Table 8. Number of Schools with Learning Resources Centers (LRCs) and Number of Computers in those LRCs by type of Schools and Sex – Academic Year 2002/2003

Type/Level of Schools	Sex	No. of Schools	No. of LRCs (No of PCs is 1-4 PCs)	No. of Computers
Secondary	M	14	14	89
	F	12	12	93
	T	26	26	182
Intermediate/Secondary	M	-	-	-
	F	4	4	24
	T	4	4	24
Intermediate	M	14	14	42
	F	18	18	76
	T	32	32	118
Primary/Intermediate	M	14	14	50
	F	7	7	25
	T	21	21	75
Primary	M	57	57	154
	F	55	55	182
	T	112	112	336
Total	M	99	99	335
	F	96	96	400
	T	195	195	735

Table 9. Number of PCs at the Ministry of Education Schools

Type/Level of Schools	Sex	No. of Schools	Have PCs	Computer Labs	No. of PCs
Secondary	M	14	14	91	1729
	F	12	12	74	1406
	T	26	26	165	3135
Intermediate/Secondary	M	-	-	-	-
	F	4	4	10	190
	T	4	4	10	190
Intermediate	M	14	12	12	228
	F	18	13	13	247
	T	32	25	25	475
Primary/Intermediate	M	14	6	6	114
	F	7	2	2	38
	T	21	8	8	152
Primary	M	57	13	13	403
	F	55	16	16	496
	T	112	29	29	899
Total	M	99	45	122	2474
	F	96	47	115	2377
	T	195	92	237	4851

Table 10. RATIO PC-to-Student

Type/Level of Schools	Total No. of Students	No. of PCs	Ratio PC:Student
Primary	63620	1755	1:36
Intermediate	30243	899	1:34
Secondary	26472	3623	1:7
Total	120335	6277	1:19

Number of PCs in Simulation Room in Commercial Education

No. of Schools	No. of PCs	Total
10	18	180

Number of PCs in in Primary School for Special Need Education

No. of Schools	No. of PCs
51	55

Table 11. Information and Communications Technology (ICT) at Ministry of Education Expenditure

Year	WorkStation (Pc, Printers, Scanner)	Servers	NetWorks	Software	Total ICT Purchases	HardWare/ Software Maintenance
1998	169,054.000	0.000	5,668.000	12,527.000	189,247.000	45,074.000
1999	319,048.000	1,720.000	10,595.000	30,030.000	363,392.000	49,000.000
2000	143,074.000	0.000	28,784.000	43,479.000	217,337.000	52,862.000
2001	1,048,519.000	29,339.000	49,211.000	42,070.000	1,171,140.000	42,860.000
2002	1,245,810.000	41,000.000	190,000.000	31,698.000	1,510,510.000	78,245.000

- (a) Vocational training (volume and quality of institutions for ICT vocational training in regular education programmes and in private/public training centers);
- (b) University education (variety and quality of ICT programmes, departments and faculties, number of students/graduates and professors in ICTs,...)

C. EDUCATIONAL INSTITUTES

IT educational institutes in Bahrain include of higher education institutes and training institutes.

The main higher education institution is the University of Bahrain. The University of Bahrain has computer science and business information systems departments. The University has an IT college that include Computer Science, Management Information Systems and Computer Engineering departments. Other departments that teach IT related course modules include Educational Technology and Geography, which teach Geographical Information Systems (GIS) courses.

Table 12. Number of IT students at the University of Bahrain

Department	Computer Science	Information Systems
Enrollment	1200	900
Graduates annually	60	50

Berla Institute of Technology opened a campus in Bahrain that offers Computer Science and Engineering degree. This school will be another source of IT graduates with a BSc degree once the institute receives the final approval of its program.

Bahrain has many training institutes that teach computing certificates related to Microsoft, Adobe, Sun, Cisco and other leading IT companies. Bahrain Training institute, Bahrain Institute of Technology, Aptech, NIIT, and New Horizon are some of the well-known IT institutes in Bahrain:

- (a) Research, Development and Innovation in ICTs (RDI institutions, initiatives/programmes, including excellence centers, output volume and quality).

IV. BUILDING THE ICT SECTOR

ICT firms (categories: private/public, telecom, hardware, software, services; size and quality).

