ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

REGIONAL PROFILE OF THE INFORMATION SOCIETY IN WESTERN ASIA

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Preface

This profile is published by the Economic and Social Commission for Western Asia (ESCWA) within the framework of preparations for the World Summit on the Information Society (WSIS). It is the second in a series of such profiles that describe the current situation and the progress made in the region with regard to building the information society, while providing an evaluation in comparison with the rest of the world.

Within that context, this report provides essential information on the situation in the ESCWA region in order to assist decision-makers in their planning and to enhance national capacities for building the information society. Moreover, it aims to assist national authorities to compare their current status with that of other countries in the region, thereby promoting the cooperation and regional integration opportunities in an increasingly knowledge-based global economy.

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ABBREVIATIONS

3G	third generation of mobile services
ADSL	asynchronous digital subscriber line
ASP	application service provider
ATM	automated teller machine
B2B	business-to-business
B2C	business-to-consumer
BSA	Business Software Alliance
DESA	Department of Economic and Social Affairs
DSL	digital subscriber line
ERP	Enterprise Resource Planning
ESCWA	Economic and Social Commission for Western Asia
EU	European Union
FIRDOS	Fund for Integrated Rural Development of Syria
FLAG	Fibre Link Around the Globe
FOG	Fibre Optic Gulf
FTP	file transfer protocol
G2B	Government-to-business
G2C	Government-to-citizen
G2E	Government-to-employee
G2G	Government-to-Government
Gbps	billion bits of data per second
GCC	Gulf Cooperation Council
GDP	gross domestic product
GPRS	General Packet Radio Services
GSM	Global System for Mobile Telecommunications
GTZ	German Agency for Technical Cooperation
ICT	information and communication technology
IIPA	International Intellectual Property Alliance
IPR	intellectual property right
ISDN	Integrated Service Digital Network
ISP	Internet service provider
IT	information technology
ITU	International Telecommunications Union
Mbps	million bits of data per second
MDG	Millennium Development Goal
OECD	Organisation for Economic Co-operation and Development
PC	personal computer
PCA	Professional Computer Association
PCT	Patent Cooperation Treaty
PDN	Public Data Network
PLT	Patent Law Treaty
RDI	research, development and innovation
RFP	request for proposal
TRIPS	The Agreement on Trade-related Aspects of Intellectual Property Rights
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Education, Scientific and Cultural Organization
USTR	United States Trade Representative
VoIP	Voice over Internet Protocol
VSAT	very small aperture terminal
WCT	WIPO Copyright Treaty
WIPO	World Intellectual Property Organization
WSIS	World Summit on the Information Society
WTO	World Trade Organization

Introduction

Global changes are taking place at the economic, social and cultural levels, with information and knowledge playing a major role in the move towards the information society. The accelerating development in knowledge during the past few decades has modified the principles of economic growth with the move towards knowledge-based economy affecting all sectors of the economy.

The information society is a society that processes information efficiently in its socio-economic development, including information production, exchange, adaptation and use for the purpose of development and enhancing the quality of life and work environment for all citizens. In order to realize the information society, modern information and communication technologies (ICTs) need to be used. While ICTs are necessary, they are not sufficient, given that capacity building must equally be developed in a number of areas, including economic, social, legal, educational and research.

Significant differences exist in the capacity of countries in terms of adapting to changes in technology and knowledge. Consequently, the move towards the information society constitutes a real challenge to developing countries, particularly in view of the expanding digital divide with developed countries, which renders them increasingly vulnerable to reduced productivity and economic capacity; and which, in turn, leads to unemployment, poverty and marginalization.

In this context, the General Assembly adopted resolution 56/183 in December 2001 to endorse a proposal presented by the International Telecommunications Union (ITU), which aimed at convening the World Summit on the Information Society (WSIS) under the patronage of the Secretary-General of the United Nations. This Summit seeks to reduce the digital divide by increasing awareness regarding the benefits of the Information Society, and by presenting mechanisms to help developing countries advance towards such a Society within the context of the global knowledge-based economy. WSIS was divided into two phases, namely: (a) the first Summit (Geneva, 10-12 December 2003), which resulted in a Declaration of Principles and a Plan of Action; and (b) the second Summit (Tunis, 16-18 November 2005), which is set to focus on the implementation of the Plan of Action, financing mechanisms for using ICTs for development, Internet governance issues, and follow up to the first Summit.

It is crucial for ESCWA member countries to build information societies if they aspire to lay the foundations for sustainable economic development and achieve the Millennium Development Goals (MDGs). Accordingly, ESCWA organized the Second Regional Preparatory Conference for the World Summit on the Information Society (Damascus, 22-23 November 2004) under the motto "Partnership for Building the Arab Information Society". This Conference resulted in a Regional Plan of Action, which dealt with various issues relating to the development of an information society in the region through 38 projects grouped in 10 programmes, each with a lead agency.[1] Additionally, the Conference produced the "Damascus Call: Towards Partnership for Building the Arab Information Society", which aimed at providing strategic support to implement regional projects and solid foundations for building this Society.

This report aims to depict the status of information societies in the ESCWA region, measure the progress made in building these societies and evaluate the current status of member countries. With those objectives, comprehensive analyses are provided on the following: (a) ICT policies and strategies in chapter I; (b) legal and regulatory environment for ICTs in chapter II; (c) ICT infrastructure in chapter III; (d) ICT capacity building in chapter IV; (e) building the ICT sector in chapter V; (f) ICT applications in Government establishments, education, commerce and business, and health care in chapters VI, VII, VIII and IX, respectively; and (g) digital Arabic content in chapter X. Chapter XI presents the conclusions and recommendations.

Throughout, the concept of maturity levels has been used in each of the major areas constituting the information society in order to categorize ESCWA member countries and compare their status in building

[1] ESCWA, "Regional Plan of Action for Building the Information Society", E/ESCWA/ICTD/2004/4.

information societies. Specifically, four maturity levels are used for every aspect of the information society, whereby level 1 indicates the lowest level of maturity and level 4 indicates the highest level of maturity.

Based on these results and recommendations, several initiatives and projects could be launched to reduce the existing digital divide both among ESCWA members and between the ESCWA region and more developed regions of the world. Within that context, ESCWA is fostering support for important regional projects through its Regional Plan of Action, which has been signed by its member countries, cognizant of the vital need to collaborate and synchronize efforts in order to reduce the digital divide and press forward towards the information society.

I. ICT POLICIES AND STRATEGIES

To varying degrees, ESCWA member countries are still trying to reap the benefits inherent in ICTs in terms of raising the standard of living, increasing productivity and developing the establishment of a knowledge society. At a regional level, there is a significant diversity of ICT policies and strategies (see box 1). While some countries have taken great strides in transforming their societies to knowledge societies, others have taken their first steps towards that end, and others still are facing basic challenges posed by inadequate ICT infrastructure.

The responsibility for formulating strategies and policies aimed at establishing knowledge societies lies primarily with Governments and political leaderships, in close collaboration with the private sector and civil society organizations. The existence of other urgent and outstanding economic and social undertakings in some ESCWA member countries must not relegate the task of transformation to a knowledge society to a lower priority that can be put off to a future date. Technology is a powerful tool that can be used for the following: (a) to develop society; (b) to hasten progress in terms of raising productivity, creativity and the quality of products and services; (c) to gain knowledge and information; and (d) to support transparency and limit bureaucracy.

Consequently, the formulation modalities must serve the needs of member countries in reducing poverty and unemployment, eradicating illiteracy, and supporting social development and education and health care services. Specifically, the key criteria for measuring ICT policies and strategies are as follows:

(a) National information society policies and strategies;
(b) Sectoral plans for building the information society;
(c) Realization of WSIS objectives.

Box 1. Telecommunications and the World Trade Organization

Under the General Agreement on Trade and Services (GATS), members of the World Trade Organization (WTO) must adhere to the basic norms related to the development of telecommunications policies. These include the following:

(a) Encourage progressive liberalization through binding commitments to schedules;
(b) Foster non-discrimination and transparency;
(c) Formulate regulations that are reasonable, objective, impartial and not overly burdensome;
(d) Promote competition safeguards aimed at realizing obligations and commitments;
(e) Support flexibility with regard to the recognition of national sovereignty and economic development needs.

Source: ESCWA, "Enhancing Telecommunciation Infrastructures, Services and Policies in ESCWA member countries", E/ESCWA/ICTD/2005/5.

A. COMPARATIVE ANALYSIS OF POLICIES AND STRATEGIES IN THE ESCWA REGION

1. *National information society policies and strategies*

With the exception of Iraq and the United Arab Emirates, most ESCWA members have established national ICT policies and strategies (see table 1). In the aftermath of the war in Iraq, that country has not witnessed sufficient political stability and security to allow the various successive transitional Governments to draw up such strategies. Given its constituent seven emirates, each with its own local government, the case of the United Arab Emirates is different. While the federal Government has not drawn up a comprehensive national strategy for its information society, very advanced strategies are in place and have been implemented at the local level, particularly in Dubai.

Formulating detailed ICT strategies necessitates the existence of explicit implementation plans for such strategies. Seven ESCWA member countries lack explicit implementation plans for their ICT strategies, either through delays in ratification, in the case of the Syrian Arab Republic and Yemen, or for other reasons. Moreover, the length of time needed to implement executive strategies varies between ESCWA members. For example, Lebanon and Saudi Arabia have been comparatively slower at implementing such strategies than Egypt, Jordan, Oman and Qatar; and the smallest ESCWA member, namely, Bahrain, has implemented the most ambitious strategy in the ESCWA region at the fastest rate.

TABLE 1. NATIONAL INFORMATION SOCIETY POLICIES AND STRATEGIES IN THE ESCWA REGION

Country or territory	Detailed ICT strategy	Explicit strategy implementation plan	Pace of implementation
Bahrain	Yes	Yes	Excellent
Egypt	Yes	Yes	Good
Iraq	No	No	..
Jordan	Yes	Yes	Good
Kuwait	Yes	No	..
Lebanon	Yes	Yes	Average
Oman	Yes	Yes	Good
Palestine	Yes	No	..
Qatar	Yes	No	..
Saudi Arabia	Yes	Yes	Average
Syrian Arab Republic	Yes[a/]	No	..
United Arab Emirates	No[b/]	No[b/]	..
Yemen	Yes[a/]	No	..

Source: Compiled by ESCWA from data in "Country reports" (in Arabic), E/ESCWA/ICTD/2003/11.

Notes: Two dots (..) indicate that the pace of implementation could not be accurately assessed.

a/ These ESCWA members have not yet ratified national ICT strategies.

b/ Despite a lack of ICT strategies at a national level, there is an excellent pace of implementation at a local level, particularly in Dubai.

2. *Sectoral plans for building the information society*

Sectoral strategies and implementation plans include development projects and programmes, in addition to associated measures taken by the private and public sectors in the ESCWA region towards establishing ICT research facilities, industrial clusters and incubators.

With the exception of Palestine, all ESCWA members have dedicated ICT research facilities or plans to launch new facilities. Moreover, in the case of Egypt, Jordan, Kuwait, Lebanon, Saudi Arabia and United Arab Emirates, new facilities have been planned to complement existing ones.

While Oman, Iraq and Palestine lack both ICT industrial clusters and plans to establish such clusters, Egypt, Jordan, Saudi Arabia and United Arab Emirates plan to launch new clusters to add to their existing ones. The remaining ESCWA member countries, which lack such clusters, have in place plans to launch them.

Similarly, in the area of ICT incubators, four ESCWA members, namely, Bahrain, Egypt, Jordan and United Arab Emirates, have drafted future plans to add new ICT incubators to existing ones.

Currently and at a regional level, only Egypt, Jordan and the United Arab Emirates have ICT research facilities, industrial clusters and incubators, and have plans in place to establish additional ones. Table 2 assesses the status of ICT research facilities, industrial clusters and incubators in the ESCWA region.

TABLE 2. SECTORAL PLANS FOR BUILDING THE INFORMATION SOCIETY IN THE ESCWA REGION

Country or territory	ICT research facilities		ICT industrial clusters		ICT incubators	
	Existing facilities	Plans for new facilities	Existing clusters	Plans for new clusters	Existing incubators	Plans for new incubators
Bahrain	Yes	..	No	Yes	Yes	Yes
Egypt	Yes	Yes	Yes	Yes	Yes	Yes
Iraq	No[a/]	Yes	No	No	No	No
Jordan	Yes	Yes	Yes	Yes	Yes	Yes
Kuwait	Yes	Yes	No	Yes	No	Yes
Lebanon	Yes	Yes	No	Yes	Yes	Yes
Oman	Yes	..	No	No	No	Yes
Palestine	No	No	No	No	Yes	No
Qatar	Yes	..	No	Yes	No	No
Saudi Arabia	Yes	Yes	Yes	Yes	No	Yes
Syrian Arab Republic	No	Yes	No	..	No	No
United Arab Emirates	Yes	Yes	Yes	Yes	Yes	Yes
Yemen	No	Yes	No	Yes	No	Yes

Source: World Economic Forum (WEF), *Global Information Technology Report 2002-2003: Readiness for the networked world* (Oxford University Press, 2003), which was subsequently adapted by Madar Research Group based on the data compiled by ESCWA in the 2005 country reports.

Notes: Two dots (..) indicate that the indicators could not be accurately assessed given a lack of available data.

a/ Existing facilities, which were destroyed by successive wars in Iraq, lost their effectiveness in the 1990s in the wake of imposed sanctions on that country.

3. *Realization of WSIS objectives*

Within the framework of the Plan of Action, the WSIS objectives are as follows: (a) to build an inclusive information society; (b) to put the potential of knowledge and ICTs at the service of development; (c) to promote the use of information and knowledge for the achievement of internationally agreed development goals, including MDGs; and (d) to address new challenges of the information society at national, regional and international levels. Moreover, the two-phase structure of WSIS has provided an opportunity to evaluate and assess the progress made towards bridging the digital divide (see box 2).

Under these objectives, specific national targets for the information society are set to be established as appropriate and in accordance with national e-strategies, development policies and particular national circumstances. Such targets can serve as useful benchmarks for actions and for the evaluation of the progress made towards the attainment of the overall objectives of the information society.

Box 2. Bridging the digital divide

The term "digital divide" refers to the gap between individuals, households, businesses and geographic areas at various socio-economic levels in terms of access and use of information and communication technologies (ICTs). The widening of this gap reinforces disparities between and among countries, which leads to increasing exclusiveness in both cases.

According to the Organisation for Economic Co-operation and Development (OECD), the digital divide can be measured according to the availability of telecommunications infrastructure, and of computer and Internet access. In the case of both households and countries, the digital divide can equally be attributed to the levels of education and income, as reflected in the Human Development Index by the United Nations Development Programme (UNDP).

Policies can play a crucial role in overcoming this widening digital divide. Moreover, adequate regulatory reforms are needed to ensure low-cost access to ICTs, thereby reaping the associated economic and social benefits.

Source: ESCWA, "Information Society Indicators", E/ESCWA/ICTD/2005/1.

Taking into account national targets and particular circumstances, there are a number of WSIS indicative targets that can serve as global references for improving connectivity and access to ICTs.[2] These are as follows:

(a) To connect villages with ICTs and establish community access points;

(b) To connect universities, colleges, secondary schools and primary schools with ICTs;

(c) To connect scientific and research centres with ICTs;

(d) To connect public libraries, cultural centres, museums, post offices and archives with ICTs;

(e) To connect health centres and hospitals with ICTs;

(f) To connect all local and central Government departments and to establish relevant websites and email addresses;

(g) To adapt all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances;

(h) To ensure that people across the world have access to television and radio services;

(i) To encourage the development of content and to put in place technical conditions in order to facilitate the presence and use of all world languages on the Internet;

(j) To ensure that more than half of the global population have ready access to ICTs.

Table 3 divides ESCWA members into three assessment levels, thereby providing an overview of the status and progress of each member in terms of realizing individual WSIS targets. The assessment allows the classification and ranking of countries according to their general performance in this regard.

TABLE 3. REALIZATION OF WSIS OBJECTIVES IN THE ESCWA REGION

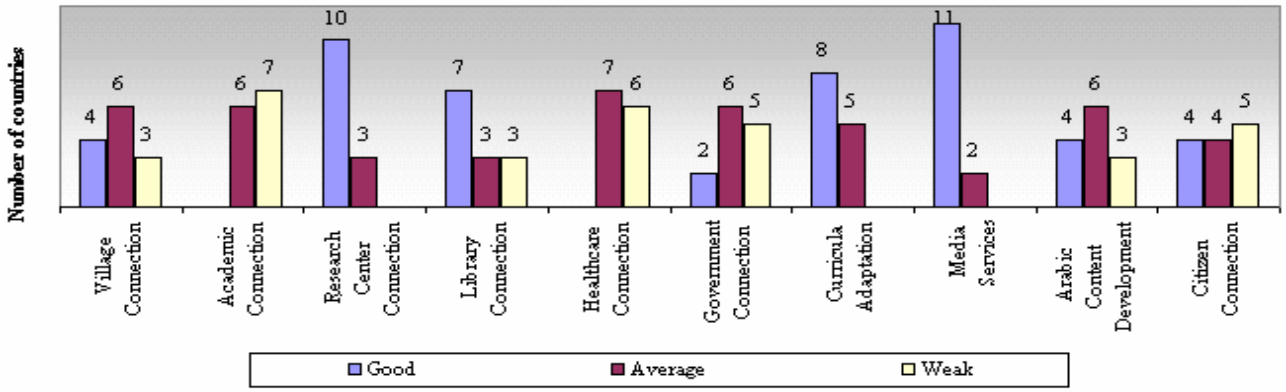
Country or territory	Village connection	Academic connection	Research centre connection	Library connection	Health care connection	Government connection	Curricula adaptation	Media services	Development of Arabic content	Citizen connection	Result
Bahrain	3	2	3	3	2	3	3	3	2	3	27
United Arab Emirates	3	2	3	3	2	2	3	3	3	3	27
Qatar	3	2	3	3	2	3	2	3	2	3	26
Kuwait	3	2	3	3	2	1	3	3	2	3	25
Jordan	2	2	3	3	2	2	3	3	3	2	25
Egypt	2	1	3	2	2	2	3	3	3	1	22
Saudi Arabia	2	1	3	3	2	1	2	3	3	2	22
Lebanon	2	2	3	2	1	2	2	3	2	2	21
Oman	2	1	3	2	1	2	3	3	1	2	20
Syrian Arab Republic	2	1	3	3	1	1	3	3	2	1	20
Palestine	1	1	2	1	1	1	3	3	2	1	16
Iraq	1	1	2	1	1	2	2	2	1	1	14
Yemen	1	1	2	1	1	1	2	2	1	1	13

Source: Compiled by ESCWA based on the ESCWA 2005 country reports.

Note: The digits 1, 2 and 3 indicate, respectively, weak, with less than 40 per cent of WSIS objectives realized; average, with 40-60 per cent of WSIS objectives realized; and good, with more than 60 per cent of WSIS objectives realized.

[2] Under the Plan of Action of the World Summit on the Information Society (WSIS), the target date for these objectives is 2015.

Figure 1. Realization of WSIS objectives



Source: Compiled by ESCWA.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

The methodology used in the report by ESCWA on the regional Plan of Action for Building the Information Society forms the basis of the current ranking of ESCWA members. This methodology clarifies the national ICT policies and strategies, the sectoral plans and the operational effectiveness of these policies and strategies.[3] As the data provided is not quantitative, ranking is based on the presence or absence of ICT policies and strategies, the extent to which they are realistic and the effectiveness of sectoral plans.

Four maturity levels were used in the 2003 report, namely: (a) maturity level 1, which indicates the absence of a clearly articulated vision and national ICT strategy, and limited implementation plans and initiatives; (b) maturity level 2, which indicates the existence of a clearly articulated vision and national strategy, albeit with limited implementation plans; (c) maturity level 3, which indicates the existence of a clearly articulated vision and advanced national strategy, in addition to moderately effective implementation plans; and (d) maturity level 4, which indicates a clearly articulated vision and advanced national strategy, and effective implementation plans.

Table 4 summarizes the maturity levels and ranking of ESCWA members in 2005, compared to their levels in 2003.

TABLE 4. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN ICT STRATEGIES AND POLICIES

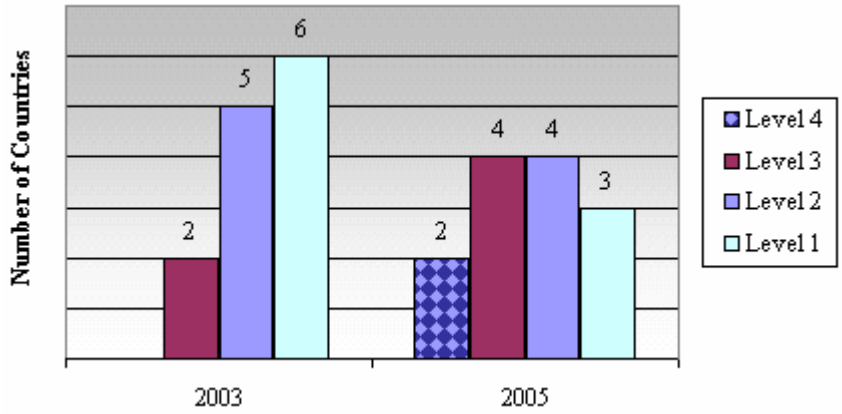
	Level 1		Level 2		Level 3		Level 4	
Country or territory	2003	2005	2003	2005	2003	2005	2003	2005
Bahrain			√					√
Egypt			√			√		
Iraq	√	√						
Jordan					√			√
Kuwait			√			√		
Lebanon	√			√				
Oman			√	√				
Palestine	√	√						
Qatar			√	√				
Saudi Arabia	√					√		
Syrian Arab Republic	√			√				
United Arab Emirates					√	√[a/]		
Yemen	√	√						

Source: Compiled by ESCWA, based on tables 1, 2 and 3, and on the "Regional Profile of the Information Society 2003" (E/ESCWA/ICTD/2003/11).

a/ Dubai in the United Arab Emirates achieved maturity level 4 in 2005.

[3] ESCWA, "Regional Plan of Action for Building the Information Society" (E/ESCWA/ICTD/2004/4).

Figure 2. Maturity levels of ESCWA members in ICT strategies and policies



Source: Compiled by ESCWA.

Maturity level 1: Iraq, Palestine and Yemen

Countries at this level have either failed to devise national ICT policies and strategies, or they have formulated such plans at a theoretical level with unspecified implementation plans. A common trait for these countries is the breadth of areas targeted, and an appreciation of how ICTs can be leveraged to accomplish a variety of objectives. However, stated objectives need to become more specific and aligned with dedicated resources to succeed operationally.

Notably, this maturity level, which comprised almost half the ESCWA members in 2003, currently comprises only Iraq, Palestine and Yemen. In Palestine, the 2005-2007 Development Plan covers various sectoral development needs for the budding knowledge economy, in collaboration with the private and academic sectors. In Yemen, while a national ICT strategy has been drafted, it has yet to be ratified.

Maturity Level 2: Lebanon, Oman, Qatar and Syrian Arab Republic

While not all countries at this maturity level have devised clear ICT policies and strategies, they have, to varying extents, clearly articulated ICT-enabled programmes. Moreover, most have devised clear plans and benchmarks to measure success, and have created legal and investment frameworks, thereby making them attractive targets for ICT investment. However, they are not yet successful in achieving a critical mass in terms of results.

Oman and Qatar have shown no discernable improvements since 2003. By contrast, Lebanon and the Syrian Arab Republic have striven to realize the WSIS targets and, consequently, have moved up to maturity level 2 since 2003.

Maturity Level 3: Egypt, Kuwait, Saudi Arabia and United Arab Emirates

Kuwait, Egypt and Saudi Arabia have risen to maturity level 3 as a result of clear strategic goals that have sought to leverage strong local funding capabilities. While they have benefited from their national ICT strategies, the effectiveness of their achievements remains moderate. In the United Arab Emirates, the lack of a comprehensive federal ICT strategy is offset by the existence of clear ICT strategies and effective implementation of these strategies at the local level, particularly in Dubai. Often, the implementation surpasses the actual strategies, thereby resulting in continuing growth and penetration of ICTs and ICT literacy in the country, which are comparable to levels found in some developed countries. Moreover, despite the lack of a federal ICT strategy, the United Arab Emirates has realized many WSIS targets.

In Saudi Arabia, the Government is striving to transform the country into an attractive target for ICT investment, which has resulted in its advancement to maturity level 3. Specifically, the long-term national

ICT strategy for the next 20 years comprises a forward-looking vision and seven general targets, in addition to a number of implementation strategies. The first five-year ICT plan includes specific goals derived from this long-term strategy; implementation plans; and suggestions for a number of projects, regulations and practices.

Maturity Level 4: Bahrain and Jordan

Bahrain has risen to maturity level 4, up from level 2 in 2003, as a result of its outstanding performance in realizing WSIS targets. It has faced very few obstacles in realizing these targets. Bahrain currently has plans to establish ICT research facilities, industrial clusters and incubators. Moreover, Bahrain, which represents the smallest ESCWA member, has implemented the most ambitious strategy in the ESCWA region at the fastest rate.

Similarly, Jordan is among the few ESCWA members that possesses actual ICT research facilities, industrial clusters and incubators, in addition to plans to establish additional ones. Furthermore, Jordan's performance in the past few years has been aligned closely to WSIS targets.

II. LEGAL AND REGULATORY FRAMEWORKS FOR ICTs

Out of all the factors pertinent to the development of information societies in the ESCWA region, the challenge posed by underdeveloped legal and regulatory environments represents the most difficult obstacle. Laws and regulations relating to intellectual property rights (IPRs) and the ICT sector have been developed to meet international demands and pressures, rather than as a result of domestic industrial or public demand. While this does not diminish the major developments undergone in some countries in this regard, it does imply that the legislative factor is still not fully appreciated as an imperative component of the development process. As the national reports indicate, given that the issue of information privacy and security is not currently required by international bodies and local industries, none of the countries in the ESCWA region has tackled this issue. This absence of progress with regard to privacy and security is a direct indicator of the shortcomings in the legal and regulatory environment.

However, most of the countries in the ESCWA region have formulated or are in the process of formulating legislations on IPRs and ICTs, which represents favourable developments in the legal and regulatory frameworks.

