ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

REGIONAL PROFILE OF THE INFORMATION SOCIETY IN WESTERN ASIA

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Preface

This regional profile is published by the United Nations Economic and Social Commission for Western Asia (ESCWA) within the framework of follow-up activities to the World Summit on the Information Society (WSIS) outcomes. It is the fourth in a series of such profiles; the first was published in 2003 and thereafter in 2005 and 2007, respectively. It describes the current situation and the progress made in the region in building the information society, providing a comparative evaluation with the rest of the world.

Within that context, this report provides essential information on the status of the information society in the ESCWA region, thereby assisting decision makers in their planning and enhancing national capacities for implementing such a society, and providing researchers with reference information for analysis. Moreover, it allows national authorities to compare their current status with that of other countries in the region in order to promote opportunities for cooperation and regional integration in an increasingly knowledge-based global economy.

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ABBREVIATIONS AND EXPLANATORY NOTES

AAG	Arab Advisors Group
ACES	Arab Campus E-Learning System
ACT	ATCO Clearwire Telecom
ADNS	Arabic Domain Name System
ADSL	Asymmetric Digital Subscriber Line
AEA	Arab eContent Award
AIDS	Acquired Immune Deficiency Syndrome
ALECSO	Arab League Educational, Cultural and Scientific Organization
AOU	Arab Open University
AREGNET	Arab Regulatory Network
ARISPA	Arab Regional ISPs and DSPs Association
ASBU	Arab States Broadcasting Union
ASR	Automatic Speech Recognition
ATCO	A.A. Turki Group of Companies
ATICM	Arab Telecommunications and Information Council of Ministers
ATWG	Assistive Technology Working Group
AUB	American University of Beirut
AUBMC	American University of Beirut Medical Centre
AUDI	Arab Urban Development Institute
B2B	Business to Business
B2C	Business to Consumer
B2G	Business to Government
BATELCO	Bahrain Telecommunications Company
BCM	Business Continuity Management
BCSR	Bahrain Centre for Studies and Research
BDT	ITU Telecommunications Development Bureau
BEA	Bahrain eContent Award
BIS	Bahrain Internet Society
BITS	Bahrain Information Technology Society
BOT	Build-Operate-Transfer
Bps	Byte per second
BSA	Business Software Alliance
BSI	British Standards
BTP	Bahrain Technology Park
CA	Certification Authority
CAIT	Central Agency for Information Technology
ccTLD	Country Code Top-level Domain
CDMA	Code Division Multiple Access
CD-ROM	Compact Disc Read-only Memory
CED	Civil Engineering Department
CERD	Lebanese Centre for Educational Research and Development
CERT	Computer Emergency Response Team
CERT	Centre of Excellence for Applied Research and Training
CERT-SA	Computer Emergency Response Team - Saudi Arabia
CICTS	Arab City ICT Strategy
CIO	Central Informatics Organisation
CITC	Communications Information Technology Commission
CKC	Community Knowledge Centres
CMC	Clemenceau Medical Centre
CMC	Communications and Media Commission
CNAP	Cisco Networking Academy Programme

CO^2	Carbon Dioxide
CRDF	Civilian Research and Development Foundation
CSIRT	Computer Security Incident Response Team
CSP	Certificate Service Provider
CULTNAT	Centre for Documentation of Cultural and National Heritage
DAC	Digital Arabic Content
DAP	Doha Action Plan
DAR	Digital Assets Repository
DESA	United Nations Department of Economic and Social Affairs
DGCS	Directorate General of Civil Status
DIC	Dubai Internet City
DIFC	Dubai International Financial Centre
DNS	Domain Name System
DOS	Department of Statistics
DSP	Data Service Provider
DS3	Digital Signal 3
DSO	Dubai Silicon Oasis
DSL	Digital Subscriber Line
EADS	The European Aeronautic Defence and Space Company
EBPP	Electronic Bill Presentment and Payment
ECOMLEB	E-Commerce in Lebanon
ECSSR	Emirates Centre for Strategic Studies and Research
EDI	Electronic Data Interchange
EEI	Egypt Education Initiative
EELU	Egyptian E-learning University
eGA	eGovernment Authority
EGS	Egyptian Geographic Society
EIDA	Emirates Identity Authority
ELCC	E-Learning Competence Centre
EMEA	Europe, Middle East and Africa
EMIX	Emirates Internet Exchange
EMRO	WHO Regional Office for the Eastern Mediterranean
ERP	Enterprise Resource Planning
ESA	Egyptian Software Association
ESI	European Software Institute
ETC	ESCWA Technology Centre
EUN	Egyptian Universities Network
FAJ	Federation of Arab Journalists
FBWA	Fixed Broadband Wireless Access
FDI	Foreign Direct Investment
FLAG	Fibre-optic Link Around the Globe
FMS	Fixed-to-Mobile Substitution
FNOC	FLAG Network Operations Centre
FOG	Fibre Optic Gulf
FOSS	Free and Open Source Software
FTP	File Transfer Protocol
FTTH	Fibre-to-the-Home
G2C	Government to Citizen
G2G	Government to Government

GAID	Global Alliance for ICT and Development
Gbps	Gigabit per second
GCC	Gulf Cooperation Council
GDCO	Gedaref Digital City Organization
GDP	Gross Domestic Product
GE	General Electric
GEI	Global Education Initiatives
GII	Global Innovation Index
GIS	Geographic Information System
GIT	Global Information Technology
GITR	Global Information Technology Report
GNI	Gross National Income
GPRS	General Packet Radio Services
GSD	General Supplies Department
GSM	Global System for Mobile Communications
GVCA	Gulf Venture Capital Association
HDI	Human Development Index
HDR	Human Development Report
HDSL	High bit-rate Digital Subscriber Line
HIS	Health Information System
HIV	Human Immunodeficiency Virus
HP	Hewlett-Packard
HR	Human Resources
HRMS	Human Resource Management System
HSI	High-speed Internet
HSPA	High-speed Packet Access
IBM	International Business Machines Corporation
ICANN	Internet Corporation for Assigned Names and Numbers
ICDL	International Computer Driving License
ICT	Information and Communications Technology
ICTARB	Information and Communications Technology in the Arab Region for the Blind
ICTDAR	Information and Communications Technology for Development in Arab Region
ID	Identity
IDAL	Investment Development Authority of Lebanon
IDC	International Data Corporation
IDI	ICT Development Index
IDSC	Information and Decision Support Centre
INA	Iraqi Networking Academies
INSEAD	Institut Européen d'Administration des Affaires - European Institute of Business Administration
INT@J	Information Technology Association of Jordan
INTALEQ	Innovations in Technology-Assisted Learning for Educational Quality
IP	Internet Protocol
IPR	Intellectual Property Right
IPTV	Internet Protocol Television
IPV6	IP Version 6
IREX	International Research and Exchanges Board
ISC	Internet Systems Consortium
ISESCO	Islamic Educational, Scientific and Cultural Organization
ISMF	Institutional and Sector Modernization Facility
ISP	Internet Service Provider

ISPER	Information Society Portal for the ESCWA Region
ISR	Intelligence, Surveillance and Reconnaissance
IT	Information Technology
ITA	Information Technology Authority
ITAC	Information Technology Academic Collaboration
ITIDA	Information Technology Industry Development Agency
ITRC	Information Technology Research Centre
ITU	International Telecommunication Union
IXP	Internet Exchange Point
IXSA	Internet eXchange of Saudi Arabia
JEI	Jordan Education Initiative
JTC	Jordan Telecommunications Company
KACST	King Abdul Aziz City for Science and Technology
KAM	Knowledge Assessment Methodology
Kbps	kilobit per second
KFAS	Kuwait Foundation for the Advancement of Science
KISR	Kuwait Institute for Scientific Research
KOM	Knowledge Oasis Muscat
KSA	Kingdom of Saudi Arabia
LAN	Local Area Network
LBDR	Lebanese Domain Name Registry
LMRA	Labour Market Regulatory Authority
LMS	Learning Management Systems
Mbps	megabit per second
MCIT	Ministry of Communications and Information Technology
MDG	Millennium Development Goals
MENA	Middle East and North Africa
MEPI	Middle East Partnership Initiative
MIMO	Multiple-input and multiple-output
ML	Maturity Level
MOC	Ministry of Communications
MOEE	Ministry of Electricity and Energy
MOH	Ministry of Health
MOHE	Ministry of Higher Education
MOICT	Ministry of Information and Communications Technology
MOPH	Ministry of Public Health
MOSA	Ministry of Sports Affairs
MPLS	Multiprotocol Label Switching
MSAD	Ministry of State for Administrative Development
MSE	Micro and Small Enterprises
MSI	Media Sustainability Index
MSP	Multi-sector Partnership
MT	Machine Translation
MTC	Mobile Telecommunication Company
MTIT	Ministry of Telecommunication and Information Technology
MVNO	Mobile Virtual Network Operators
NAE	National Archives of Egypt
NAP	Network Access Point
NCCAL	National Council for Culture, Arts and Letters
NCDC	National Centre for Digital Certification

NCHRD	National Centre for Human Resources Development
NCR	National Cash Register Company
NEDSS	National Egyptian Disease Surveillance System
NGO	Non-Governmental Organization
NHIC	National Health Information Centre
NIC	National Information Centre
NIS	National Information System
NITC	National Information Technology Centre
NITTA	National IT Training and Awareness Framework Initiative
NMMSS	National Maternal Mortality Surveillance System
NRI	Networked Readiness Index
NRS	National Registration System
NTRA	National Telecom Regulatory Authority
OCC	Optical Communications Company
OCR	Optical Character Recognition
OECD	Organisation for Economic Co-operation and Development
OeGAF	Oman e-Government Architecture Framework and Standards
OMSAR	Office of the Minister of State for Administrative Reform
OSS	Open Source Software
OSS	One-stop shop
PASP	Prince Abdullah Bin Abdulaziz Science Park
PC	Personal Computer
PCA	Professional Computer Association
PCFC	Paperless Initiative of Dubai Ports, Customs and Freezone Corporation
PCT	Patent Cooperation Treaty
PDA	Personal Digital Assistant
PDN	Public Data Network
PEI	Palestinian Education Initiative
PFI	Press Freedom Index
PICTA	PCA ICT Academies
PICTI	Palestinian Information and Communications Technology Incubator
PiPoP	PCA Internet Points of Presence
PKI	Public Key Infrastructure
PLT	Patent Law Treaty
PPP	Public-Private Partnership
PTC	Public Telecommunication Corporation
Q-CERT	Qatar-Computer Emergency Response Team
QF	Qatar Foundation
QSTP	Qatar Science and Technology Park
R and D	Research and Development
RPoA	Regional Plan of Action
RSS	Really Simple Syndication
RWB	Reporters Without Borders
SAMA	Saudi Arabian Monetary Agency
SCICT	Supreme Council of Information and Communication Technology
SCS	Syrian Computer Society
SCT	Salalah College of Technology
SDH	Synchronous Digital Hierarchy
SECC	Software Engineering Competence Centre
SITC	Saudi Integrated Telecom Company
SME	Small and Medium Enterprise

SMS	School Management Systems
SMS	Short Message Service
SSIT	Sudanese Society for Information Technology
STC	Saudi Telecom Company
STE	Syrian Telecommunications Establishment
STI	Science, Technology and Innovation
STM-1	Synchronous Transport Module level-1
STM-4	Synchronous Transport Module level-4
SVU	Syrian Virtual University
TCCM	Total Country Connectivity Measure
TDF	Technology Development Fund
TIGA	Technology in Government in Africa
TLD	Top Level Domain
TOKTEN	Transfer of Knowledge through Expatriate Nationals
TRA	Telecommunications Regulatory Authority
TRC	Telecom Regulatory Commission
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Right
TTS	Text-To-Speech
UIS	UNESCO Institute for Statistics
UKS	Universal Knowledge Solutions
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
UNPAN	United Nations Public Administration Network
UNPSA	United Nations Public Service Awards
URL	Universal Resource Locator
USAID	United States Agency for International Development
USPTO	United States Patent and Trademark Office
VC	Venture Capital
VoD	Video on Demand
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WBN	Wireless Broadband Network
WCT	WIPO Copyright Treaty
WHO	World Health Organization
WiMAX	Worldwide Interoperability for Microwave Access
WIPO	World Intellectual Property Organization
WIT	Women in Information Technology
WLAR	World Links Arab Region
WITSA	World Information Technology and Services Alliance
WLL	Wireless Local Loop
WPPT	WIPO Performances and Phonograms Treaty
WRCATI	Promoting the Rights of Women and Children through Access to Information
WSA	World Summit Award
WSIS	World Summit on the Information Society
WTDC-06	World Telecommunication Development Conference - 2006
WTO	World Trade Organization
3G	Third Generation

References to dollars ($) are to United States dollars, unless otherwise stated.

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 a 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 the production, exchange, adaptation and use of information for the purpose of development and the enhancement of the quality of life and work environment for all citizens. In order to realize the information society, information and communications technologies (ICTs) need to be used. While ICTs are necessary, they are not sufficient, given that capacity-building must equally be enhanced in knowledge-related areas covering economic, social, legal, educational and research.

Significant differences exist in the capacity of countries to adapt 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, thereby rendering them increasingly vulnerable to reduction in productivity and economic capacity. This leads, in turn, to unemployment, poverty, corruption and marginalization.

In this context, the General Assembly adopted resolution 56/183 in December 2001 to endorse a proposal presented by the International Telecommunication 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. The Summit aimed 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 focused 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 WSIS (Damascus, 22-23 November 2004) under the motto "Partnership for Building the Arab Information Society". The Conference resulted in a Regional Plan of Action (RPoA), which dealt with various issues relating to the development of an information society in the region.[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. Another conference on the Regional Follow-up to the Outcome of the World Summit on the Information Society was held in Damascus, 16-18 June 2009, to provide a forum where various WSIS stakeholders in the ESCWA region were able to meet to present, discuss and review the progress made towards the implementation of the 11 WSIS action lines, as well as of the execution of the RPoA for Building the Information Society. The conference resulted in updating the RPoA; launching the Global Alliance for ICT and Development (GAID) Regional Arab Network;[2] and adopting the Damascus Proclamation for the Promotion of the Arab Knowledge Society for Sustainable Economic and Social Development.

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

[2] See http://www.un-gaid.org/Networks/RegionalNetworks/RegionalArabicNetwork/tabid/1090/language/enUS/Default.aspx.

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 each member country.[3] With those objectives, comprehensive analysis is provided on the following: (a) role of Governments and all stakeholders in chapter I; (b) ICT infrastructure in chapter II; (c) access to information and knowledge in chapter III; (d) ICT capacity-building in chapter IV; (e) building confidence and security in the use of ICTs in chapter V; (f) enabling environment in chapter VI; (g) ICT applications in chapter VII; (h) cultural diversity and identity, linguistic diversity and local content in chapter VIII; (i) media in chapter IX; (j) regional and international cooperation in chapter X; (k) MDGs in chapter XI; (l) building the ICT sector in chapter XII; and (m) the regional and global comparative analysis and results in chapter XIII.

Following the first phase of WSIS, serious work spearheaded by international and regional organizations has been carried out to develop a methodology for measuring ICT and the information society. The Partnership on Measuring ICT for Development was launched in Geneva 2004 and its continuous work over the past five years has led to the development and adoption of a common list of core ICT indicators covering five main aspects of the information society, namely: ICT infrastructure and access; access to, and use of, ICT by households and individuals; use of ICT by businesses; the ICT sector and trade in ICT goods; and ICT in education.

Aspects of the information society evaluated by this report rely mainly on the WSIS action lines, in addition to other areas of interest to the ESCWA region. Each of chapter one through twelve is thus dedicated to a specific theme, providing a comprehensive analysis, evaluation and recommendations covering all ESCWA member countries.

While the work of the Partnership on Measuring ICT for Development has been the guiding measurement model for this report, such a model is a work in progress and has yet to cover more aspects of the information society. This stems mainly from the difficulties associated with measuring intangible concepts. For instance, there are neither specific indicators for measuring the "role of Governments and all stakeholders in building the information society" nor standard ones for measuring the progress in "building confidence and security in the use of ICTs".

For these reasons, the concept of maturity levels has been adopted for each of the major aspects comprising the information society in order to provide ESCWA member countries with benchmarks for assessing rather than comparing their status in building information societies. Specifically, four maturity levels are used for each aspect of the information society whereby level 1 indicates the lowest level of maturity and level 4 indicates the highest level of maturity. As such, the maturity level assessment results should be used by member countries as tools for identifying gaps, and outlining corrective measures rather than becoming the focus of national efforts dedicated to improving ones rank. In addition, this 2009 version of the regional profile report will refrain from providing an overall ranking of ESCWA member countries in building an information society, given that the four subjective maturity levels cannot be translated into comparable statistical indicators.

Based on these results and recommendations, several initiatives and projects may be launched to reduce the existing digital divide both among ESCWA member countries and between the region and the more developed regions of the world. Within that context, ESCWA is fostering support for important regional projects through its Regional Plan of Action. The RPoA has been signed by ESCWA 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.

[3] Based on the 2009 country profile reports of ESCWA member countries, which were prepared by national consultants and ESCWA staff and are available at: http://www.escwa.un.org/wsis/profiles.html.

I. THE ROLE OF GOVERNMENTS AND ALL STAKEHOLDERS IN BUILDING THE INFORMATION SOCIETY

Governments in ESCWA member countries play an important role in building the information society by adopting policies, devising strategies and developing implementation plans. In addition, the private sector and non-governmental organizations (NGOs) are becoming increasingly involved in the process through partnership. With telecom regulation becoming a reality in most ESCWA member countries, Governments are adopting policies that encourage competition and increased efficiency, and facilitate the participation of private companies in developing the sector. Furthermore, Governments are increasingly relying on NGOs in terms of raising awareness and creating community telecentres, particularly in remote and rural areas, thereby contributing to the reduction of internal digital divides and to sustainable development of the information society.

A. COMPARATIVE ANALYSIS

Differences exist between ESCWA member countries with respect to the roles of Governments and other stakeholders in building the information society. While some of these countries adopted ICT policies and strategies over a decade ago and advanced in their implementing plans, others are still in the process of drafting strategies or adopting them. Public-private partnership (PPP) is also less developed in some countries with strong governmental leadership, while others relied on the private sector and NGOs to take the initiative in many aspects of the information society development.

1. *National information society policies and e-strategies*

All ESCWA member countries currently have, in one form or another, national ICT strategies, although a few have not yet adopted them formally or are expected to do so in the near future. However, most are implementing projects according to existing strategies and are in the process of establishing the necessary legislative structure to modernize and develop the ICT sector. In a number of cases, though, adoption of strategies and their implementation are progressing at a slower pace than expected.

In most ESCWA member countries, ministries of communications have become responsible for the ICT sector and their names changed accordingly, stressing the convergence of telecom and information technology as an integrated sector and the need to develop it based on appropriate policies and strategies while facilitating the move towards the information society. These ministries are upgrading their ICT infrastructure and starting to develop e-strategies in such specific areas as Government, research and development, education, health and commerce. The focus on telecommunications is obvious in all strategies, with less emphasis given to information and knowledge (i.e. content development) and capacity-building in technology.[4] Specific and important national initiatives taken by Governments in the ESCWA region with respect to information society policies and strategies are indicated below.

Bahrain established the Supreme Committee of Information and Communication Technology (SCICT) headed by the deputy Prime Minister to provide guidance and coordination, thereby ensuring the implementation of ICT strategies and comprehensive plans. SCICT is supported by a technical committee formed of representatives of concerned ministries. Special attention is given to an e-government strategy for 2007-2010 to deliver customer value through collaborative government, including an action plan with strategic priorities to ensure achieving targets. Liberalization of the telecom sector remains a high priority in the Second National Telecommunications Plan adopted in 2008 to regulate and develop the sector.

Egypt's strategy focuses on an export-oriented ICT industry giving research and innovation a major role. High sectoral growth has been achieved, with 7.7 per cent annual growth rate and 19 per cent in the fourth quarter of 2008. More deregulation is promoted by the Government through a sound institutional framework, noting that the private sector already contributes 67 per cent of total ICT gross domestic product (GDP). Increasing e-access is another priority for the Government, aiming at affordable access to ICT for an increasing segment of the population, including setting up IT clubs in disadvantaged areas. "Egypt PC 2010

[4] See http://www.boozallen.com/media/file/The_ICT_Evolution.pdf.

– Nation Online", the successor of "PC for Every Home" is a new initiative that targets the low-income population and aims to equip 25 per cent of Egyptian households with personal computers.

Iraq produced a draft ICT strategy developed in collaboration with ESCWA, to be adopted in late 2009 or early 2010. The renaming of the Ministry of Communications (MoC) to the Ministry of Communications and Information Technology (MCIT) is also expected to go through at the same time. Meanwhile, liberalization of the sector remains a key policy and a large number of projects are being implemented by the various ministries and Government agencies to accelerate the progress towards the information society, including rebuilding the infrastructure that was destroyed during the war and its aftermath.