A. IT PLAYERS

A key government policy is to attract major international and regional IT companies to play a bigger role in the Bahrain economy. Government consultants are looking for the best computer systems and e-Solutions in terms of costs and applicability. The general practice for government procurement is to offer tenders for public contracts. All major software and hardware companies have dealings with the government, and among the companies that are winning contracts related to e-Government and IT training of civil servants are Microsoft, IBM, Cisco and Oracle. Microsoft signed an enterprise agreement with the Central Informatics Organization to deploy its products and technologies. The agreement is intended to reduce the overall cost of technology acquisition, software asset management, deployment and ongoing upgrades for government departments. Last year, the Ministry of Labor and Social Affairs signed an agreement with IBM to develop local IT expertise in Bahrain. The agreement will see IBM training and graduating 2000 people in various IT domains such as e-business over a period of five years. IBM will also train and certify 40 Bahraini instructors as specialist IT trainers.

The IT related companies, as per the commercial register; in Bahrain are approximately 282 companies. 36% deals with Internet, 38% deal with hardware, 9% deal with training, 9% provide consultancy, 8% deal with software.

- (a) Investment in ICTs (National and foreign direct investment; policies, volume, trends,...);
- (b) Government facilitation (tax incentives, import/export facilitation,...);
- (c) Export of ICT equipment/software (market, volume, obstacles).

V. APPLICATIONS IN GOVERNMENT ESTABLISHMENTS

A. MINISTRY OF COMMERCE & INDUSTRY

With a two-way communication infrastructure and online payment facility, Commerce & Industry ministry's website (www.commerce.gov.bh) is currently one of the first sites giving online delivery of government services such as Commercial Registration (CR) and its renewal.

As the second Phase of improving the efficiency of CR process Government of Bahrain has initiated eInvestorPilot Project (eIPP), which is a pilot project to test an e-government solution and a methodology to be used to transform the activities of the government into a more effective, efficient and economical processes. The process selected for the pilot is Commercial Registration (CR), which is facilitated by the Ministry of Commerce and Industry (MOCI). The CR process requires to be coordinated through a number of other ministries, depending on the nature of the business and the status of the investor. It is the vision of the MOCI to provide the investors with a "single window" and "single visit" service. This is a key requirement to encourage potential investors to select Bahrain as the preferred place for investments. It is also key to achieve high operational performance and customer orientation, which is monitored through performance measurement processes.

B. MINISTRY OF INTERIOR

The Directorate of Traffic and the General Directorate of Immigration and Passports under the Ministry of Interior are currently developing applications where online services for traffic and visa services could be made possible. There is also a plan to link all the police station with wireless voice and data network which will be connected to GDN via a gateway.

C. MINISTRY OF FINANCE AND NATIONAL ECONOMY

Ministry of Finance and National Economy (MOFNE) has upgraded its Financial Management Information System (FMIS) to a web enabled system which can be accessed using the GDN by all user ministries or via Internet.

D. MINISTRY OF ELECTRICITY AND WATER

Ministry of Electricity and Water also has got major plans to introduce web enabled systems and make many of its customer services available online. The Project is well underway is expected to be completed within the first phase of the e-Government.

E. GENERAL DIRECTORATE OF CUSTOMS & PORTS

The General Directorate of Customs and Ports is developing its web-enabled system in order to streamline its business processes and increase the quality of services. A bilingual website (www.bahraincustoms.gov.bh) is undergoing development of online transactions and payment of customs duties and taxes through online banking facilities (I-Net) and an Electronic Data Interchange (EDI) system.

F. CIVIL SERVICES BUREAU

Civil Services Bureau (CSB) has recently commissioned its centralized Human Resources System using Oracle HRMS applications.