In order to facilitate the evaluation of such developments, these are categorized as follows: (a) national legal and regulatory status on IPRs; (b) telecommunications regulatory framework; (c) regulating the Internet; and (d) laws and regulations on consumer privacy and security.[4]

A. COMPARATIVE ANALYSIS OF LEGAL AND REGULATORY ENVIRONMENTS IN THE ESCWA REGION

1. *National legal and regulatory status on IPRs*

Most ESCWA members have joined several international treaties and have promulgated laws pertaining to IPRs. However, several international organizations, including, most prominently, the International Intellectual Property Alliance (IIPA) and the Business Software Alliance (BSA), consider the level of enforcement to be largely inadequate, and retain several ESCWA member countries on their watch lists.[5] There are various major challenges facing the implementation of laws related to IPRs, including as follows: (a) a lack of coordination among involved ministries, particularly the Ministries of Information, Interior, Culture and Information in the case of Oman and Saudi Arabia; (b) the absence of IPR units in police forces in the case of Kuwait and Lebanon; and (c) the lack of implementing legislations aimed at regulating publishing in the case of Egypt.

The following ESCWA members are currently on two IPR watch lists:[6]

(a) All ESCWA members with the exception of Bahrain, Jordan, Oman and United Arab Emirates, according to the "Special 301" watch list by the Office of the United States Trade Representative (USTR);

(b) Egypt, Kuwait, Lebanon and Saudi Arabia, which are on the IIPA watch list.[7]

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[4] The laws and regulations relating to e-government and e-signature are reviewed in chapter VIII.

[5] The International Intellectual Property Alliance (IIPA), which was established in 1984, is a private sector coalition aimed at representing the copyright-based industries in the United States and at improving the international protection of copyrighted materials.

[6] While the two watch lists by the Office of the United States Trade Representative (USTR) and the International Intellectual Property Alliance (IIPA) largely reflect appraisal of IPR status by the United States, both reports depend heavily on data from the World Intellectual Property Organization (WIPO) and other international conventions and standards relating to IPRs.

[7] This list, which is compiled in conjunction with the "Special 301" by USTR, does not include references to Iraq, Palestine, Syrian Arab Republic and Yemen given the absence of formal commercial agreements relating to IPRs between those ESCWA members and the United States.

TABLE 5. RANKING OF ESCWA MEMBERS ACCORDING TO THE LEVEL OF SOFTWARE PIRACY
(*Percentage*)

Ranking	Country or territory	Piracy rates
1	United Arab Emirates	34
2	Saudi Arabia	52
3	Qatar	62
4	Bahrain	62
5	Oman	64
6	Jordan	64
7	Kuwait	68
8	Egypt	65
9	Lebanon	75
..	Palestine[a/]	..
..	Syrian Arab Republic[a/]	..
..	Yemen[a/]	..
..	Iraq[a/]	..

Source: Business Software Alliance (BSA) and International Data Corporation (IDC), "Second annual BSA and IDC global software: Piracy study" (May 2005), which is available at: http://www.bsa.org/globalstudy/upload/2005-Global-Study-English.pdf.

Note: Two dots (..) indicate that the rates could not be accurately assessed given a lack of available data.

a/ The report did not specify the level of use of pirated software.

TABLE 6. STATUS OF INTERNATIONAL AGREEMENTS IN THE ESCWA REGION

Country or territory	WTO	Paris Convention	WCT	PCT	Madrid Agreement	Hague Agreement	PLT	TRIPS
Bahrain	✓	✓	×	×	×	×	×	✓
Egypt	✓	✓	×	✓ 2003	✓	✓ 1952	×	✓
Iraq	OB 2004	✓	×	×	×	×	×	×
Jordan	✓	✓	✓ 2004	×	×	×	×	✓
Kuwait	✓	×	×	×	×	×	×	✓
Lebanon	OB 1999	✓	×	×	×	×	×	×
Oman	✓	✓	✓ 2005	✓	×	×	×	✓
Palestine	×	×	×	×	×	×	×	×
Qatar	✓	✓	×	×	×	×	×	✓
Saudi Arabia	OB 1993	✓ 2004	×	×	×	×	×	×
Syrian Arab Republic	×	✓	✓ 2003	✓ 2003	✓ 2004	×	×	×
United Arab Emirates	✓	✓	✓	✓	×	×	×	✓
Yemen	OB 2000	×	×	×	×	×	×	×

Source: World Intellectual Property Organization (WIPO), which is available at: http://www.wipo.int/portal/index.html.en.

Note: Those ESCWA members with observer status in WTO are represented by OB.
The dates shown indicate the years of joining a treaty or of gaining observer status.

2. *Telecommunications regulatory framework*

Most ESCWA members have witnessed an exponential growth in telecommunication usage. The rapid growth of mobile use in such countries as Iraq and the Syrian Arab Republic has been unparalleled. However, many ESCWA member countries have still not liberalized their telecommunication sector to accommodate rules of competition and market demand.

Within that context, some ESCWA members, including Jordan, Bahrain and the United Arab Emirates, have issued laws aimed at liberating fixed line services, thereby enabling private companies to

operate and provide such services.[8] However, all fixed line services in the region are currently provided by monopolies.

By contrast, there have been some more noticeable changes in the regulatory framework of mobile telecommunications. Several ESCWA members, including Bahrain, Egypt, Iraq, Jordan, Oman, Saudi Arabia and United Arab Emirates, have established either a telecommunications regulatory authority or a telecommunications commission that is independent of the Ministry of Telecommunications (see box 3). These national regulatory authorities aim at preparing telecommunication laws, which in turn are set to liberalize and deregulate the sector. However, the current situation of all the countries still reflects a duopoly in the Global System for Mobile Telecommunications (GSM) sector, a monopoly in fixed lines, and relative competitiveness among Internet service providers (ISPs).

Box 3. Telecom liberalization in selected ESCWA member countries

Jordan

As planned, Jordan Telecom Company's monopoly of the fixed phone line was ended as from 2005. The Telecom regulatory body started, as of April 2005, the preliminary selection procedures for access and transport providers. The licence will be completed during 2006.

Bahrain

As of 1 July 2004, the telecom sector was liberalized, with basic services opened up for competition. In February 2005, the number of companies that applied for service provisioning licenses reached 29, compared to 26 applications in 2004 and only 16 in 2003. Many improvements are expected in the telecom market in Bahrain during 2005 and the following years, along with the issuance of new frameworks to regulate market access and to encourage several different companies to enter the market.

Oman

The privatization of Oman Telecom started on 24 May 2005, in the form of an offer of 30 per cent of its shares for sale; 21 per cent of shares were allocated to Omani nationals, while 9 per cent were allocated to pension funds. The value of these shares amounted to US$ 760 million. In fact, the liberalization of the sector started in 2004 with the establishment of Norus Telecom Company as the second mobile operator, with the leadership of Qatari Telecom Company (Q-Tel) and the partnership of the Danish company TDL, and other partners from Oman. As a result, the mobile telephone density increased from 13.43 per cent at the end of March 2005 to 25.83 per cent at the end of June 2005.

Egypt

The liberalization of the telecom sector in Egypt started with the commercial introduction of Internet services in 1996, followed by the introduction of mobile telephony services in 1998. Telecom Egypt has also gone through several partnerships with the private sector in the privisioning of selected services. Examples include partnerships for public payphones, VSAT and prepaid calling cards. In 2000, there was an attempt to privatize Telecom Egypt, but it was postponed due to the prevailing market conditions. By mid-2000, the the Government announced that liberalization of cable communications would be achieved before the end of 2005. By 2004, the new Telecom Law had been issued, aiming at liberalization of the sector, achieving transparency and encouraging investments. Today, the following services are fully liberalized: local and transit calls, asymmetric digital subscriber lines (ADSL), wireless local loops, Internet services and VSAT, while international calls remain the responsibility of Telecom Egypt until 2005.

On the mobile telephony side, there is still controlled competition, with only two companies, expected to increase to three in the near future.

Source: ESCWA, "Enhancement of Telecom infrastructure services and policies in ESCWA member countries", August 2005, E/ESCWA/ICTD/2005/5.

[8] Additionally, Saudi Arabia is expected to liberalize this sector by 2006.

TABLE 7. STATUS OF LIBERALIZED TELECOMMUNICATIONS AND INTERNET SERVICES IN THE ESCWA REGION

Country or territory	Fixed lines	GSM	ISP	Telecommunications regulatory authority
Bahrain	Monopoly	Duopoly	Competitive	Yes
Egypt	Monopoly	Duopoly	Competitive	Yes
Iraq	Monopoly	Competitive	Monopoly	Yes
Jordan	Monopoly	Competitive	Competitive	Yes
Kuwait	Monopoly	Duopoly	Competitive	No
Lebanon	Monopoly	Duopoly	Competitive	No
Oman	Monopoly	Duopoly	Monopoly	Yes
Palestine	Monopoly	Monopoly	Competitive	No[a/]
Qatar	Monopoly	Monopoly	Monopoly	No
Saudi Arabia	Monopoly	Duopoly	Competitive	Yes
Syrian Arab Republic	Monopoly	Duopoly	Duopoly	No
United Arab Emirates	Monopoly	Monopoly	Duopoly	Yes
Yemen	Monopoly	Duopoly	Monopoly	No

Source: Compiled by ESCWA.

a/ Palestine is in the process of forming an independent regulatory authority and updating its Telecommunications Law.

3. *Regulating the Internet*

While nine of the countries in the ESCWA region have more than one ISP, the international gateway in each country is still controlled by one entity in most ESCWA members. Regulating the Internet falls mainly into the following two categories:

(a) Operational control, whereby most international gateway operators control access to certain services provided through the Internet, including Voice over Internet Protocol (VoIP), peer-to-peer and file transfer protocol (FTP);[9]

(b) Censorship, whereby national proxies forbid access to lists of websites, including, among others, adult, political, religious, chat and newsgroups.

4. *Laws and regulations on consumer privacy and security*

None of the ESCWA members has developed or is in the process of developing regulations and laws pertaining to consumer privacy and security over the Internet. With the exception of e-banking services, which are largely maintained by e-government sites, no warranties or laws exist to guarantee consumer information privacy. However, major websites and ISPs across the region have independently developed privacy statements suitable for their own use.

While these private companies issue declarations on their websites indicating protection of consumer privacy, such declarations are often little more than copied or translated texts drawn from international websites. There are no official consumer protection associations in the region and no specific laws on consumer protection. Similarly, the right to individual privacy in most ESCWA member countries, including the privacy of civil, financial and other individual records, is either not protected by law or is rendered general to the extent that it cannot be enforced in a court of law.

[9] While VoIP is still prohibited by national telecommunication authorities in all the countries, some ESCWA members, particularly Egypt, are allowing commercial calling centres to use VoIP.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

The ranking of ESCWA member countries on legal and regulatory environment reflects the overall success and commitment in terms of creating and implementing adequate legal and regulatory frameworks for ICTs. The maturity levels assigned are a function of the existence of ICT-specific frameworks and effective implementation.

Four maturity levels were used in the "Regional Plan of Action for Building the Information Society" (E/ESCWA/ICTD/2004/4), namely: (a) maturity level 1, which indicates outdated legal and regulatory frameworks inadequate to ICT industrial and consumer needs, and poor enforcement of existing laws; (b) maturity level 2, which indicates legal and regulatory frameworks increasingly being updated and adapted, albeit insufficient to ICT industrial and consumer needs, with poor performance on enforcement; (c) maturity level 3, which indicates legal and regulatory frameworks adapted to ICT industrial and consumer needs, with progress being made in enforcement; and (d) maturity level 4, which indicates legal and regulatory frameworks fully adapted to ICT industrial and consumer needs, with full enforcement.

None of the ESCWA members has achieved maturity level 4; and only two countries, namely, Bahrain and Saudi Arabia, have advanced their legal and regulatory environment in the past two years (see table 8). However, the level of advancement between these countries varies considerably. When investigating these maturity levels, particular care must be taken with regard to internal and external factors. For example, while the recent move to liberalize the telecommunication industry in Saudi Arabia is often considered sluggish by many observers, it is comparatively faster than reforms being undertaken in other sectors. Other issues relating to the regulatory and legal framework include the size of the sector affected by the change. Within that context, most small countries, whether in terms of population or geography, can adapt and adopt changes faster and more easily than larger countries. Consequently, any advancement in the legal environment cannot be isolated as an independent factor without considering other factors and elements.

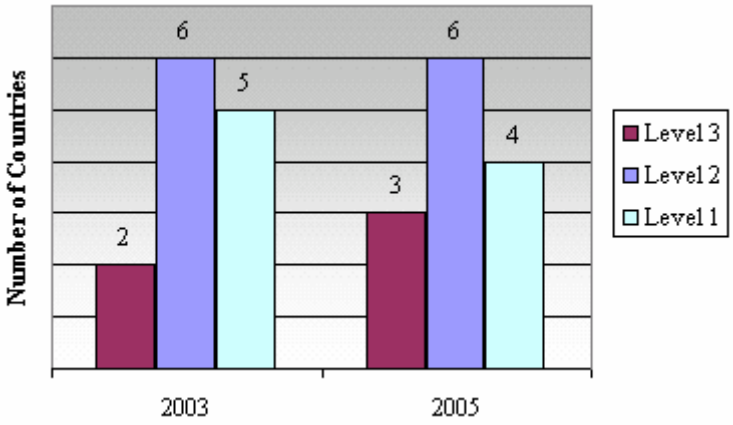
TABLE 8. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN LEGAL AND REGULATORY ENVIRONMENT

	Level 1		Level 2		Level 3	
Country or territory	2003	2005	2003	2005	2003	2005
Bahrain			☑			☑
Egypt			☑	☑		
Iraq	☑	☑				
Jordan					☑	☑
Kuwait			☑	☑		
Lebanon			☑	☑		
Oman			☑	☑		
Palestine	☑	☑		☑		
Qatar			☑	☑		
Saudi Arabia	☑			☑		
Syrian Arab Republic	☑	☑				
United Arab Emirates					☑	☑
Yemen	☑	☑				

Source: The table is based on the "Regional Profile of the Information Society, 2003" and ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis.

Figure 3 indicates that the number of countries ranked in level 2 has not changed since 2003, while the number decreased for level 1 and increased in level 3.

Figure 3. Maturity levels of ESCWA members in the legal and regulatory environment



Source: Compiled by ESCWA.

Maturity level 1: Iraq, Palestine, Syrian Arab Republic and Yemen

While these ESCWA members have started to change certain legal and regulatory aspects, there have been no major changes since 2003 in terms of legislation or implementation. In fact, Yemen articulated new measures restricting flexible Internet use in public places, including Internet cafes. By contrast, Palestine is endeavouring to develop laws aimed at structuring its ICT sector; and Iraq is expected to witness dramatic changes in telecommunications regulations as part of the overall restructuring of the Government. Within this group, the Syrian Arab Republic is the only country that has developed a comprehensive set of regulations as part of a national ICT strategy. However, the scope of adoption and implementation of such regulations is not yet clear.

Maturity level 2: Egypt, Kuwait, Lebanon, Oman, Qatar and Saudi Arabia

With the exception of Saudi Arabia, none of these countries has witnessed major changes in their legal environment since 2003. Most still suffer from issues of implementation rather than legislation. Moreover, enforcing IPRs and copyrights is still a sensitive issue in all the countries in this group.

In Saudi Arabia, the advancement from maturity level 1 in 2003 to maturity level 2 can be attributed to significant efforts aimed at liberalizing the telecommunications sector, in addition to serious steps regarding IPRs and copyrights. As mentioned above, Saudi Arabia is still facing considerable challenges with regard to regulatory issues and implementation. However, taking into account its size, an extensive bureaucracy level and other factors, it becomes evident that Saudi Arabia is undertaking reforms in its telecommunications sector at a faster rate than those in other sectors.

Maturity level 3: Bahrain, Jordan and the United Arab Emirates

Bahrain has witnessed dramatic improvements in almost all aspects of its telecommunications sector. The full liberalization of the telecommunications sector, the establishment of the Bahrain Internet Exchange, the high level of commitment to IPRs and copyrights, and other relevant regulations prove the serious intent of Bahrain to liberalize, modernize and adapt its regulations to meet international standards. All of these observations qualified Bahrain to move from level 2 in 2003 to level 3.

Both Jordan and the United Arab Emirates continue to update and modernize relevant ICT regulations to adhere to international standards.

III. ICT INFRASTRUCTURE

Any plan of sustainable development cannot succeed without adequate, state-of-the-art ICT infrastructure. Unlike other factors affecting the transformation to information societies and knowledge-based economies, the development of ICT infrastructure is the easiest to acquire, implement and measure. Major hurdles facing the establishment and use of a proper ICT infrastructure are immediately apparent and include a lack of sufficient funds and technical problems. However, these hurdles can be overcome comparatively swiftly given that they do not incorporate socio-cultural attributes. This is in stark contrast to challenges that relate to inadequate legal, regulatory and institutional structures, which were addressed in chapters I and II, and which require both a political will and a future-oriented vision capable of inducing change in the dynamics of the whole sector.

However, developing and sustaining an ICT infrastructure requires consistent and continuous efforts by the public sector. Specifically, there is a need to identify accurately the requirements and applications of ICTs. Without this identification process, such undertakings can essentially hinder the process of development given the concomitant poor allocation of funds. Consequently, any developments in ICT infrastructure must not be quantitatively isolated from other, equally important developments, particularly those related to legislative reform, strengthening the sector and capacity building of human resources.

For the purpose of this report, the components of ICT infrastructure are categorized as follows: (a) telephone services; (b) connectivity to the global Internet; (c) ISPs and application service providers (ASPs); and (d) personal computer (PC) penetration.

A. OVERVIEW OF ICT INFRASTRUCTURE CAPABILITIES

1. *Telephone services*

(a) *Fixed line services*

While some countries in the region have liberalized their telecommunication sectors, fixed line services are still operated and monopolized by Governments. However, this monopoly has not proved a major hindering factor for the spread of the service. As penetration and growth rates clearly show, countries of the Gulf Cooperation Council (GCC) have generally very good penetration rates without liberalizing this sector. Moreover, rapid developments in the mobile phone sector have affected the growth and penetration rate of fixed line services as more and more users are opting for mobile phone services. In addition, the relative growth of non-dial-up Internet services, particularly asynchronous digital subscriber line (ADSL), is having a negative impact on the spread of fixed line services as a means for fast internet access.

With the exception of Iraq, most ESCWA members have witnessed very modest growth in fixed line services. Only Iraq registered an exponential growth of 25 per cent in one year. Collectively, the countries of the GCC registered a growth of 5 per cent in fixed line services in 2004, which indicates, among other things, a strong preference for mobile phone services, particularly among the expatriate populations of that sub-region.

TABLE 9. GROWTH RATE OF FIXED LINES IN THE ESCWA REGION, 2003 AND 2004

Country or territory	Fixed line subscribers, 2004 (*Thousands*)	Fixed line subscribers, 2003 (*Thousands*)	Growth (*Percentage*)
Bahrain	192	186	3
Egypt	9 600	8 800	9
Iraq	960	770	25
Jordan	638	623	2
Kuwait	490	489	0.20
Lebanon	704	700	0.57
Oman	243	238	3
Palestine	333	316	5
Qatar	200	186	8
Saudi Arabia	3 695	3 500	6
Syrian Arab Republic	2 657	2 411	10
United Arab Emirates	1 200	1 138	5
Yemen	750	685	9
Total	21 662	20 042	8

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

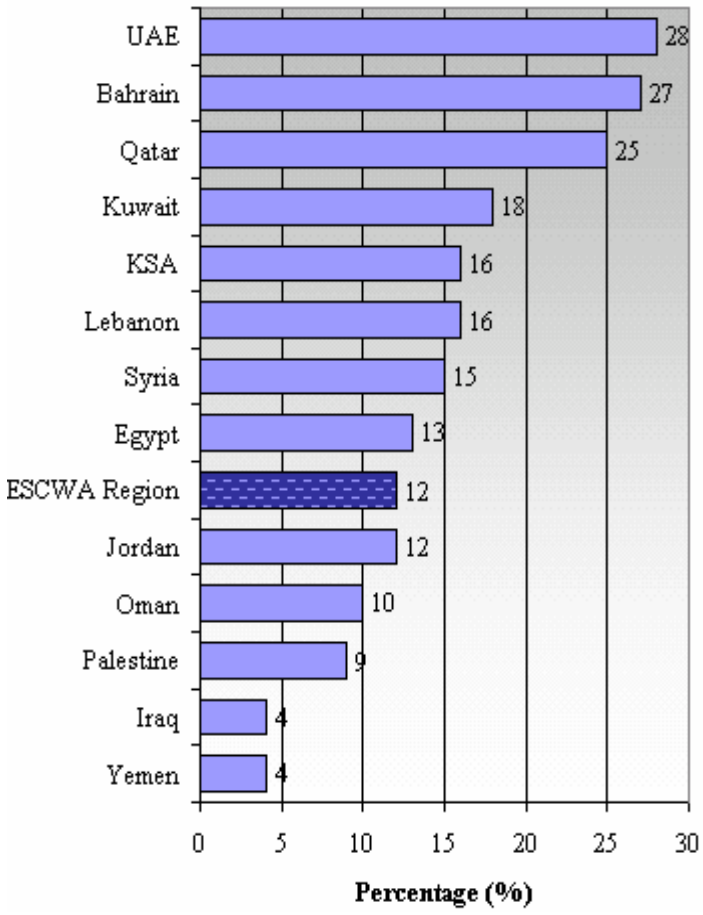
Fixed line penetration rates reflect a more accurate picture of the maturity of the fixed line infrastructure (see table 10).

TABLE 10. PENETRATION RATE OF FIXED LINES IN THE ESCWA REGION, 2004

Rank	Country or territory	Population (*Thousands*)	Subscribers of fixed lines (*Thousands*)	Penetration rate of fixed lines (*Percentage*)
1	United Arab Emirates	4 320	1 200	28
2	Bahrain	708	192	27
3	Qatar	790	200	25
4	Kuwait	2 750	490	18
5	Saudi Arabia	22 866	3 695	16
6	Lebanon	4 500	704	16
7	Syrian Arab Republic	17 980	2 657	15
8	Egypt	73 500	9 600	13
9	Jordan	5 470	638	12
10	Oman	2 410	243	10
11	Palestine	3 670	333	9
12	Iraq	25 400	960	4
13	Yemen	20 350	750	4
	Total	184 714	21 662	12

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 4. Penetration rate of fixed lines in the ESCWA region, 2004



When the regional penetration rate in table 10 is compared to the growth rate presented in table 9, it is evident that most countries of the GCC have reached market maturity levels. By contrast, Iraq, Jordan and the Syrian Arab Republic are still at the initial growth level. Moreover, figure 4 indicates that the United Arab Emirates comes first in terms of penetration. Only Yemen suffers from low penetration and growth rates, which impede the spread of fixed lines in the country. Additionally, Palestine suffers considerably from relatively higher costs for fixed line services compared to neighbouring countries, and from other logistical difficulties involved in connecting the Gaza Strip with the West Bank. These issues hinder significantly the development of the fixed line services and discourage international operators from contributing to the sector, despite the fact that the monopoly of the local operator is set to end by 2005.

TABLE 11. OPERATORS OF FIXED LINES IN THE ESCWA REGION, 2004

Country or territory	Operator	URL
Countries of the GCC		
Bahrain	Bahrain Telecommunications Company	www.batelco.com.bh
Kuwait	Ministry of Communications	www.mockw.net
Oman	Oman Telecommunications Company	www.omantel.net.om
Qatar	Qatar Telecommunications Company	www.qtel.com.qa
Saudi Arabia	Saudi Telecommunications Company	www.stc.com.sa
United Arab Emirates	Etisalat Telecommunications Company	www.etisalat.co.ae
Other ESCWA members		
Yemen	Yemen Telecommunications Company	www.mtit.gov.ye
Egypt	Egypt Telecommunications Company	www.telecomegypt.com.eg
Iraq	Ministry of Telecommunications	www.iraqimoc.net
Jordan	Jordan Telecommunications Corporation	www.jordantelecom.jo
Lebanon	Ministry of Telecommunications	www.mpt.gov.lb
Palestine	Palestine Telecommunications Company	www.paltel.ps
Syrian Arab Republic	Syrian Telecommunications Establishment	www.ste.net.sy

Source: Madar Research Group.

(b) *Mobile services*

The region's mobile phone industry and the demand for its various services (see box 4) rose significantly in 2004, with the number of mobile phone subscribers reaching more than 33.04 million, up some 39 per cent from 2003; and with concomitant increases in mobile teledensity rising from 11 per cent in 2003 to 17 per cent in 2004 (see table 12). The actual growth of mobile phone subscriptions has exceeded all expectations owing primarily to a massive increase in mobile subscribers in Iraq, which witnessed a rise from a very modest 0.10 million in 2003 to 1.59 million by the end of 2004. Another key contributor to the growth in this sector is the presence of a thriving competitive environment in all ESCWA members with the exception of Palestine, Qatar and the United Arab Emirates, which has played a key role in lowering tariffs and call charges.

Bahrain registered the highest mobile phone penetration rate at 91.7 per cent, while Yemen registered the lowest rate at 5.4 per cent (see table 13[10] and figure 5). Moreover, mobile phone subscribers in Iraq registered the strongest growth at 1,353 per cent, while the growth of mobile phone lines in Lebanon were the most sluggish at 7 per cent. However, despite impressive growth and penetration rates in some ESCWA member countries, the average penetration rate is considerably low compared to the average of 75 per cent in Europe.

[10] This teledensity implies that 17 out of 100 people living in the ESCWA region were subscribed to a mobile phone network in 2004, compared to 11 out of every 100 in the previous year.

Box 4. The new generation of mobile communications: definitions of services

GSM: The Global System for Mobile Communications (GSM) is an open source system and, consequently, its development is not restricted to a single developer. It includes a variety of sub-systems that ensure the secure transfer of voice and data packets and provide the roaming service. Unlike the first generation of wireless technologies, GSM is based on a digital system and uses variations of Time Division Multiplexing (TDM) for packet transfer. Using GSM, voice is digitized and compressed in a way that maintains the main characteristics of human voice and ensures a high level of reliability during transfer. It is noted that GSM has considered the core security issues since the start of its development lifecycle. Indeed, it has become the best global system in that field.

GPRS: The General Packet Radio Service (GPRS) is a network that is installed on top of GSM networks and uses the Internet transfer protocol (TCP/IP) through a compatible mobile device for communication purposes. It offers new opportunities related to the Internet connection. In fact, it connects to the Internet at a speed rate that is 3 times faster than that of fixed lines and allows data transfer that is 10 times faster than the old GSM generation. This technology allows instant communication and can be used to send/receive data directly without going through the traditional dial-up connection as long as there is radio coverage in the area. For this reason, GPRS users are considered to be "always connected". It is the first system to provide all Internet services through a mobile device with a private number or Internet address. GPRS provides the most modern means of transferring data through mobile phones and is the most developed way for using the frequency spectrum. However, there exists a main limitation related to cost. Specifically, the amount to be paid is strongly linked to the size of data being transferred, which prohibits the user from knowing the exact cost of the mobile Internet being used.