In 2007, Jordan launched its national ICT strategy for 2007-2011, setting priorities, goals and indicators of achievement, while indicating weakness points and stressing the importance of PPP in adopting a common vision and future plans. A strategic plan for 2008-2011 was launched aiming to achieve high competitiveness in the ICT sector. Sectoral strategies adopted recently include an ICT research and development strategy for 2007-2009 (assisted by ESCWA) and an e-commerce strategy for 2008-2012. It is worth noting that Jordan was one of the first countries in the region to launch a strategy for building an information society and knowledge-based economy starting in 1999, with the REACH initiative launched by int@j in 2000 and updated several times.[5] With the general policy of liberalization, Jordan developed an open market for ICT, reaching an ICT sector capital of $167 million in 2007 with an increase of 350 per cent in ICT exports between 2000 and 2007.

While awaiting the formal approval of e-Lebanon as the national ICT strategy, which has been delayed owing to the political situation in the country, Lebanon established in 2007 a national coordinating office, which launched, in cooperation with Partnership for Lebanon,[6] a number of national projects and initiatives, including community telecentres in disadvantaged areas and the National Broadband Strategy.[7] An e-government strategy drafted in 2002 was modernized and updated in 2008 based on a new situational assessment and includes clear and realistic goals.

Kuwait included an e-policy and an e-strategy in its national five-year plan for 2009-2014, taking into account WSIS outcomes and the local context to balance the desirable with the achievable. It focused on increasing e-services, developing cyberlegislation and the enabling environment, as well as giving a bigger role to the private sector and NGOs. The plan also included sectoral plans for increasing ICT applications and e-services in Government, education, health and commerce.

Oman followed up on its national strategy, which was adopted in 2002 and launched in May 2003. It focused on improving Government services, developing the ICT sector, increasing competitiveness and providing job opportunities for Omani youth. Most of the projects planned according to the eOman strategy were implemented by the end of 2008.

In accordance with the Palestinian national ICT strategy and the e-government plan of action, the ICT sector expanded due to its liberalization. Several governmental decisions were adopted leading to implementation of ICT initiatives and projects, including, among others, updating the law on telecom regulation; ICT licensing procedures for Voice over Internet Protocol (VoIP) and broadband; a strategy and plan of action for the Palestinian Education Initiative (PEI);[8] and implementing the e-government project.

The regulatory authority in Qatar, namely, the Supreme Council of Information and Communication Technology (ictQATAR), adopted a programme for ICT development through nine national programmes.[9]

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[5] See http://www.intaj.net.

[6] See http://www.lebanonpartnership.org.

[7] See http://www.tra.gov.lb/NewsDetails.aspx?pageid=451.

[8] See http://www.pei.gov.ps/english/introduction.html.

[9] See http://www.ictqatar.qa.

These include the following: infrastructure, regulatory and legal framework, cyber safety and security, integrated government, e-education, e-health, enterprise development, e-inclusion and innovation. The implementation of the first three programmes is well on the way and targets for other programmes are at varying stages of achievement.

In Saudi Arabia, MCIT prepared a comprehensive plan, including a vision and a five-year implementation plan for transformation to the information society and knowledge-based economy.[10] The stated objectives include increasing productivity, providing e-services for all and building a robust and sustainable ICT sector. The implementation of the e-government strategy and related plan of action, adopted in 2005, is advancing well and should reach the set targets by the end of 2010.[11]

The Sudan National Strategy for ICT Industry was adopted in 2007 and is being followed up by a high-level ministerial commission and a supporting technical commission. It includes among its objectives moving towards the information society, the dissemination of ICT, providing access for all, increasing employment opportunities and reducing poverty. Innovation, competitiveness and transparency are key features of this strategy to build the capacities of human resources in ICT. A regulatory commission was also established the same year to organize the telecom sector and propose appropriate programmes and plans. More recently, the Ministry of Information and Communications was established aimed at focusing on telecom policies through its National Telecommunication Commission.[12]

As indicated in its national ICT strategy and tenth Five-year Plan, covering the period 2006-2010, the Syrian Arab Republic is in the process of restructuring the telecom sector. This process includes establishing a regulatory commission and adopting a new law for telecom regulation, a draft of which was prepared by the Ministry of Communications and Technology and awaits approval.[13] It also includes IT sector development, with a focus on the software industry. In this regard, standards for IT applications were developed in collaboration with the European Union within the framework of institutional and sectoral modernization.

As follow-up to the information society development plan adopted in 2005 by the United Arab Emirates, a number of initiatives have been completed aimed at boosting ICT infusion and diffusion in the country. Mega technology-based projects such as Dubai Media City, Dubai Internet City and Dubai Knowledge Village have contributed to a great extent towards making the United Arab Emirates the region's innovation hub, which in turn has attracted further investment in the ICT sector, both local and international. It stands out for its ability to promptly put into action any plans it devises. Hence, the United Arab Emirates now ranks first among Arab countries in a number of international and regional indices as indicated below.

While Yemen, through its National Information Centre (NIC), devised its national strategy for information technology in collaboration with ESCWA in 2007-2008, it has not been officially adopted or launched.[14] Elements of this strategy relating to ICT sector development and the building of the knowledge economy had already been included in the third socio-economic development plan (2006-2010). The restructuring of the Ministry of Telecommunication and Information Technology (MTIT) and Yemen's Public Telecommunication Corporation (PTC) have been under consideration as well as the creation of a regulatory telecommunications commission.[15] A draft new law for telecommunications has been awaiting ratification since 2008.

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[10] See http://www.mcit.gov.sa/english.

[11] See http://www.yesser.gov.sa/.

[12] See http://minic.gov.sd and http://www.ntc.gov.sd.

[13] See http://www.moct.gov.sy.

[14] See http://www.yemen-nic.info.

[15] See http://www.mtit.gov.ye.

The World Economic Forum's 2009 Networked Readiness Index (NRI) includes a number of indicators related to the national strategies and policies of 134 countries, including nine ESCWA member countries. The United Arab Emirates was ranked highest among ESCWA member countries on that index, at 27 globally, followed by Qatar (at 29), Bahrain (at 37), Saudi Arabia (at 40), Jordan (at 44), Oman (at 50), Kuwait (at 57), Egypt (at 76) and Syrian Arab Republic (at 94). Other ESCWA member countries were not included in the report.

Similarly, in terms of individual indicators related to ICT policies and strategies, the United Arab Emirates ranked first among ESCWA member countries on the indicator related to Government prioritization of ICT, at 5 globally, followed by Qatar (at 15), Jordan (at 17), Bahrain (at 21), Egypt (at 32), Saudi Arabia (at 33), Oman (at 46), Syrian Arab Republic (at 75) and Kuwait (at 96).

The United Arab Emirates also ranked first among ESCWA member countries, and in third position globally, on the indicator related to the importance of ICT to Government vision of the future, followed by Qatar (at 6), Jordan (at 18), Bahrain (at 19), Oman (at 21), Saudi Arabia (at 27), Egypt (at 45), Syrian Arab Republic (at 71) and Kuwait (at 102).

Table 1 provides a summary of the current situation of national ICT strategies in all ESCWA member countries and the date of their adoption, and evaluates the pace of their implementation.

TABLE 1. NATIONAL ICT STRATEGIES IN THE ESCWA REGION

Country or territory	Existence of an ICT strategy	Year of adoption	Government agency in charge	Pace of implementation
Bahrain	Yes	2001	Central Informatics Organisation (CIO)	Excellent
Egypt	Yes	1999[c/]	Ministry of Communications and Information Technology	Good
Iraq	Yes[a/]	2009	Ministry of Communications	..
Jordan	Yes	1999[c/]	Ministry of Information and Communications Technology	Good
Kuwait	Yes	2005[c/]	Central Agency for Information Technology	Good
Lebanon	Yes[a/]	2003	Office of the Minister of State for Administrative Reform (OMSAR)	Limited
Oman	Yes	2002	Information Technology Authority (ITA)	Good
Palestine	Yes	2004	Ministry of Telecom and Information Technology	Limited
Qatar	Yes	2005	Supreme Council of Information and Communication Technology (ictQATAR)	Good
Saudi Arabia	Yes	2002	Ministry of Communications and Information Technology	Good
The Sudan	Yes	2007	National Information Centre/Ministry of Information and Communications	Limited
Syrian Arab Republic	Yes	2004	Ministry of Communications and Technology	Average
United Arab Emirates	No[b/]	..	The Government of each Emirate	Excellent
Yemen	Yes[a/]	2008	National Information Centre (NIC)	..

Source: Compiled by ESCWA from data in national profiles of the information society for the years 2003-2009.

Notes: a/ Not yet ratified national ICT strategies 2007-2010.

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.

c/ Egypt updated it for the period 2007-2010, Jordan for the period 2007-2011, and Kuwait for the period 2009-2014.

Two dots (..) indicate that data are not available.

2. *Public-private partnerships (PPP) and multi-sector partnerships (MSP)*

PPP take different forms in different ESCWA member countries depending on governmental policies and views towards the private sector. Examples of long-term strategic partnerships are few and require more maturity than short-term contractual type partnerships, whereby specific tasks need to be completed with specific budgets and in a defined timeframe. Partnerships with international companies subsidized by foreign Governments, as part of an economic aid programme, are common in the ESCWA region, particularly in such post-conflict situations as Iraq and Lebanon, and in such least developed countries, as Yemen. The results of such partnerships are sometimes disappointing, In some of these projects, expectations are set high by the beneficiaries, while the partnership is invariably driven by narrow material profits, or hampered by governmental bureaucracy, indifference and dictates.

In most ESCWA member countries, the private sector is the main driver in the development of the ICT industry, with or without governmental facilitation and support. It dominates software development efforts and operates the majority of mobile telephone networks. However, research and development carried out by the private sector is limited or nonexistent in the region, thereby curtailing innovation in spite of available potential for technology absorption and collaboration with universities.

Bahrain Technology Park (BTP) is a major PPP initiative, with an initial focus on ICT and health care medicine. It was launched in late 2006 with a budget of $1 billion and financed by the Kuwait Finance House.[16] It is planned to attract prestigious international technology-based companies into Bahrain.

The approach by the Government of Egypt in building the ICT sector focuses on an ICT industry geared for export. This is realized through effective and strategic partnerships by forming industry clusters, linking the education sector to the industry and collaboration with multinational companies. The development of the ICT industry is a strong driver for the growth of exports and job creation. The Information Technology Industry Development Agency (ITIDA) and Telecom Egypt play an important role in this respect, attracting investments of foreign companies in the country, particularly in outsourcing. The latter has been achieved by devising a targeted national ICT strategy and building a network of trust and partnership with global businesses.[17] The Free Internet Initiative is an example of a successful national partnership between Telecom Egypt and some 140 Internet service providers to provide Egyptians with easy and affordable access to the Internet through a revenue-sharing scheme and without subscription fees.

The Iraq ICT Alliance was launched in 2006 by the United States Agency for International Development (USAID) as a PPP initiative to promote the development of ICT in Iraq.[18] The alliance involves public institutions as well as private and multinational companies, and aims at capacity-building through training programmes. Private companies are equipping laboratories and providing free Internet services to university laboratories. Since its establishment in 2006, the Iraqi Communications and Media Commission has provided a number of licences to private sector companies to provide intelligence, surveillance and reconnaissance (ISR) services through various technologies, including dial-up, VSAT, Wi-Fi and ADSL, in order to facilitate access to the Internet.[19]

The Jordan Education Initiative (JEI) represents a landmark in PPP, supporting the Government's vision of a knowledge economy and providing lifelong learning opportunities.[20] It involves 17 international corporations, 17 Jordanian entities, and 11 governmental and non-governmental organizations. JEI is

[16] See http://www.unido.org/index.php?id=o26334 and http://www.ameinfo.com/100870.html.

[17] World Economic Forum, *The Global Information Technology Report 2008-2009* (2009), chapter 2.1.

[18] See http://www.iraqictalliance.org.

[19] See http://www.cmc.iq.

[20] See http://www.jei.org.jo.

organized around three tracks, namely: discovery schools (through in-classroom technology, e-curricula and teacher training), lifelong learning and IT industry development.

Partnership for Lebanon was launched in September 2006 by business leaders from the United States of America to assist in the reconstruction efforts following the Israeli-Lebanese war of July 2006.[21] It includes Microsoft, Intel, Cisco, Ghafari Inc. and Occidental Petroleum Corporation, and coordinates with the Office of the Prime Minister. Five work streams have emerged, namely: connected communities, workforce training and education, job creation/private sector revival, ICT infrastructure and relief and response. Several projects and initiatives were launched, some involving all partners (such as Government Interoperability), others involving one private sector partner (such as National Education Network, Telemedicine and Partners in Learning).

The Government of Kuwait is promoting collaboration with the private sector, including the development of e-strategies and the execution of ICT development plans. Two representatives of the business community sit on the Board of Directors of the Central Agency for Information Technology (CAIT). The private sector is also represented on the Supreme Council for Planning and Development that prepares the country's five-year plan, including ICT. Mechanisms have been developed for involving the private sector in building the ICT industry in Kuwait and partnering with the Government in the execution of its projects through various models, including build-operate-transfer (BOT), outsourcing and mixed private-public ownership companies.

The implementation of Oman's e-strategy is carried out by the ITA through PPP. Most current ICT projects, such as the e-payment project, are implemented through outsourcing.[22] The Knowledge Oasis Muscat (KOM) represents a successful example of multi-stakeholder partnership.[23] Top multinational ICT companies are present in KOM, including Huawei, Hewlett-Packard, Microsoft, Motorola, National Cash Register Company (NCR) and Oracle. Other PPP initiatives have recently been launched by Petroleum Development Oman and the Ministry of Education aimed at setting up a multimedia centre for developing educational material and establishing four "smart" classrooms in four regions across the country.[24]

The Palestinian ICT market is dominated by Israeli companies and residents in the occupied territory are compelled to go through Israel's international gateway for communication services. Recently, the telecom infrastructure in Gaza suffered several blows following Israeli attacks on the Strip. Despite all this, the Palestinian Authority, the private sector and NGOs managed to build successful PPPs. In particular, the Palestine Telecommunication Company (PalTel) partnered with Zain for mobile telephony, the Palestinian Information and Communications Technology Incubator (PICTI) and technology parks/hubs are the result of partnership between the public and private sector and international organizations.[25]

Qatar's implementation of its ICT strategies and programmes is carried through participatory partnerships involving public and private establishments as well as NGOs and regional/international organizations. The Assistive Technology Working Group (ATWG) is a successful example of PPP. It is led by ictQATAR and involves more than 17 members from educational institutions, local/international ICT companies and NGOs. Aimed at enabling access to technology, including for persons with disabilities, ATWG provides independent advice, creates opportunities for all people, and promotes research and development.

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[21] See http://www.lebanonpartnership.org.

[22] See http://www.ita.gov.om/ITAPortal/ITA/default.aspx.

[23] See http://www.kom.om.

[24] Oman, Oman Digital Society Report (January 2007), p. 36, which is available at: http://www.ita.gov.om/ITAPortal/MediaCenter/Document_detail.aspx?NID=23.

[25] See http://www.picti.ps.

Saudi Arabia is effectively using PPP to implement major ICT projects, including those related to its national ICT plan of action adopted in 2007. Three such projects are currently being implemented with heavy involvement of the private sector, namely, the e-government project, "Yesser"; the electronic data interchange for e-Trade, "SaudiEDI"; and the Electronic Tourist Visa.[26]

The Sudan promoted the involvement of private sector companies in ICT and was the first Arab country to establish a PPP for fixed line telephony through the Sudan Telecommunications Company (Sudatel). It started in 1993 with the State owning 67 per cent of shares and the private sector with the remaining 33 per cent. In 2007, the Government's share plummeted to 26 per cent, while the share of the private sector increased to 74 per cent. The Government also partnered with Zain Sudan, holding 15 per cent of its shares.

The private sector is having an increasingly important role in developing the ICT sector and building the information society in the Syrian Arab Republic, particularly in the software, mobile telephony and Internet service provision. While PPPs are still limited, the Syrian-Korean Telecommunications Company for Manufacturing and Marketing the Telecommunication Equipment was launched in 1997 for manufacturing communications equipments, followed by the Syrian-German Telecommunications Company in 2005. Mobile telephony services were introduced in 2000 according to a BOT model over 15 years, with an increasing share of revenues for the Government. The latest PPP venture is between the Syrian Telecommunications Establishment (STE) and the Dubai-based Global Information Technology (GIT) to develop e-payment services for various utilities whereby 25 per cent of the capital for the new company comes from STE and 75 per cent from GIT.[27] An interesting partnership was forged in 2002 between the Syrian Arab Republic and Iraq to form an Iraqi-Syrian telecom company. However, owing to the adverse events in Iraq since 2003 and the changing political environment, the project has not been launched and is still awaiting agreement on a joint vision and a plan of action for execution.

In the United Arab Emirates, PPPs are quite common in the ICT sector. The federal Government and local Governments of the seven Emirates rely on the private sector to implement projects to incorporate ICT in Government services. In Dubai, examples include partnerships with Hewlett-Packard, Intel, Microsoft and Oracle. The latest such partnership involved Intel and the Government of Abu Dhabi to implement the "Teach to the Future" initiative, which aims to enhance learning by developing higher-level thinking skills for students. Implementation started across the United Arab Emirates in 2008 after the completion and evaluation of the pilot stage.

In Yemen, the private sector has played an essential role in providing mobile telephony and Internet services since 2000, following governmental guidelines and terms of reference, which were updated recently. The latest PPP initiative is a project for online teaching of high school science and mathematics through the Ministry of Education with financing from the private sector, the Ministry and donor organizations. Projects of this nature follow governmental guidelines and terms of reference.

In general, the private sector in the ESCWA region contribute little to the development of a thriving and sustainable ICT sector given the comparatively low level of corporate spending on research and development, as evidenced in the 2009 NRI of the World Economic Forum for nine ESCWA member countries. Specifically, Qatar ranks first regionally and 35 globally, followed by Saudi Arabia (at 43), Oman (at 44), United Arab Emirates (at 50), Egypt (at 57), Jordan (at 79), Bahrain (at 82), Kuwait (at 98) and Syrian Arab Republic (at 115).

Similarly, the capacity for innovation of private sector companies is below the global average as illustrated by the corresponding NRI indicator, with Saudi Arabia coming first in the region, at 37 globally, followed by Oman (at 49), Qatar (at 60), Jordan (at 66), United Arab Emirates (at 74), Egypt (at 85), Kuwait (at 93), Syrian Arab Republic (at 117) and Bahrain (at 118).

University-industry research collaboration seems to be slightly better in the ESCWA region as shown by the corresponding NRI indicator. Qatar comes first in the region and 25 globally, followed by Saudi Arabia (at 37), Oman (at 39), United Arab Emirates (at 58), Jordan (at 60), Kuwait (at 73), Egypt (at 79),

[26] See http://www.yesser.gov.sa and http://www.saudiedi.com.

[27] See http://www.git.ae.

Syrian Arab Republic (at 100) and Bahrain (at 101). Firm-level technology absorption is even better as indicated by the corresponding NRI indicator. The United Arab Emirates comes first regionally and 14 globally, followed by Kuwait (at 28), Jordan (at 35), Bahrain (at 36), Qatar (at 40), Saudi Arabia (at 44), Egypt (at 63), Oman (at 82) and Syrian Arab Republic (at 87).

3. *Role of non-governmental organizations*

In most ESCWA member countries, the involvement of NGOs in developing the information society and the ICT sector is still limited to awareness-raising, ICT training and development of rural and remote areas. National computer societies or information technology associations whose membership is mainly ICT professionals, carry out awareness-raising and training in line with their main goal of dissemination knowledge on ICT and its applications. NGOs working in social development include in their activities projects to establish community telecentres in disadvantaged areas in order to accelerate the development of these communities that are usually neglected by the private sector owing to lack of profit and, to some extent, by the Government owing to the high costs of infrastructure and services and limited economic scale of the areas in question. Few professional associations venture into ICT incubators, providing guidance to young graduates in launching their own business and developing the entrepreneurship spirit to increase employment opportunities.

The Bahrain Internet Society (BIS) and Bahrain Information Technology Society (BITS) undertake training programmes to increase awareness on opportunities offered by ICT and to enhance ICT skills of the community at large.

In Egypt, a large number of NGOs exist that are working in the ICT professional field, including the Egyptian Computer Society, the Egyptian Software Association (ESA), the Chamber of Information Technology and Communication and the Egyptian Association for IT Exports.[28] They often play the role of think-tanks by helping ITIDA to shape its strategy and identify the needs of the ICT industry. On the other hand, a number of NGOs, particularly local ones, are involved in implementing and managing IT clubs (community telecentres) in collaboration with the Government and the United Nations Development Programme (UNDP).[29] They often undertake illiteracy eradication programmes and awareness-raising training in rural and remote areas.