G. BAHRAIN DUTY FREE

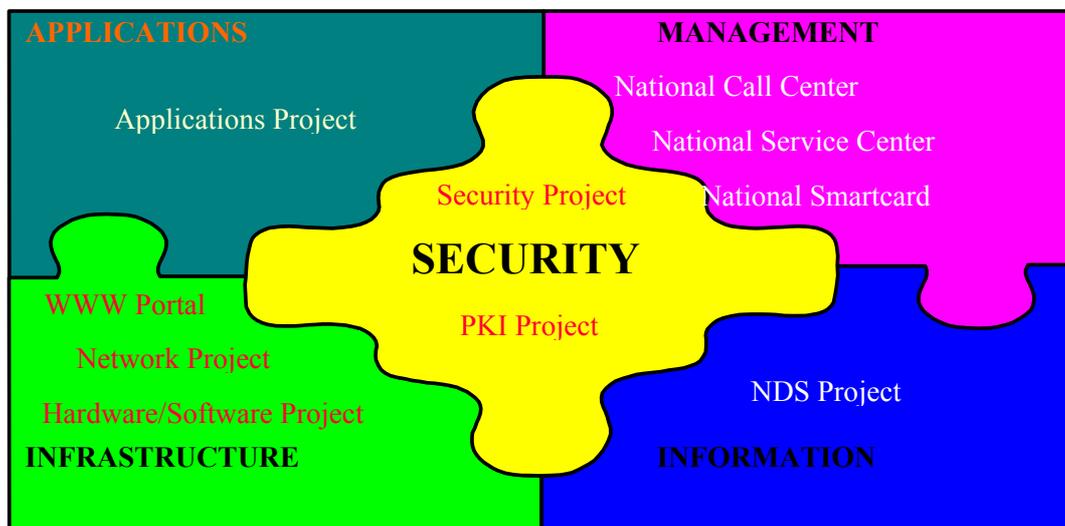
This is a well-developed stage-two level website where travelers can buy goods online and participate in raffles. Content, however, are provided only in English.

The Government of Bahrain is focusing a national effort on leading the region in information technology. A significant part of this effort entails enabling all of its current and future computer systems to function over open networks such as the Internet and deploying them using new technology infrastructures (e-Systems). The transformation to e-Government is supported by an e-Government Strategy that maps out a blueprint for the transformation process and gives a high level direction to all communities of the (State, Regional and Municipal) public authorities. The e-Government strategy undertakes to implement a series of related projects, or program of projects, to improve the effectiveness of systems and technology within the Government of Bahrain.

The Strategy is a conventional IT strategy, which proposes technical solutions to a defined set of business and information needs. The business of government is too varied and complex, and the range of its dealings and contacts too great for that to be easily and quickly achieved. Instead the strategic direction is set for the way the Bahrain public sector will transform itself by implementing business models which exploit the possibilities of new technology. It is informed by the rapid development of new ways of doing business in the wider economy, in the public sector in other countries and by leading-edge practitioners in the Bahrain public sector. It identifies the respective roles of public sector bodies to deliver the benefits of a common approach.

The strategy provides a framework for planning and action across the whole public sector, covering Bahrain local government and the executive agencies, non-departmental bodies and Statewide Government departments. In Ministries and Bahrain Governates, the devolved administrations are responsible for delivering allotted functions and for the preparation of appropriate IT strategies that converge with this main strategy. The overall Bahrain e-Government Program consist of an infrastructure phase and an applications phase, each lasting for two years and will focus on four areas of architecture: security, information, applications and management.

Figure 6. Bahrain e-Government Program



J. E-GOVERNMENT STRATEGY MODEL

The e-Government strategic program is made up of I.T. components, each being the focus of a project. The Program Strategy that include the following active component projects:

- (a) Establishment of a program/project office;
- (b) Establish the Security Forum. (Security Strategy Implementation Project 1);
- (c) Implementation of an Architecture Adherence Policy;

- (d) Implementation of the Central Technical Platforms (Hardware and Software Upgrade Project);
- (e) Implementation of the required Network topologies, protocols and bandwidth (Network Upgrade Project);
- (f) Establishing the Contents of the National Data Set;
- (g) Implementing the National Dataset;
- (h) Transforming selected Applications;
- (i) Development and Implementation of a new Disaster Recovery Plan (DRP) Project;
- (j) Implementation of the remainder of the Security Strategy;
- (k) Transformation of the remaining Applications;
- (l) Government Portal Project;
- (m) Public Key Infrastructure (PKI) Project;
- (n) National Call Centre Project;
- (o) National Smartcard Project;
- (p) National Service Centre Project.

K. BAHRAIN E-GOVERNMENT READINESS

Bahrain featured high in an e-Government report published in May 2002 to assess e-Government progress of the United Nations 190 member countries. ‘Benchmarking e-Government: A Global Perspective’ – made jointly by the UN Division for Public Economics and Public Administration (UNDPEPA) and the American Society for Public Administration (ASPA) – placed Bahrain high in four categories of e-Government development.

