

The National eStrategy for Lebanon

The United Nations Development
Programme

The Office of the Minister of State for
Administrative Reform

Document 3:

eReadiness Assessment

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1.0 Executive Summary

The National eStrategy for Lebanon project covers 7 major initiatives:

- Initiative 1:** eReadiness Assessment
- Initiative 2:** National ICT Policies
- Initiative 3:** Policies for ICT as a Production Sector
- Initiative 4:** Policies for ICT and Human Capacity Development
- Initiative 5:** Policies for ICT for Social Development
- Initiative 6:** Policies for ICT for Economic and Business Development
- Initiative 7:** Policies for eGovernment

The purpose of the National eStrategy is the development of Policies that the Government of Lebanon can adopt for various aspects of ICT in Lebanon. On developing the policies and the objectives for the Government, the project would proceed to identify the strategies needed to achieve these objectives. Therefore, the project is Solutions oriented, providing a comprehensive set of solutions or project proposals that shall all address on or the other of the policies adopted for the above initiatives.

The project needs to start with an assessment of the current situation in Lebanon. In ICT terms, the world has accepted the use of the term “eReadiness” for such an exercise. eReadiness is therefore an assessment that measures the gap between where Lebanon is in ICT terms and where it wishes to be.

eReadiness Assessment commenced by analyzing the various eReadiness models. It was seen that no one model covers all requirements in Lebanon. The approach was then taken to analyze eReadiness criteria used by all models and select those that are of importance or relevance to Lebanon. Seventeen criteria were arrived at which were grouped into 5 major categories. The classification was seen to be quite close to a fair number of models.

On defining the 18 criteria, the project proceeded to develop a set of key questions or issues to assess for each of these. A total of 118 questions or issues were identified. The project then addressed these questions and commenced on a data collecting and analysis exercise.

Two issues arose with data analysis. First of all, many eReadiness models rely on a strictly quantitative approach, defining indicators and requiring a yearly update on each. Data in and on Lebanon was not readily available and will not be for a while, obviating the possibility of following this approach. Secondly, in many of the issues discussed, it was seen to be more critical to analyze a situation in a cause and effect manner than to simply collect data about it. For example, much is made over the penetration of mobiles yet few of the eReadiness Assessments reviewed for other countries could provide a causal connectivity between the level of penetration and any of its causes or effects.

On completing the Assessment for the 118 issues, the next step was the development of a set of Recommendations and Solutions needed to close the eReadiness gap. Here it should be noted that a parallel exercise was taking place to identify Recommendations and Solutions for the other 3 initiatives. It became clear that the proposed Recommendations and Solutions could easily address multiple initiatives. Therefore, the reader is urged to review the Recommendations and Solutions developed for other initiatives than eReadiness as these would also have an impact on closing the eReadiness gap.

2.0 Introduction and Background

This document forms part of the National eStrategy for Lebanon project. It is the first deliverable in the project and is to be followed by additional documents leading to the National eStrategy for Lebanon Document.

The following sections define the objectives of the document, its approach and methodology.

2.1 eReadiness and the National eStrategy Project

The aim of the National eStrategy for Lebanon Project is to develop national policies and solutions covering four main initiatives:

- Initiative 1:** eReadiness Assessment
- Initiative 2:** National ICT Policies
- Initiative 3:** Policies for ICT as a Production Sector
- Initiative 4:** Policies for ICT and Human Capacity Development
- Initiative 5:** Policies for ICT for Social Development
- Initiative 6:** Policies for ICT for Economic and Business Development
- Initiative 7:** Policies for eGovernment

The approach of the project is to identify National Issues of Concern in each of these 4 initiatives. Issues of concern can be challenges or opportunities. From these issues, the project will develop the required policies the Government needs to adopt.

Using the policies and their more specific objectives, the National eStrategy Project shall proceed to develop individual solutions that respond to such challenges and opportunities.

In the specific case of eReadiness, recommendations and solutions will be developed with the purpose of closing the gap between where Lebanon is and where it needs to be. This means that Initiative 1 will result in policies that will make Lebanon eReady.

These recommendations and solutions will be presented as 1 page project briefs. Later on, the eReadiness recommendations and solutions would be grouped with those developed for initiatives 2, 3 and 4. The full set will be evaluated according to specific criteria. The final result will be a set of ranked solutions which can then be grouped into three bracketed priorities: high, medium and low. The high priority solutions will be further developed into Project Definitions and Plans.

2.2 The Requirement for eReadiness

The purpose of the eReadiness Assessment was stated in the Terms of Reference issued by OMSAR and the UNDP as follows:

“To design and conduct an eReadiness assessment analysis for government, private sector and academia to assist in identifying the status of all ICT and non-ICT building blocks that can enable National Development priorities.”

eReadiness is understood differently based on which perspective one takes. From the most highly focused point of view, it is the readiness of an entity to be networked. eReadiness in this sense can be applied to an institution or a whole country. The stress in this sense is on the infrastructural or physical side.

On a wider scale, eReadiness is taken to mean a national readiness to meet strategic and developmental uses and applications of ICT.

An "e" before "Readiness" should not be understood to mean readiness to be web based or networked. The "e" is for electronic and as such should cover all aspects of ICT readiness.

The project follows the wider approach to eReadiness.

2.3 The Objectives of the Assessment

eReadiness Assessment is an exercise that aims at identifying the challenges and opportunities facing Lebanon vis-à-vis the use of Information and Communication Technology (ICT) in general and the Internet in particular. The current situation is an assessment of the degree of readiness of Lebanon to participate in the digital economy.

In order to assess the eReadiness of a country, several aspects must be studied simultaneously. These generally cover the telecommunications infrastructure, education levels, the social environment, human capacity, income levels, economic and business climate as well as related laws and regulations.

Broadly speaking, such questions need to be asked:

- Is society able to meet strategic and developmental uses and applications of ICT?
- Is society taking advantage of ICT's full potential?
- Is society ready to turn into a knowledge based society?
- What is the minimum requirement to reach such levels?
- What are additional requirements needed to take Lebanon into more progressive stages?
- Is ICT an integral part of socio-economic development and what needs to be done to take it into that phase?

The differences among nations in the extent of using ICT and the Internet are commonly called the Digital Divide. The Digital Divide, with few exceptions, runs along the rich / poor - developed / underdeveloped axis. However, the divide can be assessed according to other disparities in one country such as the access to ICT by:

- Gender
- Area (Remote, urban, etc)
- Age groups
- Educational levels
- Etc.

All nations need to be part of one digital world in the same way that roads, railways and telegraph used to connect the old world. In more practical terms, access to the world markets through the Internet and eCommerce is estimated to develop into trillions of dollars worth of industry. The nations on the wrong side of the digital divide face the risk of being marginalized.

Therefore, the purpose of assessing the eReadiness of Lebanon is to establish where on the ICT map it is and how far is it from being an active player. Upon answering such questions, strategies can then be developed to allow Lebanon to develop into a beneficial position that is particular to it and that is sustainable.

2.4 Approach and Methodology

This section defines the approach and methodology used in the project for the following:

- The structure of the document
- The use of eReadiness models
- Identifying and classifying eReadiness criteria
- Developing the required questions for each criterion

2.4.1 The Use of eReadiness Models

eReadiness assessment has been successfully implemented in many countries. The web provides many documented results of such assessments. Several models or toolkits were developed to measure eReadiness and standardize results.

eReadiness models are numerous and have been used for different objectives. In the Appendix in Section 10.0, a brief summary is presented that defines the aim and focus of the most frequently used models. Various parties have already developed rigorous comparisons of these models. The same Appendix points to such sources.

These models have been successful and have yielded fruitful results. The main concern while researching these models was their highly focused aims. Some were strictly concerned with eCommerce. Others focused on the eEconomy or other aims.

Another dimension that partitioned the models was the assessment method. Some models were based on measuring various indicators. Others resorted to an analytic qualitative approach using quantitative analysis only when data is available and the analysis is appropriate.

Because no specific focus was required for the assessment and as the data was not always available (See Section 2.5), the project positioned eReadiness Assessment as an in-depth analysis of the current situation. The time and resources allocated to the eReadiness Assessment were not sufficient to carry out a wide spread and comprehensive quantitative survey of eReadiness indicators.

InfoDev is the World Bank Information for Development Program¹. In their published "eReadiness Guide for Developing Countries", a step by step approach is advocated. The approach presented in the next few sections follows these guidelines and processes.

2.4.2 The Structure of the Document

The following diagram shows eReadiness assessment as structured into 3 major levels:

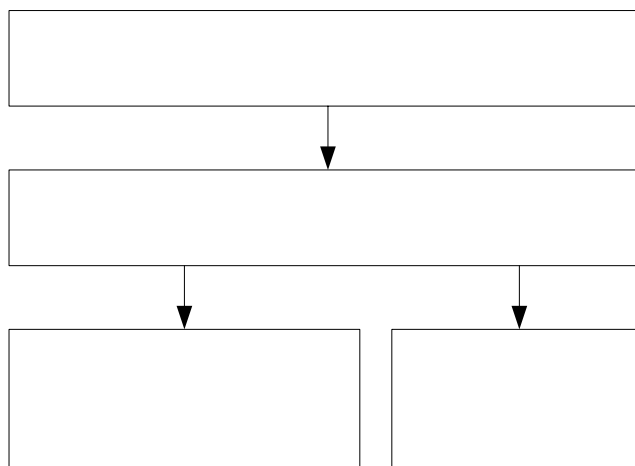


Figure 1: Structuring the Criteria

The document is broken down at the first level, ie, the categories of eReadiness Criteria. (Section 3.0 to Section 7.0). Criteria are shown at the second level while the specific questions to assess for each criterion are shown at the third level.

These levels will be elaborated in the next few sections.

Section **Error! Reference source not found.** follows with the recommendations and solutions for closing the eReadiness gap.

2.4.3 The Identification of eReadiness Criteria and their Categorization

As a first step, the criteria for eReadiness assessment had to be identified. This was achieved by consolidating all relevant eReadiness criteria from all models into one table.

The following was then carried out:

- Duplications were removed
- Additional criteria specific to Lebanon were included
- Parallelism was established to ensure that criteria stated similar requirements

Resorting to the different models, it was found that the various criteria were grouped or categorized under 4 to 8 different groups or categories. It was also found that criteria in one model were classified under different headings in different models.

Five groups or categories of criteria were then identified and used. They are shown below with their individual criteria:

Access and Infrastructure

- Network Infrastructure
- Access
- Affordability
- Reliability and Speed
- International Connections
- Government Leadership**
 - National ICT Strategy
 - ICT Policies and Regulations
 - Central Bank Initiatives
 - Partnerships and Funding for ICT
 - eGovernment and Organizational Efficiency
- Human Capacity**
 - ICT as Formal Education
 - ICT as Informal Education
 - The ICT Brain Drain
- eBusiness and Economic Environment**
 - Economic Climate
 - ICT as a Production Sector
 - eCommerce
- Social Environment and Public Awareness**
 - Usage of ICT in Everyday Life
 - The Internet Society

Figure 2: eReadiness Categories and Criteria

The 18 criteria were selected and approved by the Technical Committee overseeing the project. Figure 2 above shows the overall structure of the document: the categorization at Level 1, the Criteria at Level 2.

One major issue when using the above grouping was that it was possible in some cases to place one criterion under one or more categories.

For example, eReadiness regulatory issues were categorized under one criterion (See Section 4.2). However, the reader looking into Telecommunications would find that there is a discussion on regulatory issues in the Telecommunications sector under the Access and Basic Infrastructure Category.

The same issue was met in the Human Capacity category where the reader may be interested in such an issue under the Social Environment and Public Awareness category.

Indeed, the eReadiness criteria are interrelated and to resolve the problem of a criterion belonging to more than one category, a comprehensive cross referencing scheme was followed to make the reader aware of related issues.

2.4.4 Issues and Questions for each Criterion

In order to assess a specific eReadiness criterion, several questions or issues needed to be addressed such as PC penetration rate, Teledensity, policies and regulations regarding eSignature, etc.

In total, 118 questions or issues were addressed. The questions are shown as Level 3 in Figure 1 presented earlier.

As can be seen, the assessment of each of these questions or issues was often totally quantitative while in many cases, the issues had to be dealt with analytically.

2.4.5 Assessment of Criteria

The assessment covered the whole of each of the 18 criteria. A special assessment section was added at the end of each second level section, or the end of the specific criterion.

2.5 Data Collection

The Technical Committee decided that quantitative data should be collected where possible. An additional issue became the collection of valid data.

An example would be the total population of Lebanon. This varied in some accounts from 3.4 to 3.8 Million inhabitants depending on the source such as the UNDP, various Ministries and the ITU. (The 3.4 Million figure adopted by the 2002 ITU statistics was used and was based on the previous year).

The data about Lebanon's eReadiness had the following characteristics:

- Data was scarce and often non-existent
- Much of the data was out of date. In some cases, this made it irrelevant.
- Data presented by different sources was often found to be inconsistent.
- The conclusions drawn by various parties over the same data were often contradictory.
- In some cases, mostly related to ICT figures, the data was so scarce that Lebanon was not even placed in the international tabulations.
- There was no consistency in the use of indicators from one year to the other.

Only one eReadiness Assessment was made in Lebanon in response to a questionnaire presented to OMSAR by McConnell International in 2001. It was not quantitative in its focus.

2.5.1 Assumptions

Two assumptions need to be highlighted.

Surveys and Elaborate Data Collection: Such wide ranging surveys were not made within the eReadiness Assessment. They would have covered a much deeper look into households, geographical distributions, historical trends and more detailed breakdowns of various eReadiness indicators.

Development of Standard Indicators and eReadiness Indices: Standard indicators and eReadiness model indices were not developed within the project. Such indicators and indices as the following would have been very useful for monitoring progress: trends, standards, comparisons with other countries and accepted benchmarks.

The main reason for the above two assumptions is that the National eStrategy project aimed at developing ICT Policies and generating Programs and Solutions from them. One

month was allocated for eReadiness Assessment with limited resources. Responding to the above two assumptions would not have been possible under such restrictions.

Nevertheless, as can be seen in this document, the Consulting Team did address a wide range of issues and analyzed them in terms of their impact on the National eStrategy.

Indeed, the above situation pointed to one of the key gap closing solutions for Lebanon's eReadiness, namely, the development of a robust information gathering process.

2.5.2 The Source of the Data

Much of the data was collected first hand from local sources such as ISPs, the Professional Computer Association and various domain experts. Another major source of data was the International Telecommunications Union whose 2002 data was made available to the project by ESCWA. Other data was collected from various publications and web sites.

Here are some approaches followed for data collection:

- All data is referenced under the charts and in the end notes.
- In the case where several sources were found, the most consistent and reliable was quoted.
- In the case where multiple sources were found for one datum, the one adopted was the most recent. This resulted in various charts presenting data from different years.
- All years indicated on the charts and tables are the years of publication. Generally, these would cover the previous year's data.

The above again points to the need for a robust ongoing data collection project.

2.5.3 Benchmarks and Goals

An eReadiness Assessment aims at bridging the gap between a current and a desired situation. This implies that benchmarks and goals are known and placed as objectives to be reached by a specific country. Variances would indicate how far a country is from being "eReady".

It was again problematic for the Consulting Team to identify clear goals and agreed upon objectives for being "eReady". Very few clear goals were available for use.

However, in order to reach eReadiness objectives, the following approaches were used:

- Lebanon's position on several indicators was compared with that of regional countries.
- Lebanon's position was also compared with that of developed countries. This was resorted to when it was seen feasible and relevant to reach such goals.
- In various situations, the levels reached by Lebanon were seen to be unsatisfactory. Immediate goals were therefore established to allow Lebanon to move out of such levels. For example, it was clear that affordability was standing in the way of Internet penetration. Goals were then set to allow Lebanon to provide more "affordable" access.

In all cases, a justification was presented as to why the goals were set.

2.6 Developing Recommendations and Solutions

When developing the National eStrategy for Lebanon, four major requirements were addressed. (Refer to Document 2). eReadiness was the primary requirement as it presents the project with several pre-requisite and high priority solutions without which the rest of the project cannot proceed.

The National eStrategy project developed ICT Policies. These were grouped into 7 initiatives as was presented in the Executive Summary of this document. Initiative 1 covered the policies recommended by the Consulting Team for Lebanon to close the gap and reach eReadiness.

The ICT Policies were elaborated in Document 4 while the Programs, Solutions and Recommendations proposed to implement these policies were detailed in Document 6.

3.0 Access and Infrastructure

This section covers the following criteria:

- Network infrastructure
- Access
- Affordability
- Reliability and speed
- International connections

Each of the above criteria is broken down into specific questions and issues.

3.1 Network Infrastructure

3.1.1 Fixed Line Network

This is a Public Switched Telephone Network (PSTN) operated and maintained by the Organisme de Gestion et d'Exploitation de l'ex-société Radio Orient (OGERO). The fixed line network is the most popular mode of access to the Internet providing users with dial up connections and leased lines services. The Government has a monopoly on this service.

The Lebanese civil war resulted in a telecommunications infrastructure which was greatly weakened. Furthermore, it was left without progress and development. From 1995 to 1999, the Lebanese Government reconstructed the telecommunications network at a cost of nearly USD 1 Billion. Siemens, Alcatel and Ericsson were contracted to build a state-of-the-art network with new cables, street boxes, digital switches, fiber optic backbone and microwave links. A submarine fiber optic connection to Europe was laid through Cyprus. A microwave link to Syria and one to Egypt were also added. Satellite links were established to Arabsat and Intelsat through two earth stations.

The work on the new network was completed in 2001. Today, Lebanon has 296 switches to support a capacity of 1.4 million lines and 3 International Gateways².

ISDN (Integrated Services Digital Network) was made available by OGERO in 2001.

The following table shows the various services available on the existing fixed line telecommunications network. It also shows the number of subscribers per service:

Service	Bandwidth	Subscribers
Total Telephone Subscribers		681,066
Residential Telephone Subscribers		564,143
Commercial Telephone Subscribers		116,923
ISDN	128 Kbps	747
Analog Leased Lines	33.5 Kbps	1,126
Digital Leased lines	64 Kbps	270
	128 Kbps	31
	256 Kbps	12
	512 Kbps	6
	2 Mbps (E1)	94
International leased lines	Up to 2 Mbps	50
DSL, ADSL, XDSL	Not available	0

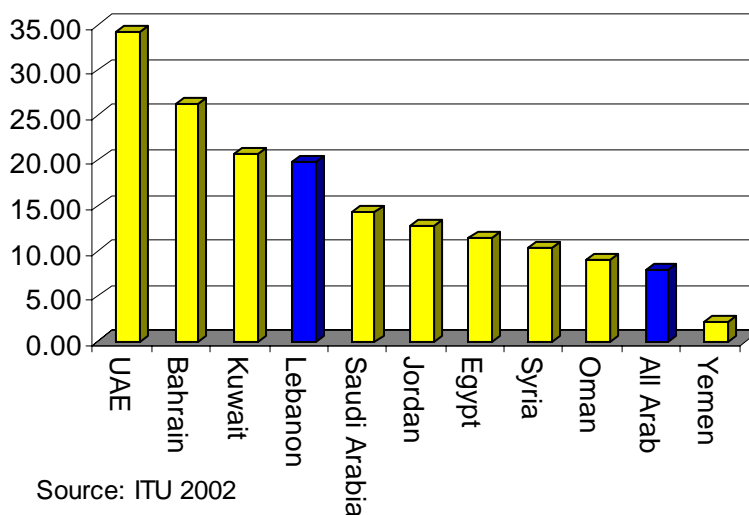
Source: OGERO 2003

Figure 3: Usage of Fixed Line Network (2003)

Given the availability of 1.4 Million lines, the above total subscribers represent around 48% utilization.