The Jordan Computer Society was one of the first computer societies in the ESCWA region to provide ICT awareness-raising and training activities.[30] The Information Technology Association of Jordan (INT@J), which is an association of some 13 IT companies, aims to develop the ICT sector through its National ICT Strategy. The Jordan Network (Shabakat Al Ordon) is a relatively new NGO that focuses on socio-economic development by training youth and supporting projects that integrate ICT in daily life of local communities.[31] It receives support from the Ministries of ICT and Planning, in addition to UNDP and Microsoft.

Lebanon has a large number of NGOs with ICT-related activities. Over the past three years, the Professional Computer Association (PCA), which is an association of ICT companies, established a number of PCA Internet Points of Presence (PiPOPs) as community telecentres; and PCA ICT Academies (PICTA) provide low-cost ICT training. Moreover, Women in Information Technology (WIT) initiated an IT training programme for women in four centres in rural areas and an ICT youth awareness initiative as well as an empowerment project for Women.[32] Saradar Foundation, which is financed by Audi Saradar Private Bank, has an IT programme running in rural areas as well as mobile computer laboratories (e-Caravans) being implemented in collaboration with ESCWA.

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[28] The Egyptian Association for IT Exports signed an agreement with ITIDA in July 2008 to build up the potential of member companies of the association in producing, outsourcing and exporting IT services. More information is available at: http://www.mcit.gov.eg/PressreleaseDetailes.aspx?id=GQBmrEyZMzc=.

[29] See http://css.escwa.org.lb/ictd/17-19DEC08/d1.pdf.

[30] See http://jcs.org.jo.

[31] See http://www.ishabakat.org.

[32] See http://www.wit.org.lb.

Kuwait has several NGOs involved in building the information society, focusing on computer literacy and ICT capacity-building for all strata of the society. The Kuwait Foundation for the Advancement of Science (KFAS) partnered with the Ministry of Education to establish computer laboratories in all schools.[33] Additionally, the Chamber of Commerce and Industry is collaborating with Government institutions to establish e-government service centres in different parts of Kuwait.

Both the Saudi Telecommunications Society and the Saudi Computer Society are strongly contributing to ICT awareness-raising, dissemination and development of scientific research through training, conferences and publications.

In the Sudan, the Gedaref Digital City Organization (GDCO-Sudan) is a very active and innovative NGO aimed at establishing a digital city in the Sudan as well as telecentres at the grassroots level.[34] It was successful in obtaining donations for ICT equipment and establishing ICT training centres for the disabled and the poor. In 2009, GDCO won the eIndia 2009 Award for Civil Society-Telecentre for Development for the third time. Additionally, the Sudanese Society for Information Technology (SSIT) is a promoter of ICT, providing public and private sector institutions with needed support to implement ICT programmes and projects for the development of a software industry in the country. The Sudan Internet Society manages the .sd ccTLD registry, implements awareness-raising and capacity-building activities regarding the efficient use of the Internet and provides a code of ethics for Internet usage.

The most active NGO in the Syrian Arab Republic is the Syrian Computer Society (SCS), which provides awareness-raising and specialized training programmes in addition to managing an Internet Service Providers (ISP) and two ICT incubators (which are located in Damascus and Homs).[35] Additionally, the Syria Trust for Development is the latest NGO in the Syrian Arab Republic and aims to contribute to education, rural development, culture and heritage through various programmes and projects launched in partnership with other institutions, public and private.[36] The latest project is Massar that focuses on educating youth (5-21 year-olds) to become innovative and adapt quickly to change in an ICT-based interactive learning environment.[37]

B. Classification and ranking of ESCWA member countries according to maturity level

1. *Maturity level 1: Iraq, Palestine and Yemen*

Iraq and Palestine continue to suffer from political crises and turmoil that hinder the efficacy of their Governments in activating or adopting ICT strategies and vitalizing their ICT sectors. Despite the existence of an ICT strategy and policy in Palestine, this has been placed on hold. In Yemen, meanwhile, the Government has not yet completed/adopted its national ICT strategy. Limited implementation plans are being executed.

2. *Maturity level 2: Lebanon, Oman, the Sudan, and Syrian Arab Republic*

All four countries have devised ICT policies and strategies, although some have not been adopted formally, but their implementation plans are incomplete or slow paced. PPP/MSP are still developing and ineffective owing either to lack of governmental interest or to incomplete legislative/enabling environments for such partnerships, although the private sector may be active in the field as well as NGOs.

3. *Maturity level 3: Egypt, Jordan, Kuwait and Saudi Arabia*

All four countries have devised clearly articulated ICT policies and strategies, as well as implementation plans. However, implementation of these policies and strategies is proceeding at a moderate

[33] See http://www.kfas.com.

[34] See http://www.gedaref.com.

[35] See http://www.scs.org.sy.

[36] See http://www.syriatrust.org.

[37] See http://www.massar.sy.

pace, either because of bureaucracy (Kuwait and Saudi Arabia,) or because of insufficient resources (Egypt and Jordan). While PPP and MSP are developed, they require strengthening to become more effective.

4. *Maturity level 4: Bahrain, Qatar and United Arab Emirates*

The three countries at maturity level 4 are characterized by a clearly articulated vision, a strong political will and concerted efforts to move into knowledge societies. They have devised a clearly articulated vision, advanced national ICT policies and strategies, with effective implementation plans, and implementation is proceeding at a good pace. PPP and MSP are well developed and producing good results.

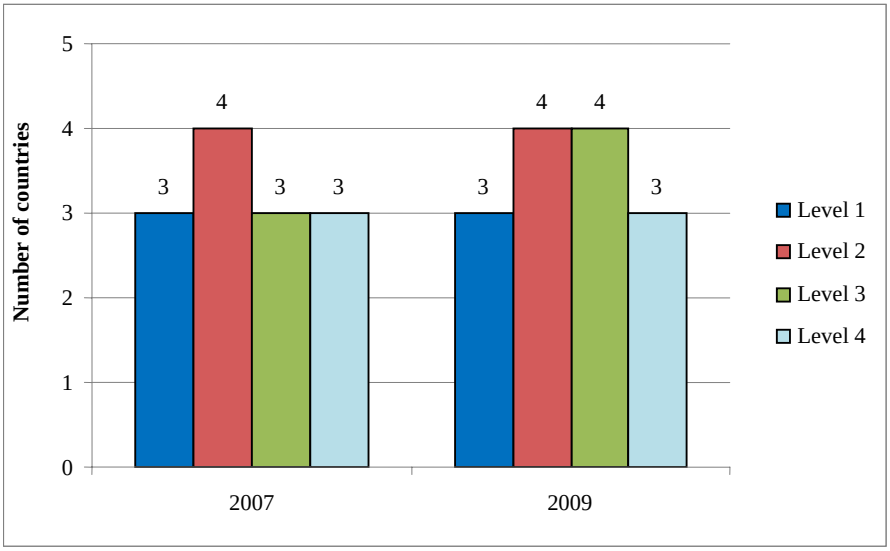
TABLE 2. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN THE ROLE OF GOVERNMENTS AND ALL STAKEHOLDERS IN BUILDING THE INFORMATION SOCIETY

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain							✓	✓
Egypt					✓	✓		
Iraq	✓	✓						
Jordan					✓	✓		
Kuwait			✓			✓		
Lebanon			✓	✓				
Oman			✓	✓				
Palestine	✓	✓						
Qatar							✓	✓
Saudi Arabia					✓	✓		
The Sudan[a/]				✓				
Syrian Arab Republic			✓	✓				
United Arab Emirates							✓	✓
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 1. Maturity levels of ESCWA member countries in the role of Governments and all stakeholders in building the information society



C. SUGGESTIONS AND RECOMMENDATIONS

National policies and strategies are just the starting point for building the information society; they are not targets, but tools for implementation. They require good governance and partnership with various stakeholders and actors in the socio-economic sectors, mainly private sector companies and NGOs, for timely and effective implementation.

The following recommendations take into account the above comparative analysis:

(a) Strategies are tools for formulation of plans of action and implementation. They should not be considered as standalone objects that are shelved on completion;

(b) Formulation of strategies and implementation require mindset and management change in Government institutions and the private sector to overcome bureaucratic hindrances and resistance to change, as well as overcome the lack of trust between Governments and private sector and to ensure that private companies are not looking for quick profits at the expense of long-term benefits;

(c) Systematic and periodic monitoring of execution of strategies and plans is essential, thereby ensuring that corrective actions are taken as appropriate;

(d) ICT strategies should be revised periodically based on evidence collected through information society indicators as well as on future national needs of the society and economy, while allocating needed financial resources and without resorting to blindly copying other countries' strategies or plans of action;

(e) Strategic PPP should be activated at a wider scale in order to involve the private sector and NGOs in developing strategies and plans of action, and implementing, evaluating, revamping and monitoring their execution;

(f) While telecommunications is important, including infrastructure, more importance should be given to information technology in devising ICT strategy updates and implementing them, particularly capacity-building, content and knowledge development, software development and building the IT sector;

(g) Sectoral e-strategies should be devised, including strategies and implementation plans for e-learning, e-government and ICT research and development;

(h) Coordination of ICT strategies at the regional level and developing partnerships between ESCWA member countries strengthen regional integration and complementarities;

(i) Standard templates can help to structure ICT strategies in an internationally acceptable format. ESCWA and the World Bank have templates that can assist countries in formulating their ICT strategies.

II. ICT INFRASTRUCTURE

A. OVERVIEW OF THE MARKET STRUCTURE AND REGULATORY LANDSCAPE

The market structure and regulatory landscape of ICT infrastructure in the ESCWA region is developing towards maturity slowly albeit steadily, with more sophisticated regulatory frameworks, increased competition in the markets and the introduction of new services and new service provisioning business models.

As of mid-2009, dedicated telecom regulatory authorities existed in ten member countries. Only four ESCWA members still remain without regulatory authority, namely, Iraq, where the ministries are largely responsible for the regulatory aspects of the telecom sector, Palestine, the Sudan and Syrian Arab Republic.

As far as competition is concerned, the Internet and mobile markets are the most competitive. Fixed line markets, which are considered more of a national asset in most countries, are also moving towards competition albeit at a much slower pace and through an alternative roadmap that is different from that of the mobile and Internet markets. Fixed-to-Mobile Substitution (FMS) and the increased use of VoIP in several markets are also symptoms of new trends in the region.[38] Table 3 depicts the status of competition in the different telecom and Internet services markets in the region.

Regarding Internet services, ten ESCWA member countries enjoy full competition, while two countries still maintain duopolies, namely, the United Arab Emirates and Yemen. However, only Oman and Qatar still have a monopoly in their Internet markets.[39] Internet access, including broadband, is being offered by traditional ISPs, fixed-line operators and mobile operators through General Packet Radio Services (GPRS) or third generation (3G) mobile Internet services.

TABLE 3. COMPETITION IN THE TELECOM AND INTERNET MARKETS IN THE ESCWA REGION, JULY 2009

Country or territory	Internet services	Mobile services	Fixed-line services (according to operational networks)
Bahrain	Competitive	Competitive[a/]	Competitive
Egypt	Competitive	Competitive	Monopoly[a/]
Iraq	Competitive	Competitive[a/]	Competitive
Jordan	Competitive	Competitive	Competitive
Kuwait	Competitive	Competitive[a/]	Monopoly
Lebanon	Competitive	Duopoly[a/]	Monopoly
Oman	Monopoly[a/]	Competitive[a/]	Monopoly[a/]
Palestine	Competitive[a/]	Competitive[a/] Duopoly[a/]	Monopoly
Qatar	Monopoly	Last country to end monopoly	Monopoly[a/]
Saudi Arabia	Competitive	Competitive	Competitive[a/]
The Sudan	Competitive	Competitive	Duopoly
Syrian Arab Republic	Competitive	Controlled Duopoly	Monopoly
United Arab Emirates	Duopoly[a/]	Duopoly	Duopoly
Yemen	Duopoly	Competitive	Monopoly

Source: Arab Advisors Group (AAG), Strategic Research Service (23 July 2009).

a/ For updated news and services offered by these operators, refer to the source above.

[38] Fixed-to-Mobile Substitution (FMS) refers to substituting fixed-line service with a mobile service.

[39] In Oman, while it is still a monopoly, the fixed services licence of Nawras allows it to offer Internet services; and there are reports that the regulator has plans for further liberalization.

Mobile service markets in the region have gone a long way in terms of competition and sophistication. The mobile market in Qatar was the last market in the ESCWA region to end its monopoly with a consortium of Vodafone and Qatar Foundation (QF) launching its services in July 2009.[40] Currently, while ten ESCWA member countries enjoy full competition in their mobile services, duopolies still exists in four member countries, ushering the disappearance of monopoly from the region's mobile markets.[41]

Another interesting trend in the mobile markets is the emergence of Mobile Virtual Network Operators (MVNOs). Two operators launched their services in Oman during the second quarter of 2009, namely: Friendi Mobile, which launched its services in April 2009, thereby becoming the first MVNO in the Middle East; and followed weeks later by Majan Telecommunication, which launched the second MVNO in Oman under the brand Renna.

Moreover, the increased number of regional mobile operators investing in other ESCWA member countries is inducing more regional integration. During 2008-2009, Saudi Telecom Company (STC) won two mobile licences, one in Bahrain and one in Kuwait. In Kuwait, STC ended the long-term duopoly of Zain and Wataniya when it won the third mobile licence in November 2007, and launched operations in December 2008. In Bahrain, STC also won the third mobile licence in March 2009 and is expected to launch its services by the end of 2009 or early 2010.[42]

With regard to fixed-line services, ESCWA regional markets are becoming more competitive but far less competitive than the mobile and Internet markets. While it is still a monopoly service in six ESCWA member countries, Egypt has announced intentions to welcome a new entrant. Recently, two countries have decided to end their monopolies, namely Qatar and Oman.[43] Four countries enjoy a competitive environment and two countries enjoy a duopoly (the Sudan and the United Arab Emirates).[44] While four fixed-line markets are considered competitive, namely, Bahrain, Iraq, Jordan and Saudi Arabia, six operators are still enjoying monopolies over fixed-line services in their countries. These are as follows: Egypt Telecom, MoC in Kuwait, Ogero in Lebanon, Paltel in Palestine, STE in the Syrian Arab Republic, and PTC in Yemen. Table 4 summarizes the fixed-line licensing landscape in the ESCWA region.

TABLE 4. FIXED-LINE LICENSING LANDSCAPE IN THE ESCWA REGION, NOVEMBER 2008

Country or territory	Operational licensees	Licensed but not operational yet	Total licensees	Status (according to awarded licences)
Bahrain	4	9	13	Competitive
Egypt	1	0	1	Monopoly
Iraq	3	3	6	Competitive
Jordan	1	6	7	Competitive
Kuwait	1	0	1	Monopoly
Lebanon	1	0	1	Monopoly
Oman	1	1	2	Duopoly
Palestine	1	0	1	Monopoly
Qatar	1	1	2	Duopoly
Saudi Arabia	1	3	4	Competitive
The Sudan	2	0	2	Duopoly
Syrian Arab Republic	1	0	1	Monopoly
United Arab Emirates	2	0	2	Duopoly
Yemen	1	0	1	Monopoly

Source: Arab Advisors Group (AAG), A Scorecard of Key Performance Indicators of Arab Telecom Operators 2008 (November 2008).

[40] The service which was officially launched on 7 July 2009 added 20,000 account customers in its first two weeks.

[41] In Palestine, Jawwal faces unlicensed competition from Israeli operators. Arab Advisors Group (AAG), Strategic Research Service (23 July 2009).

[42] This is according to Mohammed al-Amer, the chairman of Bahrain's Telecommunications Regulatory Authority (TRA).

[43] Nawras Telecom was awarded the second fixed services licence in November 2008.

[44] Arab Advisors Group (AAG), Strategic Research Service (23 July 2009).

Despite increases in network capacity, nationwide network coverage remains a challenge and in need of creative solutions. One approach being considered to meet the high demand for fixed telephony in remote areas involves the establishment of wireless fixed-line networks, used by several member countries to liberalize their fixed-line markets. During 2007 and until November 2008, new fixed-line licences were awarded in Bahrain, Jordan, Oman, Qatar and Saudi Arabia.

Table 5 lists member countries by type of fixed wireless service technology used. Such operators as Itisaluna and Kalimat Telecom in Iraq, Canar in the Sudan and Zain Bahrain provide wireless fixed services only, while other operators (mainly incumbents), such as OmanTel, provide both wire-line and fixed wireless services.[45]

TABLE 5. OPERATIONAL FIXED WIRELESS SERVICES PROVIDED IN ESCWA MEMBER COUNTRIES

Country or territory	Type of fixed wireless service technology used
Bahrain[a/]	WiMAX
Egypt	CDMA
Iraq[b/]	CDMA
Jordan[c/]	WiMAX
Kuwait	WiMAX
Lebanon	MPLS, WiMAX
Oman	CDMA
Palestine	..
Qatar	..
Saudi Arabia	WiMAX
The Sudan	CDMA, WiMAX
Syrian Arab Republic	CDMA
United Arab Emirates	..
Yemen	CDMA

Source: Arab Advisors Group (AAG), WiMAX in the Arab world: current status and regulations (February 2009).

Notes: a/ National fixed wireless services licence.
b/ Wireless Local Loop (WLL) local and provincial services licence.
c/ Fixed broadband wireless access licence.
Code Division Multiple Access (CDMA). Worldwide Interoperability for Microwave Access (WiMAX).

Two dots (..) indicate that data are not available.

In Jordan, the increasing demand of WiMAX has resulted in the issuance of five fixed broadband wireless access (FBWA) licences by the Jordanian Telecom Regulatory Commission (TRC). The licensees since December 2006 were Bahraini Telco provider, Batelco; ATCO Clearwire Telecom; the Blue Zone East; ATCO Clearwire Telecom (ACT) Jordan; and Wi-tribe Jordan. Qatar's Telecom (Qtel) fixed-line monopoly ended in November 2008 when ict QATAR decided to award the second fixed telecommunication licence to a consortium comprising Vodafone and QF. While in Saudi Arabia, the Communications and Information Technology Commission (CITC) Arabia awarded in 2007 three public fixed service licences to Etihad Atheeb Telecommunication Company, the Optical Communications Company (OCC) and Saudi Integrated Telecom Company (SITC).

B. COMPARATIVE ANALYSIS OF ICT INFRASTRUCTURE IN THE ESCWA REGION USING COMPOSITE INDICES

1. *ICT Use Index by Madar Research Group*

The Madar Research ICT Use Index examines four major ICT indicators for every member country. These indicators are as follows: mobile phone subscribers, fixed-line subscribers, Internet users and

[45] Arab Advisors Group (AAG), WiMAX in the Arab world: current status and regulations (February 2009).

computer installed base. During 2008, ESCWA member countries continued to make significant progress in the adoption of ICTs. The average score of the 14 ESCWA members according to Madar Research ICT Use Index increased from 1.10 in 2007 to 1.32 by the end of 2008, constituting an increase of 22 per cent.

TABLE 6. RANKING OF ESCWA MEMBER COUNTRIES BY GROWTH IN THE ICT USE INDEX, 2007-2008
(*Ranked by growth*)

Rank	Country or territory	ICT Use Index 2007	ICT Use Index 2008	Percentage point change	Growth (*percentage*)
1	Egypt	0.70	0.96	0.26	37.14
2	Yemen	0.30	0.41	0.11	36.67
3	Iraq	0.62	0.80	0.18	29.03
4	Syrian Arab Republic	0.65	0.82	0.17	26.15
5	Saudi Arabia	1.66	2.09	0.43	25.90
6	Qatar	1.70	2.12	0.42	24.71
7	Lebanon	0.73	0.91	0.18	24.66
8	Bahrain	1.78	2.18	0.40	22.47
9	Kuwait	1.49	1.81	0.32	21.48
10	Oman	1.23	1.48	0.25	20.33
11	The Sudan	0.34	0.40	0.06	17.65
12	Jordan	1.25	1.40	0.15	12.00
13	United Arab Emirates	2.19	2.39	0.20	9.13
14	Palestine	0.71	0.76	0.05	7.04
	Average	1.10	1.32	0.23	22.45

Source: Madar Research Group.

Countries of the Gulf Cooperation Council (GCC) achieved the highest ICT Use Index in 2008. Specifically, four of them, namely, Bahrain, Qatar, Saudi Arabia and United Arab Emirates exceeded the Index's threshold of 2.00. Among ESCWA members outside the Gulf subregion, Jordan recorded the highest ICT Use Index, followed by Egypt.