3G: The third generation of mobile services (3G) uses the techniques of the Universal Mobile Telephony Systems (UMTS). The system was developed and coordinated within the framework of the 3G Partnership Project (3GPP) and the global cooperation on GSM. The most important characteristics of 3G include the development of a communication system that transfers data over a wide range of frequencies, thereby allowing the usage of high speeds necessary for such services as video streaming and Internet connection. This is set to pave the way towards the shift from the world of mobile communications to that of the Internet and PC.

Source: ESCWA, "Review of information and communication technology infrastructure in ESCWA member countries" (in Arabic), E/ESCWA/ICTD/2003/4.

TABLE 12. GROWTH RATE OF MOBILE PHONE SUBSCRIBERS IN THE ESCWA REGION, 2003-2004

Country or territory	Mobile phone subscribers, 2004 (*Thousands*)	Mobile phone subscribers, 2003 (*Thousands*)	Growth rate (*Percentage*)
Bahrain	650	440	48
Egypt	7 557	5 797	30
Iraq	1 598	110	1 353
Jordan	1 624	1 325	23
Kuwait	2 109	1 620	30
Lebanon	900	840	7
Oman	806	590	37
Palestine	854	660	29
Qatar	490	376	30
Saudi Arabia	9 176	7 000	31
Syrian Arab Republic	2 480	1 185	109
United Arab Emirates	3 700	2 950	25
Yemen	1 100	800	38
Total	33 044	23 693	39

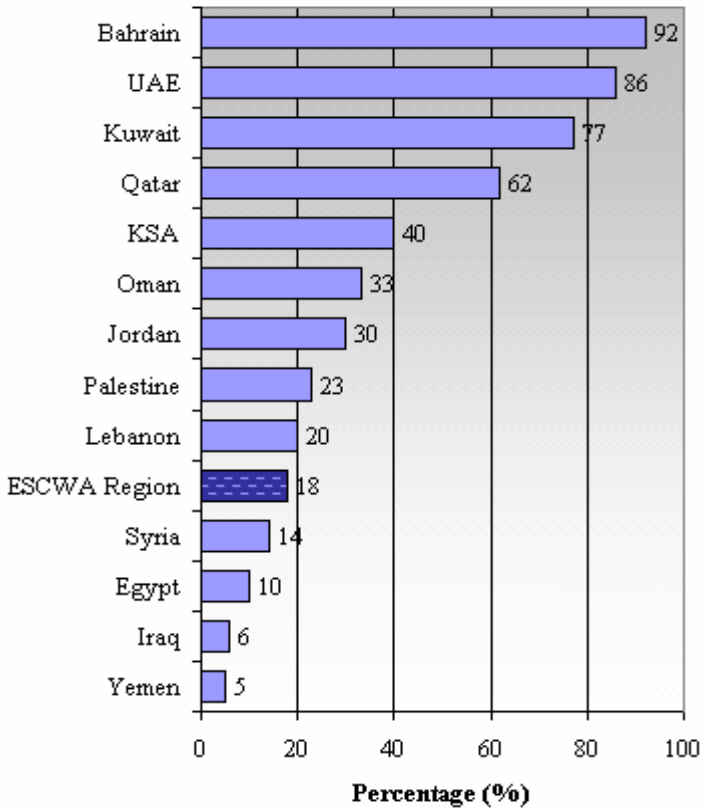
Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

TABLE 13. PENETRATION RATE OF MOBILE PHONE SUBSCRIBERS IN THE ESCWA REGION, 2004

Rank	Country or territory	Population (*Thousands*)	Mobile phone subscribers (*Thousands*)	Mobile phone penetration rate (*Percentage*)
1	Bahrain	708	650	92
2	United Arab Emirates	4 320	3 700	86
3	Kuwait	2 750	2 109	77
4	Qatar	790	490	62
5	Saudi Arabia	22 866	9 176	40
6	Oman	2 410	806	33
7	Jordan	5 470	1 624	30
8	Palestine	3 670	854	23
9	Lebanon	4 500	900	20
10	Syrian Arab Republic	17 980	2 480	14
11	Egypt	73 500	7 557	10
12	Iraq	25 400	1 598	6
13	Yemen	20 350	1 100	5
	Total	184 714	33 044	18

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 5. Penetration rate of mobile phones in the ESCWA region, 2004



When penetration and growth rate indicators are combined, a very clear picture emerges. Iraq is undergoing a massive upgrade with substantial restructuring and demand. Yemen, on the other hand, shows a huge lack of telephony services and modest growth, and requires a very ambitious plan in order to revamp the telecommunication infrastructure.

2. *Connectivity to the global Internet*

One of the most important Internet backbones in the ESCWA region is the Fibre Optic Gulf (FOG) backbone, which links Bahrain, Kuwait, Qatar and United Arab Emirates, with a capacity of 5 billion bits of data per second (Gbps) per fibre pair. There are two other major links, namely: the Fibre Optic Link Around the Globe (FLAG), which connects Europe to Southeast Asia via the United Arab Emirates; and the Europe 3 Cable System, which connects Southeast Asia, the Middle East and Western Europe with a capacity of 40 Gbps.

The United Arab Emirates, which enjoys one of the most advanced Internet infrastructures in the region, uses 10 STM-1 cables with a capacity of 1.5 Gbps in addition to satellite services. As for Saudi Arabia, the Internet bandwidth is 1,556 million bits of data per second (Mbps) and uses a mixture of cables, satellite and broadcasting stations. Saudi Arabia is also home to the ARABSAT satellite, which provides, among other broadcasting services, Internet connectivity.

In Egypt, the Internet bandwidth increased from 850 Mbps in 2003 to reach 2,060 Mbps in 2004. Meanwhile, in Jordan, the Internet bandwidth provided through submarine cables reached 465 Mbps.

Other important developments in Internet backbone links are the Public Data Network (PDN) project in the Syrian Arab Republic, which increased Internet capacity to 500 Mbps by mid 2005 and is expected to reach 2.1 Gbps by year end 2005; and Yemen Telecom's agreement with Alcatel, which will provide the first digital subscriber line (DSL) network of 3,000 lines in the first phase of installation.

3. *ISPs and ASPs*

The nature and number of ISPs differs from one country to another in the region. Some ESCWA member countries have only one ISP, which is usually the main telecommunication provider as in the case of Iraq, Oman, Qatar and Yemen; or two main providers, as in the case of the Syrian Arab Republic and the United Arab Emirates. In other countries, Internet services are provided by a number of local ISPs ranging from four in Bahrain to more than 90 in Egypt. Despite the monopolization of Internet services in some ESCWA members, the quality of service is not necessarily adversely affected. For example, while Q-tel is the sole provider of Internet services in Qatar, it is one of the best ISPs in the region in terms of pricing and services.

In the area of ASPs, there is a very limited spread of such services owing mainly to the prerequisite requirement of high bandwidth connectivity, which is not readily available across the region. Moreover, there is a lack of awareness by most enterprises in the region with regard to the services provided by ASPs. Despite these hurdles, a number of ASPs have been established, particularly in news applications/services over mobile phones, which represents a nucleus for services that can be extended over the Internet.

There have been many initiatives to introduce the Internet to a wide user-base through, among others, universities and educational forums, free Internet schemes, telecentres and Government-sponsored computer sales schemes. However, despite these initiatives, the prohibitive cost of owning a computer and the lack of proper education concerning the benefits still undermine widespread Internet use in the Arab world. ESCWA members with "Internet and computer for all" initiatives include Egypt, Saudi Arabia, Jordan, Palestine, Syrian Arab Republic and Yemen.

Besides the economic factor, the benefits and services that can arise from the Internet are still unclear for the average user in the region. Unlike in developed countries, there is a general absence of Internet-related services that are deemed critical by the average user. Moreover, as a source of information, the language barrier and the lack of Arabic websites that provide services and information for regular users are prohibitive factors. Even in education, where the Internet is the prime research tool for students in advanced countries, the Internet provides little or no value for students in the ESCWA region, as most national curricula do not involve research and problem-solving approaches.

Additionally, at the enterprise and business levels, Internet applications suffer from several limiting factors, including as follows: (a) comparative weakness in electronic trade transactions; (b) absence of research-based industries that depend heavily on the Internet; and (c) limited number of regional institutions that need the Internet as part of their workflow system. All these factors, when combined, have a significant impact on the spread and use of the Internet in the region.

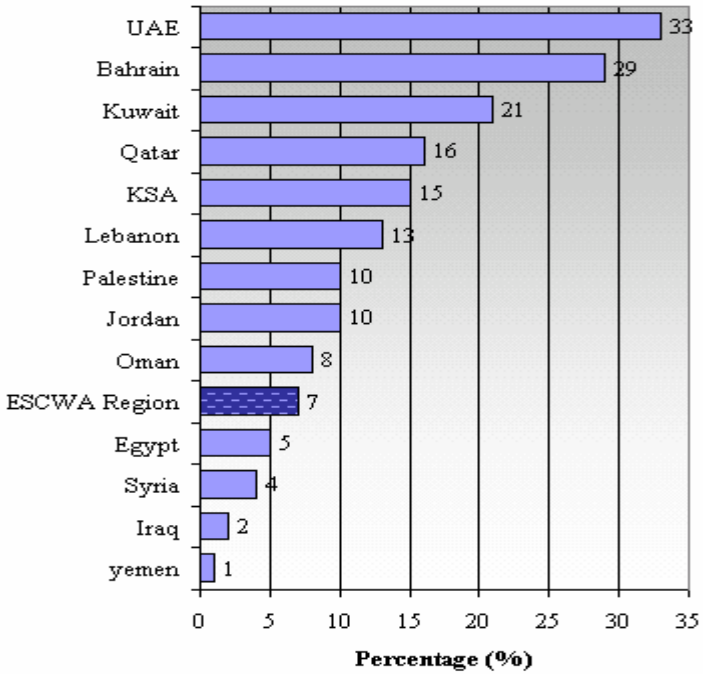
Internet penetration rates show considerable differences among ESCWA members, ranging from more than 33.3 per cent in the United Arab Emirates, which is close to the average of 35.5 per cent in Europe, to less than 1.1 per cent in Yemen, which approximates the average of 1.5 per cent in Africa. This disparity indicates a digital divide within the region (see table 14). The average regional Internet penetration rate is relatively close to the global average of 13.9 per cent.[11] Figure 6 indicates the relative ranking of ESCWA members with respect to Internet penetration.

TABLE 14. INTERNET PENETRATION RATE IN THE ESCWA REGION, 2004

Rank	Country or territory	Population (*Thousands*)	Internet users (*Thousands*)	Internet penetration rate (*Percentage*)
1	United Arab Emirates	4 320	1 437	33
2	Bahrain	708	202	29
3	Kuwait	2 750	590	21
4	Qatar	790	125	16
5	Saudi Arabia	22 866	3 400	15
6	Lebanon	4 500	600	13
7	Palestine	3 670	380	10
8	Jordan	5 470	550	10
9	Oman	2 410	201	8
10	Egypt	73 500	3 900	5
11	Syrian Arab Republic	17 980	700	4
12	Iraq	25 400	450	2
13	Yemen	20 350	210	1
	Total	184 714	12 745	7

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 6. Internet penetration rate in the ESCWA region, 2004



The growth in Internet users reflects the endeavours and efforts exerted by countries to elevate and provide Internet services to citizens. Iraq is noteworthy for its efforts to increase Internet usage among its people, with users growing by some 80 per cent since 2003 (see table 15). Meanwhile, slow growth rates in Bahrain indicate that users in that country are reaching maturity levels.

[11] See Internet world statistics, which is available at: http://www.Internetworldstats.com/stats.htm.

TABLE 15. GROWTH RATE OF INTERNET USERS IN THE ESCWA REGION, 2003 AND 2004

Country or territory	Internet users, 2003 (*Thousands*)	Internet users, 2004 (*Thousands*)	Growth rate (*Percentage*)
Bahrain	180	202	12
Egypt	2 700	3 900	44
Iraq	250	450	80
Jordan	430	550	28
Kuwait	400	590	47
Lebanon	525	600	14
Oman	175	201	15
Palestine	300	380	27
Qatar	90	125	39
Saudi Arabia	2 600	3 400	31
Syrian Arab Republic	540	700	30
United Arab Emirates	1 250	1 437	15
Yemen	140	210	50
Total	9 580	12 745	33

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

4. *Personal computer penetration*

The PC penetration rate is one of the hardest to determine owing to technical and statistical factors, including, chiefly, the components upgrade factor coupled with irregularities in local computer assembly. Many small and individual assemblers usually recycle such hardware components as drivers, monitors and cases. Moreover, the grey market, which refers to the sale of original products through non-licensed channels, hinders the assessment with regard to the number of processors, motherboards and other basic components used in each country. Furthermore, the scarcity of local assembly factories and locally branded computers renders the process of estimation closer to a process of approximation.

Despite these challenges, basic indicators developed by research centres in the region, including Madar Research Group, help in the process of estimating the PC penetration rate in each country in the region. Within that context, the estimation uses the assumption that the average life of PCs in the countries of the GCC is four years, while it is set at five years in other ESCWA members.

Using such approximations, Iraq enjoyed the highest growth in computer-installed base at 60 per cent over 2003, while the Syrian Arab Republic witnessed the slowest growth at a modest 10 per cent over the same period (see table 16). However, in terms of actual hardware, Saudi Arabia ranked first with 2.25 million computers in 2004.

TABLE 16. GROWTH RATE OF COMPUTER INSTALLED BASE IN THE ESCWA REGION, 2003 AND 2004

Country or territory	Computer installed base, 2004 (*Thousands*)	Computer installed base, 2003 (*Thousands*)	Growth rate (*Percentage*)
Bahrain	145	124	17
Egypt	1 900	1 600	19
Iraq	480	300	60
Jordan	400	330	21
Kuwait	450	340	32
Lebanon	420	320	31
Oman	130	111	17
Palestine	170	140	21
Qatar	142	124	14
Saudi Arabia	2 250	2 000	12
Syrian Arab Republic	430	390	10
United Arab Emirates	850	673	26
Yemen	190	165	15
Total	7 957	6 617	20

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

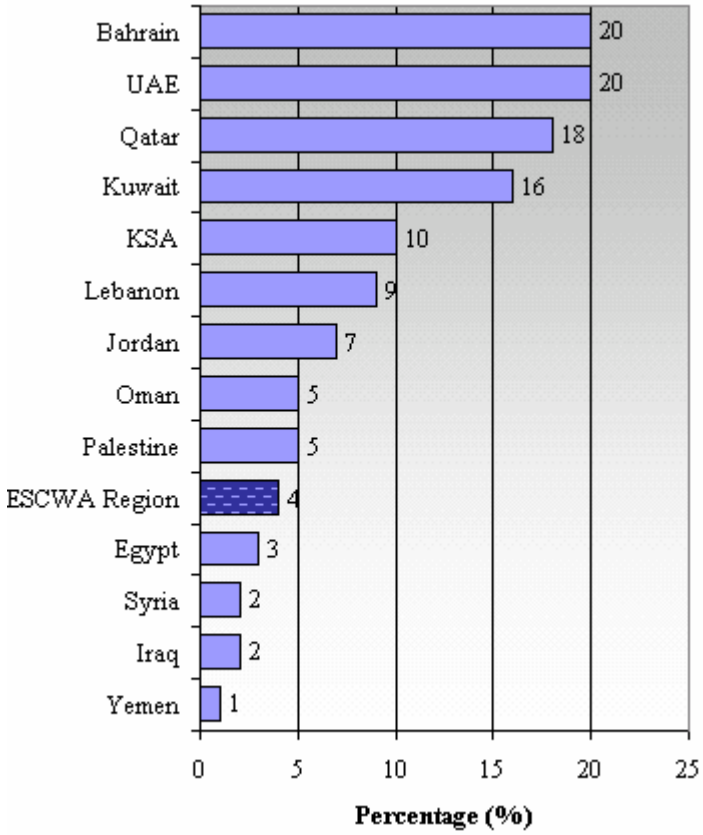
In terms of PC penetration rates, Bahrain is ranked first at 20.5 per cent, and Yemen is last with less than 1 per cent. Figure 7 summarizes the data of table 17 and ranks ESCWA members with respect to PC penetration rates.

TABLE 17. PC PENETRATION RATE IN THE ESCWA REGION, 2004

Rank	Country or territory	Population (*Thousands*)	Computer installed base (*Thousands*)	Penetration rate (*Percentage*)
1	Bahrain	708	145	20
2	United Arab Emirates	4 320	850	20
3	Qatar	790	142	18
4	Kuwait	2 750	450	16
5	Saudi Arabia	22 866	2 250	10
6	Lebanon	4 500	420	9
7	Jordan	5 470	400	7
8	Oman	2 410	130	5
9	Palestine	3 670	170	5
10	Egypt	73 500	1 900	3
11	Syrian Arab Republic	17 980	430	2
12	Iraq	25 400	480	2
13	Yemen	20 350	190	1
	Total	184 714	7 957	4

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 7. PC penetration rate in the ESCWA region, 2004



Source: Compiled by ESCWA from data in table 17.

The correlation between the number of computers and the number of Internet users provides the clearest indicator of Internet accessibility and usage. The significant ratios are shown in Iraq where the number of computers exceeds the number of Internet users (see table 18). The ratio in Iraq is 94 per cent, which can be attributed to considerable lack of Internet usage. By contrast, the ratio is 88 per cent in Qatar, which can be attributed to a comparatively larger number of expatriate and foreign workers with little or no access and training to use the Internet.

TABLE 18. INTERNET/COMPUTER RATIO IN THE ESCWA REGION, 2004

Rank	Country or territory	Internet users (*Thousands*)	Computer installed base (*Thousands*)	Internet/computer ratio
1	Qatar	125	142	88/100
2	Iraq	450	480	94/100
3	Yemen	210	190	111/100
4	Kuwait	590	450	131/100
5	Bahrain	202	145	140/100
6	Saudi Arabia	3 400	2 250	151/100
7	Oman	201	130	155/100
8	Jordan	550	400	138/100
9	Syrian Arab Republic	700	430	163/100
10	Lebanon	6 000	420	143/100
11	United Arab Emirates	1 437	850	169/100
12	Palestine	380	170	224/100
13	Egypt	3 900	1 900	205/100
	Total	12 745	7 957	160/100

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

1. *The ICT Index by the Madar Research Group*

The ICT Index by the Madar Research Group covers four major criteria, namely: computer-installed base, Internet users, fixed line subscribers and mobile phone subscribers. The value of the index of each country is reached by aggregating the sub-values of each of the four indicators and dividing the outcome by the population figure. Registering a higher index value indicates a higher level of ICT penetration and usage (see table 19).

TABLE 19. RANKING OF ESCWA MEMBERS ACCORDING TO THE ICT INDEX BY THE MADAR RESEARCH GROUP, 2004

Rank	Country or territory	Population (*Thousands*)	Computer installed base (*Thousands*)	Internet users (*Thousands*)	Fixed line subscribers (*Thousands*)	Mobile phone subscribers (*Thousands*)	ICT Index
1	Bahrain	708	145	202	192	650	1.68
2	United Arab Emirates	4 320	850	1 437	1 200	3 700	1.66
3	Kuwait	2 750	450	590	490	2 109	1.32
4	Qatar	790	142	125	200	490	1.21
5	Saudi Arabia	22 866	2 250	3 400	3 695	9 176	0.81
6	Jordan	5 470	400	550	638	1 624	0.59
7	Lebanon	4 500	420	600	704	900	0.58
8	Oman	2 410	130	201	243	806	0.57
9	Palestine	3 670	170	380	332	854	0.47
10	Syrian Arab Republic	17 980	430	700	2 657	2 480	0.35
11	Egypt	73 500	1 900	3 900	9 600	7 557	0.31
12	Iraq	25 400	480	450	960	1 598	0.14
13	Yemen	20 350	190	210	750	1 100	0.11
	Total	184 714	7 957	12 745	21 661	33 044	0.41

Source: Madar Research Group.

2. *ESCWA Regional Report Index (2003)*

The purpose of the process of ranking is to reflect the overall level of development in the ICT infrastructure. In addition to the quantitative indicators, other factors are taken into consideration, including plans for ICT development; allocated budgets for improving ICT infrastructure; and maturity of market structure. Maturity levels are categorized as follows:[12]

(a) Maturity level 1, which indicates the following: (i) low telephony density rates and unattractive telecom market conditions that discourage personal and corporate users; (ii) scarce international links for telephony and to the Internet backbone; and (iii) poor Internet dissemination، inadequate national backbone and limited number of Internet players in the market;

(b) Maturity level 2, which indicates the following: (i) average telephony density rates and increasingly attractive telecom market conditions for personal and corporate users in the individual and business segments; (ii) developing international links for telephony and to the Internet backbone; and (iii) improving Internet dissemination, improving national backbone and active Internet players market;

(c) Maturity level 3, which indicates the following: (i) above average telephony density rates and attractive telecom market conditions for personal and corporate users; (ii) solid international links for telephony and to the Internet backbone; and (iii) comparatively strong Internet dissemination, adequate national backbone and active Internet players market;

(d) Maturity level 4, which indicates the following: (i) world class telephony density rates and very attractive telecom market conditions for personal and corporate users; (ii) highly developed international links for telephony and to the Internet backbone; and (iii) strong Internet dissemination, world class national backbone and a recognized Internet players market.

TABLE 20. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN ICT INFRASTRUCTURE

	Level 1		Level 2		Level 3		Level 4	
Country or territory	2003	2005	2003	2005	2003	2005	2003	2005
Bahrain					☑			☑
Egypt			☑	☑				
Iraq	☑	☑						
Jordan			☑	☑				
Kuwait			☑			☑		
Lebanon			☑	☑				
Oman			☑	☑				
Palestine	☑			☑				
Qatar					☑	☑		
Saudi Arabia			☑			☑		
Syrian Arab Republic			☑	☑				
United Arab Emirates							☑	☑
Yemen	☑	☑						

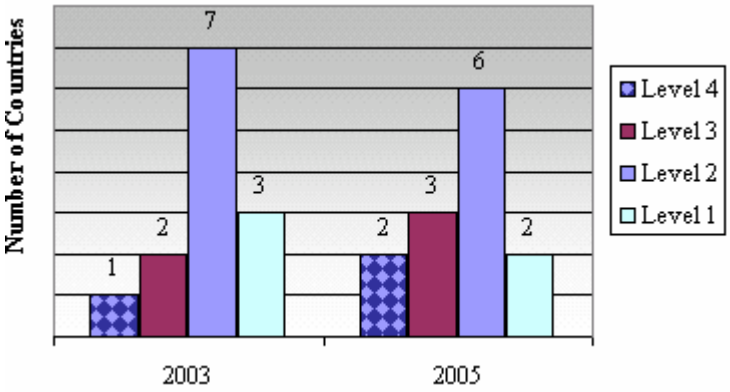
Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Table 20 indicates that Palestine has managed to improve from level 1 to level 2 during the past 2 years, while Saudi Arabia and Kuwait improved from level 2 to level 3, and Bahrain reached the highest

[12] For the purpose of consistency, the same maturity levels that were used in the "Regional Plan of Action for Building the Information Society" (E/ESCWA/ICTD/2004/4) are hereby used.

level of maturity in level 4. Other countries have stayed in the same respective maturity levels, despite equally significant achievements (see figure 8).

Figure 8. Maturity levels of ESCWA members in ICT infrastructure



Source: Compiled by ESCWA from data in table 20.

IV. ICT CAPACITY BUILDING

Human resources are a country's most important asset. Regardless of population size, continuous training and development is the key factor for the sustainable growth of the national economy and society, particularly for developing countries and countries with limited natural resources. Given that information technology plays an increasingly pivotal role in all processes of production and economy, ICT capacity building has become almost an essential prerequisite to any serious development effort.

However, ICT capacity building is qualitatively different given that it requires rapid adaptation and continuous change. As ICT technologies have a short life span, continuous training is not an option. The other major factor is population growth and the need to equip and train future generations on new technologies.[13]

As earlier trials and experiences have shown, importing computers and building an adequate ICT infrastructure in the hope of modernizing processes and elevating production have had the opposite effect. This failure is directly linked to the human resources factor. Currently, there is a general consensus that any strategy or plan of development must include training as an integral part of the plan.

ICT capacity building is the collective responsibility of Governments, international organizations, industries and private social institutions. Consequently, the following criteria are used to review developments relating to this issue: (a) awareness and dissemination; (b) computers in school; (c) vocational training; (d) university education; and (e) research, development and innovation (RDI).

A. COMPARATIVE ANALYSIS OF ICT CAPACITY BUILDING IN THE ESCWA REGION

1. *Awareness and dissemination*

In the past two years, major developments in the ESCWA region indicate the seriousness and efforts involved in elevating the level of ICT awareness. These developments are embodied in several strategies and endeavours put forward by Governments in the region, including, for example, plans for providing accessibility and training in rural areas in Yemen, integrating information technology in curricula in the Syrian Arab Republic, and establishing highly-equipped schools as a model for future educational institutions in Bahrain. All these endeavours are a very clear indicator of real steps towards spreading awareness among ESCWA members.

In addition, several governmental and official entities, including, for example national computer societies, are involved in creating programmes that ease the burden of owning a computer or enrolling in a training course. These include, among others, the "computer in every home" initiative in Egypt; the Syrian Computer Society's programme for subsidizing computer and Internet connections; Saudi Arabia's establishment of a world-class computer assembly line; and the free Internet access schemes in Egypt and Palestine.

Despite these efforts, many ESCWA member countries still suffer from high illiteracy rates, particularly in rural areas, which restrict awareness campaigns and bind them to the advancement of illiteracy eradication programmes. The other major predicament is the significant disparity between male and female educational levels in most rural areas of the region. For example, Yemen, which has the highest illiteracy rate for both genders and an exceptionally high illiteracy rate among women, is still faced with the daunting task of eradicating illiteracy at the most basic levels. However, integrating ICT capacity building and computer illiteracy eradication with conventional programmes are set to lead to better results and accelerated development.

[13] This relation between population and sustainable development is well emphasized in Agenda 21 of the United Nations.

At the governmental level, many ministries and organizations have IT and computer training programmes for employees. Jordan stands out for its IT literacy programme, which aims to train 20,000 Government employees. Meanwhile, the Fund for Integrated Rural Development of Syria (FIRDOS) launched an ICT training programme for rural citizens, which represents one of many programmes supported by the Fund. The cost of the training course is an affordable $1, which is the cost of the training manual provided to the trainee.