The number of telephone subscriptions per one hundred people or Teledensity is 20%. (2003).

The following chart shows Lebanon's position in the Arab World:



Source: ITU 2002

Figure 4: Teledensity in the Arab World (2002)

3.1.2 Fixed Line Network - Planned Projects

The Ministry announced the implementation of an Intelligent Network (IN) in 2001. The aim was to allow non-leased lines subscribers throughout Lebanon to be part of a WAN,

using their existing telephone lines. This project is being finalized and released for marketing in June 2003.

The MPT is aware of the need to accommodate increasing IP traffic. It plans to move dial up Internet traffic away from PSTN. In June 2003, the MPT is expected to announce the approval for use of the 2.4 GHz radio frequency band for wireless Internet access. This will replace the dial up Internet connections currently in use.

The MPT plans to implement a 3 phase plan for an IP network. Each phase is to be implemented over six months:

1. Phase 1: Provide additional international IP capacity (see 3.5.1)
2. Phase 2: Provide an IP backbone through two pilot projects for DSL and VPN. Two VPN pilot projects will be implemented by OGERO. One will connect all banks to the Central Bank. The other will use the concept of Metropolitan Area Network (MAN). This will connect all Government Ministries and Agencies. The timetable for both networks has not been set.
3. Phase 3: Provide full scale DSL, VPN and packet telephony (VoIP) services

The DSL pilot project will be providing DSL to 3000 customers including the Banque du Liban. In phase three, the MPT will deploy 30,000 DSL lines.

3.1.3 Wireless Network - Mobile

The mobile network was launched in 1994, five years ahead of the revitalized telecommunications network. The mobile telephone network uses GSM technology and covers all of Lebanon.

The mobile telephone took advantage of the existing need for communications which was still unfulfilled. Mobile phones were therefore resorted to as a need and not as a complementary service. With this head start, the number of mobile subscribers reached the limit placed by licensing.

The license allowed 400,000 lines to each of two operators which soon brought the subscription capacity to its limit. The terms of the contract were based on a BOT agreement (Build, Operate and Transfer). In June 2001, the Lebanese Government terminated the contracts with the two operators. By September 2002, the two companies started operating the networks on a management basis only.

The Government has prepared an international bid for licensing the mobile network. A third mobile license is provisioned as part of the new telecommunications law.

General Packet Radio Service (GPRS) was launched in 2001 by both companies. It covers most of Lebanon. GPRS has not shown a high penetration mostly due to lack of proper marketing and the low speeds provided. These are also limited by currently available handsets (24 Kbps).

The mobile telephone is emerging as a viable platform to access the Internet throughout the world. This potential can be especially exploited in Lebanon when taking in consideration that mobile penetration rates is slightly greater than fixed line telephone penetration.

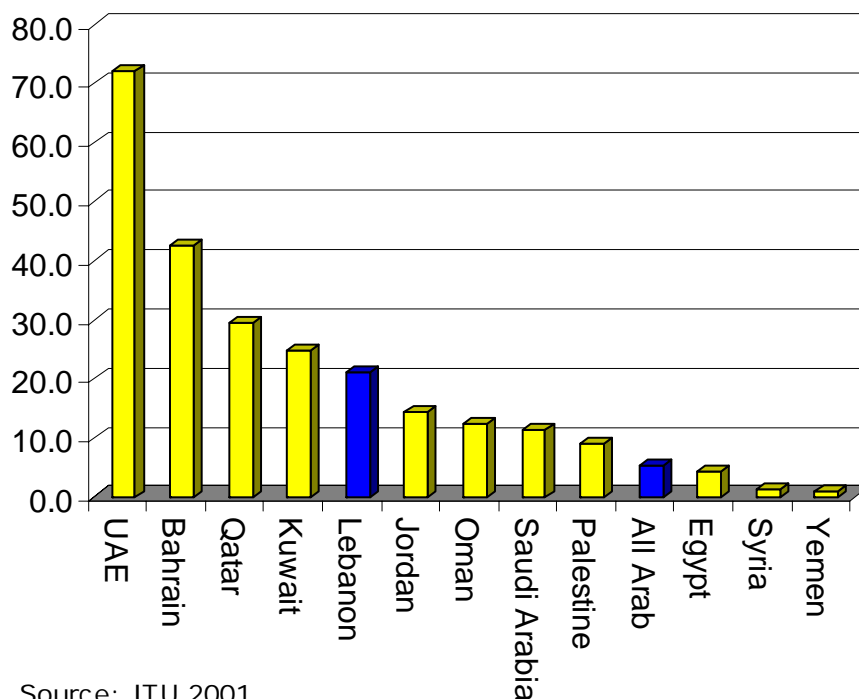
The mobile penetration rate in 2003 is 22%.

Service	Subscribers
Total subscribers	770,000
With SMS	300,000
With GPRS	3,600
With WAP	16,000
With Voice Mail	30,000
With Voice Roaming	17,000

Source: LibanCell and Cellis 2003

Figure 5: Mobile Usage in Lebanon (2003)

The following chart shows the mobile density per 100 inhabitants. Its source is the more elaborate data provided for the Arab World published by the Regional Office of the ITU in 2001.



Source: ITU 2001

Figure 6: Mobile Density per 100 inhabitants in the Arab World (2001)

In the Arab World, the mobile penetration rate of Lebanon is surpassed by the United Arab Emirates, Bahrain, Qatar and Kuwait.

However, undocumented information shows that the Arab World has far surpassed the above figures in the past two years. For example, in 2003, Kuwait had 60% access rather than 24% as shown above. This was due to the introduction of a second operator in 2001 which allowed prices to drop.

3.1.4 Wireless Network - Microwave

There are three registered data transmission operators offering wireless data transfer through 1100 active microwave links. However, many local operators use the technology without permits.

The following wireless data services are being provided by the licensed companies:

- Locally through microwave links at access speeds of 64 Kbps and up to 8 Mbps
- Internationally through VSAT with access speeds of 64 Kbps and up to 8 Mbps

The wireless network is a main competitor of leased lines. It uses frame relay technology and can be deployed on demand in most areas of Lebanon except in the remote northern and southern regions. The wireless network is popular when point-to-point distance is greater than 20 km. Furthermore, data operators are packaging their services as customer oriented products offering fast response rates, discounts and point-to-point solutions to the customers.

3.1.5 Telecommunications Capacity

The following table shows the available capacity of 4 telecommunications services:

	Utilization	Waiting list
Telecommunication networks – Dial Up	40%	None
Telecommunication networks – Leased Lines	N/A*	2 months
Wireless network – Mobile	96%	None
Wireless network - Microwave	N/A*	None

Source: Compiled by the Consulting Team 2003

* Utilization is not applicable since there is no limit on the number of users. However, from the data in Figure 3, it can be seen that the utilization rate of digital leased lines is very low.

Figure 7: Capacity of Telecommunications Services (2003)

3.1.6 Regulating the Telecom Industry

The telecommunications law number 431 was issued on 23 July 2002. The law provides for the establishment of the Telecommunications Regulatory Authority to review and restructure the whole telecommunications industry within two years. The law also calls for the privatization of the telecom industry through the establishment of "Liban Telecom" to operate the telecom sector. Twenty five percent of Liban Telecom will be sold in an initial offering and forty percent within the first two years. The law does not provide for the rate and time frame of the privatization of the remaining shares.

Although the law was passed in July 2002, it has been inactive since. A project sponsored by both the Ministry of Post and Telecommunications (MPT) and The Office of the Minister of State for Administrative Reform (OMSAR) was launched in January 2003. The project is funded by an EU grant. Its aim is to help MPT in establishing a Telecommunications

Regulatory Authority. The project will be executed with Eurostrategy at a cost of USD 3.5 Million. The project has a duration of three years.

The Telecommunications Law requires the use of permits for data providers and ISPs. It is expected that this law shall resolve issues related to piracy of cables, microwave links and satellites within an open market approach. It is hoped that the Telecommunications Regulatory Authority will view communications as a consolidated service and that the practice of licensing bits and pieces will be addressed.

3.1.7 Aerial Cables

Lebanon does not have a fixed terrestrial cable infrastructure. Local operators have been providing an illegal cable service since 1999. They connect homes hopping from one building to the other through aerial cables. Often, these same operators provide homes with generated driven electrical supply and pirated cable television. Some are sophisticated enough to provide both television and the Internet through the same aerial coaxial cable.

In February 2003, the Government stopped cable providers from operating. At the same time the Government instated reduced Internet rates through dial up telephone lines. The Government requested all ISPs to stop providing cable operators with Internet services. However, in March 2003, some operators acquired sub-Internet Provider permits.

Although local cable operators were providing poor quality and unreliable Internet access, they were filling a demand for:

- Cheap and continuous services
- Speeds higher than those achieved through telephone connections often using downloading stations
- Services that can free telephone lines while using the Internet

The cable situation remains unclear.

3.1.8 Satellites

Lebanese law requires permits for installing and using VSAT technology. Satellite dishes are in use in Lebanon. It is not known how many users illegally use satellites for Internet access.

Until recently, only outgoing data traffic was regulated. Since February 2003, both incoming and outgoing data need permits. This increased the cost of downloading stations.

3.1.9 Electrical Supply

A key requirement for proper ICT operations is stable and continuous electrical power. Users in Lebanon are accustomed to acquire Uninterruptible Power Supplies (UPS) as part of their systems.

Power is not continuous in most areas of Beirut. Outside Beirut, the interruptions are longer. Furthermore, during rainy seasons, various shorts in the circuit cause spikes, brown outs and black outs.

In short, the electrical power environment is not conducive to proper ICT operation without costly solutions such as long life batteries in UPS units and electric power generators.

Furthermore, during the late 90s, a major problem arose when the voltage was switched by Electricité du Liban from 110 to 220 volts. Laws and warnings were not issued to ensure that buildings were properly earthed for the higher voltage. Computer systems are more vulnerable to accumulated static sometimes reaching 70 volts on the chassis.

Finally, most buildings do not have lightning protection as there is also no law that requires them to. During the rainy season, this often results in extensive damage to connected equipment such modems, hubs, network cards, telephone exchanges and power lines.

3.1.10 Assessment

- The basic infrastructure is adequate.
- The infrastructure for broadband communications is lacking.
- The telecommunications fixed line network is underutilized because of insufficient marketing.
- The responsiveness of the Government to rapid changes in technology and demand is low. By the time that ISDN became available in 2001, the technology was already obsolete and the demand for it had sharply dropped. Today, DSL and ADSL are demanded by the public to provide the badly needed broadband bandwidth of 5MB or 10MB.
- UMTS is the natural evolutionary choice for operators of GSM networks. It is a member of the global family of third generation (3G) mobile technologies identified by the ITU. There are no provisions for UMTS licensing in Lebanon today.
- The new Telecommunications law does not directly address converged communication services. The consumer should be able to acquire all services from an individual source at affordable prices due to the convergence of services.
- Under the new law, the final decision for providing contracts and permits falls on the MPT. In order to be truly market driven and avoid political interference, it would have been best if the final decision can be made by the Telecommunications Regulatory Authority itself.
- The market in Lebanon is small. Competition cannot be balanced between local and major regional or international players. For example, it would be difficult for a local operator to compete with such a giant as America Online.

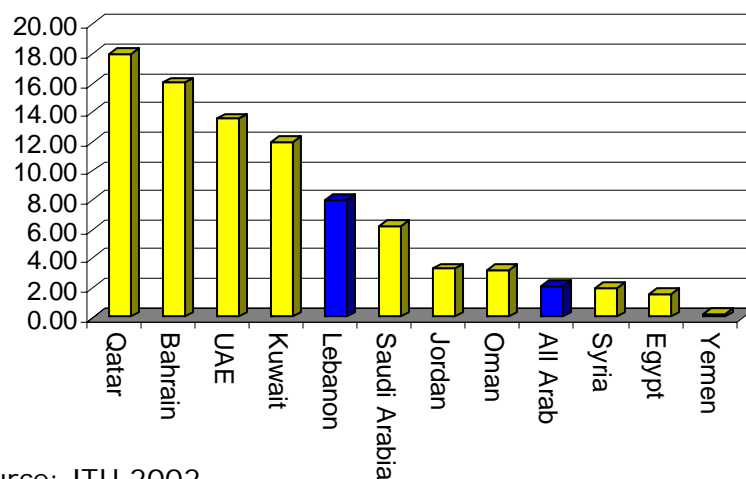
3.2 Access

3.2.1 PC Penetration Rate

According to the ITU, there were 275,000 PCs in Lebanon in 2002 or a penetration rate of 8%. Using the figure of 3.5 Million for the population of Lebanon, this results in a PC count of around 280,000.

The Professional Computer Association estimates that there are 200,000 PCs in Lebanon in 2002 according to Intel Corporation data.

The low penetration rate cannot be accounted for only by the high customs rates. As mentioned in Section 6.1.4, custom duties on ICT products were reduced and then eliminated in 2002. However, VAT is now applicable to ICT products. This does not lead to a significant reduction in end user prices.

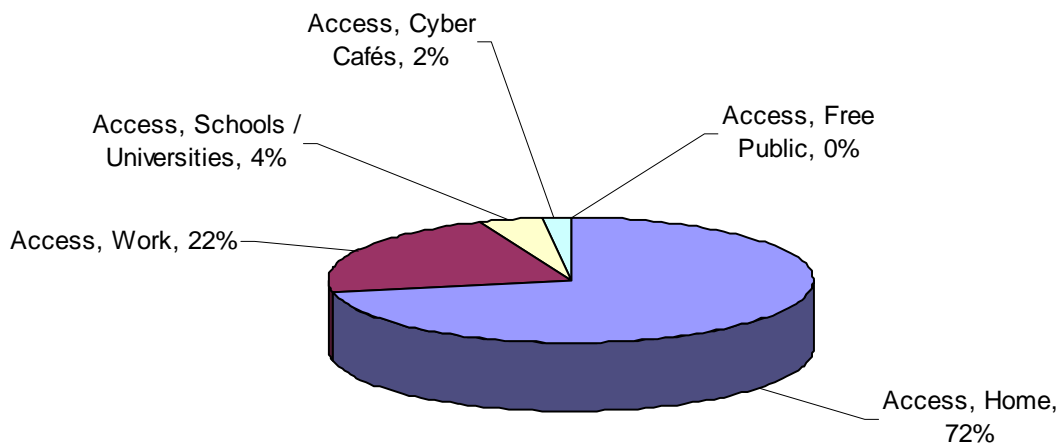


Source: ITU 2002

Figure 8: PC Penetration per 100 inhabitants in the Arab World (2002)

3.2.2 Places of Access to the Internet

A study was conducted by Booz Allen Hamilton³ in 2002 about ICT development in the Arab World. The following statistics regarding the place of access to the Internet were compiled from ITU sources.



Source: Booz Allen Hamilton 2002

Figure 9: Access to the Internet in the Arab World (2002)

There is no hard data to substantiate these numbers for Lebanon. The data emphasizes the importance of dial up connection through the fixed line telecommunications network because it accounts for the majority of the Internet access.

The number of Cyber Cafés is on the rise. Cyber Cafés also offer computer games and are becoming part of the landscape of the neighborhood. Madar Research⁴ estimated the number of Cyber Cafés at 2002. It is interesting to note that Cyber Cafés are spreading in villages and small towns. The town of Nabatiyeh in south Lebanon has seven Internet Cafés.

It is important to note that public and free access points to the Internet in Lebanon are beginning to appear. Two banks provide free access to their customers. Early in 2003, the PCA launched a program called PiPOP which provides free Internet access centers in 10 villages (see Section 6.2.14). This is an ongoing project and will be spread throughout other villages.

The Ministry of Culture has established thirty public libraries throughout Lebanon in the last few years. There are plans to equip 15 of them with Multi-Media centers offered by the Organisation Internationale de la Francophonie.

There are two good practices for offering free Internet access across the Arab World. One consists of providing free telephone access within towns. This has been applied in UAE and Kuwait. The other consists of providing Internet access free of charge as in the case of Egypt.

3.2.3 Internet Penetration

Lebanon was one of the first Arab countries to introduce the Internet in 1993. The American University of Beirut (AUB) implemented and ran the first Internet node in 1991 and opened it to the public in 1993. AUB still hosts the Lebanon root name server.

According to the ITU, the number of Internet users was 400,000 in 2002 and the Internet penetration rate was therefore 11.7%.

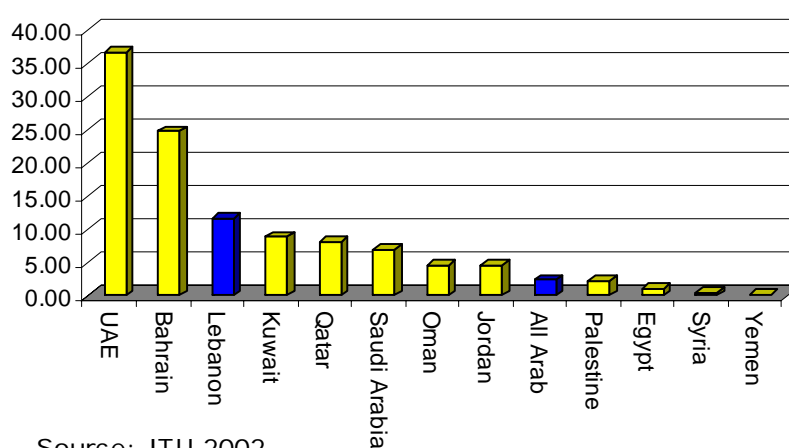


Figure 10: Internet Penetration per 100 inhabitants in the Arab World (2002)

3.2.4 ISPs

Internet services started to appear in Lebanon in 1996. This led to the licensing of 30 private Internet Service Providers (ISPs)⁵. These ISPs provide services mainly to the capital, Beirut. Some have points of presence in the major cities throughout the country. In 2000, the number of licensed ISPs decreased to 16 and in 2003 rose up to 18. However, the number of active providers in Lebanon in 2003 is 5.

These major ISP providers have self regulated their tariffs and services. The ISPs have the necessary capacity to absorb an increase in the demand for Internet access.