TABLE 7. RANKING OF ESCWA MEMBER COUNTRIES BY THE ICT USE INDEX, 2008

Rank	Country or territory	Population	Fixed-line subscribers	Mobile phone subscribers	Internet users	Computer installed base	ICT Use Index
1	United Arab Emirates	7 338 140	1 640 000	10 079 000	3 353 600	2 475 451	2.39
2	Bahrain	1 156 114	220 386	1 453 000	435 600	407 100	2.18
3	Qatar	1 553 729	263 363	1 946 343	592 200	498 080	2.12
4	Saudi Arabia	25 239 067	4 123 000	36 059 212	7 936 000	4 755 392	2.09
5	Kuwait	3 441 813	547 111	3 382 733	1 272 433	1 021 614	1.81
6	Oman	3 013 184	274 178	3 219 865	540 150	416 000	1.48
7	Jordan	5 850 000	519 000	5 438 000	1 441 000	814 660	1.40
8	Egypt	76 054 000	11 900 000	44 526 000	12 570 000	4 295 590	0.96
9	Lebanon	4 209 000	527 500	1 436 000	1 196 800	674 360	0.91
10	Syrian Arab Republic	19 880 423	3 633 400	7 789 563	3 432 000	1 430 000	0.82
11	Iraq	30 581 365	1 755 000	18 287 470	3 084 500	1 337 050	0.80
12	Palestine	4 212 000	357 000	2 022 163	596 700	210 993	0.76
13	Yemen	23 248 500	1 337 122	6 059 000	1 570 800	592 551	0.41
14	The Sudan	41 810 000	356 500	11 437 000	3 479 000	1 292 562	0.40
	Total/average	247 587 335	27 453 560	153 135 349	41 500 783	20 221 403	1.32

Source: Madar Research Group.

However, in terms of ICT index growth, several non-GCC countries, namely, Egypt, Iraq, Syrian Arab Republic and Yemen, took the top four positions, owing to unsaturated and under-served ICT markets. Saudi Arabia was in fifth position. By stark contrast, the United Arab Emirates was ranked 13 in terms of ICT Use Index growth, thereby clearly indicating a near-to-saturation situation.

In 2008, mobile phone subscribers continued to provide the impetus for ICT growth across the ESCWA region, with mobile subscriptions climbing at a rate of 33 per cent compared to 2007. However, the number of Internet users grew significantly as well, registering 38 per cent, while computer installed base increased by 31 per cent. The slowest growth was seen in the fixed-line market, with the total number of subscribers increasing by a modest 4 per cent.

2. *ICT price basket by the International Telecommunication Union (ITU)*

Table 8 provides another perspective for comparing and ranking member countries based on the price basket as a percentage of the per capita gross national income (GNI).[46] The measure is an indicator of affordability of ICT services for citizens of those countries. The table is self-explanatory wherein highest affordability is enjoyed by GCC countries and least affordability is a challenge for countries with least GNI per capita. Two interesting cases are observed, namely: Bahrain, which ranks modestly higher than Kuwait on the global rank despite a comparatively lower per capita GNI; and Egypt, which similarly ranks modestly higher than Jordan despite a lower per capita GNI.

TABLE 8. RANKING OF SELECTED ESCWA MEMBER COUNTRIES BY THE ICT PRICE BASKET, 2008

Rank	Global Rank (154)	Country or territory	GNI per capita[a/] ($)	Sub-baskets			ICT price basket value
				Fixed (*% of GNI per capita*)[a/]	Mobile (*% of GNI per capita*)[a/]	Broadband (*% of GNI per capita*)[a/]	
1	6	United Arab Emirates	23 950	0.3	0.2	1.1	0.5
2	18	Bahrain	19 350	0.3	0.4	1.7	0.8
3	20	Kuwait	31 640	0.4	0.3	1.8	0.8
4	35	Saudi Arabia	15 440	0.7	0.7	3.1	1.5
5	51	Oman	11 120	3.5	0.6	3.4	2.5
6	65	Lebanon	5 770	2.3	4.6	4.8	3.9
7	67	Egypt	1 580	2.3	3.6	6.3	4.1
8	82	Jordan	2 850	3.5	1.9	13	6.1
9	106	Syrian Arab Republic	1 760	0.9	6.2	35	14
10	108	The Sudan	960	5.5	6.0	36.4	16
11	120	Yemen	870	1.2	6.7	311.4	36

Source: International Telecommunication Union (ITU), *Measuring the Information Society: The ICT Development Index* (2009).

a/ The GNI per capita is based on the Atlas Method by the World Bank.

3. *Total Country Connectivity Measure (TCCM), by Arab Advisors Group*[47]

There are other alternative methods that measure the overall connectivity of ICT services in the region. The Arab Advisors Group calculates an index, referred to as Total Country Connectivity Measure (TCCM), by adding the rates of household mainlines penetration, mobile penetration and Internet users penetration in each country. The TCCM score is thus a percentage that shows the extent of connectivity of individuals in a

[46] The ICT price basket value is the sum of the three sub-baskets as a percentage of per capita gross national income (GNI), divided by 3.

[47] For more information, see Arab Advisors Group (AAG), Strategic Research Service (23 July 2009).

certain country whether via fixed lines, mobile lines and/or Internet.[48] According to the Arab Advisors Group, TCCM is an indicative measure that should be monitored on an annual basis.

Most countries achieved continued growth in their TCCM scores; only four countries covered in the 2008 TCCM reached a total country connectivity measure score exceeding 200 per cent, while the scores in four countries were equal to or below 100 per cent. The 2008 TCCM results revealed that United Arab Emirates, Bahrain, Saudi Arabia, Qatar still lead ESCWA member countries in TCCM scores. Kuwait, Oman, Jordan, Syrian Arab Republic, Egypt, Lebanon, Iraq and Palestine followed, while Yemen and the Sudan scored the lowest scores on the total connectivity measure, mirroring their status in 2007.

TABLE 9. RANKING OF ESCWA MEMBER COUNTRIES BY THE TOTAL COUNTRY CONNECTIVITY MEASURE, 2007-2008

Rank	Country or territory	Household mainlines penetration 2008 (*percentage*)	Mobile penetration 2008 (*percentage*)	Internet users penetration 2008 (*percentage*)	TCCM 2007	TCCM 2008
1	United Arab Emirates	98.3[a/]	178.0[b/]	45.4[b/]	329.5	321.7
2	Bahrain	86.4[a/]	135.6	27.4	210.4	249.3
3	Saudi Arabia	69.9[a/]	147.2	31.8	207.9	248.9
4	Qatar	74.8[a/]	108.1	22.3	193.1	205.2
5	Kuwait	48.4[a/]	99.7	36.2	164.7	184.3
6	Oman	45.2[a/]	114.0	11.4[b/]	153.7	170.6
7	Jordan	31.8	92.9	16.4	133.9	141.1
8	Syrian Arab Republic	75.5[a/]	39.7	14.7	122.5	129.9
9	Egypt	65.3	57.3	6.3	111.6	128.9
10	Lebanon	64.0[a/]	37.1	24.2	124.6	125.2
11	Iraq	26.0[a/]	64.2	10.0[a/]	77.2	100.2
12	Palestine	45.1	39.6	11.1	90.5	95.9
13	Yemen	19.8[a/b/]	29.1	6.9	47.2	55.9
14	The Sudan	5.6	27.1	1.4[a/]	28.9	34.1

Sources: Arab Advisors Group (AAG), Strategic Research Service (4 June 2008) and Strategic Research Service (23 July 2009).

Notes: a/ These are estimates.
b/ For the basis of calculations, updated operators' disclosures and adjustments in figures, refer to the source above.

The Arab Advisors Group found that the contribution of Internet had a significant effect in propelling TCCM in Kuwait, the United Arab Emirates and Lebanon when compared to the other countries. Four ESCWA member countries have Internet users penetration that is lower than 10 per cent, indicating a substantial potential for more growth. However, significant portions of the populations across the region remain without satisfactory access to ICT.

C. COMPARATIVE ANALYSIS OF ICT INFRASTRUCTURE IN THE ESCWA REGION BY SERVICE TYPE

1. *Fixed-line telephone services dissemination*

The total number of fixed-line subscribers in all ESCWA member countries surveyed in this study grew by 4 per cent in 2008, compared to 5.5 in 2006;[49] while the overall fixed-line penetration rate remained fairly steady, at 11 per cent by end 2008. Yemen experienced the highest growth, at 31 per cent, followed by

[48] Of course, there will be an overlap given that many individuals will be using these three communications technologies at the same time. However, the measure still yields an accurate and informative picture of the level of ICT services penetration in each country. For example, if a country has a TCCM measure of 60 per cent, this implies that at least 40 per cent of the population does not use any of the three services constituting the measure. While a TCCM score of more than 100 per cent is very positive, it does not mean that all the population uses the services due to overlap of usage, but remains a positive indication by the fact that it is over 100 per cent.

[49] The Sudan was not a member country in 2006; it was admitted to ESCWA in 2008.

Iraq and the United Arab Emirates. Despite the fact that the United Arab Emirates has the highest penetration rate in the ESCWA region, it ranked third in terms of growth rate as well. Egypt marked the lowest growth of all ESCWA member countries, at 1.7 per cent. However, the fixed-line exchange capacity grew significantly whereby the total exchange capacity increased by 124 per cent from 6.4 million in 1999 to 14.32 million by December 2008, thereby indicating a potential for sustained growth in the coming years.[50]

Jordan, Lebanon and the Sudan were the only ESCWA member countries whose fixed-line growth declined in 2008, sidelined by the growing popularity of mobile phone services in the three countries as well as the political and economic crises that had damaged the fixed-line infrastructure in Lebanon and the Sudan.

TABLE 10. FIXED-LINE SUBSCRIBERS BY COUNTRY IN THE ESCWA REGION, 2007-2008
(*Ranked by growth*)

Rank	Country or territory	Fixed-line subscribers 2007	Fixed-line subscribers 2008	Growth (*percentage*)
1	Yemen	1 021 988	1 337 122	31
2	Iraq	1 400 000	1 755 000	25
3	United Arab Emirates	1 386 000	1 640 000	18
4	Qatar	242 000	263 363	9
5	Bahrain	203 500	220 386	8
6	Kuwait	517 300	547 111	6
7	Syrian Arab Republic	3 450 000	3 633 400	5
8	Saudi Arabia	4 000 000	4 123 000	3
9	Oman	268 065	274 178	2
10	Palestine	350 442	357 000	2
11	Egypt	11 700 000	11 900 000	2
12	Jordan	559 000	519 000	-7
13	Lebanon	693 000	527 500	-24
14	The Sudan	580 424	356 500	-39
	Total/average	26 371 719	27 453 560	4

Source: Madar Research Group.

In Bahrain, there were 220,386 fixed lines by the end of 2008, compared to 203,541 lines in 2007, representing a growth rate of 8 per cent that was fuelled by the growth of fixed wireless.

TABLE 11. PENETRATION RATE OF FIXED LINES IN THE ESCWA REGION, 2008

Rank	Country or territory	Population	Fixed-line subscribers	Fixed-line penetration rate (*percentage*)
1	United Arab Emirates	7 338 140	1 640 000	22
2	Bahrain	1 156 114	220 386	19
3	Syrian Arab Republic	19 880 423	3 633 400	18
4	Qatar	1 553 729	263 363	17
5	Saudi Arabia	25 239 067	4 123 000	16
6	Kuwait	3 441 813	547 111	16
7	Egypt	76 054 000	11 900 000	16
8	Lebanon	4 209 000	527 500	13
9	Oman	3 013 184	274 178	9
10	Jordan	5 850 000	519 000	9
11	Palestine	4 212 000	357 000	8
12	Yemen	23 248 500	1 337 122	6
13	Iraq	30 581 365	1 755 000	6
14	The Sudan	41 810 000	356 500	1
	Total/average	247 587 335	27 453 560	11

Source: Madar Research Group.

[50] ESCWA, National Profile of the Information Society in the Arab Republic of Egypt – 2009.

The United Arab Emirates registered the highest fixed-line penetration rate in the ESCWA region, at 22.35 per cent, followed by Bahrain. The Syrian Arab Republic, whose fixed-line penetration rate stood at 18.28 per cent by the end of 2008, snatched third place. The other countries in the top five were Bahrain (in second place), Qatar (fourth) and Saudi Arabia (fifth). Palestine, Yemen, Iraq and the Sudan ranked lowest among ESCWA member countries in terms of fixed-line penetration rates.

2. *Mobile telephone services dissemination*

The total number of active mobile network operators across the ESCWA region increased from 27 in 2006 to 37 by mid-2009, with the addition of ten new operators since 2007. Out of these ten operators, there were seven new entrants to the market, one each in Bahrain, Egypt, Kuwait, Qatar, Saudi Arabia, Yemen and United Arab Emirates, in addition to three operators that were added upon the admission of the Sudan to ESCWA in 2008.

TABLE 12. ACTIVE MOBILE NETWORK OPERATORS IN THE ESCWA REGION, 2006-2009

Country or territory	Number of operators, 2006	Number of operators, 2009
Jordan	4	4
Saudi Arabia	3	4
Yemen	3	4
Iraq	3	3
Egypt	2	3
Kuwait	2	3
The Sudan	-	3
Bahrain	2	2 (+1[a/])
Lebanon	2	2
Oman	2	2
Syrian Arab Republic	2	2
United Arab Emirates	1	2
Palestine	1	1
Qatar	1	1 (+1[b/])
Total	27	35 (+2)

Sources: Madar Research Group and Arab Advisors Group.

Notes: a/ The number increased from 2 to 3 after STC won the third mobile licence in Bahrain in March 2009.

b/ The number increased from 1 to 2 after Vodafone Qatar soft launched its mobile services to a limited group of subscribers.

TABLE 13. GROWTH RATE OF MOBILE PHONE SUBSCRIBERS IN THE ESCWA REGION, 2007-2008
(*Ranked by growth*)

Rank	Country or territory	Mobile phone subscribers 2007	Mobile phone subscribers 2008	Growth rate (*percentage*)
1	Qatar	1 260 000	1 946 343	54
2	Yemen	4 107 000	6 059 000	48
3	Egypt	30 599 626	44 526 000	46
4	Iraq	12 777 000	18 287 470	43
5	Bahrain	1 116 000	1 453 000	30
6	Oman	2 500 115	3 219 865	29
7	United Arab Emirates	7 872 000	10 079 000	28
8	Saudi Arabia	28 400 041	36 059 212	27
9	Kuwait	2 773 688	3 382 733	22
10	Syrian Arab Republic	6 451 104	7 789 563	21
11	Lebanon	1 216 000	1 436 000	18
12	The Sudan	9 860 474	11 437 000	16
13	Palestine	1 744 600	2 022 163	16
14	Jordan	4 772 000	5 438 000	14
	Total/average	115 449 648	153 135 349	33

Source: Madar Research Group.

Growth in mobile phone subscribers, which registered 32.6 per cent in 2008, was still the principal driver of overall growth as measured by the composite indices discussed above in this chapter. Qatar ranks first among ESCWA member countries in terms of mobile subscriber growth, registering a rise of 54.5 per cent compared to the number of subscribers one year earlier. Three ESCWA member countries achieved mobile growth rates that exceeded 40 per cent in 2008, namely, Yemen, Egypt and Iraq. The lowest mobile growth rates were registered by the Sudan, Palestine and Jordan.

In terms of mobile phone penetration rates, five GCC countries, in ascending order, Saudi Arabia, United Arab Emirates, Bahrain, Qatar and Oman exceeded the 100 per cent barrier in 2008; while Kuwait registered a mobile phone penetration rate in the neighbourhood of 98 per cent. It is worth noting that the high mobile penetration rates enjoyed by most GCC countries is the reason for lower mobile subscriptions growth in comparison to the less-developed ESCWA member countries, particularly, Yemen, Egypt and Iraq, which enjoyed high growth rates. This observation signals that the GCC market is slowly becoming saturated in terms of mobile phone services.

TABLE 14. MOBILE PHONE PENETRATION RATE IN THE ESCWA REGION, 2008

Rank	Country or territory	Population	Mobile phone subscribers	Mobile phone penetration rate (*percentage*)
1	Saudi Arabia	25 239 067	36 059 212	143
2	United Arab Emirates	7 338 140	10 079 000	137
3	Bahrain	1 156 114	1 453 000	126
4	Qatar	1 553 729	1 946 343	125
5	Oman	3 013 184	3 219 865	107
6	Kuwait	3 441 813	3 382 733	98
7	Jordan	5 850 000	5 438 000	93
8	Iraq	30 581 365	18 287 470	60
9	Egypt	76 054 000	44 526 000	59
10	Palestine	4 212 000	2 022 163	48
11	Syrian Arab Republic	19 880 423	7 789 563	39
12	Lebanon	4 209 000	1 436 000	34
13	The Sudan	41 810 000	11 437 000	27
14	Yemen	23 248 500	6 059 000	26
	Total/average	247 587 335	153 135 349	62

Source: Madar Research Group.

At the other end of the scale, five ESCWA members registered penetration rates of less than 50 per cent, namely, in descending order, Palestine, Syrian Arab Republic, Lebanon, the Sudan and Yemen. Significant changes in these markets, however, are expected given that new mobile operators are projected to enter these markets over the next few years, particularly in Yemen, which came second in terms of growth rates in 2008.

3. *Mobile-to-fixed-line subscriber ratios*

Both the phenomenal rise in mobile phone subscriptions across the ESCWA region and the relative stagnation in fixed-line growth contributed to higher mobile-to-fixed-line ratios in ESCWA member countries. The Sudan, Oman and Jordan had the highest ratios in 2008;[51] while Lebanon and the Syrian Arab Republic come last in terms of this ratio.

Remarkably, the Sudan ranked first with a mobile-to-fixed-line ratio of 32.08 in 2008. However, this ratio needs to be viewed in the light of the negative growth incurred in the fixed-line services in 2008. Oman ranked second, with a mobile-to-fixed-line ratio of 11.74, but with positive growth in both services. The

[51] These ratios were even higher than in Iraq, which had the highest ratio in 2005 and 2006 owing to the fact that the majority of landlines in the country, particularly in Baghdad, had remained largely unoperational or damaged since 2003.

average ratio across the ESCWA region was 5.58 mobile phones for every fixed-line subscription in 2008, which represents a modest improvement over 5.23 in 2007 and 2.99 in 2006.

TABLE 15. MOBILE TO FIXED-LINE SUBSCRIBERS IN THE ESCWA REGION, 2007-2008
(*Ranked by ratio*)

Rank	Country or territory	Number of mobile phone subscribers divided by fixed-line subscribers 2007	Number of mobile phone subscribers divided by fixed-line subscribers 2008
1	The Sudan	16.99	32.08
2	Oman	9.33	11.74
3	Jordan	8.54	10.48
4	Iraq	9.13	10.42
5	Saudi Arabia	7.10	8.75
6	Qatar	5.21	7.39
7	Bahrain	5.48	6.59
8	Kuwait	5.36	6.18
9	United Arab Emirates	5.68	6.15
10	Palestine	4.98	5.66
11	Yemen	4.02	4.53
12	Egypt	2.62	3.74
13	Lebanon	1.75	2.72
14	Syrian Arab Republic	1.87	2.14
	Average	5.23	5.58

Source: Madar Research Group.

TABLE 16. FASTEST GROWING COUNTRIES IN THE ESCWA REGION IN TERMS OF PHONE SERVICE, 2007-2008
(*Ranked by overall rank*)

Rank	Country or territory	Mobile penetration (%)	Fixed penetration (%)	Mobile growth rate (%)	Fixed growth rate (%)	Rank by mobile growth rate	Rank by fixed line growth rate	Comments
1	Yemen	26.06	5.75	47.53	30.84	2	1	Speedy balanced growth well below saturation
2	Qatar	125.27	16.95	54.47	8.83	1	4	Speedy growth over 100%
3	Iraq	59.8	5.74	43.13	25.36	4	2	Speedy balanced growth well below saturation
4	United Arab Emirates	137.35	22.35	28.04	18.33	7	3	Speedy growth over 100%
5	Bahrain	125.68	19.06	30.2	8.3	5	5	Speedy growth over 100%
6	Egypt	58.55	15.65	45.51	1.71	3	11	Growth inclined towards mobile
7	Oman	106.86	9.1	28.79	2.28	6	9	Growth over 100%
8	Kuwait	98.28	15.9	21.96	5.76	9	6	Growth inclined towards mobile
9	Saudi Arabia	142.87	16.34	26.97	3.08	8	8	Growth over 100%
10	Syrian Arab Republic	39.18	18.28	20.75	5.32	10	7	Slow growth well below saturation inclined towards mobile
11	Palestine	48.01	8.48	15.91	1.87	13	10	Slow growth well below saturation inclined towards mobile
12	Lebanon	34.12	12.53	18.09	-23.88	11	13	Slow growth with FMS
13	The Sudan	27.35	0.85	15.99	-38.58	12	14	Slow growth with FMS
14	Jordan	92.96	8.87	13.96	-7.16	14	12	Slow growth with FMS

Rank	Country or territory	Mobile penetration (%)	Fixed penetration (%)	Mobile growth rate (%)	Fixed growth rate (%)	Rank by mobile growth rate	Rank by fixed line growth rate	Comments
	Average	61.85	11.09	32.64	4.10			

Source: Compiled by ESCWA based on data from Madar Research Group.

Growth rates indicate potential and predict change in other aspects of the information society. It is therefore interesting to analyse the composite rate of growth for the ESCWA region at large. While some countries ranked high in terms of fixed-line growth rates, they were low in terms of mobile growth rates and vice versa. Some countries ranked high on both rates, while others were significantly slower.