The media, especially major newspapers and specialized ICT publications, contribute in spreading ICT awareness by dedicating special sections or pages to review ICT developments. Within that context, Egypt broadcast several general and specialized educational programmes on Nilesat. Similarly, almost all the national television stations in the ESCWA region have special programmes aimed at educating and informing their public with regard to the latest ICT advancements.

2. *Computers in schools*

While basic education is one of the highest priorities in the ESCWA region, the priorities and education strategies differ greatly from one country to another. Most ESCWA member countries have a very youthful population structure and comparatively low levels of urbanization. Consequently, providing basic education in rural areas is the top priority. The level of integration of computers in the teaching process varies greatly from one country to another from one computer for every 17 students in Jordan to one computer for every 1,000 students in Yemen.

All the countries in the region have embarked on integrating IT in the curricula. Within that context, the Syrian Arab Republic has adopted a comprehensive plan for introducing IT courses to the elementary educational level. Similarly, Egypt has integrated technological training with the national educational curricula. Jordan, on the other hand, has embarked on an extensive training programme for teachers in collaboration with Intel. However, the level of integration of IT curricula in basic education is still weak compared to the number of computers available in schools. Among the more developed countries of the GCC, Bahrain stands out as one of the most advanced countries in the region in terms of IT integration in basic education. Every school in Bahrain has at least three computers connected to the Internet.

3. *Vocational training*

Vocational training programmes have witnessed major developments in some ESCWA member countries. In 2004, Saudi Arabia announced a major programme aimed at revamping vocational training as part of its “Saudization” drive. In both Jordan and the Syrian Arab Republic, technical and IT programmes are offered, which lead to international certificates for successful trainees. The Jordanian programme is notable for its concentration on rural areas. Moreover, through its Ministry of Communications and Information Technology, Egypt has provided training for more than 100,000 trainees through the efforts of the National Telecommunication Institute.[14]

While most countries of the GCC have developed vocational programmes, these are largely aimed at Government employees. Yemen has some private institutions that provide IT training, and the Government is trying to develop a modern vocational training programme. However, such efforts have not materialized into solid action.

4. *University education*

University education is a true reflection of the overall advancement and development of any country. For this reason, all ESCWA members have paid special attention towards developing their tertiary education systems in order to accommodate current and future needs.

[14] More information on these activities is available at: http://www.mcit.gov.eg/newindicator.asp.

Universities in the region can be categorized as follows: (a) Government-financed public universities; (b) privately-financed local universities; (c) branches of international universities; and (d) virtual universities.

One of the positive indicators of the seriousness of all ESCWA members to provide education is the fact that all these countries have public universities offering education freely or at nominal fees. Some of the universities in the region enjoy a strong international reputation and offer several internationally recognized and accredited doctorate programmes.

Moreover, most universities in the region offer IT programmes and are equipped with modern facilities. All established public universities in Egypt, Jordan, Saudi Arabia and Syrian Arab Republic collaborate closely with ICT ministries to develop curricula and expertise needed by their respective countries.

Private national universities are relatively new to the region, with the exception of Lebanon which has a long-established tradition of private universities. All private universities are accredited by the respective ministries of higher education.

Similarly, branches of international universities are considered a new phenomenon in the region. Within that context, Qatar and the United Arab Emirates are leading in terms of playing host to branches of international universities.[15]

However, virtual universities are still in their infancy stages in the region. The Syrian Virtual University (SVU), which was one of the first such universities to be established in the region, is aimed at providing comprehensive programmes tailored to the particular needs and requirements of individual students. While SVU is intent on establishing its role as an alternative to conventional universities, it is too early to judge the success of this endeavor. Equally at an infancy stage are online and distance learning that some universities are considering to support conventional educational teaching modes.

Iraq is a special case in the region. For many decades, the universities in Iraq were renowned in the Arab region. However, in the wake of two decades of wars and embargos, universities in that country are only beginning to regain their standing with the assistance of various United Nations agencies.

Major constraints to the development of universities in the region can be attributed to the large number of students, lack of up-to-date laboratories and the lack of proper ICT infrastructure.

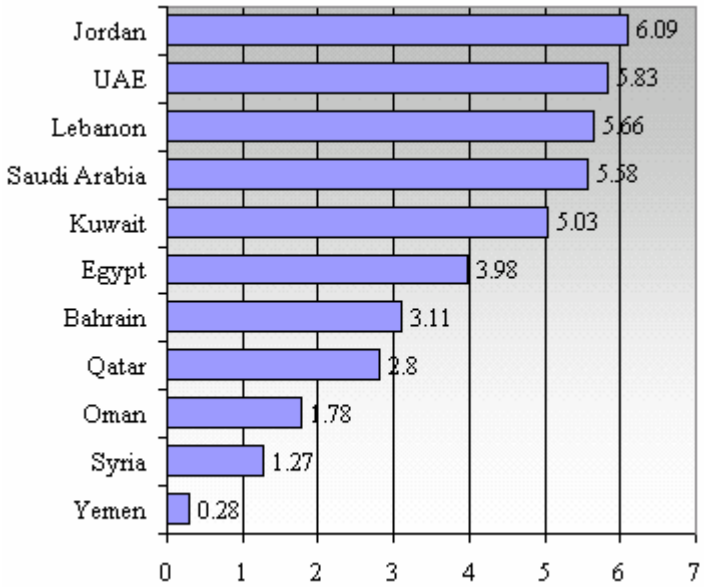
5. *Research, development and innovation (RDI) in ICT*

RDI in the region is generally one of the weakest internationally, with very low spending as a percentage of gross domestic product (GDP). Across the Arab region, this percentage is a very modest 0.2 per cent of GDP, compared to the average of other developing countries, at 0.6 per cent of GDP; the global average, estimated at 1.6 per cent; and the average of developed countries, at 2.5 per cent of GDP. Figure 9 ranks ESCWA member countries according to the Compounded Innovation Index by the World Bank, which measures the level of advancement of RDI in general, including ICT innovation.[16]

[15] The Knowledge Village in the United Arab Emirates is considered the pioneering institution in its field, and is expected to host several hundred international universities in the future.

[16] The Compounded Innovation Index by the World Bank is available at: http://info.worldbank.org/etools/kam2004/home.asp.

Figure 9. Ranking of ESCWA members according to the Compounded Innovation Index



Source: The World Bank, "The Compounded Innovation Index", which is available at: http://info.worldbank.org/etools/kam2004/home.asp.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

The capacity and level of advancement of human resources are, at best, a process of estimation of qualitative indicators. However, it is possible to measure the efforts of capacity building through such indirect indicators as the increase of productivity or the use of resources, in addition to such direct indicators as the number of students and trainees. For the purpose of this report, maturity levels are categorized as follows:

(a) Maturity level 1, which indicates the following: (i) lack of awareness and dissemination programmes; (ii) scarcity of computers in schools; (iii) lack of adequate vocational training; (iv) insufficient university level involvement in terms of curricula and outputs; and (v) absence of RDI in ICT;

(b) Maturity level 2, which indicates the following: (i) introduction of awareness and dissemination programmes; (ii) computers are present in schools; (iii) vocational training is available; (iv) universities have established some form of ICT-oriented curricula and its related output; and (v) RDI in ICT is still in the early stages;

(c) Maturity level 3, which indicates the following: (i) development of awareness and dissemination programmes; (ii) increased adoption of computers in schools; (iii) consistent vocational training output in terms of quantity and quality, with suitability to the job market; and (iv) increased output from universities in both outcomes and curricula;

(d) Maturity level 4, which indicates the following: (i) strong awareness and dissemination strategy; (ii) good benchmark ratios for computers in schools; (iii) efficient vocational training output, catering to market demand; (iv) developed university programs corresponding to higher education needs; and (v) effective, high level output of RDI in ICT.

Maturity level 1: No ESCWA member

In 2003, only Iraq was ranked in this maturity level. Since then, many developments have taken place in Iraq, with the country undergoing a rapid pace of advancement, which has moved it up to maturity level 2.

Maturity level 2: Iraq, Kuwait, Lebanon, Oman, Palestine, Saudi Arabia, Syrian Arab Republic and Yemen

While most ESCWA members are at this maturity level, there are major differences among them. If consideration is given to the overall circumstances circumventing the process of development and capacity building, Iraq, Palestine and Yemen show remarkable resiliency and eagerness to overcome significant obstacles not found in other countries. On the other hand, both Saudi Arabia and the Syrian Arab Republic show considerable advancements in their educational systems. However, these gains are overshadowed by the sheer numbers of students and the deep level of restructuring still needed.

Maturity Level 3: Bahrain, Egypt, Jordan, Qatar and United Arab Emirates

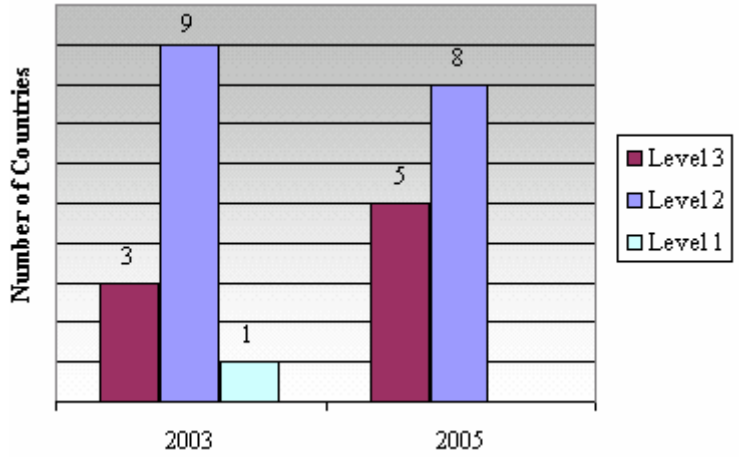
Bahrain and Qatar have achieved major developments in the last two years. If the current pace of development is maintained, both countries, in addition to the United Arab Emirates, are expected to reach maturity level 4 in a few years. While Egypt is still facing significant challenges, it has prevailed consistently, including, in particular, endeavours aimed at pursuing rural development programmes with the same pace and vigour displayed in urban areas.

TABLE 21. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN ICT CAPACITY BUILDING

	Level 1		Level 2		Level 3	
Country or territory	2003	2005	2003	2005	2003	2005
Bahrain			☑			☑
Egypt					☑	☑
Iraq	☑			☑		
Jordan					☑	☑
Kuwait			☑	☑		
Lebanon			☑	☑		
Oman			☑	☑		
Palestine			☑	☑		
Qatar			☑			☑
Saudi Arabia			☑	☑		
Syrian Arab Republic			☑	☑		
United Arab Emirates					☑	☑
Yemen			☑	☑		

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 10. Maturity levels of ESCWA members in ICT capacity building



Source: Compiled by ESCWA from data in table 21.

V. BUILDING THE ICT SECTOR

Building and developing the ICT sector in any country is a function of strategic choices in exploiting development opportunities, in addition to other strategic choices, including, for example, developing the agricultural, industrial, trade, tourism and export sectors.

The rapid pace of technological development in the world, as evidenced in the experiences of such countries as China and India, allows a number of ESCWA member countries to seize a key role in the ICT sector and to build on and develop it, thereby transforming the sector into an economic lever that contributes to the development and growth of other economic sectors and increases economic revenue and national income.

The opportunity provided by the scientific and technological revolution in these countries is a result of several factors, including, among others, the freedom of information transfer and the speed of communication. The multiplicity of approaches to develop their ICT sectors allows countries to collaborate and cooperate in order to build multiple complementary industries concurrently.

Development approaches can include computer hardware manufacture, software development, service provision, call centres, mobile data network design, technical training, website development, content development and Arabization, e-commerce and e-banking services.

Moreover, many factors contribute to shaping and building an ICT sector, including investments and finance facilities, industry structure, employment structure and RDI capacities. Undoubtedly, the involvement of the private sector, in addition to public-private cooperation in terms of investment and employment play a key role.

The criteria for determining the effectiveness of building the ICT sector in the ESCWA region can be narrowed down to include the following issues: (a) categories, size and structure of ICT private and/or public companies, including telecommunication operators, software developers and service companies; (b) investment in ICT, including national and foreign direct investment, policies, volumes and trends; (c) Government facilitation, including tax incentives, import/export facilitation and promotion schemes; and (d) export of ICT products in terms of export types, markets, volumes and barriers.

A. CATEGORIES OF ICT COMPANIES IN THE ESCWA REGION

Telecommunication operators constitute the dominant category of companies in the ICT sector in the ESCWA region, with some operators growing into telecommunication giants.[17] Telecommunications providers in the ESCWA region register large profits annually, even in such comparatively poorer countries as the Syrian Arab Republic and Yemen. Most ESCWA member countries, with the exception of Qatar and the Syrian Arab Republic, have begun to liberalize their telecommunications sectors, albeit at different rates, in order to conform to WTO requirements.

The continued growth of the IT market in the ESCWA region, particularly in the GCC sub-region, has led to a large growth in revenues for companies that provide total ICT solutions. While these solutions are largely based on imported software and equipment, they include local activities in the form of system integration, installation and maintenance. A number of large companies have emerged in the past several years that specialize in the assembly of computer equipment in Egypt, Saudi Arabia and the United Arab Emirates.

Traditional software development companies have not made any tangible progress. Indeed, several firms have suffered financial crises that have led to closures or to diverting activities into other domains. The programming domain has focused increasingly on website development and related e-services, in addition to

[17] Within that context, the *Financial Times* classified Etisalat in the United Arab Emirates among the top 500 companies in the world.

Arabization of global software solutions. However, there appears to be little opportunity for Arabic software development to expand considerably, except in collaboration with the international software industry.

A number of Arab countries have realized the benefits of setting up IT groupings. Within that context, for example, Egypt and the United Arab Emirates have established, respectively, Smart Village and Dubai Internet City. However, these have not yet fully matured owing to the absence of networking opportunities among the companies in these groupings, and to the fact that they have not yet been transformed to genuine cluster models.

B. INVESTMENT IN ICT

At a regional level, spending on ICT as a percentage of GDP is estimated at 2.87 per cent, which is low compared to the global average of more than 6 per cent. In Egypt, ICT spending in 2004 was valued at a modest 2.37 per cent of its GDP, while ICT spending in the United Arab Emirates was valued at 3 per cent (see table 22). Bahrain was closest to the global average, at 6 per cent of GDP, which represented the highest ICT spending in the ESCWA region in 2004.

TABLE 22. RANKING OF ESCWA MEMBERS ACCORDING TO ICT SPENDING AS A PERCENTAGE OF GDP, 2004

Rank	Country or territory	GDP (*Billions of $*)	ICT spending (*Billions of $*)	ICT spending (*Percentage of GDP*)
1	Bahrain	10,00	0,60	6.00
2	Palestine	4,46	0,21	4.71
3	Jordan	11,20	0,52	4.64
4	Iraq	21,10	0,85	4.03
5	United Arab Emirates	91,00	2,80	3.08
6	Lebanon	21,77	0,58	2.66
7	Saudi Arabia	251,00	6,20	2.47
8	Egypt	75,15	1,78	2.37
9	Syrian Arab Republic	23,13	0,53	2.29
10	Kuwait	50,00	1,10	2.20
11	Oman	24,50	0,50	2.04
12	Qatar	28,46	0,52	1.83
13	Yemen	12,83	0,20	1.56
	Total	625	16,39	2.62

Sources: Madar Research Group; the World Bank; and central banks of ESCWA members.

While all ESCWA members are currently witnessing significant investment in their telecommunication infrastructures, there is a great disparity in investment levels in the IT sector. Investments in the private sector in Egypt's ICT sector were estimated at $1.5 billion in 2004.[18] Several global IT companies have also invested in Egypt, including, most prominently, IBM and Microsoft, with the annual investment of the latter company estimated at $20 million. Moreover, the Arab Computer Manufacturing Company in Egypt, with a capital investment of $23 million, announced plans to begin production of computers at its plants. First year production is expected to reach 100,000 computers, rising to 200,000 computers in the following year. The company, the majority of which is owned by the Kharafi Group in Kuwait, stated that some 40 per cent of computer components is set to be manufactured locally.

Saudi Arabia, which is home to the largest ICT market in the Arab region estimated at $8 billion annually, witnessed numerous developments in investment in the computer assembly market. These developments include the establishment of a computer assembly plant in that country by Hewlett-Packard. Equally, another global IT company, namely, Acer, announced it would soon be setting up a similar plant.

[18] Ministry of Communications and Information Technology in Egypt, which is available at: http://www.mcit.gov.eg.

Moreover, in April 2005, Specialized Solutions in Saudi Arabia signed a $50 million contract with Zenith Technologies, one of the leading computer manufacturers in India, aimed at establishing a computer manufacturing plant in Riyadh with a production capacity of 50,000 computers per month, which represents the largest such facility across the region.

With the exception of Jordan, whose direct investment in its ICT sector has been formally estimated at some $80 million in 2004, there is a lack of official data with regard to FDI in the ICT sector. However, in general, ESCWA members recognize the need to adjust national investment laws to bring them in line with international standards through a gradual implementation of WTO standards. For example, the United Arab Emirates is host to increased investment activity by global, regional and national ICT companies, with tens of new companies entering the market each year, mostly based out of Dubai Internet City. On the other hand, investment laws in other ESCWA members have become outdated and are in need of updating, as in the case of the Syrian Arab Republic; or they face obstacles in implementation, as in the case of Saudi Arabia, whose General Investment Authority is trying to overcome such barriers by reducing bureaucracy.

C. GOVERNMENT FACILITATION

There is great disparity between facilities provided by different Governments in the ESCWA region, while the role played by these measures remains limited. In Egypt, for example, the Government was able to provide environments conducive to the ICT sector through tax incentives and designated economic zones, including Smart Village and incubators. The latest facilities regarding the new tax and customs laws encourage foreign companies to invest in Egypt's ICT sector, while Government sector investments in this field tie in with private sector investments to achieve these goals.

In March 2005, Saudi Arabia launched a unique initiative to facilitate computer purchases for families. Under this initiative, whose duration has been set to five years, the Government assists families to buy PCs through easy installments payable with monthly telephone bills. Moreover, the ICT Committee in Saudi Arabia announced that priority in the initiative will be given to computers manufactured or assembled in the country, over brand name computers.

Within the framework of WTO, three ESCWA member countries, namely, Egypt, Jordan and Oman, have joined the Free Trade Agreement in Information Technology Products. The agreement, which was signed by 64 countries and constitutes more than 95 per cent of world trade, stipulates the cancellation of tax duties on ICT imports and exports among these countries.[19]

D. EXPORT OF ICT PRODUCTS

Generally, there is a lack of viable ICT industries in the ESCWA region that could contribute effectively to the national economy. With the exception of Egypt and Jordan, which are planning to build their national ICT industries into vital economic sectors, the various national strategies do not indicate any plans to develop the respective ICT sectors into export sectors.

In Saudi Arabia, despite the existence of several computer assembly plants, including, most prominently, the abovementioned plant by Hewlett-Packard, a large segment of this production is intended for local consumption and only a small percentage is exported to neighbouring countries.

The United Arab Emirates is considered a regional hub for the re-export of ICT products to countries in the region, particularly to Iraq and Iran. Despite the lack of accurate data on the size of this market, this re-export has been estimated at hundreds of millions of United States dollars. In addition to re-export, the United Arab Emirates is home to several international computer assembly plants that export a segment of their production to neighbouring countries. The United Arab Emirates is also home to a number of solutions development operations, especially Arabization. A section of these are destined for the local market, while the remainder is exported to neighbouring countries.

[19] More information is available at: http://www.wto.org/english/tratop_e/inftec_e/itapart_e.htm.

Jordan exports IT products worth some $70 million annually to countries, including Saudi Arabia, the United Arab Emirates and the United States; and Lebanon exports $10-20 million annually in IT products to the countries of the GCC and France. Egypt exports some $150 million annually in IT products, particularly software; and there is a modest export market for IT products in Palestine and the Syrian Arab Republic.

The stimulation of the ICT export market requires a strong base, which is reflected in the existence of an advanced IT industry, especially a software industry, in compliance with international standards; and in strong Government support for this sector as a strategic industry in terms of loans, tax incentives and export facilities. Within the context of the latter, such support is, at best, partial in ESCWA member countries and is unable to establish a viable and internationally competitive national ICT industry.

E. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

Within that context, the four maturity levels can be defined as follows: (a) maturity level 1, which indicates scarce presence of local ICT firms with a low level of investment, a limited or inefficient facilitation role from the Government and the scarcity or absence of ICT product exports; (b) maturity level 2, which indicates the presence of nascent local ICT firms with limited investment volumes, an improved Government facilitation role, and the existence of some ICT product exports; (c) maturity level 3, which indicates a growing number of local, regional and global ICT firms with an increasing investment level, an increasingly efficient governmental facilitation role and increased growth in ICT product exports; and (d) maturity level 4, which indicates the presence of a large number of highly-capitalized local, regional and global ICT firms, strong governmental facilitation role and a solid base of ICT product exports.

Table 23 table outlines maturity levels and ranking of the countries covered.

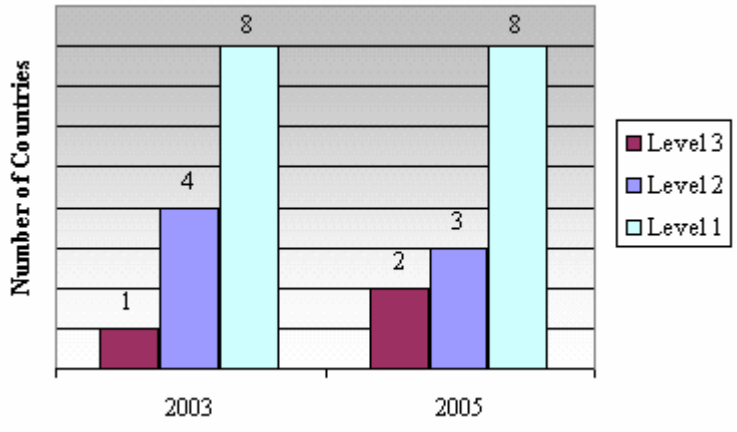
TABLE 23. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN BUILDING AN ICT SECTOR, 2003 AND 2005

	Maturity level 1		Maturity level 2		Maturity level 3	
Country or territory	2003	2005	2003	2005	2003	2005
Bahrain	☑	☑				
Egypt			☑	☑		
Iraq	☑	☑				
Jordan			☑			☑
Kuwait	☑	☑				
Lebanon			☑	☑		
Oman	☑	☑				
Palestine	☑	☑				
Qatar	☑	☑				
Saudi Arabia			☑	☑		
Syrian Arab Republic	☑	☑				
United Arab Emirates					☑	☑
Yemen	☑	☑				

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 11 summarizes the maturity levels of ESCWA members in building the ICT sector, indicating that most of them are still at or below level 2 of maturity.

Figure 11. Maturity levels of ESCWA members in building the ICT sector



Source: Compiled by ESCWA from data in table 23.

In the past two years, all ESCWA members have made progress in building their ICT sectors. However, with the exception of Jordan, this progress has been insufficient in terms of moving from one maturity level to the next. Saudi Arabia and Egypt edged closer to maturity level 3, and are expected to achieve it within a year or two. Bahrain, Qatar and the Syrian Arab Republic, on the other hand, edged closer to maturity level 2, and are expected to reach it in the short term.

VI. ICT APPLICATIONS IN GOVERNMENT ESTABLISHMENTS

The use of ICT applications in governmental agencies and establishments in advanced countries began in the mid-1960s. However, the exponential growth of ICT utilization by Governments started with the spread of PCs and the Internet.

The first serious effort to provide e-services began in 1994 in Canada and the United States. Both countries developed a comprehensive strategy to implement and provide e-government services, comprising Government-to-Government (G2G), Government-to-citizen (G2C), Government-to-business (G2B) and Government-to-employee (G2E) services.[20] In the space of ten years, e-government services became one of the best indicators for efficiency, transparency and good governance. While e-government services aimed initially at reducing operational costs and workload, the objectives grew to include the provision of better information and services, and the reduction of bureaucracy and governmental services as a whole.

To measure the effectiveness of e-government, the following criteria have been chosen to determine the level of integration of ICT applications in Government: (a) computerizing public administration; (b) digitizing information; (c) e-government plans; (d) e-procurement applications; (e) computerizing customs processing; and (f) computerizing taxation and revenue management systems.

A. COMPARATIVE ANALYSIS OF ICT APPLICATIONS IN GOVERNMENTS IN THE ESCWA REGION

1. *Computerizing public administration*

Most ESCWA member countries have initiated programmes aimed at computerizing their public administrations. The bulk of this has taken place in the spheres of civil records in the ministries of interior, finance in the ministries of finance, and local services in local governments and municipalities. The approach to the process of computerization differs from one country to another in accordance with the strategies envisioned by each country and by national priorities. For example, the civil records programme in the Syrian Arab Republic is considered one of the most comprehensive programmes of any ministry of interior. The programme was initiated as the basis for all e-government services, with an underlying philosophy of providing all services through a "national number".[21]

By contrast, the process is different in Egypt whereby the focus is on creating an inter-departmental exchange of information that allows all ministries to communicate internally. In the United Arab Emirates, the concept is more attuned to the needs of the country given that all computerization efforts are undertaken in order to answer the needs of the population. The concentration of local and municipal services reflects the important role of local governments as facilitators of such services.

Bahrain created one of the first networks to link all governmental agencies and administrations. With the introduction of other projects, Bahrain was able to become the leading provider of e-government services in the region.

Similarly, Jordan is the only ESCWA member country that has a comprehensive programme of computerization on multiple tracks, which is designed to accommodate the strategy of transformation to an information society.[22] On the other hand, Yemen still lacks a clear strategy or plan of action to tie the process of automation of different administrations. The only activity that can be attributed to e-government efforts is the automation of civil records, particularly the project on identity cards.

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[20] More information on the e-government strategy in Canada can be found at: http://www.communication.gc.ca/information/can_history.html.

[21] More information on this programme is available at: http://www.civilaffair-moi.gov.sy/sf04/index.php?lang=ar&page=news_detail.php&ID=10.

[22] More information on this strategy in Jordan is available at: http://www.moict.gov.jo/MoICT/MoICT_program_overview.aspx.