There are no regulations against the launch of additional ISPs in Lebanon. The main barrier is financial and is due to two main causes:

- ISPs must lease international lines in order to connect to the Internet in Europe. The telecommunications costs are still high. The establishment of an Internet Hub in Lebanon would help alleviate such a cost.
- ISPs face competition from illegal cable, satellite and microwave links providers. They are forced to give up their market share to such operators who do not have high operating costs since they do not share in license fees and taxes.

3.2.5 Host Count

According to the RIPE Region Host Count published in February 2003⁶, the number of hosts under the domain .lb is 7349. The survey counts the names that have IP addresses and that are stored in Name Servers located in the RIPE region (Europe). The host counts provided by Ripe and others⁷ are approximations. This is due to the fact that even if an IP address is assigned to a hostname, the host need not actually exist. The host count is a good indicator of the relative position of Lebanon web activity.

The ITU estimates the number of hosts in Lebanon in 2002 at 7199. The following chart shows the position of Lebanon in the Arab World.

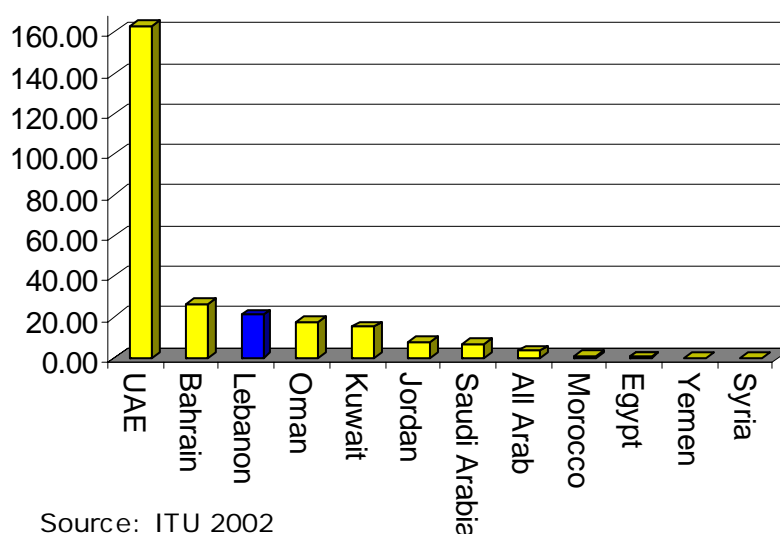


Figure 11: Host Count per 10,000 inhabitants in the Arab World (2002)

3.2.6 Assessment

Relative to the regional figures for Internet penetration, the position of Lebanon is relatively good. Lebanon is surpassed only by a few Gulf States with high income. All indicators show a rise in Internet access and it is reasonable to believe that the trend will continue.

However, Internet Penetration is lower than is required for a country that wishes to bridge the digital divide both internally and externally.

Lebanon needs to address Internet penetration rate in order to protect its good position and face the competition emanating from both Egypt and Jordan who have put in place new ICT strategies.

There are no direct measures that can be used to increase Internet penetration. Internet penetration is an effect and is caused by such factors such as affordability, bandwidth, Teledensity and PC penetration. Recommendations and Solutions will be presented in Section 8.0 that aim at increasing Internet penetration rates.

3.3 Affordability

3.3.1 The Cost of Telephone Dial Up Access

An average dial up time of 30 hours per month is used for the following statistics.

It costs USD 48 to dial up to the Internet through the fixed line telecommunications network. The cost is evenly divided between the ISP and telephone charges.

OGERO instated new rates for data in February 2003, aimed at lowering the data rates with respect to voice rates. The new data rates are shown in the figure below.

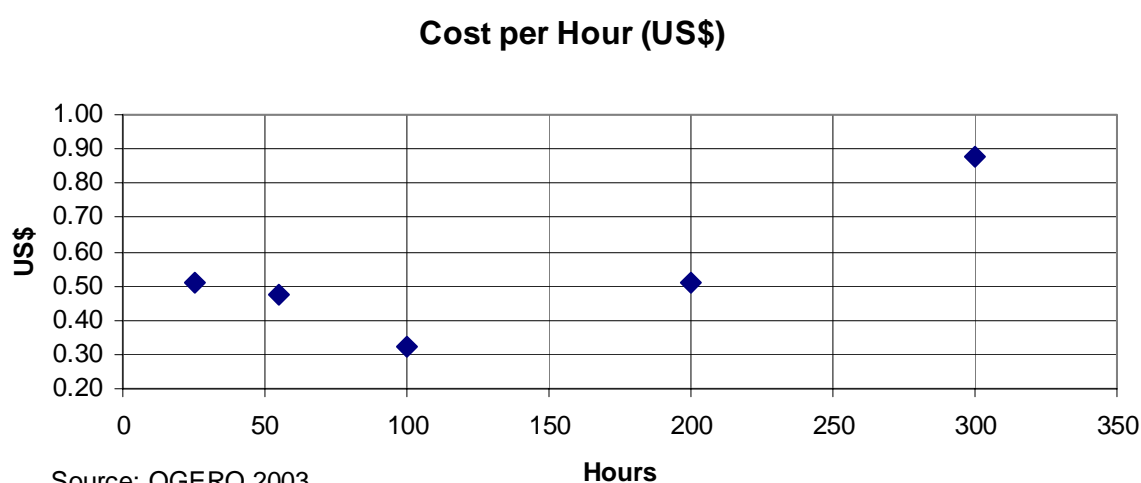


Figure 12: Telephone Data Connection Dial Up Costs (February 2003)

The data connection rates are charged per block of hours 25, 55, 100, 200 and 300. Above 300, the rates revert to the regular telephone connection rates. As can be seen, after the 100 hours block, the cost per hour of usage goes up. Regular connection above 300 is charged at the rate of USD 1.8 per hour.

3.3.2 The Cost of ISDN Access

The total cost of a 128 Kbps ISDN connection for 168 hours of usage per month is estimated at USD 10,355 per year. (168 hours approximate a full working month).

Again, the cost is evenly divided between the ISP and OGERO and includes one time installation fees, modem cost and 10% VAT.

3.3.3 The Cost of Leased Lines Access

Pricing a leased line is a complicated matter in Lebanon. The pricing is dependent on the following factors:

- The type and bandwidth of the leased line: analog, digital 64K, digital 128K, up to the E1 line which is a digital 2 Mbps line
- The cost of installation

- Whether the charge is quarterly or monthly
- The distance between the two points in kilometers
- The number of intervening switches

It is interesting to note that leased analog lines were not intended for data usage. However, because of their low cost, they are being used in Lebanon for point-to-point transmission of data whenever possible.

Until recently, the leased line subscriber had to settle two separate bills: one to OGERO and one to the ISP. OGERO has now shifted the collection of its charges to the ISPs who would later settle both their charges and those of their customers with OGERO.

The pricing information for leased lines is published on OGERO's website <http://www.ogero.gov.lb>.

The total costs associated with leased lines are shown in USD in the table below. (1 USD=1,500 LBP). As per the table, additional cost may be incurred by the subscriber such as one time installation costs, taxes and the purchase of necessary equipment such as routers or modems.

Service	Speed	Installation Cost	OGERO Monthly Charge*	ISP Monthly Charge	Monthly Total **
Direct Leased Line	64 Kbps	533	440	1,350	1,790
	128 Kbps	800	660	2,400	3,060
	256 Kbps	1,120	924	4,600	5,524
	512 Kbps	1,456	1,201	8,900	10,101
	1,024 Kbps	1,747	1,441	17,000	18,441
	2 Mbps	1,922	1,586	34,000	35,586

Source: OGERO and ISPs, 2003

Figure 13: Leased Line Connection Costs In LBP (2003)

* For distance > 20 km

** Excluding Installation cost, taxes and equipment

The pricing structure and break down of the charges of leased lines vary from country to country. It is therefore not a simple matter to compare them. It should be noted, however, that the average telecom monthly charges for a 64 Kbps leased line for the OECD countries is USD 450. The OGERO rate of USD 440 is comparable.

Lebanon's leased lines rates are also comparable with the UAE except for those subscribers in the Dubai Internet City which are much lower. Lebanon's monthly rate is lower while the installation cost is higher. The difference is that Etisalat in the UAE charges a different rate according to the nature of the business. Government agencies, education facilities and NGOs get charged a much lower rate, while commercial institutions pay the full rate.

3.3.4 The Cost of Wireless Access

Three companies provide data services through wireless microwave links.

The price of wireless data links are related to the number of access points from the customer's location. The prices are subject to negotiations with the data providers. Below are the list prices associated with the wireless links.

Service	Speed	Installation Cost	Data Provider Monthly Charge*	ISP Monthly Charge	Monthly Total **
Wireless Data	64 Kbps	750	675	1,350	2,025
	128 Kbps	750	850	2,400	3,250
	256 Kbps	750	1,150	4,600	5,750
	512 Kbps	750	1,400	8,900	10,300
	1,024 Kbps	750	1,700	17,000	18,700
	2 Mbps	750	2,200	34,000	36,200

Source: Data Providers and ISPs, 2003

Figure 14: Wireless Access Connection Costs In LBP (2003)

* For distance > 20 km

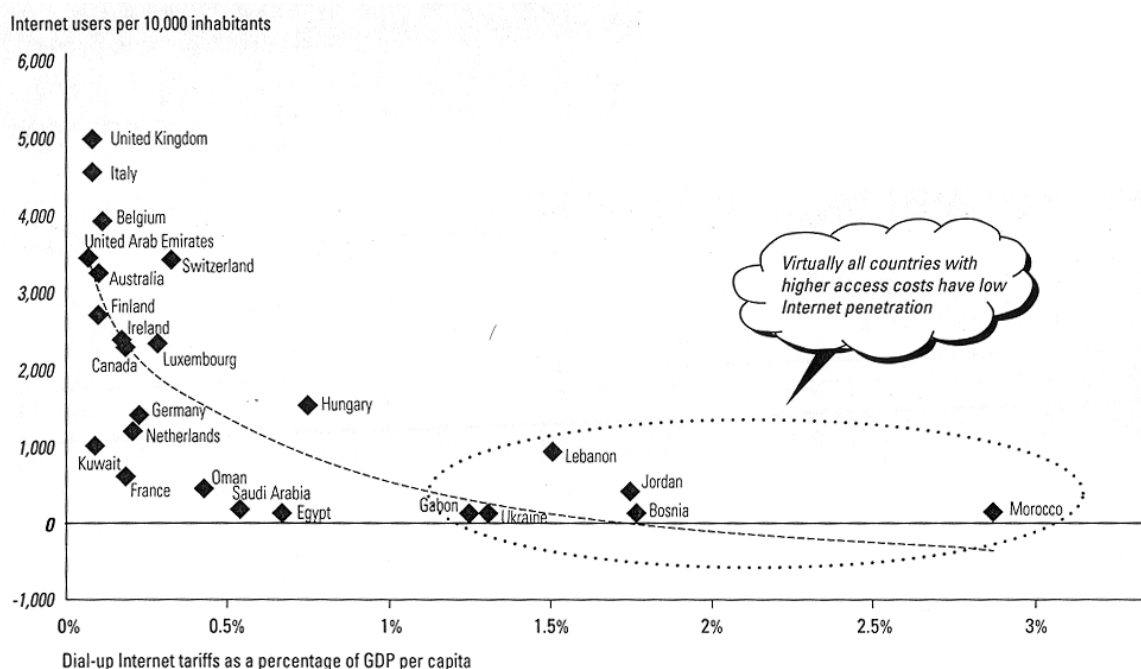
** Excluding Installation costs, taxes and equipment

3.3.5 Assessment

Access cost remains the number one enabler for Internet connectivity. The digital divide is first a division between rich and poor nations. The Booz Allen Hamilton study⁸ has shown that the holders of 81% of the world income account for more than 75% of the world's Internet users. Yet the holders of 81% of the world income are no more than 34% of the world population.

The approach towards assessing the affordability of Internet access is not to compare the cost but to assess it according to the GDP per capita of other countries. It has been demonstrated by both the ITU and the Center for International Development at Harvard University that Internet access is directly affected by cost as a percentage of the GDP per capita.

The following chart is taken from a study carried out by Booz Allen Hamilton⁹ in 2002 based on figures from the ITU. It presents Internet penetration on the vertical axis against dial up costs taken as a percentage of GDP per capita.



Source: ITU 2002

Figure 15: Internet Penetration vs Dialup Costs as a percentage of GDP per Capita (2002)

The data fit an exponential curve. It shows a trend whereby the lower ratio of dial up costs to GDP per capita, the higher the Internet penetration rate. For example, the United Kingdom had the highest penetration rate and the lowest connection costs taken as a percentage of GDP per capita. Lebanon, Jordan, Bosnia and Morocco were shown as countries with low Internet penetration rates and high connection rates taken as a percentage of GDP per capita.

Lebanon had a connection cost of 1.5% of the GDP per capita. The graph demonstrates that an ideal dial up Internet tariff as a percentage of GDP per capita would be 0.5% or less.

3.4 Reliability and Speed

3.4.1 The Reliability of the Basic Infrastructure

The fixed line telecommunications network is reliable with a .0053% of faults on main lines¹⁰.

Power stability and quality problems contribute to the degradation of the telephone lines from the user's perspective as modems switch down to lower speeds when encountering power noise. (See Section 3.1.9 for a discussion on power quality).

3.4.2 Connection Speeds Supported by the Infrastructure

Consumers (Dial-Up)		Business (Leased Lines and Wireless)	
Average	Maximum	Average	Maximum
N/A	128 Kbps	33.5 Kbps	2 Mbps

Source: Compiled by Consulting Team 2003

Figure 16: Highest Connection Speeds (2003)

The consumer average speed is limited by the modem speed available. ISPs offer special packages for 56 Kbps connections through dial up. The maximum speed of 128 Kbps is achieved only through an ISDN subscription.

The business sector average speed is 33.5 Kbps because of the common use of analog leased lines for data operation. There is a facility for connecting at 56 Kbps but the charge is around 20% higher. It should be noted that higher speeds can be reached using the analog line depending on several factors including distance, gauge and quality of the line itself.

OGERO has announced the introduction of DSL. With DSL technology, users can go up to 5 Mbps or even 10 Mbps on the existing infrastructure. However, the time plan for the implementation of this technology has not been announced.

3.4.3 Assessment

- Lebanon needs to provide broadband access throughout its territory. Broadband access is a major cause of the digital divide, between and among nations. The digital divide between Europe and the USA and Canada, is caused by the availability of broadband access in the latter.
- DSL should be offered as a service without delay, because DSL is not a long term solution and it will certainly be replaced by new technologies.

3.5 International Connections

3.5.1 The Bandwidth of the International Connection

The international voice bandwidth consists of 229 E1 lines. This bandwidth computes as 0.558 Gbps for Lebanon. Of this bandwidth, 17% is handled by the two satellite stations while 83% is routed through the submarine cables.

The Arab Advisors Group (A Dubai based research firm) has studied the bandwidth issue in all Arab countries and has computed several indices to rank countries. International Voice Circuits Utilization (IVCU) index was the lowest for Lebanon in 2002, showing that the Lebanese are the most likely to get busy signals when placing international phone calls among their Arab neighbors because of the low international voice bandwidth.

Lebanon has in addition to the 229 E1 lines, 9 E1 lines dedicated for data and the Internet. The international data bandwidth is hence .018 Gbps presently, which explains ISPs dependence on VSAT and downloading stations. MOT is planning to acquire two 45 Mbps lines. One line will be directed towards Europe and the other to the USA. The connection was timed for April 2003. At that time, Lebanon international bandwidth would reach 0.108 Gbps. However, at the time of writing (Summer 2003), it is still not available.

The Telecommunications network in Lebanon can interconnect with international connections without any technological restrictions.

3.5.2 The Internet Hub

Arab Governments have not taken any initiatives for building an Internet gateway infrastructure for the region. Arab end users simply connect through European or USA IP destinations in order to connect to each other's.

In Lebanon, ISPs took the initiative to self regulate and establish a common hub (or traffic exchange gateway) in order to control the national IP traffic and keep it in the country. Because they lease international lines to reach the Internet hubs located in Europe, this self-regulating procedure is returning considerable savings. However, this initiative should not be a permanent alternative to having an Internet hub in the Middle East or even in Lebanon.

The establishment of an Internet hub in Lebanon was addressed by MPT. One option was to take advantage of the expansion of FLAG from its existing nodes in Alexandria and Aqaba into Damascus and Beirut. The other option was to use the earth satellite gateway. In addition to ensuring the availability of the international telecommunications lines, the project would entail establishing and managing the Internet gateway. Unfortunately, this key project was addressed in an ad-hoc manner without feasibility requirements.

3.5.3 Assessment

The international bandwidth of Lebanon is unacceptably low. Its reliability is low where the percentage of successful international calls is only 60%. On the data side, the total data bandwidth provisioned for Lebanon has also been shown above to be low. The demand for additional bandwidth is badly needed. It would result in major benefits such as increased traffic for eCommerce, higher export of knowledge based products and a more reliable access to knowledge and information.

4.0 Government Leadership

This section covers the following criteria:

- National ICT Strategy
- Current Policies and Regulations Surrounding ICT
- Government Partnerships and Funding for ICT
- eGovernment and Organizational Efficiency

Each of the above criteria is broken down into specific questions and issues.

4.1 National ICT Strategy

4.1.1 Priority Level Given to ICT by the Government

ICT does not figure on the priority list of the country. Direct government expenditure on ICT is very limited. The Government depends on major donors to fund projects envisaged and underway with OMSAR and other agencies.

An estimate was made of the ICT share in the 2001 Government budget. The classification shown below is that used in the budget:

- | | |
|--------------------------------------|------------------|
| • Technical equipment | USD 24 Million |
| • Equipment (PCs) and maintenance | USD 8 Million |
| • Maintenance of Technical Equipment | USD 2.45 Million |

The sum of around USD 35 Million represents around 0.5% of the total budget. Data was not available for other countries.

4.1.2 The Government's ICT Strategy

In 1998, Allan MacLean with a team from OMSAR, carried out a study that resulted in a National ICT policy and strategy document. Since its publication, the national ICT policy and strategy document has been distributed and discussed with the different stakeholders in the public and private sectors, as well as in the academia. It has received valuable inputs that resulted in a number of revisions to make it as encompassing as possible.

The "Nationwide Information Technology Policy and Strategy" specifies the roles of the public sector, the private sector and academia to support and promote ICT in an interdependent manner on the national level. The approach is based on the premise that the Government shall be responsible for the key regulatory functions (privacy, intellectual highlights of the national IT policy, security, information content, etc.) and the private sector shall be the main driver in implementation. The policy draws on the experiences of a number of other Governments' IT policies and seeks to adapt these to the particular needs of Lebanon. It outlines the context of the information age and assesses the potential benefits in the sectors of industry, learning and education, communications and culture. The document provides a framework within which each of the public and private sectors can take responsibility for addressing its requirements, developing plans and being accountable for implementation. The Government's main role will be that of facilitation.