An e-Government index devised for the report gave Bahrain a rating of 2.04, compared to a global mean of 1.62 and the highest score of 3.11 achieved by the United States. The index averaged 1.76 for the Middle East region, with Israel ranking highest at 2.26, then the United Arab Emirates 2.17, Kuwait 2.12, and then Bahrain, which was followed closely by Lebanon at 2.00. Bahrain ranked slightly above the European mean index of 2.01. The index, which had a ceiling of 3.25, gave South America an overall rating of 1.79, Asia; 1.38, and Africa; 0.84.

In determining the e-Government index for individual countries, the UN study took into account demographic statistics and factors such as the level of human development and Internet, PC and mobile phone penetration, in addition to ICT infrastructure and the degree of government online presence and level of services.

Yet another study by Brown University in Rhode Island, US, which published a global e-Government survey in September 2002, the Bahrain Government has a fair standing in terms of e-Government progress when compared with 198 other countries. This study presented Brown University’s second annual update on global e-government, i.e., the delivery of public sector information and online services through the Internet.

Overall Bahrain scored a ranking of 52% and stood 13th on world index. Bahrain outperformed all other GCC countries in many areas in the study. (Please see tables 13 and 14).

Table 13. Top E-Government Countries

Taiwan	72.5	South Korea	64.0
Canada	61.1	United States	60.1
Chile	60.0	Australia	58.3
China	56.3	Switzerland	55.4
Great Britain	54.8	Singapore	53.5
Germany	52.6	Mexico	52.0
Bahrain	52.0	Qatar	52.0

14. E-Government Country Ratings for GCC

Year	2001	2002
Bahrain	26.2	52.0
Qatar	12.8	52.0
Saudi Arabia	36.8	38.0
United Arab Emirates	26.1	38.0
Oman	29.1	36.0
Kuwait	28.7	32.0

N. COST OF E-GOVERNMENT

The establishment of e-Government in Bahrain, through separate ICT projects undertaken by various government departments, is expected to cost between US\$150 and \$200 million.

O. E-GOVERNMENT RESPONSIBILITY

There are several government bodies involved in the overall project. The e-Commerce Panel, which consists of cabinet ministers and headed by the Crown Prince, Economic Development Board (EDB) and the Central Informatics Organisation (CIO) are the three executive bodies driving the e-Government move in Bahrain.

The e-Commerce panel is responsible for creating the necessary legislation to allow e-Commerce to flourish, and for devising strategies to attract prominent players in to the field.

The CIO is responsible for the over all IT strategy and the infrastructure for the entire government. The CIO hosts the e-Government Web portal (www.bahrain.gov.bh), and is responsible for Arabising the international content management system (CMS) from PostNuke.

Bahrain's Economic Development Board (EDB) was established in April 2000 as an autonomous semi-private agency – to lure foreign investment in six key 'economic clusters' including IT and telecommunications. The EDB has also been increasingly assisting in the creation of the e-Government. It is charged with formulating and overseeing an economic development strategy for Bahrain, which seeks to turn the island into a hub for global business and investment. With assistance from other government bodies, the EDB has drafted an e-Commerce law to govern online transactions.

VI. APPLICATIONS IN EDUCATION

- (a) e- learning (dissemination in schools and universities, on-line courses);
- (b) e-school projects (networking of schools, organization and coordination efforts);
- (c) Virtual universities (availability, structure and effectiveness of existing schemes).

A. MINISTRY OF EDUCATION

Bahrain was the first GCC country to introduce government-provided education in 1919. Having obtained a head-start, Bahrain today boasts a number of public schools, at which education is provided to students free of charge, as well as many top-rate, fee-based private schools, offering American, British, French, Indian, Urdu and Japanese education. Bahrain is ranked as having the highest literacy rate amongst Arab countries from 1995-2000, according to the United Nations Human Development Report (2001)

Bahrain has many training institutes that teach computing certificates related to Microsoft, Adobe, Sun, Cisco and other leading IT companies. Bahrain Training institute, Bahrain Institute of Technology, Aptech, NIIT, and New Horizon are some of the well-known IT institutes in Bahrain.

In addition, there are several language teaching centers, including the Polyglot School, the British Council Teaching Center, the Cambridge School of English, Berlitz and Alliance Française. Correspondence programs are also available with the University of Maryland and DePaul University. Vocational training facilities in Bahrain include the Bahrain Institute for Banking and Finance, Bahrain Training Institute, and the Gulf College for Hospitality and Tourism.