In Oman, the process of automation of the civil administration still lacks a clear strategy. With the lack of sufficient documentation relating to e-government activities, and sporadic activities and initiatives, the e-readiness ranking of Oman fell from 98 in 2003 to 127 in 2004.[23]

In Saudi Arabia, despite the issuance of the Royal Proclamation on E-Government in March 2003, the level of implementation is still unclear. One of the reasons for the lack of clarity is the differing levels of implementation in different provinces of that country.

The computerization of public administration is highly correlated with the overall needs of each country, even if there is no clear e-government strategy. In the main, almost all the computerization processes are done by local expertise, particularly in Egypt, Jordan, Saudi Arabia and Syrian Arab Republic.

2. *Digitizing information*

The process of digitization is highly correlated to the process of computerization. Digitization enables inter-departmental interaction and use of information. At the same time, it provides public access to information. Consequently, measurement of digitization requires measuring the level of digitization of information used internally by governmental agencies and digitization of information used by the general public.

In the area of digitizing inter-departmental information, Bahrain, Egypt, Jordan, Kuwait, Saudi Arabia, Syrian Arab Republic and United Arab Emirates have all embarked on a digitization process of their civil and/or financial records. This process aims to provide interactivity among governmental departments. Most of the digitized information is not publicly accessed in the current setup or is set to be integrated with the workflow. In Bahrain, the Smart Card System enables all governmental agencies to provide services from processing applications to paying bills and managing bank accounts.

In the area of digitizing public/general information, Bahrain, Egypt and the United Arab Emirates are the leading countries offering public information through portals and official sites. Egypt provides a large portal with extensive information and more than 700 different services.

Moreover, Bahrain has facilitated access to information through the use of the Smart Card System, which enables such activities as conducting official procedures, withdrawing and depositing money, in addition to keeping a record of such personal data as level of education and health record. Additionally, the Ministry of Industry and Trade implemented a comprehensive portal, which incorporates all needed information, particularly on commerce, and is capable of offering a large number of such online services as renewal of commercial licences and registration of companies. Finally, there is a project in Bahrain to connect the Smart Cards to driving licences and, eventually, to electronic passports.

The Dubai Courts in the United Arab Emirates stands out as another example of providing public information. In addition to publishing laws and regulations, the portal of the Dubai Courts provides an extensive list of legal references, research and relevant material.[24]

Official and semi-official media sites, including, for example Al-Ahram and the Library Network in Egypt, Sana in the Syrian Arab Republic and Al-Jazeera in Qatar, provide substantial digitized media archives that can be accessed and searched by the public. While such services are not directly related to the process of governmental digitization, they do provide the public with a considerable amount of information.

[23] More information on e-readiness and other related issues is available at: http://www.unpan.org/egovernment4.asp.

[24] More information on the Dubai Courts is available at: http://www.djd.gov.ae.

3. *E-Government plans*

Among ESCWA members, only Palestine, the Syrian Arab Republic and Yemen lack a clear e-government strategy.[25] Iraq signed an agreement with Italy in 2004 to develop an e-government project with the assistance of Ministry of Innovation and Technology in Italy. Upon completion, this project is expected to provide state-of-the-art ICT infrastructure to 30 ministries.[26]

Countries with e-government plans and strategies have different levels of implementation. Bahrain, Jordan and the United Arab Emirates have already implemented several e-government services, with Bahrain ranking among the top 50 countries in the world. In 2004, Saudi Arabia revamped its e-government strategy and set the deadline for the implementation of the project for 2008.[27] Both Kuwait and Lebanon suffer from slow implementation of their strategies; and while Oman possesses a very developed e-government strategy and some effective e-services, including the Oman Tender Board and Muscat Municipality, there is no clear or verifiable level of strategy implementation.

Table 24 presents a ranking of ESCWA members according to the report by the Department of Economic and Social Affairs (DESA), entitled "UN Global E-Government Readiness Report 2004: Towards access for opportunity"; and table 25 offers a timetable for e-government projects in the countries of the GCC.

TABLE 24. RANKING OF ESCWA MEMBERS ACCORDING TO THE E-GOVERNMENT READINESS REPORT, 2004

Rank	Country or territory	Global ranking
1	Bahrain	46
2	United Arab Emirates	60
3	Jordan	68
4	Lebanon	74
5	Qatar	80
6	Saudi Arabia	90
7	Kuwait	100
8	Iraq	103
9	Oman	127
10	Egypt	136
11	Syrian Arab Republic	137
12	Yemen	154
..	Palestine	..

Source: Department of Economic and Social Affairs, "UN Global E-Government Readiness Report 2004: Towards access for opportunity" (2004), which is available at: http://www.unpan.org/e-government4.asap.

Note: Two dots (..) indicate that the ranking could not be accurately assessed given a lack of available data.

4. *E-procurement applications*

There is a general absence of e-procurement applications in the ESCWA region, with the notable exception of a portal in Dubai, the United Arab Emirates, namely, Tejari.com, which was developed in 2000.[28] Some ministries and other governmental agencies post calls for tenders on their websites as part of the general announcement.

[25] The e-strategy of the Syrian Arab Republic has been developed for more than three years and is expected to be integrated into the forthcoming National Plan.

[26] More information on this project is available at: http://europa.eu.int/idabc/en/document/2277/339.

[27] Saudi Arabia has amalgamated the strategy and the implementation plan into one comprehensive plan. More information is available at: http://www.egov.gov.sa.

[28] While Tejari.com has signed an agreement to provide services in Jordan and Saudi Arabia, with the exception of the Emirate of Dubai, it is a non-exclusive venue of announcing tenders and procurement.

TABLE 25. E-GOVERNMENT PROJECTS TIMETABLE IN THE GCC SUB-REGION

Country	Current phase	Target completion date[a/]	IT spending (to completion date)[b/]	Major consultants or IT providers[c/]
Bahrain	Phase 3	End 2005	$150 million	IBM/Microsoft
Kuwait	Phase 2	End 2007	$450 million	Microsoft
Oman	Phase 1	End 2008	$250 million	Gartner Consulting
Qatar	Phase 3	End 2005	$200 million	Bearing Point (Barents Group)
Saudi Arabia	Phase 1	End 2008	$5 billion	IBM/Microsoft
United Arab Emirates	Phase 2	End 2006	$1 billion	IBM

Source: Madar Research Group, "Annual report on e-government in the GCC" (June 2005).

Notes: a/ The dates signify the availability of, at least, basic e-government services.

b/ Estimate by Madar Research Group. The availability of basic e-government services requires access to more services and higher spending.

c/ There are various other contributors to e-government projects, such as Sun, Oracle, HP and Dell. This column mentions the main executing/consulting bodies.

The other notable project is the Omani Tender Board, which offers another venue for ministries and governmental organization to announce and call for tenders.[29] However, it is complementary to the already existing methods and no consolidation of procurement processes is evident in the portal.

5. *Computerizing customs processing*

Jordan and Lebanon have implemented the Automated System for Customs Data (ASYCUDA) in cooperation with the United Nations Conference on Trade and Development (UNCTAD) and UNDP for more than five years.[30] Moreover, Iraq, Palestine and the Syrian Arab Republic are considering the implementation of the System. Similarly, Palestine has developed, with the cooperation of the German Agency for Technical Cooperation (GTZ), a modernized customs project aimed at establishing a proper legal and technological infrastructure for handling customs.

The other computerized system, which is currently being implemented in Bahrain, Kuwait, Oman and United Arab Emirates, is e-Mirsal. This system was developed by the Dubai Customs Authority to process customs clearing, including e-payment and documentation. The solution is fully Internet-based and is accessible 24 hours a day. While e-Mirsal was originally designed to cater to the needs of free zone ports, it was expanded given the growth of free zones and the complementarities of customs laws and regulations across the GCC sub-region.

6. *Computerizing taxation and revenue management systems*

Both Egypt and Jordan have launched comprehensive computerized tax filing services that enable payment processing through respective portals. Moreover, the Ministry of Finance in Palestine is developing a tax administration computer system in cooperation with the European Union (EU), which is expected to help the Palestinian Authority to raise tax revenue efficiently.

In Lebanon, the Ministry of Finance, which is considered one of the most computerized ministries among ESCWA members, has put forward a plan for providing a web-based filing system. Meanwhile, the Ministry of Finance in the Syrian Arab Republic is seeking a suitable computerized system for tax and revenue collection, and has deployed several computerization projects. Countries of the GCC do not have income tax systems and impose flat custom fees on all imports; and municipalities are directly responsible for levying taxes on hotel, restaurant and entertainment facilities.

[29] See Omani Tender Board, which is available at: http://www.tenderboard.gov.om.

[30] More information on Automated System for Customs Data (ASYCUDA) is available at: http://asycuda.org/countrydb.asp.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

Consistent with the ranking procedure developed in previous reports, the ranking of ESCWA members reflects the overall success and commitment in terms of creating and implementing adequate e-government strategies and services. The maturity levels assigned are a function of the existence of these services and their effective implementation (see table 26).

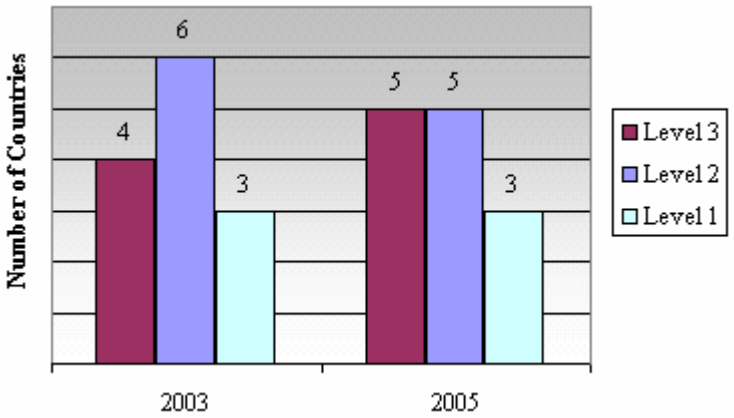
The following four maturity levels are used: (a) maturity level 1, which indicates the absence of a coherent strategy and the lack of implementation efforts with very weak digitization and automation processes; (b) maturity level 2, which indicates the existence of a clear strategy but no clear implementation or plan of action, and some digitization and automation of processes and information; (c) maturity level 3, which indicates a clear e-government strategy with advanced levels of implementation, and a variety of services and information available over the Internet with high level of digitization and automation of governmental processes; and (d) maturity level 4, which indicates a clearly implemented e-government strategy at all levels with full automation and digitization of information and services, and high quality of services provided over the Internet.

TABLE 26. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN E-GOVERNMENT

	Level 1		Level 2		Level 3	
Country or territory	2003	2005	2003	2005	2003	2005
Bahrain					☑	☑
Egypt			☑	☑		
Iraq	☑	☑				
Jordan					☑	☑
Kuwait			☑	☑		
Lebanon					☑	☑
Oman			☑	☑		
Palestine	☑	☑				
Qatar			☑			☑
Saudi Arabia			☑	☑		
Syrian Arab Republic			☑	☑		
United Arab Emirates					☑	☑
Yemen	☑	☑				

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 12. Maturity levels of ESCWA members in e-government



Source: Compiled by ESCWA from data in table 26.

With the exception of Qatar, no major changes in maturity levels have been achieved. However, Bahrain, Jordan and the United Arab Emirates are expected to reach maturity level 4 in the short term. This can be attributed to a high level of seriousness and dedication in those countries, and to full-fledged efforts to digitize, automate and provide services. Additionally, both Egypt and Saudi Arabia are expected to reach maturity level 3 if the pace and the efforts of implementation continue at the current rate. In the Syrian Arab Republic, more efforts are required to accelerate the process of adopting the national e-strategy in order to move to a higher maturity level. Only Palestine and Yemen are still facing considerable obstacles that need to be overcome before implementing e-government services. In addition to the lack of a comprehensive e-strategy, the lack of proper ICT infrastructure is among the most difficult hurdles facing these two countries.

VII. ICT APPLICATIONS IN EDUCATION

Information technology is a tool of knowledge. It is the product of knowledge and it produces knowledge. The emergence of ICTs is one of the most important advances humanity has witnessed in knowledge creation and dissemination. The real value of the Internet lies in terms of both the abundance of information readily available, and the medium to collaborate and integrate the efforts of millions of people simultaneously (see box 5).

A. COMPARATIVE ANALYSIS OF ICT APPLICATIONS IN EDUCATION IN THE ESCWA REGION

1. *Applications in education*

In the age of globalization, countries must have workforces that are not merely literate, but also able to readily exploit ICT. Integrating ICT applications in the process of education can help accelerate preparedness and transformation to a knowledge-based economy.

Such integration can be measured through the following criteria: (a) e-learning; (b) e-schools; and (c) virtual universities.

Box 5. Lifelong learning

The main goal of lifelong learning is to promote active citizenship and employability, thereby promoting the idea of an inclusive society that offers opportunities of quality learning for people at various stages of life. This goal is valid in both developed and developing countries, even if the motivating factors in each case are not the same. Developed countries now exist in a permanent technological context that requires a workforce that is capable of adapting rapidly its skills as necessary, which can be achieved through continuous education and training. This type of learning is vital for developing countries to enable them to develop, update, extend and enhance their human resources and also to absorb and assimilate new technologies.

While developed countries tend to focus on new skills, developing countries must focus more on basic and new skills. In both cases, lifelong learning is an opportunity for human development and for bridging the knowledge divide within a society. It guarantees continuing access to learning and, therefore, a sustained participation in information and knowledge societies.

Moreover, this tool overcomes the problems of distance, time and availability of trainers and teachers. The China Central Radio and TV University is a useful example in this regard, and must be noted by developing countries, particularly ESCWA member countries.

Source: ESCWA, "Information Society Indicators" 2005, E/ESCWA/ICTD/2005/1.

The terms e-learning, distance learning, online learning, computer-based training, just-in-time training, virtual instruction, web-based training, e-training and a host of other terms are often used interchangeably, although some of them differ slightly in scope.

(a) *E-learning*

For the purpose of this report, the term e-learning is defined broadly as the delivery of training content through a computer network infrastructure. This can be over the Internet, intranet or extranet.

E-learning falls into two main categories, namely, asynchronous learning and synchronous learning, as well as a blend of both. Synchronous e-learning refers to training that takes place in real time. Students log on at specified times to access learning material, and interact with their virtual classmates and virtual instructors. Asynchronous e-learning, on the other hand, is training that is delayed over time. Students access learning material at their convenience without requiring the presence of live instructors and classmates.

(b) *E-schools*

The main characteristics of e-schools include the availability of Internet connectivity and computers in classrooms, and the integration of ICT technology in the education process. E-schools are different from virtual schools, which are available only over the Internet via virtual classrooms and do not have a physical presence.

(c) *Virtual universities*

Virtual universities provide e-learning channels for university and higher education. They are portals for various types of educational programs including remote education and continuous education.

2. *E-learning*

Many countries have developed a plan of action to introduce or develop e-learning. Leading countries in the region are Egypt and Jordan, with clear programmes and deployment plans. In Egypt, the Ministry of Communication and Information Technology, in collaboration with various governmental and private sector entities, introduced an e-learning ICT skills development programmes for small- and medium-sized commercial establishments.[31] Another important e-learning initiative aims to connect all higher education academic establishments and provide e-learning programmes for all universities. Moreover, the Ministry of Education in Egypt has launched its e-learning programme consisting of 22 courses at the preparatory educational level in more than 7,700 schools.[32]

In Jordan, the Education Reform for the Knowledge Economy Initiative (ERFKE) that was launched in 2002 aimed at providing e-learning for both basic and university education. Through this Initiative, more than 1,200 out of a total of 3,200 public schools have been connected with the National Education Network, and more than 2,500 schools have been equipped with computer labs. Moreover, all but one universities in Jordan are connected through a fibre optic network to the National Education Network.

Under the umbrella of the Euro-Mediterranean Information Society Initiative by the EU, the Syrian Arab Republic has developed an e-learning strategy, namely, the Medforist Project, which aims to expand the level of exchange of academic expertise and to expand national and regional educational networks.[33]

Similarly, Saudi Arabia has embarked on a very ambitious programme to integrate ICT in education. The programme aims to provide more than 41,000 computers to be used by some 1.5 million students. Another initiative, which was launched by the country's monarch, H.H. King Abdullah Bin Abdul Aziz, aims to deploy one computer for every ten students in all public schools.

In Kuwait, the Education Net Initiative is considered one of the most important priorities for developing education and represents a cornerstone of the long-term plan of the Ministry of Education to revamp the education sector. The Initiative aims to connect all schools and libraries over one network and to provide all public schools with computers by 2006. Furthermore, an ADSL network is set to be deployed to connect all public schools to the Internet. During the 2003/04 academic year, some 8,180 computers were distributed to preparatory and secondary schools in that country.

Iraq has equally launched a programme, which is supervised by United Nations agencies, to integrate the use of ICT in universities and schools.

Among ESCWA members, only Yemen has no clear plan of action to introduce ICT and e-learning to its educational sector.

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[31] This programme was organized by Cisco Systems and the E-Learning Competence Centre.

[32] More information and details on the educational activities in Egypt are available at: http://www1.emoe.org.

[33] More information on the Medforist Project is available at: http://www.medforist.net.

Saudi Arabia stands out as the biggest spender on e-learning, estimated at $40 million in 2004, which is expected to rise to some $137 million by 2009. The United Arab Emirates comes in second place with $18 million spent on e-learning and is the most advanced country of the GCC in terms of e-learning.[34]

3. *E-schools*

Classroom connectivity is still the exception in the ESCWA region. Even with several ambitious plans for introducing ICTs in curricula, Internet connectivity remains limited in all ESCWA members, with the exception of Bahrain and Jordan. Bahrain has achieved a relatively good connectivity rate of three Internet connections per school and plans to increase that rate to 12 connections. Furthermore, a pilot project, namely, King Hamad Schools, aims to create the first comprehensive e-school in that country to service the needs of information society.

Similarly, within the framework of the national educational initiative in Jordan, the Discovery School Project offers five e-curricula to 100 schools connected through a broadband connection. Furthermore, the Jordan Broadband Learning Network, which aims to connect all public schools, universities and knowledge stations to one network, is expected to be implemented by 2006.

In addition, the Ministry of Education in Egypt and Oracle launched a web-based e-learning environment, namely, Think.com, as a pilot project in 30 schools in 2003. The service caters to students aged 7-14, and aims to support and stimulate interactive collaboration and e-learning among students and teachers.

In the United Arab Emirates, the Sheikh Mohammed bin Rashid Al Maktoum IT Education Project (ITEP) was launched in 2000 to provide IT courses at national secondary schools. The Project currently covers 40 schools in Dubai and Abu Dhabi, and provides required infrastructure and up-to-date curricula for more than 13,000 students every year.

In Kuwait, the British School started a pioneering project to provide each student from the fourth grade and higher with a laptop computer equipped with the latest wireless technology. The project aims to provide Internet connections throughout the school campuses and to integrate fully IT in the educational process.

4. *Virtual universities*

Virtual universities are newcomers into the world of education. The region has some promising projects in this domain, including the Syrian Virtual University (SVU);[35] and the Avicenna Knowledge Centre in Egypt, which is implemented jointly by the Computer and Information College in Cairo University and Avicenna Virtual Campus.[36] The Avicenna Knowledge Centre is aimed at creating a virtual campus that supports open distance learning services, creation and delivery. The project, which is managed by the United Nations Education, Scientific and Cultural Organization (UNESCO) and financed by the EU, is part of a network of partner knowledge centres established in 15 European and Mediterranean countries, including Jordan, Lebanon, Palestine and Syrian Arab Republic.

The Ministry of Higher Education in the Syrian Arab Republic established SVU in 2002, which represents the first virtual university in the Arab region. SVU is affiliated to various foreign universities, facilitates registration procedures and provides online curricula. It offers undergraduate degrees in business administration, information technology and engineering; and the Higher National Diploma in Computing and Business Applications is taught in both Arabic and English. In 2003, the number of registered students in SVU reached 528 students. However, despite facilitating more than 259 programmes, a very modest 14 students were enrolled in postgraduate courses, none of whom were at a doctorate level.

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[34] Madar Research Group, "E-learning in the GCC" (April 2005).

[35] The Syrian Virtual University (SVU) is available at: http://www.svuonline.org/sy/eng/about/admin.asp.

[36] Within the context of the latter, more information is available at: http://pleiad.unesco.org/portal/.

While the Arab Open University is not a virtual university, it shares many elements of virtual universities. The University, which was launched officially in 2001, is headquartered in Kuwait with branches in Bahrain, Egypt, Jordan, Lebanon and Saudi Arabia. The University adopts an integrated platform for providing course material using multimedia, printed material, Internet sessions and online tutoring. Additionally, the University provides academic assistance through its learning centres and the very small aperture terminal (VSAT) network available at the centres; and offers studies and degrees in the fields of education, business administration, languages and computer studies. The number of students registered at the Arab Open University reached 18,840 students in 2004.[37]

Furthermore, the Knowledge Village in Dubai, United Arab Emirates, is home to a large number of international and regional universities and academic institutions that offer both distance learning and on-campus courses. The academic cluster is best equipped to develop virtual learning facilities given its educational partners and the existing e-learning environments that serve the educational needs of the region.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

Determining the maturity level of ICT applications in education is a difficult process. For the ranking to be correct, it must necessarily reflect the return-on-investment and direct benefits of implementing ICTs in education. Given the difficulty of calculating such indicators, a more qualitative set of indicators was developed to determine the level of maturity. These indicators are subjective and, for all purposes, need to be taken as expert opinions, rather than as empirical proof of development. With that in mind, maturity levels are categorized as follows:

(a) Maturity level 1, which indicates the following: (i) no clear policy of integrating e-learning systems in the educational system; (ii) lack of connectivity and Internet availability in schools; (iii) no organized or accredited distance learning activities; and (iv) overall deficiency in e-educational services;

(b) Maturity level 2, which indicates the following: (i) efforts to put forward e-learning policy, albeit with no clear plan of action for implementation; (ii) sporadic Internet connectivity with no plan for expansion; (iii) existence of pilot e-school projects but without a clear plan of action to generalize the experiment; (iv) limited accessibility to Internet services through universities; and (v) no clear national e-education plans;

(c) Maturity level 3, which indicates the following: (i) active e-learning and e-school projects with implementation and plans of action; (ii) well-developed ICT infrastructure in educational facilities; (iii) well-developed distance learning programmes and active services by virtual universities; and (iv) existence of a national e-education plan;

(d) Maturity level 4, which indicates the following: (i) already implemented e-school and e-learning systems; (ii) existence of well-developed and integrated virtual and distance learning programmes; and (iii) existence of a national e-education plan.

Maturity level 1: Iraq, Palestine and Yemen

These countries have inadequate infrastructure and no clear policy for e-education for all educational stages. However, both Iraq and Palestine are expected to devise some elements of e-education policies in the short term. Yemen needs to develop an accelerated integration plan in order to overcome its problems of development.

[37] Detailed information on the Arab Open University is available at: http://www.arabou.org.

Maturity level 2: Egypt, Lebanon, Oman, Qatar, Saudi Arabia and Syrian Arab Republic

The level of ICT integration and e-education in these countries is disparate. While the Syrian Arab Republic launched the first virtual university in the region, most of campuses and schools in that country still suffer from a debilitating lack of connectivity. By the same token, the Ministry of Education and the Ministry of Higher Education have integrated IT courses in all educational stages. However, they lack adequate laboratories to provide the practical experience.

Egypt and Saudi Arabia are both faced with the same challenge, namely, that of providing Internet connectivity to large numbers of students and facilities over comparatively large geographical areas. On the other hand, Lebanon, Oman and Qatar have developed relatively good e-education infrastructures, albeit without strategic frameworks. Qatar, however, is expected to move up to maturity level 3 as indictors show a growing interest in the country in developing a comprehensive e-strategy.

Maturity level 3: Bahrain, Jordan, Kuwait and United Arab Emirates

These countries have adequate ICT infrastructure and the drive to devise comprehensive e-learning strategies. The above-mentioned King Hamad Schools Project in Bahrain clearly shows a strategy for preparing future generations to be fully active in the process of transformation to a knowledge-based economy. The United Arab Emirates, on the other hand, is providing world class facilities at Knowledge Village, and has positioned itself as a regional e-learning hub. Despite these gains, both Bahrain and the United Arab Emirates still lack a comprehensive e-learning strategy woven into their economic and social transformation.

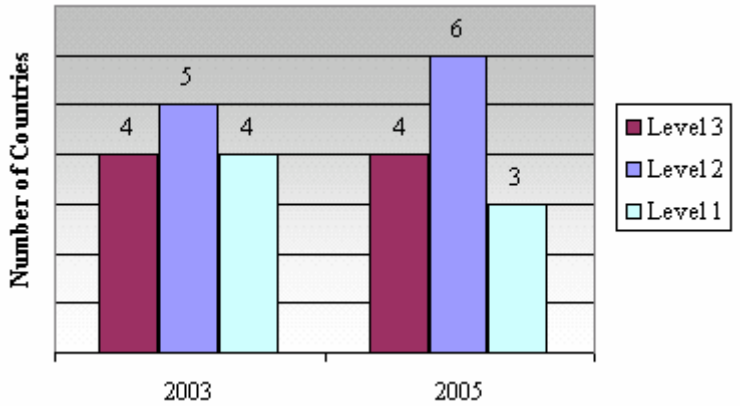
Jordan plans to transform its economy to a knowledge-based economy, and the notable efforts shown in implementation clearly indicate a resolve to transform the national educational system in order to meet the demands of the future.

TABLE 28. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN E-LEARNING

	Level 1		Level 2		Level 3	
Country or territory	2003	2005	2003	2005	2003	2005
Bahrain					☑	☑
Egypt			☑	☑		
Iraq	☑	☑				
Jordan					☑	☑
KSA			☑	☑		
Kuwait					☑	☑
Lebanon			☑	☑		
Oman			☑	☑		
Palestine	☑	☑				
Qatar	☑			☑		
Syrian Arab Republic			☑	☑		
United Arab Emirates					☑	☑
Yemen	☑	☑				

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Figure 13. Maturity levels of ESCWA members in e-learning



Source: Compiled by ESCWA from data in table 28.

VIII. ICT APPLICATIONS IN COMMERCE AND BUSINESS

The use of ICTs in commerce and business in the ESCWA region is growing at a relatively fast pace. For example, the countries of the GCC spent approximately $155 million on Enterprise Resource Planning (ERP) applications and services in 2004, $72 million on content and document management applications and services, and $105 million on information technology security applications and services.[38]

Moreover, while e-commerce is growing at a sluggish pace between regional companies and those in ESCWA member countries, it is growing at a much faster rate between international companies and those in the ESCWA region as a result of globalization. An example of this effect can be seen in that international companies require their regional distributors and agents to communicate with them through electronic means.