4.1.3 A Government Entity for Planning and Executing ICT Strategies

A request made by the Minister of State for Administrative Reform to the Council of Ministers resulted in the formation of the Ministerial Information Technology Committee (MITC) by decree 9500 dated November 7 1997 to develop and implement the an ICT Policy on a national level.

The MITC was headed by the Prime Minister and included the following Ministers:

- The Minister of State for Administrative Reform
- The Minister of Telecommunications
- The Minister of Finance
- The Minister of Economy and Trade
- The Minister of Rural Affairs

In January 1999, the new Government, which had taken office in December 1998, decided to establish a National IT Committee (NITC) to take over the responsibilities of the MITC. The Minister of Economy and Trade headed the NITC.

In 2001, with another change in Government, the Ministerial Information and Communication Technology Committee (MICTC) was formed to replace the NITC and to take over its responsibilities. It was believed that a leaner committee would carry more decision leverage and would drive national projects with greater commitment. The MICTC is headed by the Minister of State for Administrative Reform and included the Minister of Telecommunications and the Minister of Economy and Trade.

The MICTC has a supporting Advisory Committee based at OMSAR, whose members are from the public sector, private sector and the academia with the following charter:

1. To assist the Minister in providing advice and guidance on the development and implementation of a nationwide ICT Policy and Strategy for Lebanon and the other priority projects approved by MICTC;
2. To provide a forum where proposals for the strategic application of ICT in Lebanon can be discussed and assessed in terms of national priorities;
3. To ensure that the needs of the private sector are taken into account in developing and implementing national projects and strategies; and
4. To report to the MICTC on progress with the development of a nationwide ICT Policy document and other projects but focusing initially on the priority projects.

MICTC gives broad policy direction to OMSAR on national priorities. The Minister of State for Administrative Reform chairs the MICTC and provides the link between an advisory committee linked to the MICTC and the Committee itself.

OMSAR's Technical Cooperation Unit (TCU) acts as the secretariat of the MICTC. The TCU has been planning and executing ICT projects for the Government ministries and agencies since 1997. OMSAR has been acting as the de facto national ICT coordinator because of its experience in the domain and its portfolio of projects executed.

Two decrees have been issued by the Prime Minister to request all Government entities to inform and coordinate their ICT activities with OMSAR. Decree number 38/2001 was issued in November of 2001 to stress the need for coordination with OMSAR. Decree number 21/2002 was issued in August of 2002 to inform Government entities of the licensing enterprise agreement signed with Microsoft Corporation. It is expected that a third decree will be issued on the wake of the government's approval of the eGovernment strategy.

However, both OMSAR and the MICTC are vulnerable to the political changes that occur during Government changes. Permanence is a key factor for the success of ICT projects and long term strategies.

It would be more beneficial to adopt one of the following approaches:

- Create a Ministry for Information and Communication Technology. This is an option both Jordan and Egypt have taken when they instated REACH and a national eStrategy respectively.
- Create a National ICT Council as a national independent agency equivalent in stature and structure to the Central Bank or to the core agencies with an executive mandate issued by the Council of Ministers

In either case, there are advantages and disadvantages. What is sure is that a serious and fast track moving national ICT policy can only be implemented by one independent entity placed at the top level of Government coordinating with all related Ministries and Agencies.

4.1.4 Policies and Regulations: ICT Standards

LIBNOR is a public institution under the tutelage of the Ministry of Industry. It was established by a law-dated 23/7/1962 as the sole authority to prepare national standards and to give the right to use the Lebanese Conformity Mark.

National standards cover all products including agro-foods, chemicals, electrical, electronics, information technology and communication, as well as metrology, symbols, technical dictionary, methods of testing, codes of practice and structural design rules for buildings. LIBNOR is a member of the International Organization for Standardization (ISO) and of the Arab Industrial Development and Mining Organization (AIDMO).

LIBNOR had not established standards for ICT. In June 2002, OMSAR launched a project whose aim was "The Development of Standards Guidelines for all Information and Communication Technology Projects". The project was completed in May 2003 by CNSI, a systems integrator based in the USA. The project includes the development of standards, guidelines and operating procedures for the following areas:

- Software Applications
- Package Evaluation Methodologies
- Quality Assurance
- Hardware
- Networks and Cabling
- Telecommunications
- Buildings, Rooms and Environment
- Operating Systems
- Security in Information Systems
- Data Definition and Exchange
- Databases
- Risk Management
- Configuration Management

The project includes the development of national policies for the implementation of Standards and Guidelines as well as a proposal for a comprehensive implementation plan.

Although the set of Standards and Guidelines was published by OMSAR on their web site, by May 2003, by end 2003, the implementation plan was still not launched.

4.1.5 Assessment

- Government budget allocated to ICT is low resulting in a low priority for ICT.
- There is no government entity that operates on the national level with a clear mandate to
 - Plan and oversee the implementation of ICT strategies
 - Coordinate ICT activities throughout all sectors of the country and especially the public sector
 - Help the proliferation of ICT into the fabric of society
- There are very few ICT champions in Lebanon. Key figures and agencies did endorse various “e” initiatives and did proceed along the way. However, their efforts remain isolated and not fully adopted by the Government.
- The implementation of a sound eStrategy carried out at the top level of the Government is an enabler of opportunities and a sure positioning of Lebanon for the decades to come.

4.2 ICT Policies and Regulations

4.2.1 Telecommunications

Telecommunications law number 431 was issued on 23 July 2002. The law provides for the restructuring and the privatization of the telecom industry. (See Section 3.1.6)

As for Voice over IP, Lebanon has joined the majority of Arab countries who bar its use. The Arab Regional ITU Office observes that “Most Arab countries have blindly banned IP Telephony as they have call-back without considering the repercussions. First, if a service costs less than what is currently on offer, then consumers are penalized if they are not able to use it. Second there is a need to distinguish between banning the service as opposed to those who provide it because they do not have a license. In other words, can incumbent telephone operators provide IP Telephony? Third there are two aspects to IP Telephony. What is normally banned is domestic users utilizing it. But a far bigger impact is from incoming telephone calls terminated by ISPs over the local telephone network. The conclusions of the recent ITU IP-Telephony workshop may be of interest¹¹.”

Voice over IP is considered as a loss of income for the telecom providers. However, taking a larger view, it can be predicted that income lost from voice over IP traffic can be recovered by the increase in revenue from the increases in bandwidth usage, ISP growth and the use of other related services.

4.2.2 eCommerce

There are no current policies regarding eCommerce.

Towards the end of 2003, the Ministry of Economy and Trade (MOET) launched a project to develop a legal framework for eCommerce as part of a two-year, 1.7 Million EURO project. The project will study and recommend regulations for eCommerce, electronic contracts and eSignature, among other issues.

The Central Bank has also been active in this regard having defined and regulated eTransactions. (See Section 6.3.2)

4.2.3 eSignature

Four draft bills were submitted to legislation through four initiatives by:

- H. E. Dr. Saidi, Vice Governor of the Central Bank and former Minister of Economy and Trade
- Dr. Ghinwa Jalloul, MP
- H. E. Dr. Basel Fuleihan previous Minister of Economy and Trade
- H. E. Mr. Samir El-Jisr, previous Minister of Justice

It is not known at present which of the four initiatives will prevail and the time for passing of the law. The Ministry of Justice is carrying out a study that aims at consolidating the different requirements.

On the other hand, the Central Bank has defined some cases where eSignature can be accepted as part of an eTransaction (See Section 6.3.2)

It is hoped that the coming project of the Ministry of Economy and Trade will finalize the necessary legal framework for eSignature in the global context of eCommerce regulations.

4.2.4 Electronic Fund Transfers

There are no policies or regulations regarding electronic fund transfers. The Central Bank has already initiated regulations regarding eTransactions. These are discussed in Section 6.3.2.

It is expected that the coming project of the Ministry of Economy and Trade will setup the necessary legal framework for such transfers and complete the work started by the Central Bank in this respect.

4.2.5 Privacy

There are no current or planned policies or regulations regarding privacy.

4.2.6 Security

There are no current or planned policies or regulations regarding security.

However, a standard for security will be established in Lebanon as part of the development of "The ICT Standard and Guidelines" project. (See Section 4.1.4).

It is expected that the coming project of the Ministry of Economy and Trade will setup the necessary legal framework for security issues.

4.2.7 Intellectual Property Rights

An Intellectual Property Right (IPR) law number 75 was issued on 3 April 1999. The law protects the ownership of content in various forms (Text, image, voice, video, etc.) as well as the ownership of software. Clause 25 of the above IPR law violates the TRIPS agreement regarding the copying of software products and books by teachers and students. This remains unrestricted by the bill. (TRIPS is the Trade Related Aspects of Intellectual Property Rights).

Active enforcement has not yet begun and is still awaiting the training of Government officials by the World Intellectual Property Organization (WIPO).

However, the Government has signed a multi-million dollar contract with international software providers to normalize and eliminate software piracy in Government institutions. The efforts of the Government have effectively reduced software piracy from 88% in 1999 to 74% in 2002. (See Section 6.2.7). However, in 2003, piracy of music and films is still high.

4.2.8 ICT Education and Skills Training

There are no current or planned policies or regulations regarding ICT Education and Skills Training. The Labor law does not provide for minimum conditions for training employees during their employment or during their unemployment.

The companies that are seeking ISO certification are instating minimum professional training as part of their internal policies and procedures as a mandatory requirement for ISO certification.

4.2.9 ICT Awareness

Since ICT is not high on the Government's agenda, it follows that ICT awareness is also not an immediate concern. However, OMSAR is engaged in an ongoing series of workshops to expose the strategies of the Government behind ICT usage, standards, eGovernment, GIS, etc. Other initiatives have been launched by the Central Bank on eTransactions. The Central Bank has also been active in terms of raising awareness. A 2 day conference on eLebanon in May 2003 resulted in key recommendations in this regard.

4.2.10 Web Content

There are no current or planned policies or regulations regarding web content.

One issue to consider here is that many Lebanese web sites are not hosted under .lb extensions and therefore would not be subject to any such policies even if they were implemented.

4.2.11 Domain Registration in Lebanon

Up until recently, AUB was the only party authorized by ICANN (The Internet Corporation for Assigned Names and Numbers, a non-profit US based organization) to register domain names for .lb. Lately, Abou Ghazaleh Intellectual Property (AGIP) was given the same responsibility. Both parties have web sites describing the requirements for their services.

As of October 1999, the Lebanese Domain Registry enforced the Updated Registration Rules (Revision 19990922).

One of the requirements for domain registration is the presentation of a registered trademark for the company or organization seeking a domain registration. Companies already registered before that date can stay with their host without any trademark registration. However, if they need to shift hosts, they would need to submit a registered trademark with the request.

For a start, the base situation is awkward and needs to be addressed. It should not be possible for two companies to have the same name in Lebanon. That would be sufficient protection. Secondly, there is no real protection because the domain would be registered, with or without a trademark requirement, by the first applicant. The second one would be rejected and would have to use a derivative name and not the original name of the company. Finally, the registration process for trademarks requires several visits to the Ministry of Economy and Trade.

This situation is causing loss of revenue to the Government as well as a drive towards using .com addresses away from Lebanon.

There is no cost for registering a domain in Lebanon. However, if entrusted to an ISP, they usually charge around USD 200 to cover administration costs for just filling and submitting an application to the American University of Beirut.

4.2.12 Transparency and Predictability of ICT Regulations

There is a general tendency for laws in Lebanon to be issued in a manner that lacks predictability. Reversal in decisions, singling out exceptions to the implementation and the application of retroactivity remain a major puzzle to businesses operating in Lebanon.

An example is the enforcement of the Intellectual Property Right Law passed in 1999. Section 25 allows students and teachers to make unlimited duplicates of software products. This is in direct contravention of the TRIPS (Trade Related Aspects of Intellectual Property Rights agreement). TRIPS is one of the conditions for entry into the WTO which Lebanon is attempting. (See Section 4.2.13 below).

4.2.13 Membership in International Bodies and Organizations

By end 2004, Lebanon is planning membership into the WTO through the Ministry of Economy and Trade (MOET). In June 2002, Lebanon signed with the EU June 2002 an "Association Agreement". The agreement was ratified in December 2002.

The membership into WTO provides a comprehensive and uniform framework between member countries. The WTO framework contributes to eReadiness through fulfilling the following membership requirements:

- Privatization and deregulation of the telecommunications network (See Section 3.1.6)
- Harmonization of the legal systems with TRIPS
- Extend product patent protection on products not previously patented in the country
- Adhering to a standardized definition of Intellectual Property (See Section 4.2.7)
- Establishment of anti-piracy and protection enforcement procedures (See Section 6.2.7)
- Ensure investor protection, personal liberty and consumer protection rights

4.2.14 Assessment

The legal frameworks for ICT, eCommerce and eGovernment are emerging under various initiatives:

- The Association for the Development of Informatics and Law in Lebanon (ADIL)
- Ministry of Economy and Trade
- Ministry of Justice
- Office of the Minister of State for Administrative Reform
- MICT Committee
- The Central Bank of Lebanon
- The Council for the Modernization of Laws in Lebanon
- MP Dr. Ghinwa Jalloul

The efforts of the various initiatives must be coordinated on the national level to fit within the established national ICT strategy. A body with a clear mandate to coordinate the ICT legal framework does not exist in Lebanon. The body could be a national committee or a government ICT entity that operates on the national level.

4.3 Central Bank Initiatives

In addition to enabling regulations regarding electronic financial and banking transactions (see section 6.3.2), the Central Bank is seeking to become a certification authority.

The Central Bank is about to launch the Security Electronic Banking and Information for Lebanon (SeBIL) project. The aim of the project is to instate a platform for secure payments across banks, financial institutions and the public sector. The project will also tackle the regulatory environment surrounding its application.

On the front end, the project proposes web-based applications handling electronic end-to-end processing at all levels of interaction. The applications include real time settlement, automated clearing house, unpaid cheques repository, reporting and decision support systems.

On the back end, the project proposes a secure IT infrastructure (SITI) built upon VPNs. SITI includes all the mechanisms for secure communications including firewalls, encryption and access control based on PKI technology. It is worth noting that the Central Bank will be hosting the public keys of the banks, hence becoming a certification authority in Lebanon.

SeBIL hopes to extend its security infrastructure beyond the banking and public sectors.

Banks already use SWIFT for electronic transactions. A move to SWIFTNET, the IP version of SWIFT, could have also been considered as an alternative or as a complement to SeBIL. Finally, SeBIL still needs to address the infrastructure needed in the institutions that will be using it. Such infrastructure is not limited to front ends, but also include the implementation of the PKI protocols and technology in existing banking applications.

4.3.1 Assessment

The Central Bank is a key champion of ICT. Its efforts to modernize ICT were among the first in the public sector. As it governs a major driving force in the private sector, the initiatives launched by the Central Bank are crucial.

4.4 Partnerships and Funding for ICT

4.4.1 Funding for ICT Projects

Funding for ICT is low in the Government budget. (Refer to Section 4.1.1). However, there has been considerable funding as part of various loans and grants given to the Government by various donors. The list is comprehensive and can be reviewed in the CDR's annual reports.

One of the key concerns regarding donor funding is coordination. OMSAR and the Council for Reconstruction and Development (CDR) ensure the proper coordination amongst the loans they are executing as well as between one another. However, when other Ministries and Agencies do get loans and grants on their own, there has been a low level of coordination between them and the different donors.

4.4.2 Public Private Partnerships

Public Private Partnerships are still isolated occurrences in Lebanon. One example is the alliance between the French universities and leading research institutions such as the Centre National de la Recherche Scientifique.

A key example which should be emulated is the partnership with Khatib and Alami who were behind the drive to develop the GIS maps for Lebanon. The Electricité du Liban project was a partnership between the Government, Khatib and Alami and the American University of Beirut. The drive is creating a wider acceptance of GIS usage.

The CDR, in partnership with UNDP, CISCO Systems and LibanCell, established a Technology Access Center in Bint Jbeil (South Lebanon) in the spring of 2001. The center trains residents to use ICT, both hardware and software and to use the Internet.

Public Private Partnerships are more common in the educational sector. (See Section 5.1.6 for some examples).

4.4.3 Government Incentives for ICT

In 2001, in order to encourage the creation of technology zones and parks, the Government introduced tax and labor incentives as part of the new Investment Law number 360. (See Section 6.2.13). The law classifies information technology projects as Zone C, which means that they can benefit of a full exemption of income taxes and taxes on project dividends for a ten year period.

4.4.4 Regional Technological Cooperation/Partnerships

In Lebanon, regional and technical cooperation is carried out under the umbrella of international organizations such as ESCWA and UNDP. The preparation of the World Summit on Information Societies (WSIS) is a good example of such cooperation. The Beirut Declaration that resulted from an ESCWA regional preparatory conference provides the framework for all member countries in relation to the WSIS. The latest update is dated September 2003¹².

However, what is missing is an effective cooperation such as that practiced by the Gulf Cooperation Council (GCC). One of its achievements was to link the gateways of Kuwait, Qatar, Bahrain and the UAE to one global backbone through the Fiber Optic Gulf cable. Without this initiative, connecting a user in Kuwait to a web site hosted in Bahrain would have caused the communication to be routed through New York or some other distant point.

4.4.5 Assessment

While the Government has been an enthusiastic supporter of ICT, it has provided little or no concrete help or support to the sector or the technology. Government funding and support for ICT is very low. ICT activities at the national level are being funded mainly through donor programs. No incentives are in effect for the sector or for ICT research and development.

Partnerships between the public and private sectors are not being exploited by the Government of Lebanon. They remain isolated occurrences.

4.5 eGovernment and Organizational Efficiency

4.5.1 The Level of Government Effectiveness

This section addresses a key issue in any National eStrategy project. These are some of the reasons why the importance of Government Effectiveness cannot be ignored:

- Government effectiveness leads to improved socio-economic conditions.
- Citizen acceptance of Government initiatives is much easier to acquire when the Government effectively resolves the concerns of the citizen.
- The more effective Government is, the more successful the implementation of eGovernment.

There are several ways to assess the above question:

- The Governance Indicators
- Evaluation of effectiveness through the analysis of business processes

These will be briefly outlined in this Section.

4.5.1.1 Governance Indicators

In a cross Section of more than 175 countries, Kaufmann, Kraay and Zoido-Lobaton provide empirical evidence that there is a strong relationship between better governance and development outcomes. They provide examples by comparing their 6 governance indicators for different countries for per capita income, infant mortality rates and adult literacy.

Kaufmann, Kraay and Zoido-Lobaton published two key papers through the World Bank. One was published in 1999 and was called "Governance Matters". The other was published in January 2002 and was called "Governance Matters II" and was essentially a wider update of the earlier paper¹³. An update was made during May 2003. This paper is a joint product of the Development Research Group and the Governance, Regulation and Finance Division, World Bank Institute. It is part of a larger effort in the Bank to develop and analyze governance research indicators and trends worldwide.

The source of the data is a set of 17 international research institutes and organizations that have measured more detailed indicators which the paper aggregates.

The updated governance indicators report estimates six dimensions of governance for 175 countries in 2000-01. They can be compared with those constructed for 1997-98.