Clearly, the fastest growing countries in both phone services are Yemen, Qatar, Iraq, United Arab Emirates and Bahrain, followed by Egypt and Oman. The slowest growing countries in terms of both fixed-line and mobile services are Lebanon, the Sudan and Jordan, with negative growth in their fixed-line markets. This can be attributed to FMS phenomena whereby customers in these countries opt for a mobile phone service instead of a fixed-line service.

Yemen can be considered the fastest growing telecom market in the region, which is expected for an underdeveloped economy with a market well below saturation. By contrast, in Qatar, the United Arab Emirates and Bahrain, which are among the fastest growing markets, penetration rates have exceeded the 100 per cent threshold for mobile services and a threshold of 16 per cent for fixed-line services. This probably owes to the availability of broadband services, with its associated value added services, and to expansions in both rural and urban areas as a result of the influx of large numbers of expatriate workers into these countries.

4. *Internet services dissemination*

The dissemination rate of Internet services is increasing at an accelerated pace. During the period 2005-2006, the total number of Internet users in the 13 member countries under study then increased by a modest 13 per cent, reaching 21.42 million users by 2006. However, for the period 2007-2008, the total number of Internet users in the 14 member countries increased by 38 per cent, reaching 41.51 million users in 2008. The net increase from 2006 to 2008, excluding the Sudan, amounted to 16.5 million users, representing a growth of 77 per cent in two years.

From a different perspective, the overall Internet penetration rate increased from 11.5 per cent in 2006 to 17 per cent in 2008. This increase can be attributed to the continuous efforts of ESCWA member countries in promoting access to the Internet and the popularity of new broadband access technologies through wireless Local Area Networks (LANs), 3G and WiMAX.

TABLE 17. INTERNET PENETRATION RATES IN THE ESCWA REGION, 2008

Rank	Country or territory	Population	Internet users	Internet penetration rate (*percentage*)
1	United Arab Emirates	7 338 140	3 353 600	46
2	Qatar	1 553 729	592 200	38
3	Bahrain	1 156 114	435 600	38
4	Kuwait	3 441 813	1 272 433	37
5	Saudi Arabia	25 239 067	7 936 000	31
6	Lebanon	4 209 000	1 196 800	28
7	Jordan	5 850 000	1 441 000	25
8	Oman	3 013 184	540 150	18
9	Syrian Arab Republic	19 880 423	3 432 000	17
10	Egypt	76 054 000	12 570 000	17
11	Palestine	4 212 000	596 700	14

12	Iraq	30 581 365	3 084 500	10
13	The Sudan	41 810 000	3 479 000	8
14	Yemen	23 248 500	1 570 800	7
	Total/average	247 587 335	41 500 783	17

Source: Madar Research Group.

TABLE 18. GROWTH RATE OF INTERNET USERS IN THE ESCWA REGION, 2007-2008
(*Ranked by growth*)

Rank	Country or territory	Internet Users 2007	Internet Users 2008	Growth Rate (*percentage*)
1	Iraq	1 990 000	3 084 500	55
2	United Arab Emirates	2 260 000	3 353 600	48
3	Oman	370 000	540 150	46
4	Egypt	8 620 000	12 570 000	46
5	Syrian Arab Republic	2 400 000	3 432 000	43
6	The Sudan	2 450 000	3 479 000	42
7	Qatar	420 000	592 200	41
8	Yemen	1 122 000	1 570 800	40
9	Bahrain	330 000	435 600	32
10	Jordan	1 100 000	1 441 000	31
11	Lebanon	935 000	1 196 800	28
12	Saudi Arabia	6 400 000	7 936 000	24
13	Kuwait	1 050 000	1 272 433	21
14	Palestine	552 500	596 700	8
	Total/average	29 999 500	41 500 783	38

Source: Madar Research Group.

In Bahrain, broadband subscribers increased by 50 per cent between 2007 and 2008. By the end of 2008, there were 115,000 Internet subscribers, of which 96 per cent were broadband subscribers and 4 per cent were dial-up subscribers. At the end of December 2007, ten operators provided Internet services in Bahrain and offered the following four types of services: dial-up, wired broadband, wireless broadband and mobile broadband.[52]

Several ESCWA member countries have launched initiatives aimed at boosting Internet penetration rates, especially broadband penetration rates.

Within that context, Egypt launched several initiatives, including, among others, the Subscription Free initiative, the PC for Every Home Initiative and the broadband initiative. All were intended to boost Internet use, computer penetration rates in households, and the number of broadband users, which increased by 41 per cent between 2007 and 2008 to reach 7.03 million users. The broadband initiative by MCIT relies on wireless access to develop broadband services, particularly in rural areas and new satellite cities where infrastructure is not as developed as in urban areas.

Initiating a WiMAX field trial is a short-term action that has been put on the roadmap of the broadband initiative and pursued by MCIT as a preliminary step towards a more profound broadband wireless programme. The field trial took place at the Smart Village and lasted for six months, ending in May 2005. Later, in May 2007, two WiMAX pilots were launched to establish trail wide area networks (WANs) in the touristic areas of Luxor and Sharm el-Sheikh. In addition, MCIT, in collaboration with the Ministry of Electricity and Energy (MoEE), planned in 2006 to deploy broadband over power lines technology in Egypt in order to make use of the privilege of the national power line grid which covers more than 95 per cent of households with fibre optic core network. A pilot project on the power grid of MCIT buildings in the

[52] See http://www.tra.org.bh/en/marketReport.asp.

Egyptian Smart Village is being evaluated to test its features and capabilities in delivering triple play data (Internet), voice and video with aggregated speeds up to 200 megabit per second (Mbps).

In Saudi Arabia, the number of broadband subscribers increased from fewer than 35,000 in 2005 to some 1.33 million in 2008 (using digital subscriber line (DSL), WiMAX and 3G); the increase doubled over the period of 2007-2008. With the introduction of competition in the fixed-line market, there is still room for additional growth during the coming years.

In Lebanon, there are plans for improving communication facilities, boosting international Internet bandwidth, providing additional broadband services and legalizing VoIP services. During the eleventh annual Arabcom summit, which was held in Beirut in May 2009, one of the two mobile operators in Lebanon, namely, Alfa, declared that it would launch the evolved High-speed Packet Access (HSPA+) technology in Lebanon by the end of 2009.[53] The main types of Internet connections currently available in the country are as follows: dial-up, leased-line, microwave, satellite, DSL/ADSL, HDSL and wireless broadband. Currently, broadband services cover most of the geographical area of Lebanon, with 10 Gbit Ethernet base (planning to reach 40 Gbit), despite the absence of a public data network (PDN).

The United Arab Emirates remains the country with the highest penetration rate in the region and still the second highest in terms of growth rate. Internet users increased from 2.26 million in 2007 to 3.35 million in 2008, thereby boosting Internet penetration rate to 46 per cent in 2008.

5. *Personal computer dissemination*

The penetration rate of personal computers (PCs) is hard to determine.[54] However, basic indicators developed by research centres in the region provide statistics that help in the process of estimating the PC penetration rates of countries in the region.

Using these estimates, the computer installed base in the ESCWA region continued to increase, reaching 20,221,403 units in 2008, with an average growth rate of 31 per cent for the period 2007-2008, which is significantly higher than the growth registered for the period 2005-2006 at 12 per cent.

TABLE 19. GROWTH RATE OF COMPUTER INSTALLED BASE IN THE ESCWA REGION, 2007-2008
(*Ranked by growth*)

Rank	Country or territory	PC installed base 2007	PC installed base 2008	Growth rate (*percentage*)
1	Iraq	935 000	1 337 050	43
2	Qatar	352 000	498 080	42
3	United Arab Emirates	1 780 900	2 475 451	39
4	Bahrain	295 000	407 100	38
5	Kuwait	740 300	1 021 614	38
6	Saudi Arabia	3 548 800	4 755 392	34
7	Yemen	448 800	592 551	32
8	Oman	320 000	416 000	30
9	Syrian Arab Republic	1 100 000	1 430 000	30

[53] Evolved High-speed Packet Access (HSPA+) offers more than 20 Mbps faster speeds than cellular; it is an upcoming wireless broadband standard that provides data rates of up to 42 and 22 Mbps in the downlink and uplink, respectively, with multiple-input and multiple-output (MIMO) technologies and higher-order modulation.

[54] This owes to technical and statistical factors, including, primarily, the components upgrade factor coupled with irregularities in local computer assembly. Many small and individual assemblers typically 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. Within that context, the estimation uses the assumption that the average life of a PC in the GCC countries is four years, while it is set at five years in other ESCWA member countries.

10	Egypt	3 304 300	4 295 590	30
11	The Sudan	1 080 000	1 292 562	20
12	Lebanon	586 400	674 360	15
13	Jordan	708 400	814 660	15
14	Palestine	199 900	210 993	6
	Total/average	15 399 800	20 221 403	31

Source: Madar Research Group.

Iraq enjoyed the highest growth in ESCWA member countries, with an impressive 43 per cent, compared to 2007. Similarly, Qatar saw a solid growth, at 41.5 per cent, thereby propelling its overall ranking in the region to second place.

Growth of the PC installed base in GCC countries surpassed the growth in the rest of the ESCWA region. Oman registered the least growth among GCC countries, at 30 per cent, while Lebanon and Jordan each recorded 15 per cent. The least growth in the ESCWA region was experienced in Palestine, at 6 per cent.

The total number of installed computer bases in the ESCWA region nearly doubled over two years, climbing from 10.77 million PCs in 2006 to 20.22 million PCs in 2008.[55] However, the overall population of the region increased from 194.048 million in 2006 to 247.587 million in 2008.[56] This therefore translates into a modest increase in penetration rate from 5.55 in 2006 to 8.17 by 2008. The largest computer installed base was in Saudi Arabia, followed by Egypt and the United Arab Emirates. However, in terms of penetration rates, Bahrain, the United Arab Emirates and Qatar enjoyed the highest rates in the region, giving another lead in ICT infrastructure to the United Arab Emirates.

TABLE 20. PERSONAL COMPUTER PENETRATION RATE IN THE ESCWA REGION, 2008

Rank	Country or territory	Population	Installed computer base	PC penetration rate (*percentage*)
1	Bahrain	1 156 114	407 100	35.21
2	United Arab Emirates	7 338 140	2 475 451	33.73
3	Qatar	1 553 729	498 080	32.06
4	Kuwait	3 441 813	1 021 614	29.68
5	Saudi Arabia	25 239 067	4 755 392	18.84
6	Lebanon	4 209 000	674 360	16.02
7	Jordan	5 850 000	814 660	13.93
8	Oman	3 013 184	416 000	13.81
9	Syrian Arab Republic	19 880 423	1 430 000	7.19
10	Egypt	76 054 000	4 295 590	5.65
11	Palestine	4 212 000	210 993	5.01
12	Iraq	30 581 365	1 337 050	4.37
13	The Sudan	41 810 000	1 292 562	3.09
14	Yemen	23 248 500	592 551	2.55
	Total/average	247 587 335	20 221 403	8.17

Source: Madar Research Group.

6. *Internet hosts, backbone and data networks*

(a) *Internet hosts*

[55] ESCWA, Regional Profile of the Information Society in Western Asia (E/ESCWA/ICTD/2007/15). It is important to note that the Sudan was then not part of the ESCWA region.

[56] Ibid.

The number of Internet hosts per capita[57] is used as an indicator with which the United Nations Conference on Trade and Development (UNCTAD) assesses ICT connectivity.[58] The Internet Systems Consortium (ISC) issues regular statistics on Internet hosts according to top level domains (TLDs). The latest report was released by the consortium in July 2008.

TABLE 21. NUMBER OF HOSTS IN THE ESCWA REGION, JULY 2008

Rank	Country or territory	Population	Total number of hosts	Number of hosts (*per 10,000 inhabitants*)
1	United Arab Emirates	7 338 140	381 915	520.45
2	Lebanon	4 209 000	36 681	87.15
3	Saudi Arabia	25 239 067	141 232	55.96
4	Jordan	5 850 000	21 150	36.15
5	Egypt	76 054 000	175 342	23.05
6	Bahrain	1 453 000	2 621	18.04
7	Oman	3 013 184	4 785	15.88
8	Kuwait	3 441 813	3 289	9.56
9	Syrian Arab Republic	19 880 423	7 857	3.95
10	Qatar	1 553 729	563	3.62
11	Yemen	23 248 500	167	0.07
12	The Sudan	41 810 000	33	0.01
13	Iraq	30 581 365	3	0.00
14	Palestine	4 212 000	..	..

Source: Internet Systems Consortium (ISC), which is available at: www.isc.org.

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

As shown in table 21, the United Arab Emirates has by far the largest number of hosts, followed by Lebanon, Saudi Arabia, Jordan and Egypt. Kuwait had a significantly modest number, albeit having a higher GNI per capita than the United Arab Emirates. This signifies that the indicator has little to do with wealth and more to do with the availability of content and applications hosted on the servers of these countries.

(b) *Internet backbone and data networks*

While the number of Internet users is steadily increasing due to the availability of relevant applications, the increase in the number of fixed lines, mobile phones and PCs, and the introduction of competition, it is equally important for ESCWA member countries to provide for an increase in the international Internet bandwidth in order to meet with the increase in demand, as well as with the increase in bandwidth requirements by new broadband applications. Table 22 shows that all the countries in the region have managed to increase their international Internet bandwidth albeit to different extents. The highest international Internet bandwidths per Internet user rates were recorded in Bahrain, Qatar, United Arab Emirates and the Sudan, while the lowest rates were seen in Lebanon, the Syrian Arab Republic and Jordan.

Egypt has two main terrestrial fibre-optic cable links, namely: a link with the Sudan, which is up to four STM-1 and upgradeable to 2.5 Gbps; and a “dark fibre”, that is a cable laid down but not yet in use,

[57] An Internet host is a PC with a unique Internet Protocol (IP) address. A PC may have several IP addresses, and several PCs may have a single IP address. Internet user penetration is not included in the connectivity indicators. It is part of the “accessibility” indicators, which include adult literacy rate and cost of local calls.

[58] United Nations Conference on Trade and Development (UNCTAD) assesses ICT connectivity by measuring four indicators, namely: the number of PCs per capita, the number of telephone mainlines per capita, the number of mobile subscribers per capita and the number of Internet hosts per capita. See www.unctad.org/en/docs/iteipc20065_en.pdf.

linking electricity companies in Jordan and Egypt for use by Telecom Egypt and Jordan Telecommunications Company (JTC). Egypt's international Internet bandwidth witnessed a steady increase from 2001 to 2008, at an average annual growth rate of 94 per cent. Egypt's total international Internet bandwidth reached 27,077 Mbps by the end of 2008, bringing per capita share of Internet bandwidth to 359 Bps. Box 1 provides an overview of Egypt's Internet backbone and data networks.

TABLE 22. GROWTH RATE OF INTERNATIONAL INTERNET BANDWIDTH IN THE ESCWA REGION, 2002-2007
(*Ranked by growth*)

Rank	Country or territory	International Internet bandwidth per Internet user, 2002 (*bit/s*)	International Internet bandwidth per Internet user, 2007 (*bit/s*)	Growth rate (*percentage*)
1	Yemen	60	1 969	3 182
2	The Sudan	150	3 800	2 433
3	Palestine	190	3 376	1 677
4	Kuwait	308	2 577	737
5	Saudi Arabia	243	1 932	695
6	Syrian Arab Republic	44	304	591
7	Oman	211	1 088	416
8	United Arab Emirates	1 067	5 380	404
9	Bahrain	1 588	7 660	382
10	Egypt	339	1 023	202
11	Qatar	2 214	6 624	199
12	Jordan	293	831	184
13	Lebanon	150	289	93
14	Iraq	..	..	..

Source: International Telecommunication Union (ITU), *Measuring the Information Society: The ICT Development Index* (2009).

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

Box 1. An overview of Egypt's Internet backbone and data networks

While satellite networks played a leading role in the development of Internet services in Egypt in the mid-1990s as the upstream backbone connection, this role has subsided since the turn of the century due to the increasing demand for bandwidth that can only be provided through fibre-optics. Successive reductions in the cost of bandwidth delivered through fibre optics provided a much more attractive solution for establishing backbones and delivery of services throughout Egypt. Telecom Egypt had previously signed an agreement with the Fibre-optic Link Around the Globe (FLAG) project to build a local IP peering point for FLAG in Egypt. The peering point, which is located in Cairo, directly connects ISPs to FLAG IP backbone via an STM-4 link on FLAG cable. This agreement resulted in decreased prices for international Internet connectivity.

However, the need to take ICT services to rural areas where fibre-optic networks are impractical due to limited demand and rough terrain requires new solutions. Recent developments in satellite technology that have resulted in lower costs and higher throughputs now make it a more viable means to connect rural areas.

Source: The Ministry of Communications and Information Technology (MCIT) in Egypt.

In Lebanon, considerable investments and improvements are underway led by the State-owned providers, namely, Ogero and two State-owned mobile phone companies. However, Lebanon still does not have a PDN. The first Internet Exchange Point (IXP) in Lebanon, namely, Beirut-IX, was launched in December 2007, with the objective to remain a neutral, open Internet exchange where service providers and

content providers could connect and peer with each other.[59] Lebanon will soon be boosting its connection to the Internet networks, going through the Syrian Telecom Company; the Jordanian branch of Kuwaiti-based Mada Communications Company; and Saudi STC, to connect to SEA-ME-WE cable drop point in Jeddah, Saudi Arabia, which is the key station in the region. It provides some 70 per cent of the international Internet bandwidth needs of Saudi Arabia's neighbouring countries. This station is linked to several submarine cable routes and connects the eastern and western sides of the globe, providing Lebanon with multiple Internet routes. Internet speeds are projected to become 20 times faster than currently available.[60]

The national Internet eXchange of Saudi Arabia (IXSA) was established by CITC for the purpose of keeping national Internet traffic within the country.[61] This will improve the quality of Internet service, reduce costs and prices, increase reliability and security and maintain the privacy of local Internet users. In addition, Internet development projects in Saudi Arabia have led to the formation of a national task force, which was spearheaded by CITC, to promote the evolution towards the use of IP version 6 (IPv6) standards. The national IPv6 Task Force includes a number of service providers and other interested parties. A test lab was set up for testing compliance with IPv6.[62]

In Qatar, Qtel is working to ensure that the country has appropriate Internet and international bandwidth and infrastructure by having access to submarine cables to maintain alternative routes.[63] In February and December 2008, major cuts in Mediterranean submarine cables significantly impacted Internet connectivity. The damaged cables severed in December carried 75 per cent of traffic between the Middle East, Europe and America. However, rerouting and the availability of alternative international routes kept loss of capacity in Qatar below 40 per cent.[64] There are currently plans for at least two further international connectivity projects, which will serve Qatar and the Gulf subregion. Table 23 illustrates the connectivity of Qatar to the global Internet backbone.

TABLE 23. QATAR'S CONNECTIVITY TO THE INTERNET BACKBONE

Route (local)	Bandwidth	Number	Route (international)
FOG submarine cable	STM-1	2	FLAG
Qatar-United Arab Emirates submarine cable	STM-1	5	SEA-ME-WE-3
	DS3	1	SEA-ME-WE-3
Qatar-Saudi Arabia fibre-optic land cable	STM-1	8	SEA-ME-WE-3
	STM-4	9	SEA-ME-WE-4
FALCON submarine cable	STM-1	9	FLAG
	STM-4	4	FLAG
Total	DS3	1	SEA-ME-WE-3
	STM-1	24	FLAG/SEA-ME-WE-3
	STM-4	13	FLAG/SEA-ME-WE-4

Source: ESCWA, National Profile of the Information Society in Qatar (2009).

In 2008, Etisalat in the United Arab Emirates completed the first phase of its Fibre-to-the-Home (FTTH) deployment, which will eventually cover the entire country. FTTH technology enables better service delivery in such key areas as high-speed Internet service (HSI), thereby bringing subscriber speeds up to 60 Mbps and enabling a number of applications, including IP telephony, Internet Protocol Television (IPTV),

[59] See http://www.beirutix.net.

[60] See http://www.stc.com.sa/cws/content/en//stc/files/stcmagazine/STC93_English.pdf.

[61] See http://www.ix.net.sa.

[62] Communications and Information Technology Commission, *Annual Report* (2008).

[63] See http://www.ameinfo.com/58561.html.