A. COMPARATIVE ANALYSIS OF ICT APPLICATIONS IN COMMERCE AND BUSINESS IN THE ESCWA REGION

The banking sector in the ESCWA region is considered one of the most responsive sectors to modernization and the adoption of advanced technologies. This section covers the following: (a) extent and maturity of e-commerce and e-business applications; (b) availability and quality of e-banking; and (c) ATM and banking systems.

1. *E-commerce*

E-commerce is defined as conducting purchase, sale, auction and tender transactions online. In addition to selling products by providers and retailers, e-commerce includes the sale of services and information, including computer systems and applications. Table 29 summarizes the size of business-to-business (B2B) and business-to-consumer (B2C) market in ESCWA member countries.

TABLE 29. E-COMMERCE MARKET IN THE ESCWA REGION, 2004
(*Millions of United States dollars*)

Country or territory	business-to-business (B2B)	business-to-consumer (B2C)	Total	Total (*Percentage of GDP*)
Saudi Arabia	5,000	520	5,520	2.20
United Arab Emirates	1,800	200	2,000	2.20
Bahrain	140	25	165	1.62
Oman	230	40	270	1.10
Kuwait	450	80	530	1.06
Qatar	220	25	245	0.86
Remaining ESCWA members	1,160	260	1,420	0.84
Total	9,000	1,150	10,150	1.62

Sources: Madar Research Group.

The figures in table 29 reveal that the total value of e-commerce among ESCWA member countries as a percentage of total GDP is still very modest compared to the global average of more than 7 per cent.

2. *B2B e-commerce*

B2B e-commerce refers to all forms of wholesale commercial transactions conducted over an exclusive computer-mediated network or an open computer-mediated network. In B2B, payment and ultimate delivery of goods and services can be conducted on- or off-line. However, B2B does not include

[38] Madar Research Group, *Journal* in three issues, namely August 2005, May 2005 and February 2005.

such transactions as foreign exchanges, futures, derivatives, bill payments, unsuccessful online bidding, inter-bank transfers and other financial instruments trading.

B2B e-commerce channels include e-markets, private exchanges and consortium exchanges. Furthermore, one-way purchase transactions conducted online or via private exchanges are also considered e-commerce transactions.

Several e-commerce portals connecting buyers and sellers in a number of ESCWA member countries were developed in the period 2000-2001, including, among others, www.businessdubai.com, www.menabusiness.com, www.tendersme.com and www.mesteel.com. These portals only allow companies to submit or browse requests-for-proposals (RFPs) online, without offering facilities for online tendering or purchasing at prevailing prices, as well as online payment and submittal of bills. Despite these constraints, such portals have contributed towards raising awareness levels and optimism among B2B companies in the region with regard to the success of a promising e-commerce market.

(a) *Slow growth of e-commerce*

Most e-commerce transactions in the ESCWA region are directed outwards. In other words, the transactions tend to be carried out between international companies and their distribution channels in ESCWA member countries. The expansion of e-commerce among companies in the ESCWA region is generally slow, with a total value of B2B e-commerce estimated at $9 billion at end 2004, forming a modest 1.45 per cent of total regional GDP valued at $620 billion.

This value of B2B e-commerce as a percentage of GDP is very low compared to the United States, where B2B e-commerce is estimated at more than 10 per cent of GDP, and to the global average of an estimated 5 per cent of GDP.

(b) *B2B e-commerce sectors*

The automotive sector dominates B2B e-commerce in the ESCWA region. Data collected from major automotive distributors and dealers, ministries of trade and customs authorities suggest that a large number of automotive purchase orders are carried out electronically.

In second place after the automotive sector is the IT sector, owing to the growing number of IT companies that require their customers and distributors to conduct e-commerce transactions over extranet networks. The latter connect partners and suppliers through an internal intranet in order to carry out purchase orders and other purchase transactions. These purchases include, for the most part, computer equipment, peripherals, network equipment and other related equipment.

Regionally, oil and gas sector ranks third in B2B e-commerce as a result of the high value of online purchases of products and material in this sector, followed by the public sector in fourth place.

(c) *B2B e-commerce examples*

Tejari.com in the United Arab Emirates is one of the leading examples of successful e-commerce portals among ESCWA member countries.[39] Different companies use the online marketplace provided by Tejari.com to launch tenders, request quotations and bid for tenders.

Saudi Aramco is another example, featuring a private online marketplace to manage business transactions with its suppliers. The company, which currently leads the oil and gas sector, was among the first to use Electronic Data Interchanges (EDI) before the migration to the Internet.

[39] In addition to the United Arab Emirates, Tejari.com has set up e-commerce marketplaces in Iraq, Jordan, Kuwait, Lebanon and Saudi Arabia.

(d) *E-commerce laws*

E-commerce laws have been enacted in two ESCWA member countries, namely, Bahrain and Jordan. The e-commerce law in Bahrain was the first to be legislated, and fell in line with the liberal economic structure and international standards of that country, particularly with regard to banking exchange. Additionally, three ESCWA member countries have issued electronic signature laws, namely, Bahrain, Egypt and Jordan. The electronic signature law in Egypt is considered a cornerstone of the forthcoming e-commerce law, as well as a number of other laws designed to regulate internal and external electronic commerce transactions.

Within that context, both Palestine and the Syrian Arab Republic have issued preliminary drafts for e-commerce and electronic signature laws. However, these drafts have yet to be discussed and activated by legislative bodies in the respective ESCWA members.

Iraq is expected to issue its own e-commerce law once financial laws to regulate banking and financial transactions have been enacted. Notably, Iraq is cooperating actively with the World Bank and other international financial agencies to modernize its banking and finance systems.

Table 30 summarizes the availability of e-commerce law in ESCWA member countries.

TABLE 30. AVAILABILITY OF E-COMMERCE, ELECTRONIC SIGNATURE AND CONSUMER PROTECTION LAWS IN THE ESCWA REGION

Country or territory	E-commerce law	Electronic signature law	Consumer protection law
Bahrain	Available	Available	Unavailable
Egypt	Under preparation	Available	Unavailable
Iraq	Unavailable	Unavailable	Unavailable
Jordan	Available	Available	Unavailable
Kuwait	Under preparation	Under preparation	Unavailable
Lebanon	Under preparation	Under preparation	Unavailable
Oman	Under preparation	Under preparation	Unavailable
Palestine	Draft	Draft	Unavailable
Qatar	Status unavailable	Status unavailable	Unavailable
Saudi Arabia	Under preparation	Under preparation	Unavailable
Syrian Arab Republic	Draft	Draft	Unavailable
United Arab Emirates	Draft[a/]	Draft	Unavailable
Yemen	Under preparation	Under preparation	Unavailable

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

a/ While the United Arab Emirates is expected to issue a federal e-commerce law in the short term, such a law already exists in Dubai.

3. *B2C e-commerce*

B2C e-commerce refers to all retail transactions conducted electronically over an open network, including the direct sale of products and services to customers over the Internet.

The online payment of bills or transfer of money is not considered a part of B2C e-commerce given that the actual transactions are conducted offline. Similarly, transactions where products are purchased offline and paid for online are not considered B2C e-commerce transactions, nor are online payments of bills, including credit card, telephone and utility bills.

The total B2C e-commerce in the ESCWA region was estimated at $1.15 billion in 2004, constituting approximately 0.18 per cent of total GDP for the region.

(a) *B2C e-commerce channels in the ESCWA region*

At a regional level, companies have been quick to adopt new and evolving channels to market their products and bring them to end-clients. With the rise in online purchasing worldwide, a large number of companies in the region have set up e-commerce channels, while others are in the process of establishing such channels, to facilitate online purchasing for clients. The majority of companies in the region that offer e-commerce channels sell such products as, among others, flowers, gifts, books, software and computer equipment.

Moreover, a large number of ESCWA member countries are currently investing heavily in their tourism sectors in order to attract tourists from both within and outside the ESCWA region. The presence of several international airlines and hotel chains in the region indicates that the tourism sector is slated for large growth in the coming years. Airline and hotel bookings, which represent an important element of this sector, are considered the fastest growing sector in B2C e-commerce among ESCWA member countries.

While online purchasing constitutes 70 per cent of B2C e-commerce in the ESCWA region, the total value of online airline and hotel bookings form some 30 per cent of total B2C e-commerce revenue in all sectors.

Table 31 ranks ESCWA member countries by their maturity level in e-commerce.

TABLE 31. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN E-COMMERCE

Rank	Country or territory
1	Saudi Arabia
2	United Arab Emirates
3	Bahrain
4	Oman
5	Kuwait
6	Qatar
7	Jordan
8	Egypt
9	Lebanon
10	Iraq
11	Syrian Arab Republic
12	Yemen
13	Palestine

Source: Madar Research Group.

Note: The ranking is based on the estimates in table 29 on "E-Commerce market in the ESCWA Region, 2004", and on the 2005 country reports.

(b) *Drivers and inhibitors*

Globalization, which is usually associated with the domination of local markets by multinational corporations and their insistence on dealing with their local distributors and agents through online channels, is one of the main drivers for the growth of e-commerce among companies in the ESCWA region.

Local and federal Government ranks second among drivers for e-commerce growth in all sectors. Tejari.com is a prime example, with all business transactions of Dubai Ports Authority conducted through the e-commerce marketplace. Other drivers include the potential to lower costs, increase business opportunities and foster cooperation between business partners and suppliers.

On the other hand, the main inhibitors are the lack of awareness concerning the benefits of B2B e-commerce and the lack of alliances between Governments and different business sectors to foster B2B e-commerce. The slow expansion of electronic purchasing systems among companies is another inhibitor given that it curtails relevant choices for purchasers. This is also applicable to suppliers. If purchasers are not members of a particular electronic marketplace, suppliers will have little incentive to join.

Other leading inhibitors for the development and expansion of B2B e-commerce in the region include the following: (a) limited regional market or, more particularly, the limited part of that market that is willing and capable of migrating to online purchase and sale transactions; (b) the lack of online security, which, in the context of the ESCWA region, implies the lack of a legal framework to protect e-commerce; (c) the lack of integrated technology, which refers to the link between electronic purchase applications and back-end systems, particularly enterprise resource planning applications; and (d) the lack of electronic payment systems.

Globalization plays a smaller part in the growth of B2C e-commerce, while local factors at a national level play a larger role. Limited Internet penetration is an important inhibitor for the growth of B2C e-commerce, as is the shopping culture that is based on a need to touch and feel products before purchasing them. Shopping malls in the ESCWA region, particularly in the Gulf sub-region, are considered essential entertainment and leisure destinations for consumers, thereby limiting the growth of e-commerce. B2C e-commerce drivers, on the other hand, include comparatively lower prices offered by airlines and hotels for online bookings; the increased penetration of credit cards in the region, which allow online purchasing of those products and services that are not available in local markets; and the fast-growing number of Internet users in ESCWA member countries.

4. *Availability and quality of e-banking*[40]

With the rise in the number of Internet users in the region and the growing competition in the banking sector in a number of these countries, the majority of banks operating in the ESCWA region have begun to offer their clients online services. While some banks have used the Internet to provide clients with basic information on products and services, the majority have established channels for offering clients online banking services as well.

International banks operating in ESCWA member countries have been among the first banks to offer such services given that their main branches in home countries have been offering e-banking services for some time. Local branches of these banks had to make relatively small investments to adjust their IT systems for local needs. Local banks that entered the e-banking market, on the other hand, had to make much larger investments to develop their services to be in line with prevalent e-banking trends.

Countries, including Iraq, the Syrian Arab Republic and Yemen, have not begun to offer such services, owing to such factors as low penetration of banking accounts to inhabitants, low Internet penetration and limited competition between banks (see table 32).

TABLE 32. AVAILABILITY OF E-BANKING IN THE ESCWA REGION, 2004

Country or territory	Availability of e-banking
Bahrain	✓
Egypt	✓
Iraq	×
Jordan	✓
Kuwait	✓
Lebanon	✓
Oman	✓
Palestine	✓
Qatar	✓
Saudi Arabia	✓
Syrian Arab Republic	×
United Arab Emirates	✓
Yemen	×

Sources: Madar Research Group, "E-Banking in the Gulf Cooperation Council" (December 2004); and ESCWA, "Country reports" (in Arabic), E/ESCWA/ICTD/2003/11.

[40] This section is based on Madar Research Group, "E-banking in the Gulf Cooperation Council" (December 2004); and ESCWA, "Country reports" (in Arabic), E/ESCWA/ICTD/2003/11.

Countries that offer e-banking services are divided into the following four groups: (a) group 1, which comprises countries of the GCC where most banks offer high quality e-banking services; (b) group 2, which comprises Jordan and Lebanon where a considerable number of banks offer disparate quality e-banking services; (c) group 3, which comprises only Egypt where a small number of banks offer e-banking services; and (d) group 4, which comprises Iraq, the Syrian Arab Republic and Yemen where e-banking services are unavailable; and Palestine where e-banking services are very limited.

5. *ATM and banking systems*[41]

According to the *2005 Economic Freedom Index*, Bahrain ranks first among ESCWA member countries in economic freedom indicators; followed by Jordan and Lebanon in second place; and Kuwait, Oman and Qatar in third. While the Syrian Arab Republic achieved the lowest Index, Egypt, Saudi Arabia, United Arab Emirates and Yemen each scored a modest four points, thereby indicating low levels of economic freedom in their finance and banking sectors (see table 33).

TABLE 33. ECONOMIC FREEDOM INDEX IN THE FINANCE AND BANKING SECTORS OF ESCWA MEMBERS

Country or territory	Finance and banking sector score
Bahrain	1
Jordan	2
Lebanon	2
Kuwait	3
Oman	3
Qatar	3
United Arab Emirates	4
Saudi Arabia	4
Egypt	4
Yemen	4
Syrian Arab Republic	5
Iraq	..
Palestine	..

Source: M.A. Miles, E.J. Feulner and M.A. O'Grady, *2005 Economic Freedom Index* (The Heritage Foundation and Wall Street Journal, 2005).

Note: Two dots (..) indicate that the score could not be accurately assessed given a lack of available data.

(a) *Index criteria and scores*

The Economic Freedom Index measures the performance of 161 countries according to 50 independent variables grouped into 10 main categories, namely: trade policy, fiscal burden of Government, monetary policy, Government intervention in the economy, capital flows and foreign investment, banking and finance, wages and prices, property rights, law and legislation, and informal market activity. Low scores in the range of 1-5 points imply comparatively high economic freedom in a country. Higher scores indicate greater Government intervention in the economy, which results in lower economic freedom levels in the country. The table above displays scores for only one category, namely, finance and banking, owing to its relevance to the present topic.

[41] Ibid.

(b) *Banking system technology*

The technology used in banking systems can be divided into the following three categories: (a) basic infrastructure, including computers, operating systems, networks and databases; (b) banking application systems; and (c) customer service systems and call centres.

Moreover, two indicators are used to chart e-banking services in ESCWA member countries, namely: the number of electronic payment cards for every 1,000 inhabitants; and the number of ATMs for every 10,000 inhabitants.

(c) *Number of electronic payment cards*

Relative to their population, the countries of the GCC have considerably higher numbers of electronic payment cards than other ESCWA member countries, with Bahrain and Kuwait taking the lead with more than 50 per cent penetration rates for electronic payment cards, followed by the United Arab Emirates with almost 50 per cent penetration.

(d) *Number of ATMs*

The countries with the highest ATM penetration rates in ESCWA member countries are Qatar, followed by the United Arab Emirates and Bahrain. By stark contrast, Yemen features one ATM for every 100,000 inhabitants; and the Syrian Arab Republic, which introduced ATMs into the country merely three years ago, features three ATMs for every one million inhabitants (see table 34).

TABLE 34. PENETRATION RATE OF ATMS IN THE ESCWA REGION, 2004

Country	Number of ATMs	Number of ATMS per 10,000 inhabitants
Bahrain	180	2.54
Egypt	1 250	0.17
Iraq	..	..
Jordan	540	0.99
Kuwait	320	1.16
Lebanon	850	1.89
Qatar	350	4.43
Oman	520	2.16
Palestine	..	..
Saudi Arabia	4 092	1.79
Syrian Arab Republic	50	0.03
United Arab Emirates	1 100	2.55
Yemen	200	0.1

Source: Compiled by ESCWA based on ESCWA 2005 country reports, available at: www.escwa.org.lb/wsis; and Madar Research Group.

Note: Two dots (..) indicate that data is not available.

Globally, there are some 1.5 million ATMs, which represents a global average of 2.34 ATMs for every 10,000 inhabitants. The penetration rate for ATMs in the United States is 13 ATMs for every 10,000 inhabitants, and 2.3 ATMs for every 10,000 inhabitants in South America. Consequently, the penetration rate in all ESCWA member countries is significantly lower than in the United States; and only Bahrain, Qatar and the United Arab Emirates enjoy rates that are comparable to those in South America.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

This report shows tangible changes in maturity levels with regard to e-business and e-commerce. However, these changes do not necessarily reflect real progress or decline in levels, rather they can be

deemed corrections to earlier rankings. For example, the previous report ranked the Syrian Arab Republic at maturity level 2, while current data and indicators indicate the country is ranked at maturity level 1. Similarly, Bahrain, which is currently at maturity level 4, was categorized at maturity level 2 in 2003, while a more accurate level should have placed it at maturity level 3 in the previous report.

Jordan, Lebanon and the United Arab Emirates moved up one maturity level, while the remaining ESCWA members retained the same maturity levels, with the exception of Qatar which had not been ranked in the previous report (see table 35).

Maturity level 1: Iraq, Palestine, Syrian Arab Republic and Yemen

Iraq and Palestine have endured both military confrontation and difficult political and social circumstances, which have hindered any serious efforts aimed at developing national plans. Moreover, Iraq and Palestine lack adequate technological and financial infrastructures to support national efforts for the development and dissemination of ICT applications in business and commerce.

Yemen is in the process of building its ICT infrastructure to support ICT applications in business and commerce. Despite serious Government initiatives to modernize its banking sector, there are still many obstacles that Yemen must overcome in terms of developing its banking sector in general, deploying the relevant banking IT infrastructure, and stimulating e-commerce in the country.

In the past two years, the Syrian Arab Republic has undertaken a number of important reforms in the finance and banking sector, which gave rise to the licensing of a number of private banks and the introduction, albeit modest, of e-banking services in the country. However, the Syrian Arab Republic still lacks an advanced banking technological infrastructure and automated banking services. There are virtually no e-commerce activities in the country given the limiting nature of financial and economic laws and regulations, and the absence of any parties that could offer such services. Despite these challenges, the Syrian Arab Republic could overcome the obstacles in the financial sector given the relatively advanced nature of national ICT expertise and abilities, and the absence of real political or social obstacles to developing the banking sector and e-commerce.

Maturity level 2: Egypt

Egypt has the suitable framework for developing and disseminating ICT applications in business and commerce, and for formulating relevant national strategies and plans. However, it has yet to benefit fully from these initiatives. Notably, the country issued an electronic signature law, which is considered an important step and the fundamental basis for the development of e-commerce in Egypt. However, the relatively large geographical area and population are hindrances that must be taken into account by the development process.

Maturity level 3: Jordan, Kuwait, Lebanon, Oman, Qatar and Saudi Arabia

Countries at this maturity level have strategies, plans and evidence of their implementation. However, societies in these countries have yet to reap the full benefits of such strategies. There are success stories in a number of sectors. Within that context, there are several indications of the maturity of banking operations in Saudi Arabia in terms of the presence of large international and local financial institutions; and of the size of e-commerce in the country, which is considered the largest among ESCWA member countries. Lebanon, on the other hand, is considered the most capable among Arab countries with regard to its banking sector, especially since the passage of electronic signature and e-banking laws that have encouraged e-commerce in the country.

Qatar has recently witnessed great interest in developing the basic technological infrastructure for its banking sector, with a growing trend that encourages e-commerce in the country.

Maturity level 4: Bahrain and the United Arab Emirates

Countries at this level benefit fully from the deployment of ICT applications in the Government sector nationwide. Given its fully liberalized banking sector, Bahrain is considered one of the leading financial centres in the world and a key destination for the international banking industry. It was one of the first countries to legislate an e-commerce law, and enjoys one of the most advanced banking technology infrastructures in the world.

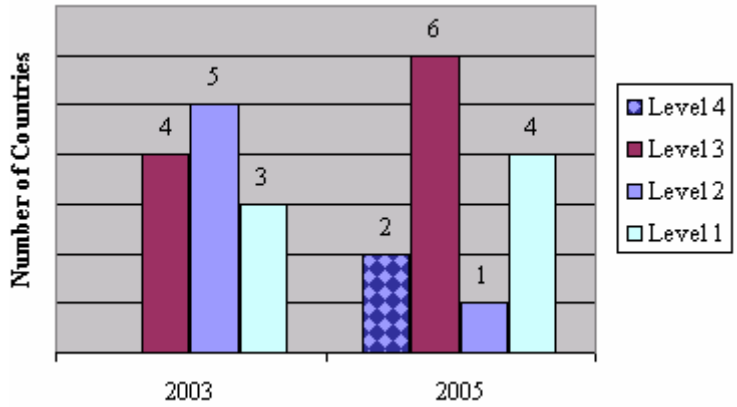
The United Arab Emirates, particularly Dubai, is at the forefront in the region in terms of adopting the latest technologies to support the development of its economy. Furthermore, the United Arab Emirates is home to branches of most international banks and financial institutions, in addition to featuring a number of preeminent local banks, both at the regional and international levels. Moreover, e-commerce in the United Arab Emirates is comparatively mature and widely prevalent, both locally and regionally.

TABLE 35. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN E-BUSINESS AND E-COMMERCE

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2003	2005	2003	2005	2003	2005	2003	2005
Bahrain			☑					☑
Egypt			☑	☑				
Iraq	☑	☑						
Jordan			☑			☑		
Kuwait					☑	☑		
Lebanon			☑			☑		
Oman					☑	☑		
Palestine	☑	☑						
Qatar						☑		
Saudi Arabia					☑	☑		
Syrian Arab Republic		☑	☑					
United Arab Emirates					☑			☑
Yemen	☑	☑						

Source: Compiled by ESCWA and based on ESCWA 2005 country reports.

Figure 14. Maturity levels of ESCWA members in e-commerce and e-business



Source: Compiled by ESCWA from data in table 35.

IX. ICT APPLICATIONS IN HEALTH CARE

ICTs currently play an important role in the health care sector by facilitating access to medical records and histories, and by promoting remote medical consultations between physicians and health care specialists across the world. Moreover, ICTs allow specialized surgical teams in one country to oversee and monitor complex surgical operations being undertaken in another country.

At a national level, most ESCWA member countries are still struggling with regard to the introduction of ICT applications in their health care sectors. However, some advanced hospitals in Bahrain, Egypt, Jordan, Lebanon, Saudi Arabia and United Arab Emirates have managed to make significant inroads in this domain through connections to international medical networks, most notably those in the United States.

The following indicators are used to measure progress in the use of ICTs in health care, namely: (a) databases for national health care; (b) telemedicine and medical use of teleconferencing; and (c) extent of health care information systems.

A. COMPARATIVE ANALYSIS OF ICT APPLICATIONS IN HEALTH CARE IN THE ESCWA REGION

1. *Databases for national health care*

While several ESCWA member countries in the region have begun to establish databases for national health care, these are so far incomplete given that they still lack exhaustive records on the health of the population. Advanced hospitals in the Gulf sub-region, Jordan and Lebanon feature their own databases. However, most remain isolated and are not connected to a centralized national network.

Qatar has achieved important accomplishments in connecting its health care centres to a centralized database. Specifically, the Hamad Medical Corporation has established a comprehensive information system connecting all administrative and medical departments of its four specialized hospitals online, thereby allowing employees to access required data to plan department budgets, consult among each other on scheduling work priorities, and allocate corporate resources.

Bahrain, Kuwait and the United Arab Emirates are among the most advanced countries in terms of establishing databases for national health care, while Iraq and Yemen are the most backward. A number of ESCWA member countries, especially those in the Gulf sub-region, are expected to witness significant advancements in the establishment of databases for national health care in the short term.

2. *Telemedicine and medical use of teleconferencing*

Telemedicine and medical use of teleconferencing are still in their early phases in the ESCWA region. In Bahrain, for example, the Bahrain Specialist Hospital is considered an exceptional medical centre in the Gulf sub-region given that it is connected electronically to most leading medical centres across the world.

Similarly, the United Arab Emirates is connected to the Arab Telemedicine Network, Egyptian Telemedicine Network, Dermatological Diseases Telemedicine Network and the Pediatric Consultation Network. Kuwait, on the other hand, is making use of its large Internet bandwidth to provide telemedicine services in the country. It is also a member of the Arab Telemedicine Network, which was established to facilitate the exchange of information between medical centres and hospitals in the Arab region and international medical centres.

In Egypt, the Ministry of Health and the Ministry of Communication and Information Technology have collaborated to establish the Egyptian Telemedicine Network, which aims to improve medical and health care services provided at those hospitals operated by the Ministry of Health. The Network allows hospitals in remote and rural areas to consult with larger hospitals, including the Nasser Institute Hospital in Cairo;[42] and features an ambulance equipped with VSAT connection to provide telemedicine services in accidents and disasters, and to accompany medical caravans to remote areas.

[42] The Egyptian Telemedicine Network, which is headquartered at the Nasser Institute Hospital in Cairo, connects seven hospitals in Marsa Matrouh, Al-Arish, Beni Soueif, Luxor, Aswan and Sharm Al-Sheikh.

Additionally, the Ministry of Health in Egypt has developed a medical portal, which provides medical teleconferencing services between the consultant and patient sites.[43] The Ministry plans to extend medical services to other Arab and African countries.

Jordan, which has provided telemedicine services for more than 10 years, is connected to several telemedicine networks, thereby allowing medical specialists across the world to provide consultation services remotely, and decreasing the need for citizens to travel abroad for treatment. A number of private hospitals are also connected via Medlab's network to Houston Hospital in the United States.[44]

In Lebanon, telemedicine and teleconferencing services are, for the most part, restricted to some private sector hospitals. While there are no reports on the progress of Oman in this regard, dire conditions in Palestine do not encourage the development of existing telemedicine projects. In Iraq, the Italian forces in that country have established a network between a hospital in Al-Talil airbase and an army hospital in Italy. The service is available to Italian soldiers and emergency humanitarian cases.

3. *Extent of health care information systems*

Despite the fast-growing use of health care information systems in ESCWA member countries, their application differs from one country to another, and even from one hospital or clinic to the next in the same country. Information systems are widely used in advanced hospitals in the GCC sub-region, Egypt, Jordan and Lebanon, while they are less prevalent among smaller hospitals. Many clinics still use traditional records, despite the move towards the introduction of electronic medical records.

B. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

The following four maturity levels are used: (a) maturity level 1, which indicates the absence of clearly formulated strategies or plans to use ICTs in the health care sector; (b) maturity level 2, which indicates the existence of plans to use ICTs in the health care sector, albeit with limited implementation; (c) maturity level 3, which indicates established databases of national health care, with telemedicine and teleconferencing services in a number of hospitals, and a widespread use of health care information systems in hospitals and medical clinics.; and (d) maturity level 4, which indicates the availability of comprehensive databases for national health care, the widespread use of ICTs in medical centres and the availability of a medical map for diseases and illnesses.

Table 36 summarizes the different maturity levels of ESCWA member countries.

TABLE 36. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN E-HEALTH

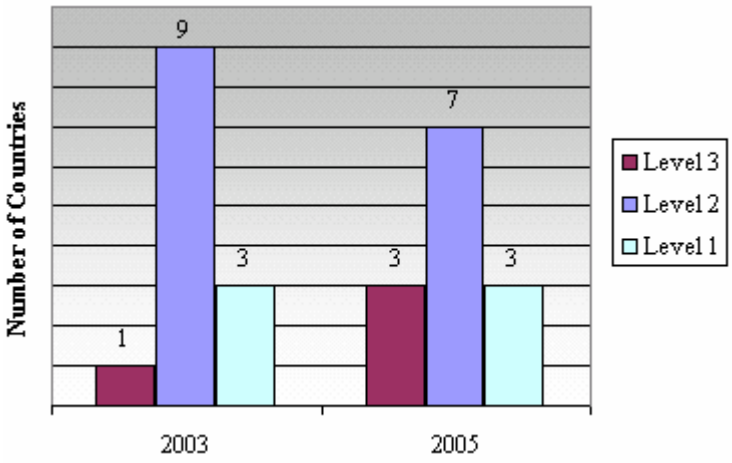
	Maturity level 1		Maturity level 2		Maturity level 3	
Country or territory	2003	2005	2003	2005	2003	2005
Bahrain			☑			✓
Egypt			☑	✓		
Iraq	☑	✓				
Jordan			☑	✓		
Kuwait			☑			✓
Lebanon			☑	✓		
Oman			☑	✓		
Palestine	☑	✓				
Qatar			☑	✓		
Saudi Arabia			☑	✓		
Syrian Arab Republic			☑	✓		
United Arab Emirates					☑	✓
Yemen	☑	✓				

Source: Compiled by ESCWA and based on the "Regional Profile of the Information Society, 2003".

[43] Within that context, audio/video discussions can be carried out and diagnostic images can be transmitted between consultant and patient sites. More information is available at: http://www.telemedegypt.net.

[44] More information is available at: http://www.medlabs.com.jo.

Figure 15. Maturity levels of ESCWA members in e-health



Source: Compiled by ESCWA from data in table 36.

X. DIGITAL ARABIC CONTENT

While Arabic speakers represent 5 per cent of the global population, Arabic web pages constitute 0.1 per cent of total web pages, which translates into an estimated 40 million pages in Arabic compared to some 40 billion pages in all other languages. This modest Arabic presence is even very far from matching the rate of Arabic speakers among total world Internet users, which stands at some 1.8 per cent.

A. ANALYTIC STUDY OF DIGITAL ARABIC CONTENT ON THE INTERNET

Despite these low percentages, a number of successful projects and new initiatives seek to contribute towards raising the level of Arabic content on the Internet, including the following:

(a) Alwaraq, which is available at www.alwaraq.com, contains a digital compilation of hundreds of Arabic heritage books made available by the Cultural Foundation in Abu Dhabi. This website is considered to be the largest of its kind on the Internet;

(b) Al-Azhar, which is available at www.alazharonline.org, posts many rare manuscripts, thereby providing access to researchers across the globe;

(c) The National Centre for the Documentation of Cultural and Natural Heritage, which was established by the Ministry of Information and Telecommunication Technology in Egypt and is available at www.cultnat.org, preserves and offers a digital representation of heritage;[45]

(d) Naseej, which is available at www.naseej.com.sa, represents one of the largest websites in terms of Arabic content;

(e) Arabic media, especially newspapers, are among the major sources of Arabic content on the Internet. Within that context, Aljazeera, which is available at www.aljazeera.net, contains tens of thousands of Arabic pages.

The sum total of these projects and initiatives, among many others, constitute only a fraction of the total web content developed in the West and, moreover, they are not enough to make a difference in the content ratio of Arabic to non-Arabic websites.

The frail presence of the Arabic language on the Internet, coupled with weak regional Arab e-commerce activities, has limited or weakened Arabic-language software development (see box 6), especially those related to, among other Internet-related technologies, Arabic search engines, archiving, information retrieval and machine translation.

Box 6. Basic software for the development of digital Arabic content

- Software for publishing information on the Web and for interaction with end-users;
- Database software, software for information storage, archiving and management;
- Tools for Arabic-language processing;
- Tools for automatic translation from and to Arabic;
- Software for graphic design and multimedia software;
- Software for security;
- Software for the management of websites on the Internet.

Source: ESCWA, "Digital Arabic Content: Opportunitites, Priorities and Strategies", E/ESCWA/ICTD/2005/4.

[45] The Ministry has recently signed a joint collaboration agreement with the Egyptian Publishers Association and the Commercial and Educational Software Producers Association, which will lead to the launch of an initiative to develop digital Arabic content for books and software at the cost of some $13 million.

1. *The distribution of Arabic versus English websites in the ESCWA region*

Global search engines available on the Internet, especially Google, were used to estimate the language distribution on websites carrying top level domain names (TLDs) of ESCWA members (see table 37).

While Egypt accounts for the largest content posted on the Internet in the ESCWA region, a modest 12 per cent of this content is in Arabic. Similarly, in the United Arab Emirates, which comes second in the total number of web pages, only 22 per cent of content is in Arabic. With 37 per cent of all Arabic web pages posted in the ESCWA region, Saudi Arabia comes first in terms of Arabic content, and third in terms of total content posted.

The Syrian Arab Republic enjoys the largest share of Arabic content from the total number of pages developed in Arabic and English, while Lebanon has the smallest share of Arabic content compared to total pages in both languages.

TABLE 37. RANKING OF ESCWA MEMBERS ACCORDING TO THE SHARE OF ARABIC ON THE INTERNET
(*Percentage*)

Country or territory	Share of web pages in Arabic over total web pages
Syrian Arab Republic	94
Saudi Arabia	67
Palestine	83
Kuwait	51
Yemen	47
Bahrain	39
Qatar	34
Jordan	33
Oman	29
United Arab Emirates	22
Egypt	12
Lebanon	5
Iraq	..
Average	28

Source: Madar Research Group.

Note: Two dots (..) indicate that the ranking could not be accurately assessed given a lack of available data.

TABLE 38. RANKING OF ESCWA MEMBERS ACCORDING TO CONTRIBUTION TO TOTAL INTERNET ARABIC CONTENT IN THE REGION
(*Percentage*)

Country or territory	Share of Arabic web pages to total Arabic content in the ESCWA region
Saudi Arabia	37
Egypt	18
United Arab Emirates	18
Palestine	11
Jordan	4
Kuwait	3
Bahrain	3
Qatar	2
Syrian Arab Republic	2
Yemen	1
Oman	1
Lebanon	1
Iraq	..

Source: Madar Research Group.

Note: Two dots (..) indicate that the ranking could not be accurately assessed given a lack of available data.

2. *Arabic-language software development*

The Arab software industry remains underdeveloped. The industry has suffered a setback in the past decade when many Arab firms specialized in the development of cultural or entertainment software made a partial or complete shift in their line of business. Some of these companies found better returns in offering Arabization services to international companies, while others succeeded in winning outsourced contracts from global firms to develop software components.

Egypt has always been home to the largest software development in the Arab region, followed by Saudi Arabia, Jordan and Lebanon. In the past few years, a software development industry has started to emerge in the United Arab Emirates, especially in the Arabization business. Meanwhile, Kuwait, which was the home to the largest Arabic software company, namely, Sakhr Software, failed to maintain these achievements owing, possibly, to direct and indirect impacts of the second Gulf War.

The Internet plays an important role in driving the Arab software industry, albeit at a slow pace, given the website development that is being undertaken in all Arab countries (see table 39). Growth in website development, however, is comparatively chaotic owing to the absence of standards and low returns on investment. However, the industry is expected to improve in the next five years.

TABLE 39. RANKING OF ESCWA MEMBERS ACCORDING TO SOFTWARE DEVELOPMENT

Rank	Country or territory
1	Egypt
2	Saudi Arabia
3	Jordan
4	Lebanon
5	United Arab Emirates
6	Kuwait
7	Syrian Arab Republic
8	Palestine
9	Bahrain
10	Qatar
11	Oman
12	Iraq
13	Yemen

Source: Madar Research Group.

B. OBSTACLES FACING DIGITAL ARABIC CONTENT DEVELOPMENT AND MEANS OF OVERCOMING THEM

The low Internet penetration rate that prevails throughout the ESCWA region, which currently stands at 13 per cent, is a main inhibitor of Arabic content development on the Web. Another equally important inhibitor is the fact that the majority of Arab Internet users currently expect information and Arabic content to be free, rather than having to pay a premium for them. This attitude has led to the failure of most Arabic websites that relied on sales of content as the main source of revenue. Meanwhile, this attitude is set to remain a hindrance to investments in the development of technologies that help to post and manage Arabic content on the Internet.

Acknowledging this hindrance, some Arabic websites have resorted to offering free content while relying on advertisements for revenue. This model has generally failed as well owing to skepticism by advertisers regarding the efficiency of Internet advertising and their preference of such traditional media channels as television, newspapers and magazines. In order for the advertisement-based model to mature in the ESCWA region, substantial educational efforts and higher Internet penetration must first be achieved.

In the medium to long term, Arabic content can generate revenues, albeit indirectly, through its use in services and marketing activities over the Web, especially as Internet use increases in the region. This kind of use is expected to encourage content development in Arabic (see box 7). As more Arab consumers adopt the practice of making online purchases in the next five years, more online shopping malls and e-commerce sites are expected to appear in the region, which can encourage the development of Arabic content to support sales and marketing services.

Box 7. Specialization needed for the development of digital Arabic content

Information technology

- Design of websites
- Software designers
- Database and database management experts
- Software engineers
- Programmers on various platforms
- Security engineers
- Operating system administrators
- Website directors
- Website operators

Other specialization

- Telecommunication engineers
- Marketing experts
- Artistic designers
- Arabic-language processing experts
- Arabic language experts

Source: ESCWA, "Digital Arabic Content: Opportunitites, Priorities and Strategies", E/ESCWA/ICTD/2005/4.

From the perspective of Governments in the region, which do not necessarily seek direct profit from establishing an online presence, investment in Arabic content is increasingly becoming a priority. The public sector is already leading the development of Arabic web content owing to ongoing e-government projects, which require the availability of online publications and Government information. As the Internet gains popularity in Arab countries, Governments are expected to turn more to the Internet as a medium that promotes and propagates their strategies, policies and political thoughts, in addition to offering the public useful social services. This will naturally support Arabic content development.

The impact of e-government initiatives on Arabic web content is best exemplified by Government projects in the United Arab Emirates. In 1998, before e-government projects started in the region, the ratio of Arabic web pages to English carrying the United Arab Emirates top level domain of "ae" was a modest 15 per cent of total registered pages, while 85 per cent were in English. In 2003, following the completion of many e-government projects in the United Arab Emirates, especially in Dubai, Arabic pages increased to the extent that they made up 43 per cent of total web pages, compared to 57 per cent English pages. In 2005, however, two new factors came into play in favour of English content, namely, a growing interest in Internet marketing that pushed the private sector in the United Arab Emirates to increase its presence on the Internet; and increased translation activities by governmental entities of their now-abundant Arabic content into English.

The obstacles hindering the development of Arabic Internet content and their remedies can be summarized as follows:

(a) A very slow pace by which e-government projects are being implemented. This can be remedied by allocating more funds to these projects aimed at speeding up their execution;

(b) Lack of awareness with regard to the importance of Internet content in Arabic. This obstacle can be addressed by laying down effective plans aimed at developing Arabic content, in addition to the formation of electronic databases in Arabic that do not seek immediate profit;

(c) Low returns on investment for the private sector to develop Arabic content. This obstacle can be overcome by increasing Government investment in infrastructure for the dual purpose of driving faster Internet penetration and of enhancing the role of the Internet as a distinctive medium capable of delivering advertisers' message as efficiently, if not better, than traditional media;

(d) Absent or insufficient legislation on digital copyrights and e-commerce. This requires Governments to speed up the drafting and adoption of such laws;

(e) Heavy censorship and filtering of digital content in some ESCWA countries. Lighter forms of censorship and minimal filtration of websites can eliminate this problem.

Obstacles facing Arabic software development

There are Arabic various challenges in the area of software development, which relate mainly to weak information technology infrastructure, legal framework, lack of skilled labour and absence of standards. Major obstacles and means of addressing them are as follows:

(a) Low PC penetration rates in offices, households and schools and universities. Governments can design programmes to facilitate PC ownership by businesses and individual users, including organizing easy installment plans and taking steps to lower the cost of PCs by supporting national assembly lines and by lowering or eliminating taxes or tariffs on computer imports;

(b) High levels of software piracy, which requires the enactment of appropriate legislation, and strong and unyielding enforcement of such laws;

(c) High cost of software development coupled with slow returns on investment. This problem can be minimized with the availability of suitable banking facilities, tax exemptions and donations;

(d) Lack of technical manpower with the right combination of skill sets. A solution can be found by reforming the educational systems, with an emphasis on academic and vocational training programmes that are related to the software industry;

(e) Poor investment in Arabic-language processing research. Governments can rectify this by allocating funds for such research at public universities and other Government research institutions;

(f) Absence of Arabic software development standards. An Arabic organization specialized in such standards can set up the standards and oversee implementation. Alternatively, the Arab Specifications and Standards Authority of the League of Arab States could be reactivated and given sufficient funds to accomplish its tasks.

C. RANKING AND CLASSIFICATION OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL

The following four maturity levels are used: (a) maturity level 1, which indicates poor development of Arabic content, with a poor or negligible software industry; (b) maturity level 2, which indicates growing development of Arabic content, with an emerging software industry; (c) maturity level 3, which indicates moderate development of Arabic content, with a growing software industry; and (d) maturity level 4, which indicates significant development of Arabic content, with an advanced software industry.

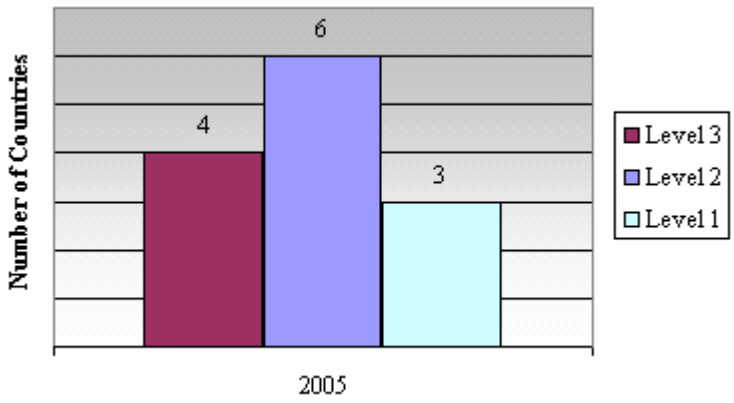
Table 40 summarizes the different maturity levels of ESCWA member countries.

TABLE 40. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN DEVELOPING ARABIC CONTENT AND SOFTWARE, 2005

Country or territory	Maturity level 1	Maturity level 2	Maturity level 3
Bahrain		√	
Egypt			√
Iraq	√		
Jordan			√
Kuwait		√	
Lebanon		√	
Oman	√		
Palestine		√	
Qatar		√	
Saudi Arabia			√
Syrian Arab Republic		√	
United Arab Emirates			√
Yemen	√		

Source: Compiled by ESCWA and based on ESCWA 2005 country reports.

Figure 16. Maturity levels of ESCWA members in Arabic content and software development



Source: Compiled by ESCWA from data in table 40.

XI. CONCLUSIONS AND RECOMMENDATIONS

The aim of this report is to profile the information society in the ESCWA region and to gauge the progress made by each country towards building such a society. To that end, the features of the information society were grouped into 10 basic components; and the maturity of each ESCWA member was divided into four levels, with maturity level 1 for the lowest maturity and maturity level 4 for the highest maturity. Based on information gathered from country reports submitted to ESCWA and other sources, the maturity level was calculated by adding the scores a country received on each of the 10 components and dividing the sum by 10. This resulted in an average score for each country in the range of 1-4, which represented the maturity level of the information society status of a given country in relation to other ESCWA members.

The United Arab Emirates achieved the highest score at 3.2 points out of 4, followed by Bahrain at 3.0 points, and Jordan at 2.9 points (see table 41).

TABLE 41. RANKING OF ESCWA MEMBERS ACCORDING TO MATURITY LEVEL IN INFORMATION SOCIETY, 2005

Country or territory	Policies	Legal Framework	ICT Infrastructure	Capacity Building	ICT sector building	Government	Education	Commerce and business	Health	Arabic Content	Average
United Arab Emirates	3	3	4	3	3	3	3	4	3	3	3.2
Bahrain	4	3	4	3	1	3	3	4	3	2	3.0
Jordan	4	3	2	3	3	3	3	3	2	3	2.9
Kuwait	3	2	3	2	1	2	3	3	3	2	2.4
Saudi Arabia	3	2	3	2	2	2	2	3	2	3	2.4
Qatar	2	2	3	3	1	3	2	3	2	2	2.3
Egypt	3	2	2	3	2	2	2	2	2	3	2.3
Lebanon	2	2	2	2	2	3	2	3	2	2	2.2
Oman	2	2	2	2	1	2	2	3	2	1	1.9
Syrian Arab Republic	2	1	2	2	1	2	2	1	2	2	1.7
Palestine	1	1	2	2	1	1	1	1	1	2	1.3
Iraq	1	1	1	2	1	1	1	1	1	1	1.1
Yemen	1	1	1	2	1	1	1	1	1	1	1.1
Average	2.38	1.92	2.38	2.38	1.54	2.15	2.08	2.46	2.00	2.08	2.14

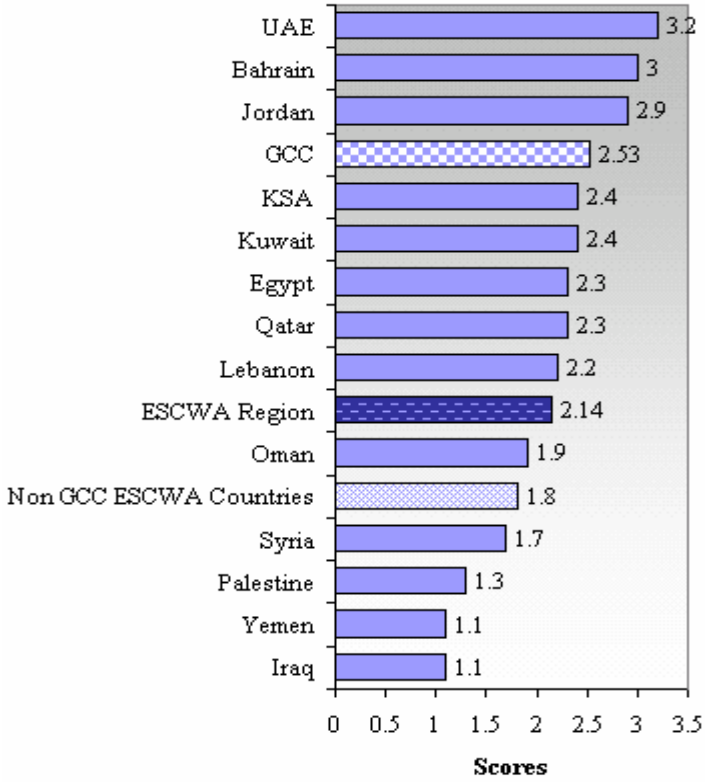
Source: Compiled by ESCWA.

The GCC sub-region achieved an average score of 2.53 points, compared to that of the whole ESCWA region at 2.14 points, and of non-GCC ESCWA members at a modest 1.8 points. This confirms the general observation that countries of the GCC have progressed faster, and by a significant margin, than their non-GCC counterparts in the ESCWA region in terms of building an information society.

If the same scoring methodology was applied to developed countries, they would all receive a full or nearly full score on each component of the information society. This implies that even the most advanced countries of the ESCWA region, namely Bahrain and the United Arab Emirates, have a long way to go to reach the level of information society development achieved in developed countries.

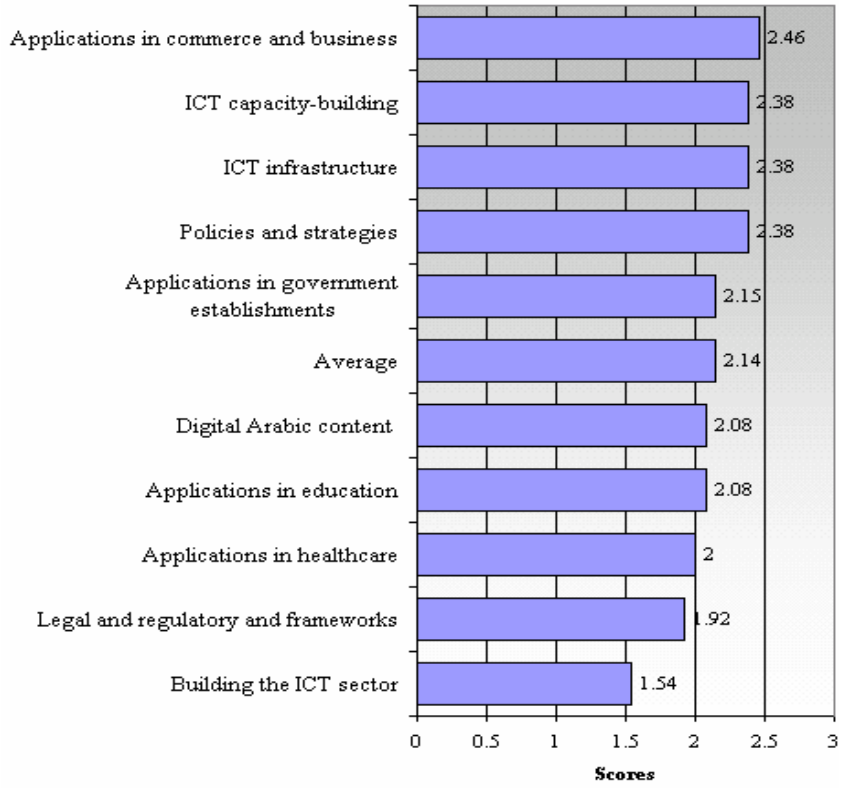
The average scores of the ESCWA region in terms of each component reveals the relative weaknesses and strengths the region has in the course of building an information society (see figure 18).

Figure 17. Ranking of ESCWA members according to maturity level in information society, 2005



Source: Compiled by ESCWA.

Figure 18. Average scores of the ESCWA region in various ICT components



Source: Compiled by ESCWA.

At a regional level, the worst performance was with regard to building the ICT sector. This can be attributed to the following: (a) the poor record of ESCWA members in terms of developing and exporting ICT products; (b) the absence of incentives or low level of official support aimed at developing the ICT sector; and (c) an environment that has not matured enough to attract foreign investment in the ICT sector.

Collectively, ESCWA members realized their second worst score in the area of legal and regulatory frameworks. Contributing to this shortcoming are the following: (a) the absence of laws and regulations pertaining to the use and protection of consumers' confidential information and privacy; (b) poor enforcement of national copyright and intellectual property laws; and (c) inadequate regulatory framework governing the Internet and telecommunication.

In terms of relative strength, the ESCWA region achieved the best scores in ICT applications in business and commerce. Credit for this achievement goes to a strong banking sector, which has acquired international standards of quality in many ESCWA countries.

Moreover, the ESCWA region had a three-way tie for the second slot at 2.38 points, namely, ICT capacity building, ICT infrastructure, and policies and strategies. These comparatively higher scores can be attributed to the following: (a) effective awareness campaigns; (b) various initiatives to increase the use of computers and the Internet in education; (c) serious efforts aimed at meeting the targets set by WSIS; and (d) high growth in the use of the Internet, computers and mobile phones.

At the level of the GCC sub-region, the weakest area relates to building the ICT sector, at 1.5 points, which is a weakness that is shared with other ESCWA members. However, the second weakest area in that sub-region is the development of digital Arabic content, at 2.17 points; while their third weakest area is legal and regulatory frameworks, where they performed better than their non-GCC counterparts in the ESCWA region.

A. PERFORMANCE OF ESCWA MEMBERS COMPARED TO OTHER COUNTRIES AND REGIONS OF THE WORLD

1. *ICT policies and strategies*

The declaration of principles at the first WSIS in Geneva emphasized the importance of full integration of all programmes and efforts related to ICT with national and regional development strategies.[46] Owing to differences in development policies and strategies between different countries, there is no fixed global criterion by which the level of performance can be measured or with which a quantitative comparison can be made. However, to varying degrees, most countries in the ESCWA region are seeking to formulate and put into action ICT strategies and policies.