Kaufmann, Kraay and Zoido-Lobaton construct the following aggregated governance indicators:

- Voice and accountability
- Political Stability
- Governance effectiveness
- Regulatory Quality

- Rule of Law
- Control of Corruption

The indicators are aggregated to reach a score between -2.5 and 2.5 (With the higher score indicator the better performance).

Lebanon appears in the updated version of the paper. The following chart shows Lebanon and 3 regional countries (Egypt, Jordan and the UAE). It also shows a line for the assessments for MENA and one for OECD countries.

Lebanon comes out with a low showing indicating weaknesses in all the above indicators. Of key concern in this document is the Government Effectiveness. On a scale ranging from -2.5 to +2.5, Lebanon scores -0.43, a drop from the previous assessment of 0.17 indicating a poor performance. Moreover, it is the lowest entry for the shown countries.

Furthermore, all indicators except that for corruption were worse in the May 2003 update than that of the previous year.

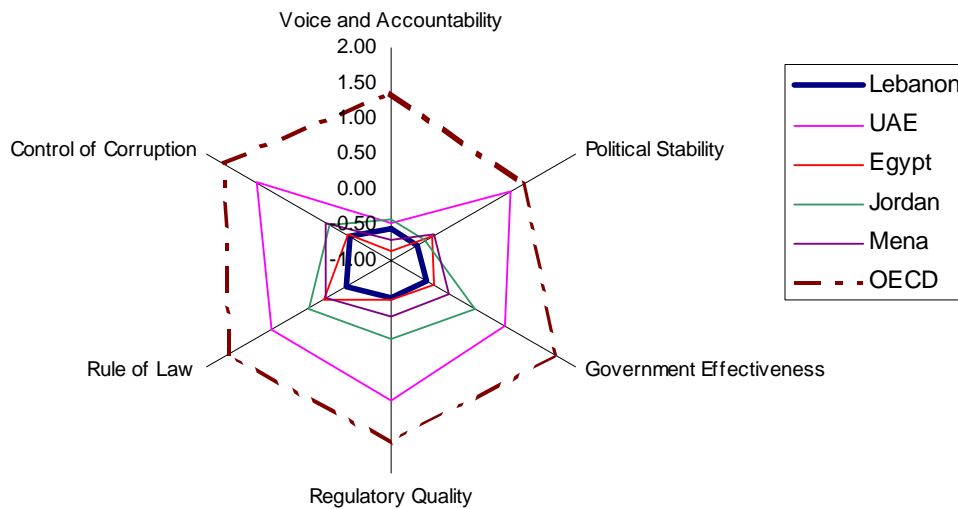


Figure 17: Comparative Governance Indicators (May 2003)

4.5.2 The Efficiency of Business Processes

It is common to label the public sector as bureaucratic. Bureaucracy is the result of inefficient business processes and not their cause. Here are some of the characteristics of business processes in the Lebanese public sector.

- Over the years, procedures in the public sector tend to accumulate layers of new decrees and regulations. These result in cumbersome processes. Only one case is known of a fundamental reengineering of the process to yield radical and dramatic results and that is the Ministry of Finance's introduction of new accounting statements to improve tax collection from private companies.

- Processes frequently offload the work of agencies onto the citizen leaving it to him or her to acquire additional documentation, approvals or authentications. Most of these are already within the public sector.
- Processes naturally span multiple agencies. However, the burden is left on the citizen to roam from one office to the other.
- There are excessive and inefficient controls that do not remove abuse. Furthermore, their cost is usually higher than the cost of the abuse they are supposed to remove.
- Processes are designed with displaced controls. An agency that fails to monitor and control its work will often request another agency to trap its defaulters.
- Processes result in duplicated information because Agencies do not trust each other's information. This results in repeated reconciliation, duplication of data and time loss checking.
- Multiple transcriptions of data is common. Examples can be given of a single transaction that has to be manually recorded on the daily register, the receipts register, the register of the transaction itself and the register to be sent to the Ministry of Finance.
- It is common to have Information Systems that rely on automating the ground process which remains manual. This is achieved by making the Information System as the second copy, reflecting the manual work but neither reducing it nor speeding it up. On the contrary, should automated systems copy such existing practices as multiple signatures, controls and reconciliations, such systems might actually slow down the process.
- The administration is unresponsive to complaints, feedback and suggestions.
- The administration is not flexible. When a situation requires change, lengthy and cumbersome change processes stand in the way of such change.
- New procedures tend to be created to solve problems by adding a layer on top of the original problem without solving it.

There is an urgent need to reengineer the business processes of the public sector. The aim would be to have a fundamental review of the objectives of these processes and redesign them in a manner that yields significant improvements.

4.5.3 Government Strategy for eGovernment

OMSAR produced an eGovernment strategy document. It provides an all encompassing seven year strategy for the realization of a Lebanese EGovernment initiative. The strategy document was submitted to the Ministerial ICT Committee and approved in December 2002. By the end of 2003, the document is still awaiting final endorsement by the Council of Ministers.

The eGovernment vision for Lebanon centers on the attainment of a number of strategic objectives, where ICT is seen as a facilitator, i.e., a mean to the end and not the end itself. The required legal and institutional frameworks back these objectives. The objectives are:

- The dissemination of all public sector information through various communication channels such as the Internet, hotlines, Government centers, etc.
- The online fulfillment of all Citizen-to-Government transactions.

- The mainstreaming of Government procedures to reduce to a minimum the information and supporting documents needed to carry out the Government transaction.
- Provision of a single point of notification for a citizen to use in informing the Government of any change in personal or business information.
- The enabling of intra-Government information exchanges and communiqués on line.

The eGovernment framework as proposed is made up of 4 logical frameworks:

1. Legal framework
2. Technical framework
3. Services framework
4. Operations/Management/Promotion framework

Priority projects were identified as part of the eGovernment strategy as follows:

1. The legal framework must be defined and implemented.
2. The technical framework needs to be implemented through the establishment of a secure network (WAN or VN) between key Government entities including a couple of international ones.
3. Some key online services have been identified for immediate implementation. These are: utilities subscription and billing services, civil and criminal records, completion of NAJM, the customs automated system automation system and NOOR (NAJM On Line Operations), residence and work permits for foreigners, passport issuance, vehicle registration and vehicle excise tax payment.
4. A capacity building and operation framework will be established which includes the ICT organization of the Government at large. Training for both civil servants and citizens throughout Lebanon will be needed on the use of the applied systems.
5. A promotional campaign will be used to educate the public at large about the new functions.

The above approach is elaborated in OMSAR's document which is available on their site¹⁴.

4.5.4 Government Services Available On-Line

Despite efforts by various agencies to promote eGovernment, Government services available online are severely limited.

Most Ministries and Agencies have home pages which define their charter organization and key services. However, these are information sources and do not constitute online services to the citizen or the private sector although some of them have some documentation or forms for downloading (IDAL, Central Bank, Ministry of Finance, Ministry of Industry, OMSAR, Municipality of Jounieh).

Although there are several projects being launched, here are the completed projects already in operation:

- **INFORMS:** A project launched by OMSAR in 2002. INFORMS provides a comprehensive list of procedures that the Citizen needs to follow when interacting with the public sector. Each procedure is defined in detail and forms can be

downloaded for manual use. The portal also contains advice and instructions for completing the forms. (The site is found at <http://www.informs.gov.lb>).

- **Document Tracking in Jounieh Municipality:** This is a project completed by the State University of New York and funded by USAID. Each citizen who submits an application, a request, etc, to the Municipality will be given an ID and password. Through the web, the citizen can then track the progress of his or her application.
- **SchoolNet:** This is an initiative developed by the Ministry of Education and Higher Education to provide an online collaboration and research environment for Lebanon schools. Last year, results of official examinations were posted through the SchoolNet.

4.5.5 PC Penetration Rate in Government

According to a survey managed by OMSAR, there are 7500 PCs located in various Government institutions. The armed forces have 1000 PCs.

The total number of Government employees is 32,000 excluding armed forces and teachers. This brings the PC penetration rate in the Government to 23.4% which is much higher than the individual PC penetration rate of 8%.

4.5.6 The Level of Automation in Government Institutions

4.5.6.1 The State of Software Applications

OMSAR is currently completing a study that aims at preparing an inventory of all ICT products: hardware, software applications and other commercial off the shelf software products.

Forty custom applications are implemented and working through 21 Government agencies. These cover such areas as document requests, archiving, time attendance, accounting and payroll as well as administrative aids systems.

The applications listed in the survey are local, fixed purpose applications. They do not address strategic issues for a particular Ministry or Agency. Such applications would manage the strategic processes of a particular Ministry or Agency. Most agencies still resort to addressing specific needs without viewing the core objectives of the agency. Few Ministries or Agencies have strategic ICT planning projects.

4.5.6.2 The State of Office Technology

Office Technology products are in a better state. A recent enterprise agreement with Microsoft provides reduced pricing on Office Technology products and has increased their proliferation. However, these are useful for improving day-to-day office efficiency but do not contribute to the strategic business processes of Ministries and Agencies.

4.5.6.3 Data Sharing and Exchange Issues

One of the characteristics of the various applications already implemented or under way is their insularity. Many are implemented to serve an internal purpose in a Ministry or an

Agency. The benefits reaped from exchanging data with other agencies are lost. Some of these benefits are: clear ownership of data, access to information by others, ability to authenticate information in one agency that belongs to another and a solid unification of codes.

For example, had there been a national ID database, then most of the burden placed on the citizen to provide an authenticated ID (Ikhraj Qaid) would have been obviated by the requesting Ministry or Agency if they could access the Ministry of Interior's database. Another example is public medical coverage since five public entities provide medical coverage for citizens and three have automated systems. (The Ministry is working on a pilot project to introduce a Smartcard for each citizen).

The same applies to other key records such as company IDs through the Commercial Register or land registration through the Ministry of Finance's Cadastre project.

A further proof of the lack of shared information is the sophisticated level of GIS maps available in Lebanon (see Section 4.4.2). These are mostly underutilized by various parties that have a real need for them. A committee headed by OMSAR is working towards putting in place the coordination framework for GIS work.

4.5.6.4 Coordination

One of the key issues with ICT activities is the low level of coordination between various Ministries and Agencies. OMSAR has been a key factor in the reduction of this phenomenon as it is often consulted on various ICT issues. However, there are many cases where directorates within Ministries commence on ICT projects without coordinating with one another resulting in duplicated effort or effort that is not aimed at the strategic aims of the Ministry or the Government.

4.5.6.5 Standardization

A survey that was part of the "ICT Standards and Guidelines" project conducted by OMSAR resulted in the conclusion that very few Ministries and Agencies have set their ICT Units any standards in terms of ICT resources and systems. As mentioned earlier, by end 2003, the implementation of the Standards and Guidelines has still not been launched.

4.5.7 The Level of Government Employee ICT Literacy

Several ICT literacy programs, aimed at government employees, have been conducted by OMSAR. In total 3,300 public servants have been trained.

The World Bank funded the first program, which was launched in June 1997. It consisted of training 600 employees in basic Windows and Office tools and 50 employees in network administration.

The Arab Fund funded the second program, which was launched in 2000. It consisted of training another 600 employees in basic Microsoft Windows and Office tools and 50 employees in network administration and database administration.

The third program was launched in June 2000 and offered training on demand to government employees. The employee could choose among the comprehensive listing of topics. The program was a big success and was extended until July 31 2003. So far, two thousand employees have been trained through this program.

In 2002, OMSAR launched administrative training programs in public administration and management, project management, communication skills, municipality management and training for NGOs.

Finally, OMSAR offers knowledge transfer training or training on the specific applications as part of all the projects it executes.

4.5.8 Assessment

From the above analysis, it can be seen that the organizational efficiency of the Government is not ready for transition into a knowledge society. Lebanon scores low in its government effectiveness and its regulatory quality. This has a major impact on such issues as democracy, proper governance and the modernization of society.

Lebanon also has an inefficient public sector that is neither ready for eGovernment nor for eCommerce activities. The Government's own involvement in ICT is low: budgets are low for ICT and applications are being launched which are neither comprehensive nor strategic. Furthermore, the Government is far from adopting modern good ICT practices such as standardization, data exchange and training.

5.0 Human Capacity

This section covers the following criteria:

- ICT as Formal Education
- ICT as Informal Education
- The ICT Brain Drain

Each of the above criteria is broken down into specific questions and issues.

5.1 ICT as Formal Education

5.1.1 Education Levels in Lebanon

The Lebanese population compares very favorably to neighboring countries in the level of education of the general population. School enrollment rates are the highest in the region.

According to a study conducted in 2001 by Mrs. Choghig Kasparian of the St. Joseph University (USJ), the illiteracy rate for people 10 and older is 8%. For people below 20 years of age the illiteracy rate is below 1% which means that the illiteracy rate has been virtually eradicated.

Illiteracy has been eliminated principally through increased school attendance. The same study compiles the following enrollment rates.

Age	Enrollment Rate %
0 -- 4	30.30
5 -- 9	99.10
10 -- 14	96.90
15 -- 19	70.80
20 -- 24	29.70
25 +	0.80
Total	32.10

Source: Kasparian (USJ), 2001

Figure 18: School Enrollment Rates (2001)

It is worth noting that there is gender equality in education in Lebanon. Finally, it is worth mentioning that the commitment of Lebanese to education reveals itself through the high enrollment rate in private schools. According to the Ministry of National Education, in 1998, private schools enrollment accounted for 56% of intermediate and secondary students and of 67% of primary enrollment.

The public school system faces many challenges that impede its ability to provide quality education. To make things worse, a rush to public education was witnessed in recent years due to the rapid increase in the cost of private education and the weakening of the economy.

Whether for public or private education, the high enrollment rates indicate that schools are the best place to develop the human capacity for the digital society.

5.1.2 ICT in Schools

The Ministry of Education announced a new educational syllabus at the end of 1998. The new curriculum included ICT skills in the program for complementary and public secondary schools. The new curriculum was implemented immediately. However, problems in identifying teachers to implement the ICT related topics are still being worked out and the implementation of the new syllabus is uneven across public schools.

Public schools are severely challenged in terms of the equipment and expertise they have. Several efforts are being implemented through donor programs to remedy the situation (see Section 5.1.7). However, such effort lacks coordination and is not comprehensive.

As far as is known, public schools have not started using Computer Based Training in their syllabi.

As for private schools, their approach to ICT is above the minimum required by the Ministry of Education. They have computer labs and provide for the use of computers in various scholastic projects.

5.1.3 ICT in Universities

It is estimated that universities produce about 400 computer science graduates every year. Again, the quality of higher education varies according to the university. The main universities, which have been established for a long while, provide reasonably advanced Computer Science degrees and other ICT related majors such as Computer Engineering, Telecommunications Engineering and Management of Information Systems.

Employers in Lebanon are regular employers of Graduates from these programs who are also well accepted by countries in the region.

Lately, there has been a proliferation of new universities in Lebanon. By summer 2003, the number reached around 40 registered Universities, many of them registered in the past 5 - 8 years. Most of them offer majors in computer sciences, business computers and management information systems.

Finally, the Arab Open University in Beirut was recently launched. Some of its courses cover ICT. Most courses require attendance while some are web based.

5.1.4 ICT in Vocational Training

In parallel with the general educational path, Lebanon's educational system provides a vocational path¹⁵ that starts after the completion of five years at the primary level. Students go through 4 years of training after the technical baccalaureate level. The transfer between the academic and vocational path is possible at any time and the reversal is possible within particular conditions.

Secretarial training on office technology is also offered within the curriculum.

5.1.5 The Access of Schools to the Internet

Currently, public schools do not have permanent access to the Internet. Section 5.1.7 presents several initiatives aimed at connecting schools. Private schools have access to the Internet. Indeed, some of them have their own web sites and regularly publish information of use to the students and parents.

5.1.6 Distance Learning

Some pilot projects have started. However, none of them have reached operational levels. The possibility of continuing formal education remotely by correspondence or through the Internet is not an option in Lebanon today.

In neighboring countries, Syria has established the Syrian Virtual University as a broker to other International Universities. Students can continue their education through the University's site.

5.1.7 ICT Educational Initiatives

SchoolNet and Schools Online are two ongoing projects implemented by the Ministry of Education in partnership with the private sector to connect Lebanese public schools to the Internet. Through the Schools Online project, 12 computer labs were setup in various secondary schools throughout the country. More are being planned. Initially, SchoolNet provided some 24 PCs and peripherals to 24 schools around the country.

Another initiative to be promoted on a national scale is a UNESCO program to channel and recycle ICT products. The PCs are fitted with a CBT program that teaches basic ICT skills. This was launched in 2003 and was completed within 18 months.

On the training side, SmartBus™ is a mobile Internet unit ICT. It is equipped with a literacy training module, project evaluation pack, a server with LAN, LCD projector, pull down screen, audio visual teaching aids, laser printer, fax machine and scanner. Smartbus is designed to reach rural communities and give ICT training. It is an international certified training center expected to train up to 4800 people per year. SmartBus was acquired by Mercy Corp in 2002 and has been managed by it since. It operates on a per request basis. Mercy Corp funds it along with funds from USAID and other associations who are sponsoring the bus in various regions. The Smartbus is currently touring schools in the Jbeil district and has activities scheduled for the next six months.

Fondation Saradar¹⁶ is a non-profit organization that sponsors ICT related educational initiatives. On July 10, 2002, Fondation Saradar launched a pilot project entitled "Saradar IT Programme®". The program is an ICT capacity-building project which proposes to meet people in their regions. Training is provided to displaced persons in a mobile school, a caravan, tailored and built as a classroom and furnished with the necessary equipment to accommodate students of all ages, particularly children and women.

A recent project financed by the Islamic Development Bank promises to provide 5000 PCs to around 400 public schools throughout Lebanon. The project was awarded in the spring of 2003 and was launched soon after that. The project covers training on the support of the systems but not on the educational use of the PCs.

Other projects stress the development of the information resources for the Education sector through the collection of educational data in databases. Such projects include the implementation of Educational Management Information Systems (EMIS) at the Ministry of Education by both the UNESCO and the World Bank. The systems aim at collecting and analyzing educational data for decision support.

5.1.8 Assessment

- Throughout history, Lebanon's key asset has been that of human resources. Lebanon has a long tradition and excellent reputation for its human capacity. The challenge for Lebanon is to keep up this tradition. If Lebanon's human capacity does not remain competitive with the global requirements of the digital economy, Lebanon will lose its competitive edge.
- Lebanon needs to bridge the gap between private and public education.
- There is donor interest in helping the public school sector and some initiatives are being active in that sector. Some schools have witnessed individual success stories such as those where support came from the parents of the students.
- The application of the ICT curriculum in public schools has been impeded by the lack of qualified teachers. This is due to the low compensation offered by the Ministry for such teachers. Other reasons include the lack of proper equipment and software.
- The new curriculum must be revised to introduce ICT at the primary level and not only at the complementary level as it stands today. Children are fast learners and that would reduce the load of learning at the secondary level.
- There is an adequate infrastructure for formal ICT training through vocational training and university education.