[64] See http://www.itp.net/510132-internet-problems-continue-with-fourth-cable-break.

high-bandwidth online gaming and Video-on-Demand (VoD). Following this achievement, the company started to offer fixed-line broadband services in March 2009, with download speeds of up to 8 Mbps and 16 Mbps for its subscriber base that is connected to the FTTH network. The company aims to connect the entire city of Abu Dhabi to its next generation network by the third quarter of 2009 and is also preparing to provide its domestic customers with mobile broadband services using Evolved High-speed Packet Access (HSPA+), thereby enabling a theoretical download speed of up to 42 Mbps and an upload speed of 22 Mbps.[65]

In addition, the expansion of telecommunication and Internet networks continued to be a priority for the Federal Government of the United Arab Emirates. Emirates Internet Exchange (EMIX), which is a division within Etisalat, constitutes the first Network Access Point (NAP) in the Middle East, offering IP transit connectivity to ISPs in the region.[66] EMIX is developing its network to meet the future requirements of ISPs in the region by increasing its total bandwidth to cater for customer demand as required. The Network is connected across the globe via fibre-optic links to Europe, the Far East and the United States through SEA-ME-WE-3, SEA-ME-WE-4 and FLAG cables. Currently, EMIX backbone bandwidth is approximately 20 Gbps and has 129 fully redundant STM-1 links on various transnational cables, linking it with various Tier-1 IP access providers across the world. Work is underway to activate additional links in order to cater for the rising demand for Internet bandwidth.

A number of regional cables connect ESCWA member countries to the Internet backbone. The Fibre Optic Gulf (FOG) project consists of a 1,300-km-long fibre-optic cable link between the United Arab Emirates, Qatar, Kuwait and Bahrain. FOG, which links the United Arab Emirates to Kuwait via Qatar and Bahrain, has a transmission capacity of 10 Gbps per fibre pair; and Synchronous Digital Hierarchy (SDH) technology will enable it to accommodate enormous volumes of traffic for high-speed Internet, VoD and other new services. The FLAG cable project connects Europe to South Asia via the United Arab Emirates. Within that context, the FLAG Network Operations Centre (FNOC) has been set up in Fujairah in the United Arab Emirates, which positions it in the midpoint of the cable system. Other cables that connect the United Arab Emirates include South-East-Asia–Middle-East–Western-Europe-3 and -4 cable systems (SEA-ME-WE3 and SEA-ME-WE4). The total length of the SEA-ME-WE3 and SEA-ME-WE4 cables is approximately 39,000 km and 20,000 km, respectively, while their capacities are 40 Gbps and 1280 Gbps.[67]

D. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL[68]

1. *Maturity level 1*: *Iraq, the Sudan and Yemen*

This lowest level of ICT infrastructure is characterized by the following: (a) low penetration rates of fixed and mobile telephone lines; (b) lack of an environment conducive to widespread use of telecommunication services by businesses and individuals; and (c) insufficient national bandwidth, inadequate backbone for voice and data telecommunication and insufficient number of Internet players in the market.

2. *Maturity level 2*: *Egypt, Lebanon, Oman, Palestine and Syrian Arab Republic*

ICT infrastructure in this group is characterized by the following: (a) average penetration rates of fixed and mobile telephone lines; (b) an encouraging environment for widespread use of telecommunication

[65] See http://www.telegeography.com/cu/article.php?article_id=27641&email=html.

[66] See http://www.emix.net.ae.

[67] See http://www.seamewe4.com.

[68] The methodology and levels of ICT maturity used in this report are as defined in previous regional profile reports (2003, 2005 and 2007).

services by businesses and individuals; and (c) national bandwidth/backbone for voice and data telecommunication undergoing development, and a sufficient number of Internet players in the market.

3. *Maturity level 3*: *Jordan, Kuwait and Saudi Arabia*

ICT infrastructure in this group is characterized by the following: (a) above average penetration rates of fixed and mobile telephone lines; (b) an encouraging environment for widespread use of telecommunication services by businesses and individuals; and (c) robust national bandwidth/backbone for voice and data telecommunication, and active Internet players in the market.

4. *Maturity level 4*: *Bahrain, Qatar and United Arab Emirates*

ICT infrastructure in this group is characterized by the following: (a) high penetration rates of fixed and mobile telephone lines and high quality services; (b) an attractive environment for widespread use of telecommunication services by businesses and individuals; and (c) robust national bandwidth/backbone for voice and data telecommunication, and active Internet players in the market.

TABLE 24. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN ICT INFRASTRUCTURE

	Maturity level 1			Maturity level 2			Maturity level 3			Maturity level 4		
Country or territory	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009
Bahrain										✓	✓	✓
Egypt				✓	✓	✓						
Iraq	✓	✓	✓									
Jordan				✓				✓	✓			
Kuwait							✓	✓	✓			
Lebanon				✓	✓	✓						
Oman				✓	✓	✓						
Palestine				✓	✓	✓						
Qatar							✓	✓				✓
Saudi Arabia							✓	✓	✓			
The Sudan[a/]			✓									
Syrian Arab Republic				✓	✓	✓						
United Arab Emirates										✓	✓	✓
Yemen	✓	✓	✓									

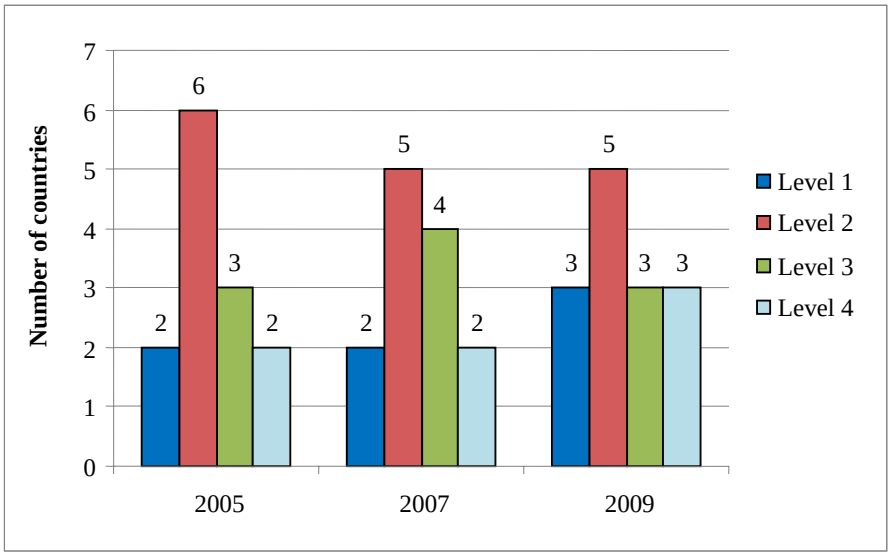
Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

ESCWA member countries have made tangible progress in developing their ICT infrastructure and in achieving growth in Internet and fixed and mobile telephone penetration. This growth, however, was offset by high population growth rates in several ESCWA member countries and by political instability in others.

Analysis of national, regional and international ICT reports on ESCWA member countries, whose results are summarized in the ICT infrastructure maturity table, shows that Qatar is the only ESCWA member country that has moved to a higher level of maturity (from the third level to the fourth), while the United Arab Emirates made significant progress within the top maturity level, which was reached two years ago. The other ESCWA member countries remained at the same levels they attained in 2007. The Sudan has no previous record to compare it against; however, its ICT infrastructure is still developing with some very modest indicators and some promising ones. Consequently, it will be a suitable candidate to move to maturity level 2 in the next two years if progress in ICT infrastructure is sustained.

Figure 2. Maturity levels of ESCWA member countries in ICT infrastructure



E. SUGGESTIONS AND RECOMMENDATIONS

(a) It is important to set up an effective and transparent telecom regulatory commission. Without this, there are strong possibilities of exploitation of subscribers through unaffordable tariffs and corruption;

(b) It is important to continue the liberalization of telecom sectors and instigate competition, which has a significant impact in increased dissemination of telecom services. Competition in the fixed-line market is crucial for a better dissemination of ICT services in marginalized and remote areas;

(c) The introduction of new telecommunication technologies, especially wireless, is essential for bridging the digital divide inside the same country, particularly when fixed-line deployment is not economically feasible or not possible. New licensing schemes and regulatory frameworks should be developed to cater for these technologies;

(d) Efforts should be directed towards the regional dimension of economies of scale, especially in such areas as bandwidth. Efforts should be directed towards harmonization of the regional telecom interconnectivity and reviving efforts related to establishing of a regional telecom backbone. The same can be applied in areas of ICT manufacturing and ICT content, which both contribute to wider dissemination of ICT services;

(e) Significant attention should be directed towards increased connectivity of such sectors as education and health given their long-term impact on socio-economical development. Dedicated initiatives for developing ICT infrastructure should be directed to specific segments and best practices from other countries in the region need to be explored and exploited;

(f) The effect of broadband on development justifies more liberalization of broadband services, unbundling local loops and availing applications and content that drive demand in this field. Dedicated initiatives at the governmental level should be directed towards harnessing the benefits of broadband technologies for development;

(g) It is important to promote universal access funds for certain sectors of the community and rural areas.

III. ACCESS TO INFORMATION AND KNOWLEDGE

ICTs allow people anywhere and at any time to access information and knowledge almost instantaneously. Individuals, organizations and communities should benefit from access to knowledge and information. However, this immediate access can only be achieved when specific measures are put in place. These include the development and promotion of public domain information, the establishment of legislations on free access to information and the preservation of public data, and the development of a digital public library and national archives as recommended by the WSIS Plan of Action.[69]

A. COMPARATIVE ANALYSIS

ESCWA member countries have exerted tremendous efforts to harness ICT for producing, disseminating and increasing the level of access to information and knowledge. While progress has been noted in some countries, the level of information and the access divide still exists between and within countries. Political conflicts, low Internet penetration rates, high access costs and the lack of community access centres are all major reasons behind the access disparity. In addition, the benefits of broadband technologies for development have yet to be realized in the region. Broadband provides unprecedented opportunities for people to communicate with each other and access information, especially educational content. However, broadband subscription costs are still high in most ESCWA member countries, even in the most developed, thereby resulting in poor access to information and knowledge.

The World Economic Forum publishes, with the European Institute of Business Administration (INSEAD), the annual Global Information Technology Report (GITR), which calculates the NRI.[70] This Index measures the propensity of 134 countries worldwide to exploit the opportunities offered by ICTs and seeks to better comprehend their impact on the competitiveness of nations. In essence, NRI is a composite index of three components or sub-indices, namely: the "environment" for ICT offered by a given country or community; the "readiness" of the community's key stakeholders (individuals, businesses and Governments) to use ICT; and the "usage" of ICT among these three stakeholders.

Tables 25 and 26 examine the current situation in nine ESCWA members countries covered by GITR 2008-2009, and attempts to analyse the disparities between readiness and usage components of NRI for the three stakeholders involved, namely individuals, businesses and Governments.

TABLE 25. READINESS SUB-INDEX COMPONENT OF NRI, 2008-2009

	Individual readiness		Business readiness		Government readiness		Sub-index	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score
United Arab Emirates	32	5.89	33	4.94	9	5.33	25	5.39
Qatar	20	6.05	30	5.01	22	4.99	26	5.35
Bahrain	35	5.7	62	4.32	28	4.75	38	4.92
Saudi Arabia	79	5.06	28	5.04	36	4.55	41	4.88
Oman	49	5.54	48	4.6	39	4.47	42	4.87
Jordan	53	5.52	76	4.19	29	4.72	45	4.81
Kuwait	62	5.37	64	4.3	80	3.8	66	4.49
Syrian Arab Republic	75	5.11	87	4.06	91	3.7	82	4.29
Egypt	97	4.66	100	3.86	51	4.27	85	4.26
Average		5.43		4.48		4.51		4.81

Source: World Economic Forum, *The Global Information Technology Report 2008-2009* (2009).

[69] See http://www.itu.int/wsis/docs/geneva/official/poa.html#c3.

[70] More information is available at: http://www.weforum.org/pdf/gitr/2009/gitr09fullreport.pdf; and http://www.insead.edu/v1/gitr/wef/main/fullreport/index.html.

The readiness sub-index component in table 25 shows the extent to which the main stakeholders are involved and prepared to use technology, notably ICT, in their daily activities. This table further indicates that individuals in the selected ESCWA member countries scored better on the readiness sub-index than both businesses and Governments by almost one full point, that is 5.43 compared to 4.48 and 4.51, respectively. This denotes that individuals in the region, while at diversified educational levels, are being engaged in using ICTs and are positioned to reap the benefits from ICTs in their daily life.

TABLE 26. USAGE SUB-INDEX COMPONENT OF NRI, 2008-2009

	Individual usage		Business usage		Government usage		Usage sub-index	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score
United Arab Emirates	31	3.57	27	5.18	16	5.06	25	4.60
Qatar	38	3.26	41	4.86	25	4.73	31	4.28
Bahrain	44	2.9	45	4.77	29	4.58	35	4.08
Saudi Arabia	53	2.38	39	4.87	42	4.3	44	3.85
Jordan	73	1.93	33	5.02	33	4.46	45	3.80
Oman	70	1.97	66	4.44	45	4.21	55	3.54
Kuwait	51	2.41	54	4.63	97	3.23	65	3.42
Egypt	98	1.49	53	4.64	53	4.0	72	3.38
Syrian Arab Republic	96	1.54	99	3.89	116	2.83	106	2.75
Average		2.38		4.70		4.16		3.75

Source: World Economic Forum, *The Global Information Technology Report 2008-2009* (2009).

The usage sub-index component of NRI in table 26 gauges the actual usage of ICT by the main stakeholders in a country, with a particular focus on the impact of ICT in terms of efficiency and productivity gains. This table also points out that individuals in the selected ESCWA member countries scored much lower on the usage sub-index than both businesses and Governments by almost two full points, namely, 2.38 compared to 4.70 and 4.16, respectively, thereby signalling a considerable gap in ICT usage among individuals compared to both business and Governments.

When comparing both the readiness and usage sub-indices, it becomes evident that the region fared better on the former sub-index by almost one full point, at 4.81 compared to 3.75. However, when comparing the individual global rankings of member countries on both sub-indices, it is clear that this is a global trend given that the rankings of member countries were almost the same on both indices. For example, the United Arab Emirates was ranked 25 on both sub-indices, Qatar was ranked 26 and 31, and Bahrain was ranked 38 and 35.

A closer look at the readiness and usage categories for individuals reveals an even wider gap for the region, as it scored an average of 5.43 points compared to a low of 2.38 points. The three-point imbalance between readiness and usage for individuals could be attributed to, among others, low ICT penetration rates, especially for broadband Internet services; the lack of information and digital content, especially in Arabic; and the restrictions that some countries are still imposing on free access to information and knowledge.

Countries of the GCC ranked better than other ESCWA member countries on both sub-indices, with the exception of Jordan which has been making noticeable progress. On average, the United Arab Emirates, followed by Qatar and Bahrain, ranked better than Saudi Arabia, Oman and Kuwait. In the United Arab Emirates, the Government's continuous push for ICT diffusion and usage has been impressive in recent years, as reflected by the country's rank of 9 and 16 globally in the Government readiness and usage categories, respectively.

Saudi Arabia has been exerting considerable efforts to get its business community ready to incorporate ICT in their daily operations and processes along with making ICTs affordable and widely available. It achieved the rank of 28 globally in the business readiness component, followed by Qatar (at 30) and the

United Arab Emirates (at 33). Qatar occupied the top position in the region with respect to individual readiness (at 20), followed by the United Arab Emirates (at 32) and Bahrain (at 35). This is partly due to the high quality of the educational system in these countries coupled with the high level of ICT awareness and the minimal access cost associated with ICTs. On the other hand, the small size of population in these countries, the large numbers of expatriates, as well as the high standard of living equally contribute to this high ranking.

While GCC countries have demonstrated notable readiness and usage levels, additional efforts still need to be exerted by all member countries and at all levels. Access costs should be reduced and educational systems should be enhanced to include mindset change and cultural adaptation and technology awareness programmes to build the ICT capacities of citizens. ESCWA member countries should dedicate special attention to their ICT strategies and their implementation plans, while putting particular focus on the impact of ICT in terms of productivity and efficiency gains.

1. *Public domain information*

Information is generally classified as private or public based on laws adopted by each country**.** Public domain information is information that is accessible to the public free of charge, without requiring access permission. On the other hand, private information is subject to intellectual property rights, where the owner of information owns the rights to it.

Article 26 of the WSIS Declaration of Principles states that a "rich public domain is an essential element for the growth of the Information Society, creating multiple benefits such as an educated public, new jobs, innovation, business opportunities, and the advancement of sciences. Information in the public domain should be easily accessible to support the Information Society, and protected from misappropriation".[71]

With the advancement of digital technology and the increase in Internet adoption and penetration rates, it is now possible to deliver and disseminate public information to a wider segment of the population, and exploit the opportunities offered by information sharing and exchange.

In order to transform themselves into information societies, a number of ESCWA member countries have embarked on the development and promotion of public domain information, the use of ICT as a fundamental tool for improving local governance, and the establishment of digital public libraries and archive services adapted for the use of citizens. In addition, most member countries began several years ago to implement e-government programmes, launching Government portals to provide official public information, and offering a variety of public e-government services.

Bahrain has put in place a comprehensive programme aimed at ensuring that governmental organizations publish public domain information on their respective websites. The e-government strategy propounds the publishing of all the procedural information and forms on the e-government portal.[72] In order to increase IT literacy and allow access to e-government services, one of the objectives of the strategy is to provide Bahraini citizens with affordable PCs and Internet connection. In addition to providing various bilingual (Arabic and English) Government services, including downloadable forms, online applications and tracking their status, the e-government portal takes into consideration the diverse population in Bahrain, and will soon be providing these services in Malayalam and Filipino. Moreover, the Bahrain Centre for Studies and Research (BCSR) provides an e-library with wealth of public information, publications, journals, periodicals, research papers and even audio recordings of seminars and conference accessible to all citizens.[73]

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[71] See http://www.itu.int/wsis/docs/geneva/official/dop.html.

[72] See http://www.bahrain.bh/.

[73] See http://www.bcsr.gov.bh.

Egypt has exerted considerable efforts to modernize its Government and put itself at pace with the latest ICT-based Government applications. MCIT in cooperation with the Ministry of State for Administrative Development has made over 700 governmental services available through the e-government portal.[74] In addition, Egypt is paying special attention to digital libraries and archives, such as the Digital Assets Repository (DAR) system at the New Library of Alexandria (Bibliotheca Alexandrina) and the National Archives of Egypt (NAE). [75] DAR provides free-of-charge online public access to the library's collections in digital form, which comprises more than 100,000 Arabic books and more than 4,000 foreign books.

Despite the instability in Iraq and the absence of e-government services, the country is providing public information on existing Government websites. Selected universities also exerted efforts in implementing the Iraqi Networking Academies (INA) project aimed at delivering certified networking technology training to Iraqi engineers, university and college students as part of the Cisco Networking Academy Programme (CNAP).[76]

Jordan has put in place a national e-government initiative aimed at transforming the country into a knowledge society founded on a competitive, dynamic economy. An e-government portal was developed to reach those stated objectives and make public information and e-services available online to citizens.[77]

While the private sector in Kuwait outpaced the public sector in providing digital information, CAIT publishes national policies and strategies on its e-government portal, thereby ensuring high information accessibility and transparency.[78] Significantly, Kuwait's National Council for Culture, Arts and Letters (NCCAL) has digitized the national library by preparing indexed catalogues for books and audiovisual material besides establishing a network between libraries within the country.[79] An example of other digitized libraries includes the Al-Babtain Central Library, which was established in 2006 and represents the first digital library that is specialized in Arabic poetry. It uses the latest technologies to provide access for people with special needs, especially the visually impaired.

In an effort to provide better public information online, Oman's ITA is working with various Government organizations to enhance their Internet presence through established guidelines for developing Web portals, thereby providing a mechanism for interaction between organizations and citizens. Moreover, ITA is harmonizing the look-and-feel and accessibility of Government websites, which links to the Government e-services portal.[80]

Public institutions in Qatar place great emphasis on developing public domain information. For instance, the Government online portal, Hukoomi, is available in both English and Arabic and ensures the ease of access to all necessary information for citizens, residents, visitors and businesses.[81] The portal is updated and maintained regularly in order to ensure that access is always rapid and convenient. Moreover, Hukoomi has a presence on YouTube, Facebook and other public portals.

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[74] See http://www.egypt.gov.eg.

[75] See http://www.bibalex.org/English/index.aspx and http://nationalarchives.gov.eg.

[76] See http://www.escwa.un.org/divisions/pptcdadvisors.asp?id=16.

[77] See http://www.jordan.gov.jo.

[78] See http://www.e.gov.kw.

[79] See http://www.kuwaitculture.org.

[80] See http://www.oman.om.

[81] See http://www.gov.qa.

The Sudan has started disseminating information about Government services online. The national repository of documents that reports to the Council of Ministers has been digitized, thereby enabling unrestricted access to its valuable content to the general public.

2. *Access to information and knowledge*

The emerging knowledge society presents a set of new imperatives for Governments and new challenges and opportunities for the society as a whole. One of these challenges is to increase access to information and advocate knowledge sharing. Many countries in the region are not yet fully aware of the challenges and opportunities presented by the emergence of the global knowledge society; and have yet to recognize that knowledge and digitization of information are becoming factors of production and a driver for economic and social development.