2. *Legal frameworks*

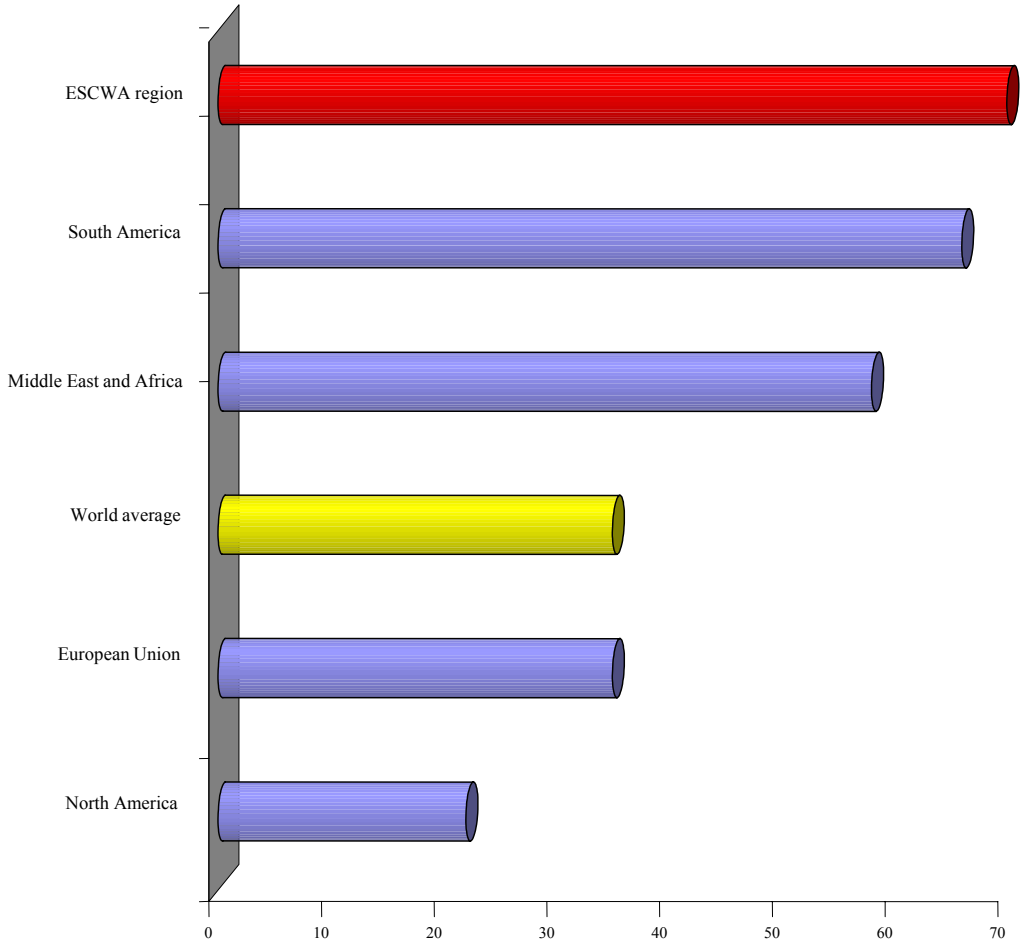
Despite the outstanding performance of some ESCWA members in terms of fighting software piracy, the region as a whole is still suffering from this challenge. The piracy rate in the ESCWA region is estimated at 70 per cent, which is twice the world average of 35 per cent (see figure 19). Except for the United Arab Emirates, where software piracy is a comparatively low 34 per cent, ESCWA member countries have a long way to go in the fight against piracy. However, piracy rates in the region are slowly decreasing.

Moreover, the ESCWA region lags behind in terms of adopting world standards on patents. None of the ESCWA countries is signatory to the Patent Law Treaty (PLT), which has 56 member countries worldwide; while only four ESCWA countries, namely, Egypt, Oman, Syrian Arab Republic and United Arab Emirates, have joined the Patent Cooperation Treaty (PCT), which has been signed by 131 countries

[46] ITU, "Declaration of principles – Building the Information Society: global challenge in the new millennium", which is available at: http://www.itu.int/wsis/documents/doc_multi.asp?lang=en&id=1161|1160.

and has 128 member States.[47] Additionally, laws and standards aimed at protecting the privacy and confidentiality of Internet users are absent.

Figure 19. Piracy rates in the ESCWA region compared to other regions, 2004



Source: Business Software Alliance (BSA), which is available at: http://www.bsa.org/globalstudy/upload/2005-Global-Study-English.pdf.

In general, the countries that constitute the ESCWA region have weaknesses in the legal and regulatory area compared to developed countries.

3. *ICT infrastructure*

Table 42 clearly shows that the ESCWA region is behind the rest of the world, with the exception of Africa, in terms of Internet penetration; while the GCC sub-region outranks Africa, South America and those European countries outside the EU.

[47] World Intellectual Property Organization (WIPO), which is available at: http://www.wipo.int/treaties/en/ShowResults.jsp?lang=en&treaty_id=6.

TABLE 42. INTERNET PENETRATION RATE ACROSS THE WORLD, 2004
(*Percentage of Internet users per 100 people*)

Region	Penetration rate
North America	68
European Union	48.1
Rest of Europe	17.5
South America	13
Africa	1.8
GCC sub-region	17.6
Non-GCC ESCWA members	4.5
Total ESCWA region	6.9
World average	13

Sources: Madar Research Group; and Internet World Stats, "Usage and population statistics", which is available at: http://www.internetworldstats.com .

Similarly, with the exception of Africa, the ESCWA region is behind the rest of the world in mobile penetration; while the GCC sub-region has a higher penetration rate than Africa and South America (see table 43).

TABLE 43. PENETRATION RATE OF MOBILE PHONES ACROSS THE WORLD, 2004
(*Percentage of subscribers per 100 people*)

Country or region	Penetration rate
United States of America	61[a/]
Western Europe	90[b/]
Central and Eastern Europe	66
South America	32[c/]
Africa	8[d/]
GCC countries	50
Non-GCC ESCWA members	10.7
Total ESCWA region	17.9
World average	26.5

Sources: Madar Research Group.

a/ CTIA – The Wireless Association, which is available at: http://www.ctia.org/.

b/ Tekrati, "Research news: network and telecom", which is available at: http://www.tekrati.com/T2/Analyst_Research/ResearchAnnouncementsDetails.asp?Newsid=5051.

c/ Mindbranch, "2005 Latin America telecoms, mobile and broadband – overviews", which is available at: http://www.mindbranch.com/products/R170-0555.html.

d/ Available at: www.mindbranch.com/products/R170-0547.html.

Table 44 shows that the PC penetration in the ESCWA region is still low. It is marginally lower than the rate in China and almost similar to Turkey. Again, the GCC sub-region fares better with regard to other ESCWA members. However, that rate in the GCC remains lower than those prevalent in developed countries.

4. *ICT capacity building*

Measurement of ICT capacity building relies heavily on three main criteria, namely: the level of ICT infrastructure development; the level of RDI; and the development level of the environment that supports innovation and invention.

The *Human Development Report* ranked Bahrain at the top of the region, followed by Kuwait, Qatar and the United Arab Emirates; while Yemen came at the bottom of the regional list and among the lowest ranking globally.[48] The good performance of some ESCWA countries in the Report can be largely attributed to well-developed ICT infrastructure.[49] However, a deeper look reveals that Jordan is the only country in the region that stands out in terms of possessing a high budget for RDI, which is twice as high as the world average; and a higher number of human resources working on RDI, compared to the world average. Similarly, while Qatar focuses on RDI, reliable data are no available figures to quantify the budget allocated to that field. At a regional level, however, the average spending on RDI and the size of human resources employed in that field remain disappointingly lower than the world average.

TABLE 44. PC PENETRATION RATE IN SELECTED COUNTRIES AND REGIONS, 2004
(*Percentage of PCs per 100 people*)

Country or region	Penetration rate of PCs
United States of America	78.5
Switzerland	71.9
Norway	68
Canada	65.5
Denmark	64.5
Sweden	60.6
The Netherlands	57.4
Australia	56.8
Singapore	53.5
United Kingdom of Great Britain and Northern Ireland	53.5
Japan	48.6
China	4.4
Columbia	4.3
Turkey	4.1
Peru	3.7
The Philippines	2.3
Indonesia	1.6
Vietnam	1.4
India	1.2
Bahrain	20.48
United Arab Emirates	19.68
Qatar	17.97
Kuwait	16.36
Saudi Arabia	9.84
Lebanon	9.33
Jordan	7.31
Oman	5.39
Palestine	4.63
Egypt	2.59
Syrian Arab Republic	2.39
Iraq	1.89
Yemen	0.93
GCC countries	11.7
Non-GCC ESCWA members	3.5
Total ESCWA region	4.31
World average	12

Sources: Madar Research Group; and Gartner, "Report on PC markets in the Asia Pacific Rim" (May 2005).

[48] UNDP, *Human Development Report 2004*, which is available at: http://hdr.undp.org/reports/global/2004/pdf/hdr04_complete.pdf.

[49] It must be noted that the *Human Development Report* includes some information that needs to be updated. For example, the Report does not provide any information on human development in Iraq, which can affect country rankings.

5. *Building the ICT sector*

Countries in the ESCWA region still have a long way to go in terms of building the ICT sector, compared to countries in other regions. This sector has no significant impact on the economies of the region, with the exception of Jordan, which has worked systematically towards developing its ICT sector. By contrast to the poor performance of ESCWA members, exports from the software industry of Ireland, for example, constitute 34 per cent of that country's total exports;[50] in France, the software industry accounts for 6 per cent of national GDP, which is larger than the share of the automotive and energy sectors combined, and has created more than 400,000 jobs;[51] and the share of the ICT sector in India is more than 1.8 per cent of national GDP.

Within that context, the best performer in the ESCWA region, namely, Jordan stands a very modest 0.62 per cent of GDP, compared to Ireland, for example, where it is estimated at 19.77 per cent of GDP (see table 45). Given that the experience of Ireland in building the ICT sector has been taken as a model by Jordan for drawing its own economic transformation strategy, the efforts that need to be made by that ESCWA member to reach comparable levels remain significant.

TABLE 45. ICT EXPORTS OF SELECTED ESCWA MEMBERS COMPARED TO THOSE OF INDIA AND IRELAND

Country	ICT exports (*Millions of $*)	GDP (*Millions of $*)	ICT exports (*Percentage of GDP*)
Lebanon	15	21,768	0.07
Egypt	150	75,148	0.2
Jordan	70	11,196	0.6
India	13,100	691,876	1.9
Ireland	36,300	183,560	19.8

Sources: Data relating to Egypt, Jordan and Lebanon are taken from the respective 2005 country reports; data relating to India from Indian Business, "Why India?", which is available at: http://www.indiainbusiness.nic.in/whyindia.htm; and data relating to Ireland from ICT Ireland, "Key industry statistics", which is available at: http://www.ictireland.ie/Sectors/ict/ictDoclib4.nsf/vLookupHTML/Key_Industry_Statistics?OpenDocument#KeyStats2.

6. *ICT applications in Government establishments*

While the countries of the GCC have managed to improve on the global average and draw closer to e-government readiness levels found in Southeast Asia, there are significant discrepancies among them. The United Arab Emirates registered very high scores on the E-Government Readiness Index of the United Nations, at 0.7430, exceeding the European average; while the Index in Oman, at 0.2880, was closer to the average in Africa (see table 46). Moreover, the Index was low in Yemen compared to the average in Africa; and Iraq achieved a relatively high score compared to Egypt and the Syrian Arab Republic.

In general, ESCWA member countries still suffer from clear shortcomings in e-government performance and readiness. The ESCWA region achieved a very low rank, at 0.3853, overtaking only African and other Arab countries (see figure 20).

7. *ICT applications in education*

Both international and national reports point out the difficulty of measuring and comparing the use of ICT applications in education, owing to the great differences in educational systems and applications in use.

[50] ICT Ireland, which is available at: http://www.ictireland.ie/Sectors/ict/ictDoclib4.nsf/vLookupHTML/Key_Industry_Statistics?OpenDocument#KeyStats2

[51] Austrade, "IT industry profiles", which is available at: http://www.austrade.gov.au/IT/layout/0,,0_S4-1_wqcrz1e-2_-3_PWB169644-4_-5_-6_-7_,00.html.

In terms of quality, ESCWA member countries are still in the early maturity levels in ICT use compared to advanced countries, especially in basic education. Apart from a few successful examples in some countries, there is a lack of genuine ICT applications in education and teaching across schools in the region. At the university level, access to such applications is adequate, while there are a few initiatives that appear promising in terms of virtual universities, including, most prominently, the Arab Open University and the Syrian Virtual University (SVU). However, these remain inferior compared to their counterparts in Europe and Southeast Asia.

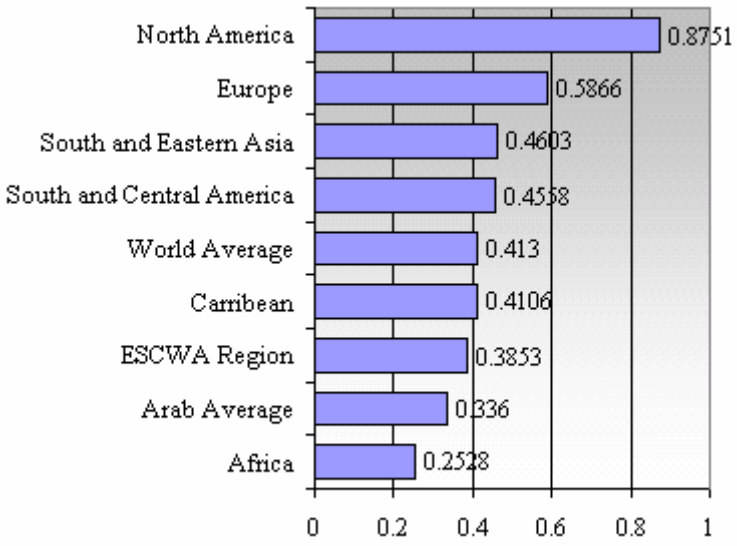
TABLE 46. PERFORMANCE OF ESCWA MEMBERS ON E-GOVERNMENT READINESS INDEX, 2003 AND 2004

Country	Web Measure Index		Telecom Index		Human Capital Index		Index Score, 2004	Percentage change over 2003
	2004	2003	2004	2003	2004	2003		
Bahrain	0.405	0.332	0.332	0.347	0.86	0.85	0.532	0.022
United Arab Emirates	0.305	0.419	0.368	0.444	0.73	0.74	0.743	0.062
Jordan	0.347	0.419	0.097	0.089	0.86	0.78	0.434	0.005
Lebanon	0.243	0.253	0.176	0.188	0.83	0.83	0.416	0.008
Qatar	0.085	0.135	0.298	0.308	0.82	0.79	0.4	0.011
Saudi Arabia	0.309	0.183	0.139	0.119	0.71	0.71	0.368	0.048
Kuwait	0.136	0.144	0.23	0.226	0.73	0.74	0.364	0.006
Iraq	0.124	..	0.16	..	0.93	..	0.356	..
Oman	0.050	0.262	0.135	0.132	0.68	0.67	0.288	0.067
Egypt	0.1	0.035	0.066	0.06	0.63	0.62	0.265	0.027
Syrian Arab Republic	0.5	0.044	0.043	0.038	0.7	0.71	0.264	0
Yemen	0.054	0.044	0.04	0.039	0.49	0.48	0.194	0.006

Source: Department of Economic and Social Affairs, "UN Global E-Government Readiness Report 2004: Towards access for opportunity" (2004), which is available at: http://www.unpan.org/e-government4.asap.

Note: Two dots (..) indicate a lack of available data.

Figure 20. Performance of ESCWA members according to E-Government Readiness Index



Source: Department of Economic and Social Affairs, "UN Global E-Government Readiness Report 2004: Towards access for opportunity" (2004), which is available at: http://www.unpan.org/e-government4.asap.

8. *ICT applications in business and commerce*

It is difficult to carry out a precise comparison of the value of e-commerce transactions in ESCWA member countries to those of the rest of the world, particularly given discrepancies in the methodologies used by market research firms. In 2004, e-commerce was estimated at $2-7 trillion globally, according to various methodologies, which in turn translates into a percentage of GDP in the range of 4.9-17 per cent. However, even this lower global percentage is significantly higher than the rates prevalent in the ESCWA region (see table 47).

TABLE 47. E-COMMERCE TRANSACTIONS IN THE ESCWA REGION, 2004

Regions	Total B2B and B2C e-commerce (*Millions of $*)	B2B e-commerce (*Percentage of GDP*)
GCC countries	8,730	1.92
Non-GCC ESCWA members	1,420	0.84
Total ESCWA region	10,150	1.62

Source: Compiled by ESCWA.

In the area of ATM penetration, the rates in only three ESCWA member countries, namely, Bahrain, Qatar and the United Arab Emirates, exceeded the world and Latin America averages; while all the rates in the ESCWA region fell far below the average in the United States (see table 48).

TABLE 48. PENETRATION RATE OF ATMS IN ESCWA MEMBERS AND OTHER REGIONS, 2004
(*Per 10,000 people*)

Country or region	Number of ATMs
Qatar	4.43
United Arab Emirates	2.55
Bahrain	2.54
Oman	2.16
Lebanon	1.89
Saudi Arabia	1.79
Kuwait	1.16
Jordan	0.99
Egypt	0.17
Yemen	0.1
Syrian Arab Republic	0.03
GCC countries	1.94
Non-GCC ESCWA members[a/]	0.24
United States of America	13
Latin America	2.3
World average	2.34

Source: Compiled by ESCWA.
a/ Excluding Iraq and Palestine for which data were not available.

9. *ICT applications in health care*

With the exception of some modest attempts by individual countries, there is a marked shortfall in ICT applications in the health care sector in the ESCWA region, with a lack of clear strategies aimed at improving health care services. Compared to the state of health care services in advanced countries, the absence of such technologies is found to be the result of a number of factors, including, most importantly, the following:

(a) Absence of clear standards for the use of health care systems among ESCWA member countries, including hospital, clinic and medical resources management systems, in addition to the haphazard selection of such systems by some hospitals as per minimum requirements;

(b) Lack of clear laws or regulatory directives issued by ministries of health, especially regarding admission procedures, treatment control and automation of drug prescriptions;

(c) Absence of detailed health and medical databases in most ESCWA member countries, including, for example, a lack of medical maps to track the extent and spread of epidemics;

(d) Lack of a mature health care insurance industry, both public and private, which usually necessitates the extensive use of information technology;

(e) Deficiency in the use of ICT applications aimed at providing telemedicine services.

10. *Digital Arabic Content*

The presence of the Arabic language on the Internet is still very poor, compared to other major languages (see table 49).

TABLE 49. SHARE OF MAJOR LANGUAGES ON THE INTERNET, 2003
(*Percentage*)

Language	Share on the Internet
English	68.30
Japanese	5.90
German	5.80
Chinese	3.90
French	3.00
Spanish	2.40
Russian	1.90
Italian	1.60
Portuguese	1.40
Korean	1.30
Other	4.50

Source: International Telecommunications Union (ITU).

While Arabic speakers represent 5 per cent of the global population, Arabic web pages constitute 0.1 per cent of total web pages, which translates into an estimated 40 million pages in Arabic compared to some 40 billion pages in all other languages. This modest Arabic presence is even very far from matching the rate of Arabic speakers among total world Internet users, which stands at some 1.8 per cent.

B. SUGGESTIONS AND RECOMMENDATIONS

ESCWA member countries need to exert further efforts aimed at producing a significant shift in establishing their information societies. With the sharp rise in oil revenues, countries of the GCC currently have a real opportunity to achieve this. To that end, some suggestions and recommendations to accelerate the creation of information societies are provided below.[52]

[52] These suggestions and recommendations need to be considered as guidelines that must be further developed by specialized ICT committees in each ESCWA member country.

1. *ICT policies and strategies*

While the majority of ESCWA member countries have established ICT policies and strategies, most of these suffer from the following challenges: (a) lack of a methodical analysis with regard to the state of the respective societies; (b) failure to delve deeply into the real needs of these societies; (c) absence of detailed plans aimed at executing such policies and strategies; (d) insufficient funds for the implementation and execution of such strategies; and (e) failure to establish necessary mechanisms aimed at monitoring progress and at seeking remedies.

The suggestions and recommendations in this regard are as follows:

(a) To study present and future needs of the society, and establish new or correct existing policies and strategies in line with the results of such studies;

(b) To increase the role of the private sector and civil society establishments in terms of planning, remedying and monitoring policies and strategies;

(c) To allocate necessary financial resources to realize policies and strategies, in addition to allocating funds in the annual budget;

(d) To establish mechanisms for monitoring and measuring the pace and progress of policies and strategies, and to issue related annual reports.

2. *Legal and regulatory environment*

ESCWA member countries suffer from a poor legal and regulatory environment. The following recommendations aim to remedy this limitation:

(a) To promote and prioritize the formulation of laws and regulations that protect personal data and information privacy;

(b) To protect Internet-related intellectual property and publishing rights, as well as software applications, by enacting a series of designated laws and their disassociation from other intellectual property rights;[53]

(c) To establish a special intellectual property and publishing rights regional committee under the umbrella of an international or Arab agency that could coordinate matters related to intellectual property and publishing rights among countries in the region;

(d) To accelerate signing, ratification and joining of international agreements related to intellectual property rights, including PCT and PLT;

(e) To finalize the regulation and liberalization of the telecommunications sector, particularly fixed line telecommunications, as well as legislating suitable laws to encourage investment in this vital sector.

3. *ICT infrastructure*

There is great disparity among ESCWA member countries regarding the status of their ICT infrastructures. Specifically, while Iraq and Yemen suffer from very low levels of deployment, the corresponding levels in Bahrain and the United Arab Emirates are close to those found in advanced countries. This disparity necessitates different recommendations, which are summarized as follows:

[53] This dissociation could be initialized by an ad hoc committee, reporting directly to the ministries of information and communication technology and justice, charged with monitoring infringements of Internet-related intellectual property and publishing rights and applications.

(a) More advanced ESCWA members must shift attention from quantity to quality in the following ways: (i) deploying high-speed broadband Internet; (ii) using and interconnecting advanced computer systems, particularly those in business and Government establishments; and (iii) increasing Internet and computer use among lower-income sectors of society by devising adequate plans and programmes;

(b) Relatively poorer ESCWA members need to focus on the following: (i) increase spending on improving ICT infrastructure and lower related service costs; and (ii) increase Internet and computer use by boosting the number of free or semi-free public access centres and by providing support to Internet cafés, thereby encouraging low-cost services accessible to a larger segment of society.

4. *ICT capacity building*

The suggestions and recommendations in this regard are as follows:

(a) To increase expenditure on RDI, which remains significantly low across the ESCWA region compared to the world average;

(b) To raise awareness concerning the importance of ICTs and boost levels of use through special targeted programmes, especially in rural areas;

(c) To link ICT awareness programmes with literacy programmes in a way that harnesses ICTs to serve the illiteracy eradication process, thereby resulting in the eradication of ICT illiteracy as well;

(d) To increase and expand the use of such media services as satellite television stations and radio channels, thereby raising awareness of the importance of ICTs;

(e) To promote the training of human resources in both public and private establishments through ongoing training programmes, and to link employee performance reviews with continued training;

(f) To increase the number of computers in schools, incorporate research on the Internet into educational curricula and vitalize the role of the telecommunications sector, thereby providing schools with technical equipment and Internet access as part of a social responsibility;[54]

(g) To provide incentives to all universities and university students, especially in the form of subsidies for increasing Internet connectivity and IT use in universities and educational and research establishments;

(h) To allocate funds for and increase Government spending on research and development in public universities.

5. *Building the ICT sector*

Governments in the region need to deploy efforts in order to build their ICT sectors. The suggestions and recommendations in this regard are as follows:

(a) To create an enabling environment for risky ICT investments;

(b) To increase ICT spending, especially Government spending, by allocating a larger share of annual Government budgets;

[54] Financial and tax incentives could be used to encourage telecommunications companies to play this role, while nominal fees could be collected from all telecommunications users.

(c) To encourage foreign and local investment in the ICT sector by creating an attractive investment environment through such measures as giving priority to locally produced products in Government purchases;

(d) To support the ICT export/re-export industry through incentives given to global corporations looking to benefit from relatively low labour costs in some ESCWA member countries.

6. *ICT applications in Government establishments*

E-Government applications are still very limited across the ESCWA region. The suggestions and recommendations in this regard are as follows:

(a) To focus on creating comprehensive and networked Government databases, and to allocate necessary funds in annual budgets;

(b) To promote the use of e-government services by formulating training plans and publishing related literature and manuals;[55]

(c) To develop advanced, unified e-purchase systems that allow unification of Government sector purchases.

7. *ICT applications in education*

The ESCWA region is still at an early stage of maturity in the use of ICTs in education, particularly primary education. The following are important steps to develop such applications:

(a) To benefit from the substantial progress made by e-learning to extend education, especially to rural areas, and to incorporate the large numbers of students in basic education;

(b) To develop e-learning curricula in association with international agencies and major educational corporations;

(c) To give priority to the establishment of multimedia e-libraries in schools, particularly given that the cost of establishing an e-library is lower than that of establishing a traditional library in each school and requires only some simple equipment;

(d) To enhance e-school experiments set up in some countries and boost their numbers;

(e) To increase the role of private sector establishments in the educational process by encouraging them, through corporate tax incentives, to provide financial or local community support;

(f) To enhance and vitalize the role of virtual universities, especially in terms of grants and scholarships.

8. *ICT applications in business and commerce*

Significant discrepancies exist in e-business and e-commerce in the ESCWA region, particularly between countries in the GCC and other ESCWA members. The suggestions and recommendations in this regard are as follows:

(a) To accelerate the legislation of e-commerce laws;[56]

[55] Within that context, while such countries as Bahrain and the United Arab Emirates have made considerable progress in terms of establishing e-governments, they still suffer from low usage levels among citizens of e-government services.

[56] Currently, such laws are lacking in the ESCWA region, with the exception of Bahrain and Jordan.

(b) To support national e-commerce websites by endorsing their use by Government establishments, when possible, and by providing them with tax incentives;

(c) To complete and vitalize the e-commerce market in the GCC;

(d) To establish an Arab e-commerce market;

(e) To enhance the banking infrastructure in less-developed ESCWA member countries and to encourage the use of electronic payment cards as a basic form of online payment in B2C e-commerce sites.

9. *ICT applications in health care*

The suggestions and recommendations in this regard are as follows:

(a) To establish national electronic health care networks in Arabic, which requires unifying basic health care terminology;[57]

(b) To link large medical centre databases in ESCWA member countries online to a single network, thereby allowing the transfer of expertise and remote collaboration;

(c) To encourage the collaboration between telecommunications companies and medical syndicates aimed at providing comprehensive online information services on doctors, hospitals and health care centres in each country.

10. *Digital Arabic content*

The presence of the Arabic language on the Internet is extremely limited compared to other languages. The suggestions and recommendations in this regard are as follows:

(a) To devise comprehensive national plans aimed at providing Internet access to schools and universities, thereby contributing to the development of educational websites as part of educational curricula;

(b) To support Arabic cultural centres aimed at establishing content-rich websites;

(c) To raise awareness of the Internet as a medium and promotional channel in order to attract the private sector to take part in developing digital Arabic content;

(d) To implement IPR laws in the software production industry, which support this developing industry;

(e) To devise ambitious national plans to develop an Arabic software industry as a strategic industry, especially in ESCWA member countries with large populations.[58]

[57] Several countries could collaborate on the project, thereby reducing development and maintenance costs.

[58] Within that context, plans must include considerable support for software development companies in the form of loans, tax incentives and export facilities, in addition to free media coverage and support.

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