5.2 ICT as Informal Education

5.2.1 ICT Skills Training for the Citizen

There are around 100 registered training institutes¹⁷ in Lebanon that address ICT skills directly. (Others address a mix of subjects). The quality of these centers has not been assessed.

Only 10 of these institutes are certified training centers for the ICT products they instruct in. They offer courses from basic Windows to advanced database administration, web master programs and Microsoft Network Administrator. The certified training centers are expensive and are not affordable to most members of the society who need to acquire ICT skills.

Cisco systems established in partnership with USJ a Regional Academy under the Cisco Networking Academy. Microsoft offers training courses throughout Lebanon through certified training education centers.

UNESCO provided training for 850 citizens age between 8 and 60 years in three centers located in Khiyam, Marjeoun and Bint Jbeil in South Lebanon. The training program was retained for a period of 18 months.

5.2.2 The Private Sector and the Culture for ICT Training

ICT and other training are still not part of the private sector culture. Employee training is not included in the Labor Law. Most SMEs do not include training as part of their employee benefits. One of the main reasons is that SMEs consider training will increase the rate of staff turn over.

Now that the interest in Quality Systems is developing, the private companies interested in achieving quality certification must incorporate training in its regular procedures.

5.2.3 Assessment

Lebanon lacks major initiatives for training citizens on basic ICT skills. Those aged above 35 did not benefit from a formal ICT education. Society cannot afford to ignore their lack of skills. Without affordable access to continuous education in basic ICT skills, these citizens will be on the wrong side of the digital divide and will be a hindrance to institutional efficiency.

5.3 The ICT Brain Drain

According to a study conducted by Mrs. Choghig Kasparian of the St. Joseph University (USJ) in 2001, the migration rate in Lebanon was 13.4%. For those aged 25 to 54, it was 23.8%.

The brain drain hit the ICT sector hardest. A study conducted by MADMA¹⁸ in 2000 estimated that 70% of computer sciences graduates left Lebanon in 1999. Employment wages and opportunities offered to ICT graduates in Lebanon cannot compare with the same offered in the Gulf countries, Europe and North America.

On a positive note, the Lebanese Diaspora extends all over the globe. A large number of expatriates are still connected to their homeland, providing moral support and material help in case of need. Encouraging links with such Diaspora would provide Lebanon with various benefits such as the return of the Diaspora, the transfer of technology and potential direct foreign investments in the ICT sector.

The challenge for Lebanon is to reduce the brain drain to a bare minimum.

6.0 eBusiness and Economic Environment

This section covers the following criteria:

- Economic Climate
- ICT as a Production Sector
- eCommerce

Each of the above criteria is broken down into specific questions and issues.

6.1 Economic Climate

6.1.1 The Effectiveness and Health of Business Competition

Given the free economy, the business environment provides a healthy competitive environment. Companies tend to race for new products and services with an unusual proliferation in number and range only to settle down to a stable size and growth.

6.1.2 Direct Foreign Investment

Companies wishing to setup offices in Lebanon have one of the following options:

- Register a company as a Lebanese company with foreign shareholding. This is possible and is not regulated with the exception of a restriction that non Lebanese shareholders in an SAL company can own a maximum of 66% of the shares.
- Register a representative office. The company will not be able to sell any product or service within Lebanon.
- Register a company as an offshore company. Such a format is restricted to carrying out studies and research. This would allow it to change the registration mode and become an onshore company. Again, offshore companies cannot sell products or services in Lebanon.

Lebanon can provide many services, particularly in ICT, for foreign companies who can use it as a cost center. For example, a foreign company may benefit from low costs in Lebanon and open a branch that solely concentrates on software development (or other knowledge based activities). Such companies are vulnerable. The Ministry of Finance does not recognize a company without revenues (a cost center) and would in most cases apply estimates forcing upon them taxes without incurring any revenues.

Currently, the only exemptions available to foreign investors are through the legal framework defined in Law 360 on investment development in Lebanon (See Section 6.2.13).

6.1.3 Postal and Courier Systems

The postal system carried over from the war years was totally inefficient leading the Government to setup a private company called Libanpost to handle all such services. Libanpost revitalized the postal system introducing many new services such as passport renewal by mail, call up for Military Service, house help labor card, real estate

transactions and license renewal. This has improved the trust in the postal system, which is currently being used by Internet users for their international shopping.

Local and international courier services also contribute towards services such as parcel deliveries.

Both postal and courier services are crucial for an efficient eCommerce system. Citizens will be encouraged to shop on the web and companies will promote their own use of eProcurement with efficient delivery systems.

6.1.4 Customs Regulations and ICT

Lebanese Customs follow the harmonized system for the classification of goods since 1996, a system recommended by the United Nations Conference on Trade and Development (UNCTAD). The Lebanese customs use NAJM and NOUR as the Customs clearance automated information system since 1998. Through Najm, the Lebanese customs have been online since 2000¹⁹.

ICT products spread into different categories within the harmonized system. For example, it is very difficult to find out the exact number of PCs that have been imported into Lebanon from the existing classification.

In 2000, the Government reduced custom duties on hardware and software from a range of 6 to 30% to a flat 6%. By the beginning of 2001, duties on computers and computer products were totally eliminated. However, the Value Added Tax (VAT) came into effect in 2002 and was applied to ICT products.

Custom formalities are time consuming and costly. All packages, books and CDs are to be opened by the General Security for content checking and censorship. The customs intervene to estimate the value. For example, a CD could be valued by customs at USD 30 even though it might contain data or family photos. Besides the delay that can take four days, the goods are often damaged by mishandling.

6.1.5 Assessment

The overall economic climate is favorable to ICT and the digital economy:

- Lebanon has a tradition of entrepreneurial, free market and private competition.
- Lebanon is positioning itself to be an international trading partner. It has signed a trade agreement with the EU and is preparing itself for entry into the WTO.
- There is a reasonable level of confidence in the market.
- Custom formalities regarding ICT products and software should be streamlined.
- Foreign investment has been low. Lebanon must seek further ways to attract foreign investment.

6.2 ICT as a Production Sector

6.2.1 Lebanon and the Technology Achievement Index (TAI)

The Technology Achievement Index (TAI) is an index of UNDP's Human Development Report. The TAI measures technological achievements, not necessarily ICT. It is based on the following criteria:

- **Technology creation:** number of patents per capita and royalty/license receipts per capita
- **Diffusion of recent innovation:** Internet users as % of population
- **Diffusion of old innovation:** electricity and telephone consumption per capita
- **Human skills:** Mean years of schooling and gross enrolment in tertiary science and mathematics education

The TAI groups and ranks 72 countries of the world into:

- **Leaders:** High achievements in technology creation (Finland, US, Japan, Korea)
- **Potential leaders:** High levels of human skills and diffusion but innovate little (Spain, Czech Rep)
- **Dynamic adopters:** Dynamic in the use of technology but tend to have lower skills than potential leaders (Brazil, China, India...)
- **Marginalized:** Low achievements in all dimensions including spread of old technology

For Lebanon, the data was missing or unsatisfactory for one or more of the indicators. In the Arab Human Development Report of 2002²⁰, Lebanon was shown to have no technology creation patents. It was also shown that recent innovations in medium and high technology represented 6.8% of its exports as a percent of total exports. The rest of the data was not available indicating a poor showing for Lebanon's TAI.

6.2.2 Business Culture and ICT

The war had its toll on ICT in the business culture. Under situations of adversity, companies tend to automate the bare minimum, ie, core information requirements. The result was a demand for small and cheap software applications. Most of the software developed to fill the market demand did not address strategic issues by integrating requirements and providing comprehensive solutions. Systems were fragmented and unwieldy.

Most businesses are automated to some extent. When management is questioned about the limited level of ICT in their organizations, the first concern is the issue of credibility in software solutions. The second concern is the low return on investment in automation. Thirdly, the culture of paying for software products is still not integrated into the business mentality. Neither is the modeling of business requirements for application in ICT products. Finally, human capacity within the organization itself, which will be addressed later, made it difficult for companies to be entrenched in ICT practices.

6.2.3 The ICT Sector

The ICT sector consists of three main activities: the assembly and sale of hardware systems and components, software systems and services and ICT consulting.

The Professional Computer Association (PCA) estimates the size of the ICT sector to USD 245 Millions with an average growth rate of 23% for the last five years. This growth rate can be best thought of as a startup rate. There are a large number of companies opening up and closing.

Total ICT exports are estimated by the PCA to be USD 23 Million or 9% of the ICT sector size. It is not known what percent of the total size of Lebanese exports is due to ICT products and services.

Finally, the PCA estimates that 18% of the ICT market size is generated by software, 28% by ICT services and 58% by hardware.

In the 2002 edition of the Lebanon Business Advisor, it is significant that of the top 25 companies by share capital and by manpower, not a single ICT company was listed. Only one company, a mobile operator, was listed in the top 25 advertisers. However, of the ISO certified companies in Lebanon, around 10 ICT companies were listed including 3 in telecommunications.

6.2.3.1 Assembly and Sale of Hardware Systems and Components

When it comes to PCs, the market is dominated by a few US brand names. The rest of the PC market comes from assembled and far eastern products. Assembly has become more credible with the standardization of brand name components.

The PCA estimates that around 60,000 PCs are sold in Lebanon per year. There is no breakdown for this figure in terms of Intel based servers, desktops and laptops. Intel estimates their penetration at 40,000. The difference can be attributed to grey import PCs and motherboards are imported into Lebanon. There is no data concerning the sale of non-Intel based products.

The number of companies involved in the assembly and sales of hardware products is not known. However, the PCA estimates that such companies generate USD 144 Million in sales that account for 58% of the ICT market size.

6.2.3.2 Development and Sale of Software Systems and Services (Including Internet)

This sector is in continuous growth. However, micro companies made up of individuals plague it. This resulted in maverick software development completely lacking in quality and standards.

However, in due course, this sector grew with the following characteristics:

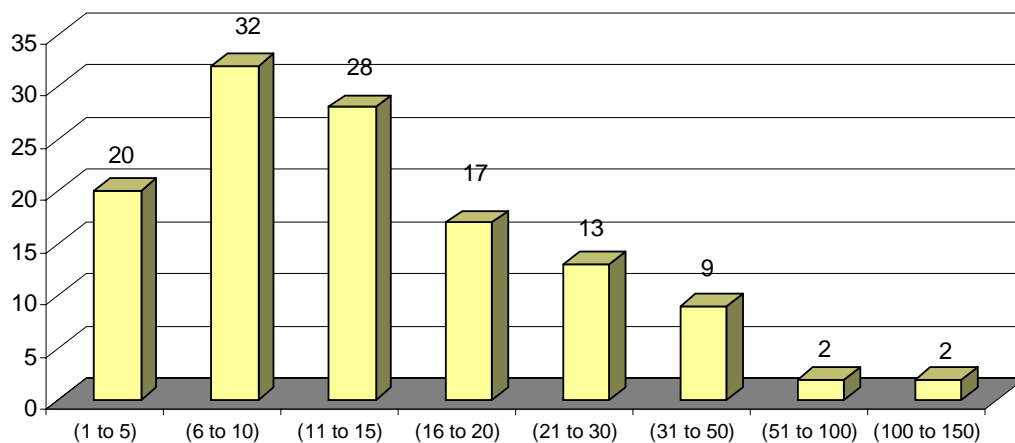
- Most of the companies are small to medium (up to 20 persons) covering local business requirements.
- Few cover very specialized leading edge technologies (See Section 6.2.8).
- Larger companies started exporting and some attribute most of their revenues to export. The export is destined to both Europe and the Gulf.

- Several companies established themselves in Lebanon as development centers for European companies.
- More and more, companies are acquiring the licensing, marketing and representational rights to international products such as Oracle Financial, J. D. Edwards, etc.
- With the entry of the Internet into the sector, many companies setup shop for web design, web services and ISP work.

There are 123 software companies operating in Lebanon employing a total of around 2100 persons. As seen below, around 80% of the companies have up to 20 persons working for them.

There is a grey market of an unknown size that consists of unregistered companies.

The following graph shows a histogram of software companies by number of staff. The number includes sales and support personnel:



Source: Synergy Sarl, 2003

Figure 19: Breakdown of Software Companies by Staff Count (2003)

6.2.3.3 ICT Consulting

Four main factors have positively impacted the ICT consulting sector. First, the heavy funding by international donors is mostly based on consulting work. Second, Lebanon saw a succession of “technocratic” governments whose Ministers required the assistance and counsel of consultants. Third, companies acquiring the services of consultants because their current salary scales do not allow ICT expertise internally (the last point applies to the public sector). Finally, international consulting firms hire Lebanese consultants to carry out projects in Lebanon.

Local consultants carry out a variety of work such as systems design, project management, project supervision and assistance and business side expertise. It is estimated that 10 local companies offer consulting services.

6.2.4 Information about the ICT Sector

Accurate information about the ICT industry is needed. This information should cover:

- Total revenue of ICT companies
- Products and services offered by ICT companies
- Products and services exported by ICT companies
- Share in GNP
- Revenue due to export
- Share in the national exports
- Share in the national imports
- Total workforce by job classification (See note below on job classification)
- Number of graduates per ICT field per year of graduation
- Unemployment of ICT personnel

Such information is needed because of the following reasons:

- Knowing the size of the sector and its contribution to the GDP will lead to a better evaluation of its national importance
- Analyzing the challenges and opportunities of the sector requires knowledge of its behavior and levels of expertise.
- Government policies that relate to communications, taxation, encouragement of investment and other issues, require a firm quantitative knowledge of the sector.
- Donor funding is a major input to the sector. It is therefore important to provide donors with accurate information about the sector.
- In order to better place Lebanon on the international eMap, it is important to have up to date and valid information about the sector.

The following paragraphs identify some of the key problems in gathering the required information:

Classification of ICT companies: There is no classification for ICT companies in general or in detail. Mobile companies, handset retailers, PC importers and distributors, ISPs, graphic design shops designing web pages are all ICT companies. As a matter of fact, the whole ICT sector is not recognized such as the Industrial, Agriculture, Construction, Financial and Public sectors.

The subject of the company in the Commercial register is descriptive by nature and not segregated into meaningful classifications. There is an automated system available at the Commercial Register that provides for any classification that would be appropriate for the ICT and other sectors. However, such classification has not been designed and acted upon yet by the CR in coordination with the various interested parties.

Products and Services: Again, there is no accepted classification for products and services offered by ICT companies.

Imports and Exports: Coordination between the ICT sector and the government must lead to being able to readily identify imports and exports. Again, the problem is faced because the breakdown of ICT products that is amenable to good analysis is missing.

Web Presence: As discussed in Section 7.2.1, Lebanese sites are hosted under both the generic .com domain and the country specific .com.lb domain. An accurate way to tally the Lebanese presence on the Internet is needed.

Job Classification: There is no accepted classification for ICT jobs (network administrator, analyst, database administrator, programmer, etc.). This is further complicated by the multi-cultural basis of Lebanese society (Arabic, French, English). Because of the multi-sector nature of ICT, the job classifications are a source of confusion for both the employers and the employees. OMSAR has completed a study on salary scales and job definitions for ICT staff in the Government. When implemented, it would put the ICT human capacity in the public sector on the right track.

6.2.5 The Status of the ICT Workforce and Job Opportunities

Apart from the above figure of 2,100 persons working for software companies, the PCA estimates that there is a total of 5,000 ICT professionals in Lebanon, counting those working in ICT fields but employed by non-ICT companies such as banks, government and other sectors.

ICT companies in general and software companies in particular have difficulty keeping and motivating their employees. Many reasons are attributed to:

- Low salary scales not commensurate with the cost of living
- The attractive job market in the Gulf which results in brain drain
- The large number of graduates from the many Universities in Lebanon. The PCA estimates that there are 400 university graduates and 600 technical schools graduates per year with ICT related majors.
- Confused terms of reference. The employee often enters into the job with poor job definitions, career paths and incentives.
- Training is scanty and is regarded as a risk on the employer who stands to lose staff if they increase their know-how.

The growth of ICT and the eReadiness of Lebanon is severely dependent on this workforce to whom little attention is paid.

6.2.6 Current Usages of Security and Encryption

Security and encryption are not common in the ICT industry. PKI technology is known and practiced in the banking industry. The government is instating security standards for use by all government ministries and agencies (see Section 4.1.4).

6.2.7 Copyright Violation and Software Piracy

With the introduction of the Intellectual Property Rights (IPR) law in 1999, copyright violation and software piracy became illegal and some convictions were made to violators. However, for many reasons, pirates still thrive.

According to the International Intellectual Property Alliance (IIPA) 2003 Annual Special 301 Recommendations, Lebanon is still on the Priority Watch List mainly because of cable piracy of movies and music. However, the Government campaign against the piracy of software is coming to terms with that and the piracy rate for software has dropped by 10% in the two years following the passage of the copyright bill in 2000.

Below are the piracy levels according to the IIPA²¹.

Industry	Piracy Levels			
	1999	2000	2001	2002
Motion Pictures	60%	60%	80%	80%
Records and Music	60%	68%	65%	67%
Business Software	88%	83%	79%	74%

Source: IIPA 2003

Figure 20: Piracy Levels in Lebanon (1999 – 2002)

6.2.8 ICT Research and Development

There are no known research and development facilities for ICT in Lebanon. Universities who are the natural place for R&D do not offer PhD study programs in ICT related majors.

There is a potential for R&D in Lebanon as can be witnessed by ground-breaking innovations that have been carried out by few individuals. Against all odds, these individuals have managed to transfer their technology abroad, where they were welcomed and appreciated. If support and/or a framework for R&D had been available, this great potential might have turned into a national resource, instead of being limited as it is today by individual success stories.

The ICT sector and the Lebanese government must both address R&D.

6.2.9 Specialized Technologies

Lebanon has traditionally been a very creative environment for various sectors. However, ICT leading edge technologies have not fared well. Other countries have made advances over Lebanon. For example, Egypt has produced a fair amount of specialized software, leading amongst them is OCR for Arabic and online web translation of web sites from English to Arabic. The UAE has created an environment amenable to the provision of ASP services.

Few advanced or specialized services are available in Lebanon, such as GIS, virtual networks, workflow and Integrated Document Management Systems.

If one considers leading edge technologies, Lebanon has a limited experience in the following:

- XML and data exchange (Extensible Markup Language)
- Web Services (Allow components of one application to be used by other applications)
- UDDI (Universal Description, Discovery and Integration): a directory service that enables the discovery of Web Services available to the developer.
- Decision Support Systems, data warehousing and data mining
- eCommerce

- Application Service Providers (One instance)
- Arabization
- Security and encryption technology

6.2.10 The Availability of Locally Suitable Software Products

The applications developed by local software companies have resolved all problems that are peculiar to Lebanon such as Arabization, dual currencies, Ministry of Finance requirements and procedures related to the labor laws and the National Fund for Social Security.