While the region is making some progress in this regard, efforts are still needed to enhance further accessibility of digital content (see table 27). The GCC countries scored higher than other ESCWA member countries, with the exception of Jordan which came in fourth position. Bahrain, Kuwait and Egypt witnessed a modest decline in their scores in 2008-2009 relative to 2007-2008; whereas Qatar, United Arab Emirates, Jordan, Saudi Arabia, Oman and Syrian Arab Republic recorded better scores in 2009 than in previous years.

TABLE 27. ACCESSIBILITY OF DIGITAL CONTENT IN SELECTED ESCWA MEMBER COUNTRIES, 2007-2009

Country	Score[a/] 2007-2008	Ranking (127) 2007-2008	Score[a/] 2008-2009	Ranking (134) 2008-2009
Qatar	5.52	29	5.57	28
Bahrain	5.77	21	5.52	29
United Arab Emirates	5.07	40	5.34	34
Jordan	4.93	47	5.05	46
Saudi Arabia	4.35	80	4.63	74
Kuwait	4.83	53	4.60	75
Oman	4.30	82	4.57	77
Egypt	4.63	67	4.44	83
Syrian Arab Republic	2.84	122	3.04	128
Average	4.69		4.75	

Sources: World Economic Forum, *The Global Information Technology Report 2007-2008* (2008); and *The Global Information Technology Report 2008-2009* (2009).

a/ This is based on a seven-point total score whereby 1 = no, digital content is not accessible; and 7 = yes, digital content is accessible via a wide range of platforms.

The ESCWA region slightly improved its accessibility score to digital content in 2008-2009, with an average score of 4.75 compared to 4.69. However, this modest improvement can probably be attributed to such factors as lack of content, particularly in Arabic, the scarcity of laws that protect the information access rights of citizens within a framework of freedom and transparency, the relatively low Internet penetration rates and high access costs, particularly for broadband subscription.

Table 28 highlights broadband penetration rates and monthly subscription costs for ESCWA member countries. Great disparities in broadband costs are noted, not only in absolute value but also as a percentage of GNI per capita. Unfortunately, while the contrary situation would be hoped for, charges for access in the less developed countries are invariably higher than charges in the more developed countries. In 2008, the cost of broadband access constituted 1.1 per cent of the GNI per capita of the United Arab Emirates while it was above 35 per cent of the GNI per capita in the Syrian Arab Republic and the Sudan. In Yemen, the cost of broadband access was more than 300 per cent of the GNI per capita.

Disparity also exists among ESCWA member countries for access to information, owing to the inadequacy of infrastructure and Internet penetration. For example, the GCC countries have excellent ICT infrastructure, while the rest of the ESCWA region suffers from inadequate infrastructure and low Internet penetration. In 2008, Yemen recorded a low Internet penetration rate of 7 per cent as a result of a number of factors, including the country's low installed computer base due to the high cost of computers compared to the low purchasing power of Yemeni citizens, the low number of host servers in the country and the inadequacy of advanced Internet services. This is reflected in the rise in broadband Internet penetration in some ESCWA member countries, particularly the GCC countries, while it remained low in others.

TABLE 28. BROADBAND PENETRATION AND COSTS IN ESCWA MEMBER COUNTRIES, 2007-2008

Country or territory	Broadband penetration, 2007	Broadband penetration, 2008	Broadband sub-basket ($)	Broadband sub-basket (*% of GNI per capita*)
Bahrain	5.23	12.14	26.7	1.7
Egypt	0.57	1	8.3	6.3
Iraq	..	..	..	..
Jordan	1.55	2.1	30.9	13
Kuwait	0.93	0.93	46.3	1.8
Lebanon	5.26	4.88	23	4.8
Oman	0.73	1.21	31.3	3.4
Palestine	1.49	1.49	..	..
Qatar	8.37	12.08	..	..
Saudi Arabia	2.43	4.08	39.7	3.1
The Sudan	0.01	0.11	29.1	36.4
Syrian Arab Republic	0.04	0.05	51.3	35
United Arab Emirates	5.17	11.75	21.5	1.1
Yemen	..	..	225.7	311.4

Source: International Telecommunication Union (ITU), *Measuring the Information Society: The ICT Development Index* (2009).

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

Despite limited progress at the regional level, some ESCWA member countries have made considerable progress in increasing access to information and knowledge. For example, Bahrain's broadband penetration almost doubled from 2007 to 2008. The Government has provided a free access to the Internet in public places, including public libraries. In addition, private sector cafés and shopping malls are also attracting customers by providing free access to the Internet through Wi-Fi technology.

In Iraq, the Ministry of Higher Education and Scientific Research, with the support of the Civilian Research and Development Foundation (CRDF), established a virtual library in which 25 universities and five ministries participated. Access to knowledge is considered vital for rebuilding Iraq, particular within the context of improving the curriculum that has suffered in the past. The library is part of the overall plan to improve access to information in Iraq. Statistics indicate that 306,021 books and research papers were electronically downloaded in 2008 from this library.[82]

Jordan has developed the National Information System (NIS), which is a centralized information system aimed at providing access to comprehensive and up-to-date information to the public that covers all sectors.[83] NIS even provides information to registered users through really simple syndication (RSS) feeds about its latest information, news and events.

[82] See https://www.ivsl.org/enter.html.

[83] See http://www.nis.gov.jo.

Lebanon is also trying to increase the rate of access to information and knowledge in the country. In addition to continuously improving and developing its tri-lingual Government Portal for Information and Forms (Informs), some ministries and Government agencies, including the Ministry of Finance and the Central Bank of Lebanon, and private financial institutions provide free access to newsletters, weekly and monthly reports through their Web portals.[84]

In October 2006, the QF in collaboration with the Carnegie Mellon University began a pilot project to digitize the Qatar Heritage Book Collection and make it available to a wide audience. Specifically, the pilot project made available online 300 rare materials and 5,000 books from the general collection of the Heritage Library. The project addressed practical problems surrounding intellectual control of the collection, digitization workflow, optical character recognition (OCR) and management of the Arabic character set, and the configuration of the information management system for worldwide access to the digital library. The Foundation's own central library is scheduled to be completed in 2010 and will be open to schools, universities, research institutes and various community development organizations. Moreover, several major libraries with a strong online and physical presence are available in Doha, bringing the resources of a number of internationally acclaimed academic institutions to Qatar. These include, among others, the Academic Bridge Programme Library, the Carnegie Mellon University Library, the Georgetown University Library and the Weill Cornell Medical College Library.[85]

3. *Multi-purpose community public access points*

Multi-purpose community public access points are vital for establishing comprehensive and affordable access to information, especially in rural areas. They serve to bridge the digital divide among individuals in communities and allow residents of rural and remote areas the opportunity to benefit from ICT as a tool for communications and information access. Public access points can provide services either for free or at reduced rates. Some countries use public facilities, including libraries, schools and post offices, to provide such access to the general public.

A number of ESCWA member countries have established, or are in the process of establishing, community public access points in rural areas, in collaboration with regional, international and non-governmental organizations. An overview of these achievements in selected ESCWA member countries is set forth below.

In Egypt, the IT clubs model offers a communal solution to problems of affordability, accessibility and awareness. The IT club centres are essential components of the country's national plan to familiarize people with technology and promote ICT awareness, regardless of skills, gender and income level. IT clubs allow affordable Internet access across the country; the price of access is approximately $0.20 per hour. In March 2009, the number of IT clubs reached 1,846 and their number is expected to grow, not only in quantity but also in the activities provided and the diversity of population groups targeted. MCIT is creating programmes of activities for those with special needs and those who have dropped out from schools.

Jordan's Knowledge Stations continue to play an important role in providing a variety of services to a broad segment of the society.[86] By the end of 2008, the total number of stations operating in the country reached 159, out of which 28 were available in very poor areas in different parts of the country. These stations contribute to bridging the digital divide and harnessing the use of ICT in various fields. From its inception in 2001 until end 2008, the number of beneficiaries exceeded 540,000 citizens, while the number of citizens who completed an ICT-based training reached over 102,000 (men and women). Moreover, some 3,000 citizens were offered employment opportunities through direct training at the Knowledge Stations.

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[84] See http://www.banqueaudi.com/geteconomy/weekly/weekly.pdf.

[85] See http://www.qf.org.qa/output/page556.asp.

[86] See http://www.ks.gov.jo.

TABLE 29. KNOWLEDGE STATIONS ICT TRAINEES BY GENDER, 2001-2008

Year	Number of trainees	Women (*percentage*)	Men (*percentage*)
2001	13 829	56	44
2002	8 626	57	43
2003	14 045	57	43
2004	21 280	54	46
2005	15 207	52	48
2006	9 463	55	45
2007	9 175	56	44
2008	10 699	60	40
Total/average	102 324	55	45

Source: Knowledge Stations, which is available at: http://www.ks.gov.jo.

In Lebanon, NGOs have been active in setting up and maintaining community centres and Internet access points. Following its launch in 2006, PICTA, in collaboration with ESCWA, private sector companies and other regional and international organizations, succeeded in launching additional community centres in 2007, reaching seven in total. The centres provide citizens across Lebanon with free, ICT-based training courses, and facilitate access to information and the Internet. Moreover, the new "E-Caravan – Phoenix", which is a mobile computer and Internet access vehicle that was launched in 2008, aims to empower local and rural communities in South Lebanon by delivering basic e-literacy sessions, especially for youth, women, the elderly and people with disabilities, as well as advanced IT courses for trainers and for micro and small enterprises (MSEs). The project was initiated as a result of the destruction of the original E-Caravan during the war between Israel and Lebanon in July 2006.[87]

The ITA of Oman continued to establish Community Knowledge Centres (CKCs) aimed at bridging the digital divide and building ICT capacity of citizens across the country. The establishment of CKCs is part of the Community IT Training Project, which in turn falls under the umbrella of the National IT Training and Awareness Framework Initiative (NITTA). In this regard, a memorandum of understanding was signed with the Salalah College of Technology (SCT) in 2008 and a similar one with the Ministry of Sports Affairs (MoSA) in 2009 to set up community centres in their facilities. CKCs can be used by the public to access the Internet and develop their IT skills and knowledge. The initiative also aims to educate and train the community to access digital information and enable citizens to use e-services provided by the public sector.

4. *Using different software models*

Free and Open Source Software (FOSS) provides a viable alternative to proprietary and commercially licensed software, especially for big organizations and Governments with limited budget spending on ICTs. ESCWA member countries have mixed feelings on FOSS, owing to the lack of trust in FOSS suppliers and the scarcity of IT experts needed for development, and support of applications developed with FOSS.

While Egypt has a thriving community of open source contributors and practitioners, the use of open source software in the public and private sector is still in its infancy. Such commercial software vendors, as Microsoft, Oracle and IBM dominate the Government and large enterprise markets with their products, while the use of software solutions in small and medium enterprises (SMEs) and the education sector remains limited. Estimations indicate that the local software and service market in Egypt is worth some $400 million annually, with open source accounting for less than $2 million of that figure.

[87] The original E-Caravan was launched in January 2006 by the Saradar Foundation in partnership with ESCWA. It roamed more than 30 villages, introducing IT awareness and training programmes to communities in South Lebanon; and trained more than 600 persons over a period of six months. More information is available at: http://www.escwa.un.org/divisions/projects/ecaravan/BrochurePh%C5%93nixEnglish.pdf.

In Saudi Arabia, King Abdul Aziz City for Science and Technology (KACST) in collaboration with UNDP is working towards establishing a national Open Source Software (OSS) centre that will act as a point of reference on OSS, focusing on coordinating and facilitating development and implementation of OSS for the public sector in Saudi Arabia.[88]

In 2009, the Information Technology Research Centre (ITRC) at the University of Khartoum and NIC held a FOSS workshop aimed at creating a Sudanese FOSS community and a repository of collaboration tools, including a database of open source experts. Moreover, the workshop aspired to enhance the research and development industry in the Sudan based on FOSS technologies, particularly for localization and building the national operating system.[89]

While some ESCWA member countries have realized the importance of using FOSS and its numerous advantages, the adoption rate of open source is still very minimal. This can mainly be attributed to the inefficiency of open source in addressing the particularity of the Arabic language, especially at the level of its different alphabetical representations. In addition, FOSS lacks the support of interface localization into Arabic, and does not currently provide Arabic spellchecker functionality.[90]

B. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

In order to rank ESCWA member countries according to maturity level in access to information and knowledge, a number of factors were considered, including Internet penetration rates, broadband subscription costs as a percentage of income, availability of community public access centres, free flow of information and the quantity of information available on the Internet. None of the ESCWA members achieved maturity level 4 in 2009.

TABLE 30. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN ACCESS TO INFORMATION AND KNOWLEDGE

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain					✓	✓		
Egypt			✓			✓		
Iraq	✓			✓				
Jordan			✓	✓				
Kuwait					✓	✓		
Lebanon			✓	✓				
Oman			✓			✓		
Palestine	✓	✓						
Qatar					✓	✓		
Saudi Arabia			✓	✓				
The Sudan[a/]		✓						
Syrian Arab Republic	✓			✓				
United Arab Emirates					✓	✓		
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

[88] See http://www.undp.org.sa/sa/index.php/en/25-e-governance-and-access-to-information/open-source-software.

[89] See http://www.itrc.sd/foss/index.html.

[90] M.A. Tawile, Open source software and the Arabic language (in Arabic).

1. *Maturity level 1: Palestine, the Sudan and Yemen*

This maturity level is characterized by low Internet penetration rates and high Internet costs as a percentage of income, as well as unavailability of e-government. Despite the existence of public access centres, these are few in numbers and do not meet the needs of rural and remote areas.

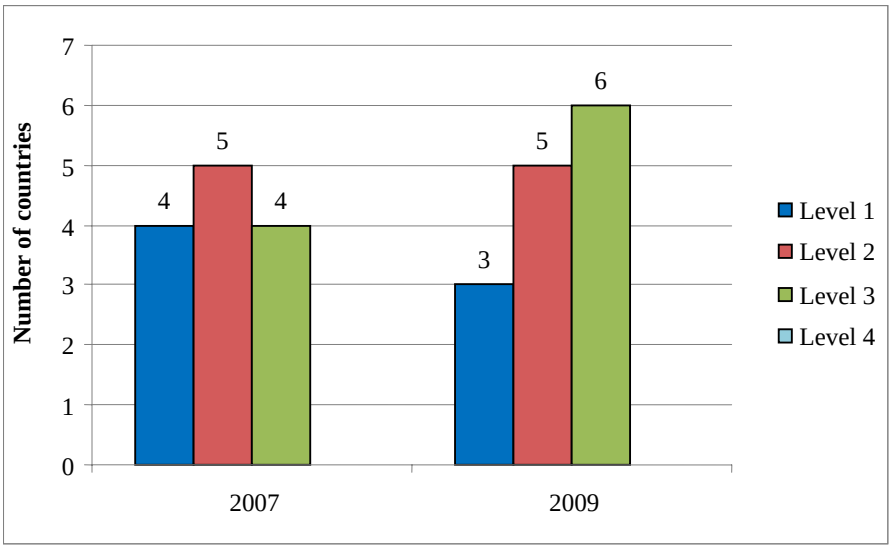
2. *Maturity level 2: Iraq, Jordan, Lebanon, Saudi Arabia and Syrian Arab Republic*

This maturity level is characterized by a relatively high Internet penetration rate and some development of public information in addition to limited access to public domain information, sometimes due to censorship.[91]

3. *Maturity level 3: Bahrain, Egypt, Kuwait, Oman, Qatar and United Arab Emirates*

This maturity level is characterized by high Internet penetration rates, widespread broadband Internet usage and low-cost Internet service. However, public access centres catering to the needs of low-income individuals are still relatively few.

Figure 3. Maturity levels of ESCWA member countries in access to information and knowledge



C. SUGGESTIONS AND RECOMMENDATIONS

Access to information and knowledge requires a reasonably priced and advanced ICT infrastructure, ICT literacy and the availability of digital content. Recommendations are as follows:

(a) Accelerate the implementation of ICT infrastructure projects, especially for broadband technologies and reduce Internet subscription costs to a level affordable by a wider cross-section of the community;

(b) Increase the number of public access centres in all ESCWA member countries, particularly those with modest or low GDP per capita;

[91] Saudi Arabia could have been ranked in a higher maturity level were it not for its strict censorship and filtering policies.

(c) Continue the liberalization of the telecommunication sector and reduce censorship and blockage of websites to a minimum;

(d) Increase the availability of digital Arabic content in order to encourage usage by large segments of the population; and provide free access to scientific content on the Internet in order to encourage research and innovation;

(e) Benefit from success stories and best practices of other regions and countries in the area of access to information and knowledge;

(f) Implement an Arabic Domain Name System for promoting access to information of a large segment of the population that is literate only in Arabic;

(g) Promote the use of FOSS by collaborating with universities and international organizations that are experienced in using FOSS.

IV. ICT CAPACITY-BUILDING

While adult education in the region has begun to take on characteristics of non-traditional learning, more prevalent in other parts of the world, the embedding of ICT skills and tools have become essential parts of this education. This includes providing people with the skills and knowledge needed to respond effectively to the growing challenges of new technologies and the information age.

Most adult education adopted by countries focuses on the major education issues that form the challenges of the human development of that society. In the ESCWA region, the focus of adult education has been primarily on literacy. The consequence is that capacity-building depends on achieving a high level of literacy. Hence, one major way of building capacities is the enhancement of skills and literacy. As such, the information society provides a major opportunity for citizens to develop such skills and education in ICTs.

Using such means requires fighting illiteracy on two levels, namely: (a) at the formal level, moving from simple reading and writing to a more acceptable form of general literacy and awareness; and (b) technical ability, which equally relates to fighting illiteracy, albeit not basic illiteracy. This can contribute towards universal education, lifelong learning and improving professional skills.

A. COMPARATIVE ANALYSIS

1. *ICT to eradicate illiteracy*

Governments in ESCWA member countries have been adopting national plans to reduce basic illiteracy. The progress of such plans has depended mainly on traditional teaching and fighting illiteracy in adult education and ordinary teaching activities. However, as early as 2003-2004, some countries have started adopting ICT tools and technologically based methods in order to achieve more impact and progress. In several countries, large projects of supplying computer systems and communications technologies were placed in high priority.

Using setups whereby computers and Internet access was made available to the community helped significantly. For example, Egypt is using IT clubs and such associated media as educational packages on CDs. In Jordan, the Knowledge Stations formed a major opportunity for fighting illiteracy. The effort was directed towards using such resources to reduce local illiteracy rates. It was apparent that retention rates were higher and learning was quicker by using CD-based media offered at no charge. However, this is not helping significantly, with illiteracy rates remaining almost stagnant on account of population.

The overall work resulted clearly in strengthening the fight against illiteracy, and better literacy rates were observed in most member countries. Table 31 shows the change in literacy rates in ESCWA member countries, and the improvement between 2004/2005 and 2007.[92] While illiteracy affects the entire ESCWA region, the more populated member countries, including Egypt and the Sudan, are particularly vulnerable. However, it has been noticed that there is a growing rate of literacy in some member countries, notably in Saudi Arabia, Qatar, Yemen and United Arab Emirates.

Female adult literacy rates (15+) in the ESCWA region ranged from almost 35 per cent in Yemen to 91 per cent in Kuwait in 2005 (see table 32). Between 1990 and 2005, seven ESCWA members ranked above the world average of 76.5 per cent, namely: Bahrain, which raised its female literacy rate from 74.6 per cent to 83.6 per cent; Jordan from 72.1 per cent to 87 per cent; Kuwait from 72.6 per cent to 91 per cent; Lebanon from 73.1 per cent to 82 per cent; Palestine registered an impressive 88 per cent; Qatar from 76 per cent to 88.6 per cent; and United Arab Emirates from 70 per cent to 87.8 per cent.

[92] United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics, Data Centre.