Bahrain has more than 115,000 students in some 200 public schools. Being a major area for ICT development as part of the e-Government and e-Learning environment, the public education sector in Bahrain is bound to draw substantial government funds – once the Ministry of Education formulates a strategy and develops a plan of action. So far, the ministry has arranged for all public intermediate and secondary schools in Bahrain to be connected to the Internet, and the process of upgrading PC labs and improving on Internet use is ongoing. The Ministry, however, is carrying out further studies and is looking into the experience of other nations before it decides on its approach and priorities. Meanwhile, ICT development in the tertiary education sector is taking place in two institutions; the University of Bahrain and the nascent Arab Open University.

The University of Bahrain has boosted its use of the Internet from mere dissemination of information to a two-way communication. Students can select their courses, and apply for admission and registration using online forms – but the university’s bilingual (Arabic, English) website does not offer online payment facility for courses. The University, however, is planning further ICT development and Internet integration to bring more of the learning and administrative processes online, such as e-Courses: which the university is currently developing.

The Arab Open University is another significant factor in the digital migration of education in Bahrain – since it is based on distance learning. Here, students use the Internet as the main channel for accessing teaching material and assignments, as well as for interacting with instructors and holding discussions with their classmates. The university is headquartered in Kuwait, but it will have a campus in Bahrain, which will be ready to accept distance learners in four initial study areas. The project is funded by the Arab Gulf program for the support of United Nations Developmental Organizations (AGFUND) and accredited by the Open University of London. The cost of the university in its first phase will reach \$32 million and it will have offices in six Arab countries. Much of the cost will go on ICT infrastructure which will initially handle about 4,000 students from around the Middle East.

VII. APPLICATIONS IN COMMERCE AND BUSINESS

- (a) Extent and maturity of e-commerce and e-business applications (B2B, B2C, standards, security issues, ...);
- (b) Availability and quality of e-banking.

A. E-BANKING

Internet banking has made real headway in Bahrain, with adoption rate standing at around 20 percent of all Internet users – equivalent to the rate in many Western countries. Several Bahraini –or partly Bahraini– banks are now offering e-Banking, while most other banks are planning or implementing online services. The Internet banking thrust, spearheaded by a number of national banks such as Ahli United Bank, the Bank of Bahrain and Kuwait (BBK), TAIB Bank, and ABC (a joint Libyan, Kuwaiti, Bahraini venture), has come at the right time. It will support e-Government efforts in establishing transaction channels and gateways so as to enable online payment of taxes, fees and other government charges. With government departments as main potential clients, BBK has just launched an online payment method based on a solution from ACI Worldwide’s Commerce Gateway. The Ministry of Commerce, Ministry of Traffic and Bahrain University are also considering using this gateway.

VIII. APPLICATIONS IN HEALTHCARE

- (a) Databases for national healthcare (volume, coverage, online/offline availability, and updates);
- (b) Telemedicine and medical use of teleconferencing

A. MINISTRY OF HEALTH

The Ministry of Health is spearheading the single most ambitious and costly project in the e-Government drive in Bahrain. Running at a cost of BD20 million (\$53 million) and approved in September 2001, the Strategic Health Information System will allow clinics, physicians and health officials to share healthcare related information and have instant access to tens of thousands of updated medical records over an internet-linked intranet. The project, launched in April 2002, will pass through four phases over a period of six years. Phase One, for completion by end 2003, focuses on setting up a new infrastructure and basic health information services. Existing legacy systems will be replaced in Phase Two – after historical data is retrieved and new applications installed. Subsequent phases will deal with electronic patient records and other end-products before the entire medical information system is made available online. The Ministry of Health already has a website (www.moh.gov.bh) where forms can be completed and submitted online, in addition to online directories.

X. DIGITAL ARABIC CONTENT

- (a) Arabic vs. English content on the Web for national use (categories, necessity/importance, content generation firms,...);
- (b) Obstacles for its development and ways for removing them.