However, few companies provide total Enterprise Resource Planning solutions covering strategic requirements of companies in Lebanon. The rest remain fragmented, aimed at specific systems or processes (Section 6.2.2).

Moreover, locally developed software is lagging in product documentation. Quality and development according to standards are missing as well.

6.2.11 The Use of International Software Products

There is a limited use of international software applications.

A few banks have used international packages and found problems while localizing their requirements:

- Globus (1 bank)
- Bankmaster (6 banks)
- Equation DBA, the new version of Kapiti (7 banks)

Trade and industry have not entered into this field and resort to local supply. Very few companies are using any of the products of the major international ERP suppliers:

- Oracle Financial (2 companies and 2 universities)
- SAP (2 companies)
- J. D. Edwards (3 companies)

Medium scale products are more prevalent, but little information is available on their spread.

6.2.12 ICT Exports

Total ICT export was estimated by the PCA to be USD 23 Million or 9% of the total ICT sector turnover. According to the Ministry of Economy and Trade, the total export of Lebanon in 2000 was USD 718 Millions. This means that ICT exports are around 3% of total exports in Lebanon.

In order to export from Lebanon, a Certificate of Origin from the Chamber of Commerce must be acquired. The license is given according to several criteria such as: the amount of electricity needed, the square footage of the manufacturer and the number of employees. Such criteria were designed for manufacturers and do not apply to the ICT industry.

The availability of high bandwidth at affordable rates is essential for the export activities of the ICT sector, as most customer services activities must be performed online for exporting ICT companies.

According to the PCA, ICT exports cannot become a reality before quality awareness is instated in the culture of ICT companies. Research and Development, packaging and financing are also key factors for increasing exports. Unfortunately, all these factors are not readily available or used in Lebanon.

6.2.13 Financing, Technology Parks and Incubators

KAFALAT SAL is a joint-stock company with the Lebanese Agency for Guarantee of Deposits that operates under the Central Bank and some fifty banks operating in Lebanon as partners. It offers fast and easy to acquire investment loans up to USD 200,000 reimbursable within seven years. It also offers guarantees on some loans acquired directly from banks within special conditions.

From the Central Bank, software and specialized techniques enterprises can benefit from the state subsidy to debit interests on their existing (pre-1997) loans.

A key enabler to the promotion of ICT as a production sector is the setup of technology incubators. Technology incubators are firms that support new entrepreneurs to develop innovative technological ideas and set up businesses. They offer space, equipment, managerial advice and other technical assistance. In return, they take a certain percentage of the equity of the companies that succeed.

Israel has some 27 incubators covering about 160 technology areas and giving research opportunities to 1600 researchers (Al-Moustaqbal, May 22 2000). The Government of Israel disburses about USD 400 Million every year for research and development.

The situation in Lebanon with regard to incubators and technology parks is still in its infant stages.

From the private sector side, Berytech is the first Lebanese technology pole that aims at the creation and the development of companies by offering state-of-the-art hosting facilities, a team of highly experienced experts and a complete range of support services that create the appropriate environment to help the creation and the growth of businesses. Berytech engages in three activities:

- The incubator identifies interesting projects and helps them evolve into sustainable companies by providing the adequate technical assistance. These include developing business plans and entrepreneurship culture, legal and intellectual property aspects, etc., as well as access to financial support.
- The business accelerator provides the supplementary services and links to financial means needed for a company to launch its commercial activities.
- Business hosting welcomes well-established companies that need to benefit from the high-tech facilities provided by Berytech such as a video conference auditorium, training and meeting rooms, fast Internet access, etc. These companies would be looking for group synergy with other companies in Berytech to complement and broaden their activities to be open to both local and international markets.

Built within the proximity of the Campus of Science and Technology of the University St. Joseph, Berytech and the hosted companies have access to all the available technological platforms necessary for their technical development: laboratories, research centers, documentation and resources centers and the eCampus of the AUF (Agence Universitaire de la Francophonie).

In 2001, the Government of Lebanon has completed a feasibility study for creating the Beirut Emerging Technology Zone (BETZ) through the Investment Development Authority of Lebanon (IDAL). The United States Trade and Development Agency (USTDA) provided USD 174,000 as a grant from to conduct the study. Two years have passed and the location of the site was selected in Damour.

IDAL operates within the legal framework defined in Law 360 on investment development in Lebanon, issued in August 2001. The law entrusts IDAL with “participating in the capital of joint-stock companies for the establishment and management of incubators to support innovators in the fields of technology, information technology, communication and other sectors ...”. Furthermore, the law classifies information technology projects as Zone C, which means that they can benefit of a full exemption of income taxes and taxes on project dividends for a ten-year period. BETZ is promoted at the national and international level to attract foreign investment. However, there is no announced time plan for launching the technology park.

Other pending private initiatives include the Edde Global Village (ICT park) in the Jbeil area and the Makse Industrial Park in the Bekaa valley area.

Lebanon faces competition from similar projects such as Dubai Internet City, Smart Villages in Egypt and a number of other projects in Jordan.

6.2.14 Professional ICT Associations

There are 3 professional organizations:

- Professional Computer Association (PCA)
- Association of Lebanese Software Industries (ALSI)
- Information Technology and Internet Association of Lebanon (ITIAL)

The PCA is the longest established of the three. The PCA is currently conducting a major survey to collect information about the ICT sector. Other ICT projects and initiatives include the Made in Lebanon and Golden Chip award programs. IN 2002, the PCA launched the PCA Internet Point of Presence (PiPOP) initiative by providing equipment and Internet subscriptions to 10 villages across Lebanon. PiPOP centers are located in municipalities or community centers of the villages. Fifty total sites are planned for 2004. The response to PiPOPs has been outstanding. Cultural characteristics must be noted. Girls whose parents might not allow them from visiting Internet Cafés have access to established centers in municipalities and community centers where PiPOPs are located.

The PCA’s strong lobbying powers have achieved a good relationship with the Government and other institutions towards regularizing some of the ICT issues.

ALSI is following suit and focusing on the development of Lebanese software for exports.

ITIAL is an ICT think tank with strong links the academic sector. It tackles ICT related issues on a periodic basis.

Lebanon lacks a professional organization for ICT professionals which they can join as individuals. Such organizations as the ACM or the IEEE are good examples providing standardization, education and an opportunity for individual growth within the ICT community.

6.2.15 Assessment

- Accurate data for ICT as a production sector is missing.
- Business culture must be further developed to take full advantage of ICT. Businesses should be made aware of ICT related business requirements, implementation cycles and procurement.
- A broader know-how base about leading edge technologies in general and security and encryption in particular must be developed. Cutting edge technologies such as Internet application servers, data exchange, security and other areas of specialized programming are simply non-existent or very sparse.
- Also lacking are ICT Research and Development facilities.
- Software engineering practices focusing on quality, project management and the use of standards are not common and must be further developed.
- Employers must address ICT workforce needs.
- Lebanon should continue its efforts regarding Copyright and software piracy by increasing awareness and convicting violators.
- The ICT sector is not healthy, especially when it comes to the software industry. The size of the sector is too small and is not able to grow as it should. In a country that ranks high in human capacity and low on natural resources, ICT is a natural choice for economic growth. In order to become a healthy sector, able to export and thrive, the ICT sector needs a push by means of venture capital, subsidies and tax incentives.

From the lessons learned in other countries (India, Malaysia, Dubai or Israel), the jump start of the ICT sector was driven by the commitment of their Governments. Lebanon has many advantages over these countries in terms of general literacy, socio-cultural environment and established higher learning institutes.

6.3 eCommerce

6.3.1 The Government Strategy for eCommerce

The Ministry of Economy and Trade (MOET) is planning the legal framework for eCommerce as part of a two-year project valued at 1.7 Million EURO. This is expected to start in September 2003. It will study and recommend regulations for eCommerce, electronic contracts and eSignature, among other issues. (Section 4.2.2)

6.3.2 Regulations on eCommerce and eTransactions

The Law 133 of October 26 1999 allowed the Central Bank to be the regulator for credit cards and eTransactions. The enacted regulations concerning electronic transactions are applicable through a decision issued March 30, 2000 by the Central Bank²². The circular defines “electronic financial and banking transactions” as: all operations and activities that are conducted, carried out or promoted through electronic or photo-electronic means. The decision states that entities engaging in eTransactions must:

- Get the authorization of the Central Bank
- Follow principles of honesty, integrity and transparency
- Take security measures for eTransactions
- Ensure that the client is at least 18 years of age
- Ensure the client’s confidentiality and privacy
- Can use digital signatures in some cases
- Have a minimum capital for some kinds of eTransactions

It is worth noting that the Central Bank, which is the clearing house of all banking transactions²³, has enacted electronic transactions between itself and all banks. However, the paperwork, which is the legal medium, follows the eTransaction for checking, control and storage purposes.

6.3.3 eCommerce Taxation Laws

No special laws or tax regulations exist for eCommerce. It is expected that given such an absence, the Ministry of Finance will resort to traditional invoicing and reporting through standard required formats.

6.3.4 Consumer Protection While Trading Over the Web

Lebanon does not have a consumer protection law. Trading over the net is no exception.

It is worth noting that credit and debit cards and their existing payment network and procedures are still the payment instruments for B2C transactions. According to UNCTAD, they are used for more than 90% of online transactions worldwide. The card networks point out that Internet transactions represent a disproportionate percentage of charge-backs and fraud.

6.3.5 ATMs

ATM count is often used as an indication of technological readiness. Lebanon was slightly late in introducing ATMs, mostly due to the communications infrastructure. In due course, the number of ATMs grew to reach a healthy position. In December of 2002, the number of ATMs in the greater Beirut and Suburb area was 386²⁴, 58% of the total number of machines located throughout the country.

6.3.6 Payment Cards

According to the Central Bank, there were 611,829 payment cards in circulation in Lebanon at the end of 2002, an increase of 33% over the previous year. The payment

cards include credit and debit cards from VISA, MASTERCARD, Amex and Diners. The number of cards issued has been increasing steadily over the years. The total amount of purchases and cash disbursement using payment cards is also increasing²⁵. This is a good indicator for the readiness for cashless transactions.

A special form of payment cards is the "Internet Card". These are debit cards with a limited ceiling designed to protect the eCommerce consumer in case of fraud. They can also be prepaid cards. There is no data regarding the number of Internet cards issued by banks. However, informal estimates place the number around 2% of the total number of payment cards or around 12,000.

Currently, two Lebanese companies offer credit card certifications for web sites. These are NetCommerce and CCS. However, their non-competitive rates and facilities again draw the Lebanese web sites to acquire similar services from abroad.

6.3.7 The State of On-line Banking

There are 61 banks members of the Association of Banks in Lebanon as of February 20th 2003, including investment banks. 31 of them have websites of which 4 are under construction, 17 are promotional for information only and 10 have transactional websites offering on-line balances, check stopping, credit card settlement and inter-account transfer.

There are no statistics for the number of on-line banking users nor the percentage of such users with respect to the total number of bank accounts, nor the percent of Internet users who use eBanking. However, bankers report a favorable response to eBanking and a trend to more demand for the service.

6.3.8 eCommerce

eCommerce is very limited in Lebanon. B2B transactions are almost inexistent and B2C are limited to online shopping and auctions. Given the advance of other countries into eCommerce and Lebanon's general trading legacy, the poor penetration of eCommerce in society is alarming. B2B eCommerce in 2001 constituted at most 2% of all B2B transactions in the United States and much less in Europe. However, it is estimated to reach 20% by 2005. For B2C, it stood at below 3% of total retail sales in the United States.

According to a UNCTAD report²⁶, a survey was conducted by Citibank, Dubai in 2001 on a sample of SMEs in Arab Gulf States (Saudi Arabia, UAE, Kuwait, Qatar, Bahrain and Oman) and Near Eastern or Mashreq countries (Egypt, Lebanon and Jordan). The following was found:

	Internet Access	Internet Access to All Departments	Internet Access to Procurement Department	Conducted Online Trading	Negative Approach to eCommerce
SMEs in Gulf States	79%	23%	13%	3%	45%
SMEs in Near East	73%	38%	18%	2%	25%

Source: Citibank (According to UNCTAD ECommerce and Development Report 2002)

Figure 21: Usage of eCommerce (2002)

The critical mass of eCommerce resources, know-how and actual operational experience is concentrated in a limited number of large private sector companies, headquartered in OECD countries. These companies handle the infrastructure aspect of eCommerce such as Internet payment methods and systems, cross-border trade payment settlement, online credit information, credit card validation and authentication, forfeiting bills, acceptance and shipping guarantees, letters of credits, etc. Some examples of such companies (besides the credit cards companies themselves) are Swift, TradeCard, PayPal, Microsoft, Yahoo, Identrus, Bolero, ITFex and LTPTrade.

6.3.9 Assessment

- The infrastructure is ready for B2C eCommerce. Some sectors stand to benefit most from online retailing such as software, travel and tourism services, books and music. These sectors account for 18% of their sales through B2C in the USA and Western Europe.
- The challenge for Lebanon with respect to ecommerce is to build capacity, particularly local expertise, to use and manage the complex eCommerce systems and the security issues related to them.
- The main restriction is the legal framework needed for eCommerce which is being addressed by the Ministry of Economy and Trade.
- Another main restriction to trading over the Internet is cultural. This relates to confidence the Lebanese user has in trading over the Internet which is perceived as less secure and of lower quality than traditional trade.

7.0 Social Environment and Public Awareness

This section covers the following criteria:

- Usage of ICT in Everyday Life
- The Internet Society

Each of the above criteria is broken down into specific questions and issues.

7.1 Usage of ICT in Everyday Life

7.1.1 Usage of Computers in Society

An opinion survey undertaken by MADMA in August 1999 showed that 23% of the Lebanese used computers at home, at work or in school. Of those using a computer, one third claimed that their knowledge of computer was good, 50% that it was average and the rest that it was poor.

On another hand, the Lebanon Business Advisor 2002 (Page 264) reported that there are 120,000 households that own PCs in Lebanon. According to a study conducted in 2001 by Mrs. Choghig Kasparian of the St. Joseph University (USJ), the number of households in Lebanon was 860,321. This puts the PC penetration rate per households at 14%.

According to MADMA, the proportion of PC users falls with age: 40% of those aged 15-24 years to 10% for those aged 45 years or older.

The use of computer rises with the level of education (Al Mostaqbal, Sept 29, 1999); 1% of those with elementary degree and below use computers while 62% of those with university degrees use them.

7.1.2 ICT Usage and Poverty

Poverty in Lebanon is a barrier to the use of ICT and the Internet. The high price of ICT equipment and Internet access disfavors their usage by the poor. In addition, the unavailability of access points with free or reduced cost leads to a lack of exposure to the use of information technology by the poor. There are few public programs and public private partnerships through schools, community centers and public libraries that are the venues most likely to provide ICT access to the poor.

7.1.3 ICT and Rural Disparity

The residential telephone penetration rate throughout Lebanon is shown in the following table. The population distribution is taken according to the joint Ministry of Social Affairs - UNDP population of Lebanon survey conducted in 2000. OGERO is the source for the number of residential subscribers per Muhafaza.

Muhafaza	Proportion*	Population	Residential Subscribers*	Teledensity
Beirut	8.7	342,345	189,325	55%
Mount Lebanon	43.4	1,707,790	191,990	11%
Bekaa	12	472,200	45,373	10%
South	16	629,600	55,817	9%
North	19.9	783,065	81,638	10%
Total Lebanon	100	3,935,000	564,143	14%

*Source: Kasparian (USJ), 2001

** Source: OGERO 2003

Figure 22: Disparity in Teledensity (2001 and 2003)

The table clearly shows that Beirut has a Teledensity almost 4 times that of each of the other Muhafazas (Governorates). This digital divide between Beirut and the rest indicates that before the other governorates need to have a higher Teledensity to connect to the Internet so that they can be ICT ready.

7.1.4 ICT and Other Disparities

In addition to the rich and poor disparities, a number of other disparities emphasize the ICT divide in Lebanon, namely:

Illiteracy rate: Although quite low for the region, approximately 350,000 people, it adds to the number of people that are far beyond the reach of ICT literacy. (Review Section 5.1.1).

Age: The disparities between the old and young as far as ICT is concerned are quite significant. Those above 50 do not have ICT literacy. This is mostly due to lack of exposure at the workplace and the lack of adult education schemes for those not working or continuing education.

Gender: The main factors for this disparity in ICT usage is a combination of higher illiteracy rates among women in rural areas, the lower percentage of higher education attained by women, where ICT is more commonly used and the lower percentage of working women with access to ICT education and internet access through work.

Geographical/Rural: Review Section 7.1.3 above.

7.1.5 Foreign Languages as Barriers to Using ICT and the Web

English is the language of the largest number of web sites in the world. Users with a slight knowledge of the language might find it difficult to use the Internet for shopping, support, information and other types of web sites.

The use of the Arabic language causes the following technical problems:

- Arabic character standards
- OCR (Optical Character Recognition)
- Web site automatic translation

A side problem resulting from the above is the lack of accepted translation of key terms in business, management, finance, technology, etc. Such a glossary is needed.

7.1.6 Assessment

The digital divide within the society runs across the following lines:

- Rich / poor
- Young / old
- Educated / uneducated
- Capital city / other areas

The high school enrollment levels will eventually take care of the young vs. old and educated vs. uneducated divides. However, in order to bridge the gap in a more timely matter, ICT skills training must be available to the old, poor and uneducated and those that live outside the capital city Beirut.

ICT can also be used to bridge the poverty gap. With ICT skills, the poor may have better chances to exit from poverty. In return the poor will contribute to the digital economy.

7.2 The Internet Society

7.2.1 Who is Online in Lebanon?

The American University of Beirut provided the following figures for the distribution of the domain names within the .lb country code top level domain (ccTLD):

The breakdown of web sites is shown in the following table:

Domains	Number
Business (.com)	1,700
Government (.gov)	90
Education (.edu)	110
Network (.net)	22
Organizations (.org)	188
Total	2,110

Source: AUB 2003

Figure 23: Breakdown of Lebanese Internet Domains (2003)

Note that many businesses publish under the .com generic top level domain (see next Section). The number of sites is evenly divided between the two domains. This would bring the number of businesses who have web sites to 3,400 and the total number of web sites to 3,810.

7.2.2 Businesses

In addition to the 1700 sites listed under the .com.lb country code top level domain (ccTLD), many Lebanese businesses have opted to host their sites under the .com gTLD. It is very difficult to count the number of business under the .com generic top level

domain (gTLD). However, an estimate can be reached by analyzing the sites in Lebanon Web Index 2001 showed that there are as many companies hosted under .com.lb as those hosted under .com. It can be assumed that there are 1700 business sites hosted outside Lebanon.

There is no current study that analyzes the nature of web sites published in Lebanon. However, several web guides have emerged that list and classify web sites that are of interest to the web visitor. The following list covers key classifications of web sites:

- Advertising agencies
- Airline, travel and tourism
- Banking
- Car rentals
- Computer hardware and software
- Contracting and engineering
- Courier services
- Hotels and furnished apartments
- Insurance
- Media (See Section 7.2.5)
- Production house and graphic design
- Web development

In addition to the above, there are a few all-in-one web sites providing information about Lebanon and events that take place in the country. These aim at the Lebanese outside Lebanon as well as incoming tourists.