Annex I

INFORMATION SOCIETY INDICATORS FOR BAHRAIN

Indicator		Y2000	Y2001	Y2002
1. Basic Background Indicators				
1.1	Population	637,600	650,600	
1.2	Area	711.85 km2	715.85 km2	
1.3	Density	896	914	
1.4	Urban population (92%)		598,552	
1.5	Adult Literacy (13.45%)	--	63118	
1.6	Poverty		--	
1.7	GNI per capita		10,470	
1.8	GDP Growth (%)	5.3	4.8	
2. Telecom Infrastructure				
2.1	Fixed lines (total)	171,000	174,000	175,000
2.2	Domestic (lines per household)	1	1	1
2.3	Urban (%) Business	24	24	24
2.4	Waiting list (total number)	1200	1700	2800
2.5	Waiting time (average)	6 days	6 days	6 days
2.6	Revenue per line (\$)			0.0079
2.7	Cost of local call (\$ per 3 minutes)	0.008	0.008	0.008
2.8	Cost of call within region (\$ per 3 minutes)			0.075
2.9	Cost of call to US (\$ per 3 minutes)			0.100
2.10	Number of fixed lines operators	1	1	1
2.11	ISDN lines			2449
2.11.1	Initial cost (\$)			
2.11.2	Monthly charge (\$)			
2.12	DSL lines		1176	5051
2.12.1	Initial cost (\$)		Residential 79.36 & Bus. 158.74	
2.12.2	Monthly charge (\$)		Ranges from 13.22 to 1190.47	
2.13	Leased lines			
2.13.1	Initial cost (\$)			
2.13.2	Monthly charge (\$)		National 291 to 3175 International 978 to 31084	
2.14	Cable	--	--	--
2.14.1	Initial cost (\$)	--	--	--
2.14.2	Monthly charge (\$)	--	--	--
2.15	Outgoing traffic (minutes per subscriber)	--	--	--
2.16	Incoming traffic (minutes per subscriber)	397	364	348
2.17	Mobile lines	225,000	300,000	390,000
2.18	Number of mobile operators	1	1	1
3. Media Infrastructure				
3.1	Radios (4 stations)			
3.2	Television (2)		102289	

Annex I (continued)

Indicator		Y2000	Y2001	Y2002
3.3	Satellites (1)		65,770	
3.4	Daily Newspapers (3+2)			
4. Computers and the Internet				
4.1	Personal computers		35,255	
4.2	Personal computers in education		--	
4.3	Percentage of computers that are networked		--	
4.4	Internet subscribers	26,457	44,109	52,446
4.5	Internet users	80,000	137,000	157,000
4.6	Internet hosts			
4.7	ISP's	1	1	1
4.8	ISP monthly charges (\$)		Ranges from 8 to 130	
4.9	Telephone usage charges (\$)			
4.10	Available national bandwidth			
4.11	Hosting availability			
4.12	Secure servers			
5. ICT expenditure				
5.1	Telecom expenditure (million \$)			
5.2	IT expenditure (million \$)			
5.3	Percentage of GDP (%)		2.0	
5.4	ICT per capita (\$)		250	
6. Capacity building				
6.1	Scientists and engineers in R&D			
6.2	R&D expenditure (% of GNI)			
6.3	ICT related university graduates per year			
7. ICT government and business environment				
7.1	e-readiness index			
7.2	e-government index			
7.3	IPR enforcement			
7.4	Compliance with WTO			
7.5	Basic telecom agreement			
7.6	Reference paper			
8. Laws and regulations				
8.1	Patent law	yes		
8.2	Trademark law	yes		
8.3	Copyright law	yes		
8.4	IT Agreement		yes	
8.5	e-Commerce law			
8.6	Signature law			
8.7	Piracy rate			
9. ICT Policy				
9.1	ICT strategy		yes	
9.2	ICT Plan of action		yes	
9.3	National initiatives		yes	

Annex II

LIST OF MAIN STAKEHOLDERS

Economic Development Board
P.O.Box 11299
Manama,
Bahrain
Tel: (+973) 58 33 11
Fax: (+973) 58 33 22
E-mail: edb@bahrainedb.com

Central Informatics Organization
P.O.Box: 5835
Manama,
Bahrain
Tel: (+973) 725725
Fax: (+973) 728989
E-mail: cio@informatics.gov.bh

Telecommunication Regulatory Authority
P.O.Box 10353
Manama,
Bahrain
Tel: (+973) 540120
Fax: (+973) 532125
E-mail: Contact@tra.org.bh

Bahrain Telecommunication Company
P.O.Box 14
Manama,
Bahrain
Tel: (+973) 884 557
Fax: (+973) 611 898
E-mail: batelco@btc.com.bh

Bahrain Information Technology Society
P.O. Box 26089
Manama,
Bahrain
Tel: (+973) 710018
Fax: (+973) 714732
E-mail: bits@batelco.com.bh

Bahrain Internet Society
P.O.Box: 26089
Tel: (+973) 822099
Fax: (+973) 106699
E-Mail: club@ic.org.bh