7.2.3 Organizations on the Web

The department concerned with registering .lb domains in the American University of Beirut indicated that there are 188 domains under the .org.lb name (2003). Organizations concerned with socio-economic issues and international organizations are currently online. As in most web sites in Lebanon, these are informative sites that present the organization and its activities.

7.2.4 Government Online

Review Section 4.5.4.

7.2.5 Media Online

Historically, Lebanon has been a heaven for books, newspapers and magazines publishers. Classical "information and communication" media have always been very active.

Here are some figures according to the UNESCO Statistical Year Book, 1999.

Media	Number
Newspapers	15
Magazines	74
Television stations	6
International TV broadcast (Satellite)	3
Radio stations	12
Advertising agencies	72

Source: UNESCO Statistical Year Book 1999

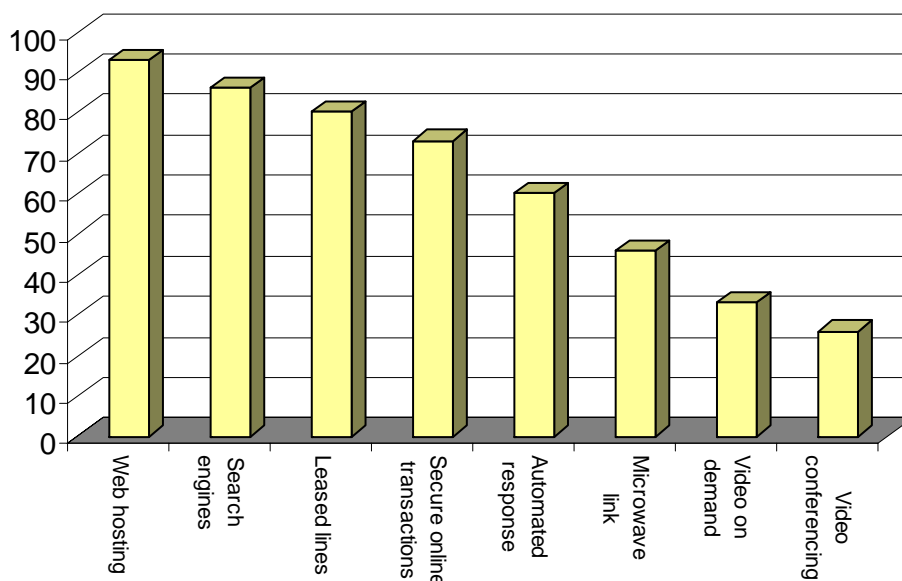
Figure 24: Media Online (1999)

7.2.6 Restrictions on the Content of Web Pages

There are no known restrictions on web content in Lebanon.

7.2.7 Web Services of Interest to the Lebanese

According to a study conducted by Lebanon Opportunities magazine in April 2000, here is how those surveyed responded when asked about what services they expect the ISPs to provide:



Source: Lebanon Opportunities magazine in April 2000

Figure 25: ISP Services (Percent of Respondents) (April 2000)

7.2.8 Assessment

- Lebanese society has not totally adopted the Internet. However, indications show growth in the right direction.
- Locally relevant content is available but is scanty and not widely used.
- The Internet is considered as a tool and does not form part of the social fabric in Lebanon.

- Communities do not use the Internet for their cultural and social benefits.
- Government and business services are still far from being widely accessible.

Lebanon is still far from being a knowledge society. Society is still involved with other problems that need to be addressed before the Internet can be used to resolve such problems such as education, health, environment, poverty, etc.

8.0 Closing the eReadiness Gap

The eReadiness Assessment study has analyzed the current situation in Lebanon well enough to confirm that Lebanon needs to work hard to become eReady.

As mentioned in Section 2.1, The National eStrategy for Lebanon project identified 7 major initiatives to develop ICT Policies for:

- Initiative 1:** eReadiness Assessment
- Initiative 2:** National ICT Policies
- Initiative 3:** Policies for ICT as a Production Sector
- Initiative 4:** Policies for ICT and Human Capacity Development
- Initiative 5:** Policies for ICT for Social Development
- Initiative 6:** Policies for ICT for Economic and Business Development
- Initiative 7:** Policies for eGovernment

The above 7 Initiatives and their related 32 Policies are detailed in Document 4.

8.1 Policies to Address eReadiness Issues

The following Policies (elaborated in Document 3) were developed to address eReadiness access and infrastructural issues:

- Improve Network Infrastructure
- Provide Wide Access or “Connectivity for All”
- Provide Affordable Infrastructural Services
- Improve Local and International Communications Reliability and Speed

eReadiness Assessment covered other criteria than Access and Infrastructure, the Policies for those other issues are presented under the other 6 initiatives. Initiative 1 concentrates on Access and Infrastructure.

8.2 Programs, Solutions and Recommendations to Close the eReadiness Gap

A comprehensive set of Programs, Solutions and Recommendations for all the above was developed and is detailed in Document 6 which maps the Programs, Solutions and Recommendations into each of the above Initiatives showing those that address eReadiness issues.

Here are the Programs proposed to close the eReadiness gap:

ID	Programs
1	Launch ICT Enabling Legal Framework
2	Improve the Affordability of Internet Connection
3	Improve Network Speeds in Lebanon
4	Increase Internet Penetration
5	Promote Proper Usage of the Internet
6	Increase PC Penetration
7	Improve Electrical Power Quality
8	Increase Government's Yearly ICT Budget
12	Capacity Building for Public Sector ICT Staff
16	Free Information Access Points
22	Use Media to Promote ICT
27	Deregulation of Telecommunications Sector

Figure 26: Programs to Close the eReadiness Gap

And here are the Solutions proposed to close the eReadiness Gap:

ID	Solutions
2	Activate and Speedup Online Banking
5	Implement Terrestrial Cable Network
8	Launch Project/Entity to Gather and Publish ICT Data
9	Setup a Government Entity to Handle ICT Matters
14	The Internet Hub Project
16	Whats On in Lebanon
27	Provide Comprehensive Electoral Information Online
39	Youth Network
40	Guide to International Relations and the Diplomatic Network
48	Manage ICT Resources in the Public Sector
60	Launch National ICT Professional Association
75	Prepaid Charge Card for Public Sector Transactions

Figure 27: Solutions to Close the eReadiness Gap

Finally, here are a few recommendations that serve to close the eReadiness gap:

ID	Recommendations
1	Improve Efficiency of Government Telecommunications Providers
2	Improve the Utilization of the Land Line Network
3	Amend Building Laws to Cover ICT Usage
4	Reduce Import and Export Complexities
5	Remove Trademarks as a Prerequisite for Domain Names
6	Create Incentives for ICT Training Companies
7	Start ICT Education at an Earlier Age

Figure 28: Recommendations to Close the eReadiness Gap

Refer to Document 6 for full details of the above Programs, Solutions and Recommendations.

8.3 Implementation and eReadiness Gap Closing

The Implementation Roadmap presented in Document 5 develops 6 stages for the implementation of the National eStrategy. After initially setting up an implementing Entity, winning the champions and preparing the project plans, Stages 4 and 5 implement Pre-requisite and High Priority projects respectively. Most of these projects, selected according to evaluation criteria discussed in Document 5, consist of eReadiness gap closing projects.

8.3.1 Stage 4: Implement Pre-requisite Programs and Solutions

As per the results of the eReadiness Assessment, there are many gaps to be closed before the National eStrategy can be properly implemented. These gaps can be closed through the following Programs, Solutions and Recommendations.

Note: The ID refers to the numbering used in Document 6 which presents all Programs, Solutions and Recommendations include the pre-requisites.

ID	Programs
1	Launch ICT Enabling Legal Framework
2	Improve the Affordability of Internet Connection
3	Improve Network Speeds in Lebanon
4	Increase Internet Penetration
5	Promote Proper Usage of the Internet
6	Increase PC Penetration
7	Improve Electrical Power Quality

Figure 29: Pre-Requisite Programs

ID	Solutions
9	Setup a Government Entity to Handle ICT Matters
55	Resolve Administrative Anti-Patterns in the Public Sector
76	Implement a National ID and Smartcard

Figure 30: Pre-Requisite Solutions

8.3.2 Stage 5: Implement Priority Programs and Solutions

Out of the wide range of Programs, Solutions and Recommendations, it may not be possible at this stage to identify with precision which projects are of a top priority nature. Many factors affect such a ranking. An exercise was carried out for such an evaluation and is detailed in the Implementation Roadmap (document 5). It arrived at the following high priority Programs and Solutions:

Note: The ID refers to the numbering used in Document 6 which presents all Programs, Solutions and Recommendations include the priority Programs and Solutions.

The following list shows the selected Programs and Solutions:

ID	Programs
9	Top Ten eGovernment Projects
11	Encourage International ICT Exhibitions and Fairs in Lebanon
12	Capacity Building for Public Sector ICT Staff
13	Public Sector Data Definition and Exchange
14	Promote and Improve Lebanon as a Training Venue
16	Free Information Access Points
20	Develop Specific eLearning/CBT Content for Lebanon
21	Combat Illiteracy through Computer Based Training and eLearning
24	Standardize and Spread the Use of GIS
27	Deregulation of Telecommunications Sector

Figure 31: Priority Programs

ID	Solutions
2	Activate and Speedup Online Banking
3	Multipurpose Community Telecenters (MCTs)
7	Educational Career Counseling
8	Launch Project/Entity to Gather and Publish ICT Data
11	Lebanon Business Promotion Entity
14	The Internet Hub Project
15	The Citizen's Guide to Health Information and Services
16	Whats On in Lebanon
17	Setup Information Decision Support Center
21	The Citizen's Guide to Governmental Procedures
26	Setup Business Startup Advisor
27	Provide Comprehensive Electoral Information Online
28	Publish Terms of Tenders and Bids
35	The Citizen's Guide to Consumer Protection
39	Youth Network
46	Setup Data Entry and Transcription Centers
52	Agrobus
59	IT Skills Portal
60	Launch National ICT Professional Association
74	ICT Training and Incentives for Public School Teachers

Figure 32: Priority Solutions

8.4 Conclusion

Implementing eReadiness Programs, Solutions and Recommendations is a pre-requisite and mandatory step to be taken before other National eStrategy policies can be implemented. Lebanon is still far from being eReady and needs to start the implementation of its National eStrategy on the right foot.

9.0 Appendix A: Acronyms and Glossary

ACM	Association of Computing Machinery
ADSL	Analog Digital Subscriber Line
AIDMO	Arab Industrial Development and Mining Organization
ASP	Application Service Provider
ATM	Automatic Teller Machine
B2B	Business to Business transaction through eCommerce
B2C	Business to Consumer online retail transaction
BETZ	Beirut Emerging Technology Zone
DNS	Domain Name System
DSL	Digital Subscriber Line
ELCIM	Euro-Lebanese Center for Industrial Modernization
ESCWA	Economic and Social Commission for Western Asia
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GNP	Gross National Product
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
Host	Is a domain name that has an IP address associated with it
ICANN	The Internet Corporation for Assigned Names and Numbers
ICT	Information and Communications Technology
IDAL	Investment and Development Authority of Lebanon
IEEE	Institute of Electrical and Electronic Engineers
IPR	Intellectual Property Rights
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecommunications Union
Kbps, Mbps, Gbps	Kilo, Mega and Giga bytes per second
LAN	Local Area Network
LIBNOR	Lebanese Standards Institute
MADMA	Center for Development Studies and Projects
MAN	Metropolitan Area Network
MICTC	Ministerial Information and Communications Technology Committee
MITC	Ministerial Information Technology Committee
MOET	Ministry of Economy and Trade
MOSA	Ministry of Social Affairs
MPT	Ministry of Post and Telecommunications
NITC	National Information Technology Committee
NSSF	National Social Security Fund
OECD	Organization for Economic Co-Operation And Development
OGERO	Organisme de Gestion et d'Exploitation de l'ex-société Radio-Orient
OMSAR	Office of the Minister of State for Administrative Reform
PSTN	Public Switched Telephone Network
RBAS	Regional Bureau of Arab States (UNDP)
RIPE	Réseaux IP Européens
SME	Small to Medium Enterprise
TAI	Technology Achievement Index
TLD	Top Level Domain
gTLD	Generic top level domain such as .com .org and .net
ccTLD	Country code top level domain such as .lb

TRIPS	The Trade Related Aspects of Intellectual Property Rights
UDDI	Universal Description, Discovery and Integration
UMTS	Universal Mobile Telephone Service
UNCTAD	United Nations Conference on Trade and Development
UNDP	United National Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USTDA	United States Trade and Development Agency
VAT	Value Added Tax
VLAN	
VPN	Virtual Private Network
VSAT	Very Small Aperture Terminals are small, software driven earth stations used for the reliable transmission of data or voice via satellite.
WAN	Wide Area Network
WAP	Wireless Application Protocol
WIPO	World Intellectual Property Organization
WSIS	The World Summit on the Information Society
WTO	World Trade Organization
XML	Extensible Markup Language

10.0 Appendix B: eReadiness Models

This section is a summary of the eReadiness models. Its main purpose is to show the general trend for such models.

Several eReadiness models are available for assessing the eReadiness of a country.

All models address the issues mentioned in the previous paragraph. However, each toolkit organizes and emphasizes the different issues a little differently.

The Consulting Team reviewed several models. Among them, these were the most relevant:

10.1 The Asian Pacific Economic Cooperation (APEC) Model

The Asian Pacific Economic Cooperation (APEC) Electronic Commerce Steering Group developed this guide. It was published in 2000 and is available at <http://www.ecommerce.gov/apec/>.

The assessments gauge a country's readiness for eCommerce through a detailed questionnaire, focusing especially on import-exports and policy. The focus is on eEconomy. The assessment tool gives the most detailed information due to a thorough examination of technology and business issues.

10.2 The Center for International Development (CID) Model

The center is at Harvard University. It developed the *CID's Readiness for the Networked World: A Guide for Developing Countries*. It was published in 2000 and is available at www.readinessguide.org.

The assessment categorizes countries along four stages of development for each of 19 categories. The focus is on eSociety. The CID offers a very user friendly tool focusing on how ICTs are used throughout society. It focuses on technology infrastructure, pervasiveness of technology and the regulatory and business environment.

10.3 The GeoSINC International Model

GeoSINC has a guide called *The e-Readiness Guide for Developing Countries*. This was developed through assistance from Infodev. This is available at www.ereadinesscenter.org

10.4 McConnell International's E Readiness Reports

McConnell International has developed eReadiness reports for various countries. A relevant report is that developed for Jordan. The source for the model is www.mcconnellinternational.com/ereadiness/default.cfm.

Countries are rated in the five categories including infrastructure and access, government policies, human capacity, information security and business climate, on a scale of one to three (blue, amber, red) and extensive analysis and recommendations are given. The

focus is on eEconomy. The analysis framework developed by McConnell provides equally balanced coverage of all assessment areas and gives good attention to government leadership.

10.5 WITSA's Model

The questionnaire developed by the World Information Technology and Services Alliance (WITSA) is available at www.witsa.org/papers/EComSurv.pdf. The questionnaire covers a range of issues, including barriers to technology industry, role of consumer trust, problems with e commerce technology, internal business practices that support e commerce, workforce problems, taxes, public policy issues and resistance from consumers. The focus is on eEconomy. WITSA presents an operational point of view and is concerned by technology-related matters.

10.6 Southern African Development Community (SADC)

This report was presented by the Steering Committee on Policies and Strategies as a deliverable to the Task Force at the World Economic Forum's Annual Meeting 2002. It is available at http://www.bridges.org/policy/sadc_wef/SADC_WEF_EReadiness.pdf and covers 8 of the member countries of the community.

The subtitle of the report is: "Better, Faster, Cheaper: Developing and Leveraging World Class ICT Networks for Social and Economic Advancement". It focuses on SADC specific policies and recommendations, but the methodology can be replicated in other areas of the world. The aim was to establish a clear and consistent strategy for achieving eReadiness.

10.7 Asean IT Readiness Indicators

These were developed by the eAsean Task Force for the digital economy and development. They cover 6 areas similar in structure to those of CID. The indicators can be found at itmatters.com.ph/indicators/indicator.html.

10.8 Comparisons

Two good reports provide a detailed comparison of the above models:

- *Comparison of E-Readiness Assessment Models* by www.bridges.org
- *Digital Opportunity Initiative, 2001* by www.opt-init.org/framework.html

The main conclusions of the Bridges comparison were presented in the project's Inception Report.

11.0 Appendix C: End Notes

¹ "e-Readiness Guide for Developing Countries; How to Develop and Implement a National e-Readiness Action Plan", GeoSinc International, July 2002. Review the following site: <http://www.ereadinesscenter.org>.

² OGERO

³ "Challenges for Information and Communication Technology Development in the Arab World", S. Dutta, C. El-Hage, P. Tarazi, World Economic Forum's Arab World

⁴ <http://www.madarresearch.com/aboutus.htm>

⁵ Compiled by the Consulting Team from data provided by ISPs.

⁶ <http://www.ripe.net/ripenc/pub-services/stats/hostcount/2003/02/lb/all.cmp.html>

⁷ <http://www.isc.org/ds/WWW-200207/index.html>

⁸ "Challenges for Information and Communication Technology Development in the Arab World", S. Dutta, C. El-Hage, K. Sabbagh, P. Tarazi, World Economic Forum's Arab World Competitiveness Report 2002-2003, Oxford University Press, NY, October 2002

⁹ idem

¹⁰ OGERO 2003

¹¹ <http://www.itu.int/osg/sec/spu/ni/iptel/workshop/Chair%20Report.htm>

¹² <http://www.itu.int/wsis/documents/index.asp>

¹³ "Governance Matters II, Updated Indicators for 2000/2001" by Kaufmann, Kraay and Zoido-Lobaton

¹⁴ http://www.omsar.gov.lb/english/strategy_egov.asp

¹⁵ <http://www.vte-lebanon.org>

¹⁶ <http://fondation.saradar.org>

¹⁷ OMSAR

¹⁸ "Lebanon 2000" by Dr. Riad Tabbarah, MADMA 2000

¹⁹ www.customs.gov.lb

²⁰ The Arab Human Development Report 2002, the UNDP, page 157

²¹ IIPA 2003 Special 301 Report

(<http://www.iipa.com/rbc/2003/2003SPEC301LEBANON.pdf>)

²² <http://www.bdl-liban.com/circ/en/circ1810.htm>

²³ <http://www.bdl-liban.com/paysys/BDLrole.htm>

²⁴ <http://www.bdl-liban.com/edata/elements.asp?Table=t515-1>

²⁵ <http://www.bdl-liban.com/edata/elements.asp?Table=t515-3>

²⁶ UNCTAD ECommerce and Development Report 2002, Chapter 6: E-Finance for Development: Global Trends, National Experience and SMEs.