TABLE 31. CHANGE IN ADULT LITERACY RATES IN ESCWA MEMBER COUNTRIES, 2004-2007

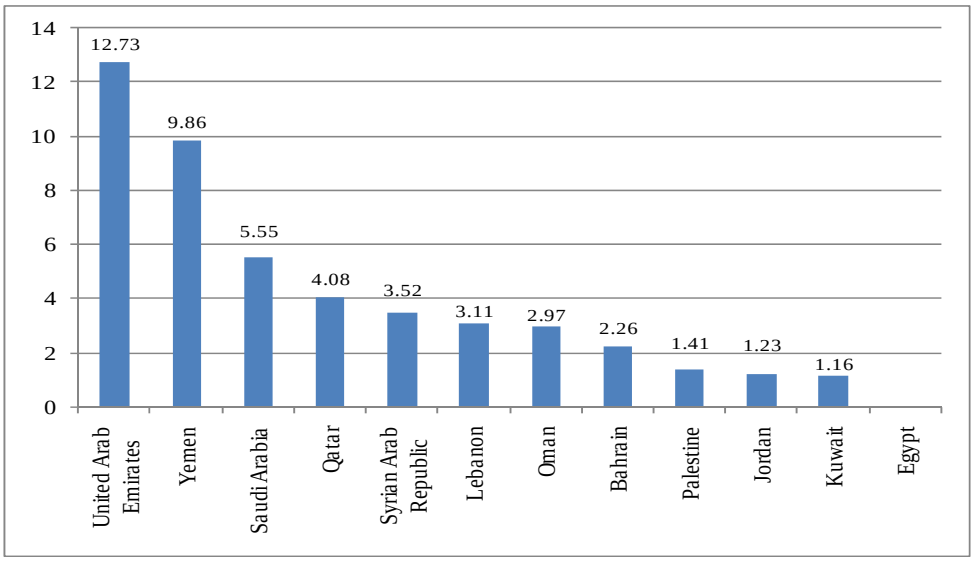
Country or territory	Adult literacy rates prior or up to 2004-2005 (*percentage*)	Adult literacy rates, 2007 (*percentage*)	Percentage point change
Bahrain	86.50	88.76	2.26
Egypt	71.40	71.40	0.00
Iraq	74.10	..	..
Jordan	89.90	91.13	1.23
Kuwait	93.30	94.46	1.16
Lebanon	86.50	89.61	3.11
Oman	81.40	84.37	2.97
Palestine	92.40	93.81	1.41
Qatar	89.00	93.08	4.08
Saudi Arabia	79.40	84.95	5.55
The Sudan	60.9	..	..
Syrian Arab Republic	79.60	83.12	3.52
United Arab Emirates	77.30	90.03	12.73
Yemen	49.00	58.86	9.86

Source: UNESCO Institute for Statistics, Data Centre, which is available at: http://stats.uis.unesco.org/.

Notes: Adults in this context refer to the total population aged 15 years and above (15+).

Two dots (..) indicate that data are not available.

Figure 4. Progress in fighting against illiteracy in the region, 2007
(*Percentage point change*)



However, despite these great strides in female literacy in the ESCWA region, high rates of illiteracy among women persist in the less developed member countries. Indeed, half of all women in the Arab region are still illiterate. Several factors seem to account for such a deficit, including, chiefly, the low rates of primary enrolment, the decline in public expenditure on education since 1995, and "a decline in political commitment or inappropriate approaches to rectifying the situation".[93]

[93] See http://unesdoc.unesco.org/images/0013/001336/133647e.pdf.

TABLE 32. ADULT LITERACY RATES IN ESCWA MEMBER COUNTRIES BY GENDER, 2005

Country or territory	Women (*percentage*)	Men (*percentage*)	Ratio of female to male literacy rate
Qatar	88.6	89.1	0.99
United Arab Emirates	87.8	89.0	0.99
Kuwait	91.0	94.4	0.96
Bahrain	83.6	88.6	0.94
Jordan	87.0	95.2	0.91
Palestine	88.0	96.7	0.91
Lebanon	82.0[a/]	93.6	0.88
Saudi Arabia	76.3	87.5	0.87
Oman	73.5	86.9	0.85
Syrian Arab Republic	73.6	87.8	0.84
Iraq	64.2	84.1	0.76
The Sudan	51.8	71.1	0.73
Egypt	59.4	83.0	0.72
Yemen	34.7	73.1	0.47

Source: UNDP, Human Development Reports online database, which is available at: http://hdr.undp.org/en/statistics/data.

Notes: a/ This is an estimated figure.

Adults in this context refer to the total population aged 15 years and over (15+).

Technology is comparatively lacking in many of the less developed member countries, particularly given that illiterate citizens tend to live in rural and deprived areas. This could stem from the fact that the priorities in such areas focus largely on basic assistance rather than on new technologies. Consequently, the use of ICTs in literacy programmes is still uncommon.

2. *ICT in education and training*

An important type of development work that has been undertaken in member countries in the field of education is often referred to as the national initiative over education. This concept is basically centred on providing more ICT capability, including hardware and connectivity. Combined with this is a set of training programmes that is planned for and administered to all the stakeholders of the educational process, rather than limited to students and teachers. Parents and citizens are encouraged to benefit from such projects. In fact, recent capacity-building programmes have focused on using e-learning platforms and tools, and have started to shift from the traditional IT training to using a PC or accessing the Internet.

In the United Arab Emirates, the Ministry of Education signed an agreement with Microsoft Gulf in 2009 aimed at advancing innovative learning in the country.[94] As part of the agreement, entitled "Partners in Learning", the Ministry of Education is set to receive technology training, tailored curriculum development, access to the latest technologies and the ability to empower schools to raise the levels of ICT literacy. It also enables innovative teaching with the aim of bridging the digital divide.

In Bahrain, the King Hamad's Schools of the Future project uses ICT in primary and secondary education and aims to improve the teaching system used in public schools by converting traditional teaching into an effective learning process based on ICT and using such technologies as digitized course material, Internet-based documents to help teachers and interconnections among schools. UNESCO provided the Government of Bahrain with guidelines to accomplish this project.

The Egypt Education Initiative (EEI) is a PPP aimed at improving education in Egypt through the effective use of ICT. In addition, the e-Learning Competence Centre (ELCC) was established through an

[94] See http://www.ameinfo.com/188122.html.

alliance between MCIT and Cisco Systems in September 2004 to develop and enhance the ICT skills of citizens in all disciplines by delivering educational e-learning programmes.[95]

In the Syrian Arab Republic, more than 1,564 schools out of 2,200 in the country have been wired and connected; while in Palestine, more than 10,000 teachers are being trained within three years (2009-2011), in addition to distributing laptops to schools.

In order to achieve maximum impact for the use of ICT in education, most efforts are carried out through educational organizations and include the development of an educational portal that allows access of students, teachers, administrative staff and parents according to their needs and restriction levels.

The large number of initiatives aimed at providing technology at schools has resulted in enhancing the chances for basic e-literacy increase. Such activities are especially found in Bahrain, Egypt, Jordan, Lebanon, Palestine, the Sudan, Syrian Arab Republic and Yemen. They include establishments that have the main objective of providing access to ICT for the public, which are often called telecentres, Internet cafés, IT clubs or knowledge stations.

In an effort to revitalize their education mainly through the use of ICTs, a number of member countries have started implementing changes to embed ICT in their educational curricula. These efforts were translated into electronic syllabuses with enriched media tools. Oman is one example of such progress whereby, under the revised education system, the field of IT has been incorporated into the curriculum. Some 292 schools in various parts of the country are using e-learning tools as part of the new curriculum. In addition, the Education Portal, launched in 2007, uses IT applications to support learning, teaching, administration and communication with the various stakeholders, especially parents.[96] The Portal provides an electronic link between schools, the regional educational directorates and departments and the Ministry, thereby enabling them to transfer and exchange plans, programmes, data and statistics. It is one of the biggest e-educational initiatives in the country, initially covering 304 schools and more than 112,800 students and 6,855 teachers in Muscat and Buraimi.[97] This is a result of the high priority that was placed on ICT integration in education.

Similarly, all schools in Lebanon, totalling 2,812, are now required to follow a new curriculum designed by the Lebanese Centre for Educational Research and Development (CERD) in 1999. The new curriculum embedded IT as a new instructional subject that emphasizes the teaching of the most common computer skills and concepts, and encourages the use of computers in teaching/learning other subjects.[98]

3. *Training programmes for capacity-building in the use of ICT*

Training programmes form an essential part at the core of national efforts in the region to build ICT capacity, especially in such countries as Egypt. ICT activities are well within national priorities, and specialized educational programmes have been installed, from basic ICT courses to customized programmes aimed at addressing the market needs for qualified professionals and for accredited academic degrees. In addition to covering technical skills in IT, information systems management, and developing systems and applications, these programmes encompass telecommunications monitoring and support.

The International Computer Driving License (ICDL) is an internationally recognized IT skills certification programme. It provides a benchmark of the computer skills of end-users and is becoming the

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[95] See http://www.elcc.gov.eg.

[96] See http://www.moe.gov.om/portal/sitebuilder/sites/eps/english/home.aspx.

[97] See http://www.moe.gov.om.

[98] Statistics for 2006-2007 are available at: http://www.crdp.org.

leading certification for Governments in the region as well as for international organizations and corporations.

ICDL training has been carefully promoted in most ESCWA member countries. In the United Arab Emirates, for example, the ICDL GCC Foundation is working intensively as the certification authority for ICDL training in the Gulf subregion, particularly for public sector employees.[99] More than 100 centres in the GCC region have trained over 12,000 GCC national students on ICDL during summer camp programmes.[100] As part of its plan to improve its educational system, Saudi Arabia has earmarked more than $650 million to train 400,000 teachers with computer skills.[101]

The gender issue, especially female education, remains a priority action in the socio-economic development of Governments in the region. In countries like Yemen, women movements have been strongly supporting such advances. A large number of technical assistance has been sought from international organizations and foreign aid agencies for ICT training and literacy programmes for women. Many of these projects are contributing to the development of the Information Society through NGOs.

For example, SOUL, which is a non-profit NGO in Yemen aimed at developing women and children, has set up capacity-building programmes to empower women and fresh graduates with IT skills and prepare them for the workforce. In fact, foreign aid is often sought for e-literacy programmes in many other ESCWA member countries. Recent studies have shown that the total number of women in the work force in the GCC region stands at 30 to 40 per cent. As such, it is important to note that some 26.8 per cent of ICDL certificates issued in 2008 in the Gulf subregion were received by women.[102]

Moreover, specialized technical training forms part of capacity-building activities. Specifically, partnerships between respective Government agencies and international companies have resulted in joint programmes for capacity-building in technical skills, whereby international companies and organizations have assisted some countries in developing the technical skills of its citizens or workforce. Examples of these companies include Cisco, Intel, Microsoft and other companies with training initiatives implemented in Egypt, Jordan, Kuwait, Lebanon, Oman and Palestine.[103]

On the other hand, the rapid adoption of e-government and the growth in the development of e-services in the region has led to the need for developing literacy programmes for society. This has implied specialized training programmes for the community, not on general computing usage, but rather for accessing and using online public services. An e-citizen training programme has been implemented in Abu Dhabi in collaboration with the UAE Academy on how to use public e-services offered online.[104] In Saudi Arabia, the e-citizen syllabus includes an e-participation block, which teaches the use of such online services as e-government transactions, and the purchase of products and services online. In Kuwait, CAIT is playing a leading role in promoting digital knowledge in the country, with plans underway to train 480 employees from various ministries and an additional 1,200 employees from 19 Government agencies during 2009.

There are governmental plans through which all public sector employees would be given the chance to develop proper ICT skills and knowledge. For example, the Jordanian Government together with NIC, adopted a plan to provide adequate training on these skills for more than 30,000 municipal employees in 2008.

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[99] See http://www.icdlgcc.com.

[100] See http://www.ameinfo.com/202342.html.

[101] Business Monitor International, *Saudi Arabia Information Technology Report* (October 2009).

[102] See http://www.ameinfo.com/192982.html.

[103] See http://www.lebanonpartnership.org.

[104] See http://www.ameinfo.com/185637.html.

While the current capacity-building plans and administered programmes are ambitions, actual achievements have only recently started to bear fruit. However, it is expected that in the coming two years major progress along this planning could be observed.

4. *Innovation and patents*

Innovation in science and technology, for most countries, has become a fundamental pillar, leading to improved economic performance and achieving substantial social development. Clearly, research and development (R and D) is still not a priority in the region given that the political leadership focuses more on solving urgent or immediate concerns rather than on making the long-term investments needed for R and D. Consequently, R and D programmes in the ESCWA region do not figure prominently in Government budgets or in long-term development agendas and strategies.

While some ESCWA member countries, including Qatar, Saudi Arabia and the United Arab Emirates, are witnessing encouraging changes that could reflect positively on long-term R and D, especially with regards to infrastructure, liberalization of the economy, education and human resources development, it is still too early to measure their outcomes, given how recently these initiatives have been undertaken.

ESCWA member countries undoubtedly need to move fast to adopt serious strategies and enhance their capabilities in innovation, research and development if they aspire for their economies to flourish in an era marked by global competitiveness.

Saudi Arabia has started developing three cities of particular importance to development. One of them is the Knowledge Economic City in Al-Madinah, which is set to focus on such knowledge-based industries, as health care, digital technology and tourism.[105] Qatar has placed resources (financial and infrastructure) for the development of research, particularly in the scope of Qatar Foundation. A national strategy for R and D has been initiated and it contains a strong ICT-oriented component.

It is interesting to note that Jordan has initiated a strategy to encourage establishing research funds to support applied research in ICT and such sectors as health and education, and to encourage the development of incubators. Additionally, this strategy aims to protect intellectual property rights and boost competitiveness in innovation.

While science and technology have always been important in the ESCWA region, national and regional mechanisms necessary to convert information and knowledge into economic products have been lacking. Apart form research activities carried out by universities and other research centres, member countries have been modest in their output, mainly due to lack of funding which is a serious impediment to research and innovation. This, coupled with a lack in long-term development strategies, is significantly hindering the development of national economies and a thriving ICT sector. Available data indicate that the entire Arab region allocated $1.7 billion for scientific research in 2004, which represent a rate that is equivalent to a very modest 0.3 per cent of the combined GDP of Arab countries.[106]

In this regard, ESCWA is in the process of establishing its Technology Centre (ETC) in order to link science and technology with the marketplace; and to support national and regional capacity-building in science, technology and innovation (STI) by promoting the use of appropriate modern technologies, with a view to attaining sustainable development.[107]

(a) *Innovation*

The World Bank annual Knowledge Assessment Methodology (KAM) includes an innovation pillar that is the simple average of the normalized scores on three key variables, namely: total royalty payments

[105] See http://www.madinahkec.com.

[106] UNESCO Institute for Statistics, Data Centre.

[107] See http://www.escwa.un.org/divisions/ictd/etc/main.asp.

and receipts; patent applications granted by the United States Patent and Trademark Office (USPTO); and scientific and technical journal articles.

The United Arab Emirates topped the ESCWA region on this innovation pillar in July 2009, while Qatar ranked second and registered phenomenal growth over its performance in 1995. Lebanon, Syrian Arab Republic and Yemen also showed significant progress, while the remaining ESCWA member countries witnessed a relapse in performance levels.

TABLE 33. PERFORMANCE OF ESCWA MEMBER COUNTRIES ON THE WORLD BANK INNOVATION INDEX, 1995-2009

Rank	Country or territory	1995	2008	Change
1	United Arab Emirates	6.59	6.69	+0.1
2	Qatar	4.79	6.45	+1.66
3	Jordan	6.17	5.59	-0.58
4	Kuwait	5.50	4.98	-0.52
5	Oman	5.48	4.94	-0.54
6	Lebanon	4.26	4.53	+0.27
7	Egypt,	5.08	4.44	-0.64
8	Bahrain	6.93	4.29	-2.64
9	Saudi Arabia	5.0	3.97	-1.03
10	Syrian Arab Republic	3.07	3.17	+0.1
11	Yemen	2.03	2.67	+0.64
12	The Sudan	2.17	1.86	-0.31
13	Iraq	..	..	..
14	Palestine	..	..	..

Source: The World Bank Knowledge Assessment Methodology (KAM 2009), weighted by population. More information is available at: www.worldbank.org/kam.

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

Alternatively, table 34 shows the rankings of selected ESCWA member countries based on the average of two popular indicators, namely the innovation pillar and the Global Innovations Index (GII). The definition of innovation by the Global Competitiveness Report is broader and, in the 2009-2010 edition, was based on the following: assessment of capacity for innovation, quality of scientific research institutions, company spending on R and D, university-industry collaboration in R and D, Government procurement of advanced technology products, availability of scientists and engineers, and numbers of utility patents.

By contrast, in their 2008-2009 GII, the Confederation of Indian Industry and INSEAD arrive at a global innovation score ranking for 130 countries by using such parameters as institution and policy, human capacity, infrastructure, technological sophistication and business markets.

TABLE 34. OVERALL RANKING OF SELECTED ESCWA MEMBER COUNTRIES ON OTHER INNOVATION INDICES

Rank	Country	Innovation pillar score	Ranking (133) 2009-2010	GII overall score	Ranking (130) 2008-2009
1	United Arab Emirates	3.87	27	3.99	34
2	Qatar	3.65	36	4.12	76
3	Saudi Arabia	3.7	33	3.65	55
4	Bahrain	3.22	60	3.59	30
5	Kuwait	2.96	83	3.66	52
6	Oman	3.3	52	3.23	24
7	Jordan	3.27	59	3.16	32
8	Egypt	3.03	74	2.83	94
9	Syrian Arab Republic	2.71	110	2.55	26

Sources: European Institute of Business Administration (INSEAD) and Confederation of Indian Industry, *Global Innovation Index 2008-2009*; and World Economic Forum, *The Global Competitiveness Report 2009-2010* (2009).

(b) *Patents*

If all patents registered by USPTO over the period 1999-2008 were distributed evenly for every one million inhabitants in the world, the Arab world's share would be around 81,000 patents, instead of the actual number registered at only 434.[108] The absence of a culture that encourages innovation and supports research and invention in the ESCWA region is evidenced in the number of patents registered by countries in the region. Throughout the past 10 years, the patents granted to ESCWA member countries by USPTO numbered only 409. By stark contrast, USPTO issued more than 1.6 million patents to applicants across the world over that decade, which translates into a share of 0.0254 per cent for the ESCWA region out of the total number of patents issued. However, the ESCWA region accounted for over 94 per cent of all patents issued to the Arab world during that same 10-year period.

The ESCWA figure gains additional meaning when it is examined in the context of the international patent measures, namely, the number of patents granted per one million people in a given country. ESCWA has calculated the number of patents granted by USPTO for each of the ESCWA member countries in the 10-year period from 1999 to 2008, and divided the result by 10 to arrive at an annual average (see table 35). The results indicate that this average for the ESCWA region is 40.9 patents, or 0.166 per one million people. This is slightly higher than the Arab average, at 0.127 patents, but dramatically lower than the global average of 23.7 patents per one million people.

TABLE 35. AVERAGE PATENTS PER PERSON: ESCWA REGION AND SELECTED COUNTRIES, 1999-2008

Rank	Country or region	Average number of registered patents (*per annum*)	Patents granted per million people (*per annum*)
1	Kuwait	7.4	2.71
2	United Arab Emirates	4.2	0.94
3	Saudi Arabia	17.4	0.71
4	Lebanon	2.5	0.60
5	Qatar	0.4	0.31
6	Bahrain	0.2	0.26
7	Oman	0.6	0.22
8	Jordan	1.0	0.17
9	Egypt	5.7	0.070
10	Syrian Arab Republic	1.3	0.061
11	Yemen	0.1	0.004
12	Iraq	0.1	0.004
13	Palestine	..	..
14	The Sudan	0	0
	ESCWA average	40.9	0.166
	Arab average	43.4	0.127
	GCC average	30.2	0.823
	Levant average	10.6	0.073
	World average	161 029	23.7
	Israel	1 017.2	139.2
	Turkey	13.2	0.179
	Malaysia	80.7	3.0
	Japan	33 552.7	262.7
	USA	83 719.4	275.3
	Germany	10 131.7	123.3
	India	1 268.2	1.1

Source: United States Patent and Trademark Office (USPTO).

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

[108] See http://www.uspto.gov.

Kuwait tops the ESCWA region in the number of patents per capita, averaging 2.71 patents per annum for every one million people, with 74 patents registered by individuals residing in the country during the past 10-year period. However, despite ranking first in the ESCWA region, Kuwait's performance is much lower than that of an emerging economy such as Malaysia, which registered 3.0 patents per one million people during the same period.

Egypt registered 57 patents in the past 10 years, the third highest figure in the Arab world, after Saudi Arabia, at 174 patents, and Kuwait, with 74 patents. However, it achieved a lower rank, at 9, given that the number of patents per one-million people was a very modest 0.07 per annum. Meanwhile, Yemen and Iraq both registered one patent in the past decade, while the Sudan registered no patents for the same period.[109]

While the average annual patents registered in the ESCWA region is 0.166 patents per one million people, there is great disparity in regional averages. The six countries of the Gulf subregion, namely, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates, average 0.823 patents per annum per one million people, which constitutes ten times the average of 0.073 patents per one million persons that was recorded in the Levant region.[110]

B. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

1. *Maturity level 1: Iraq, the Sudan and Yemen*

This maturity level is characterized by limited use of ICT in education, weak technical training programmes and an absence of research and innovation programmes.

2. *Maturity level 2: Bahrain, Kuwait, Oman, Palestine and Syrian Arab Republic*

This maturity level is characterized by relatively significant information technology use in education, existence of ICT training programmes for public sector employees and the development of clear plans for R and D and innovation.

Most countries in this maturity level have retained their position since 2007, while only Saudi Arabia has moved up to maturity level 3. Despite the efforts exerted by Oman and Palestine and the Syrian Arab Republic, their performance was not enough to take them to the next level.

3. *Maturity level 3: Egypt, Jordan, Lebanon, Qatar and Saudi Arabia*

This maturity level is characterized by widespread use of ICT in schools and universities, extensive IT literacy programmes and progress in R and D. Jordan maintained its ranking in this level; however, Egypt, Lebanon, Saudi Arabia, and Qatar advanced one level; these member countries exhibited developments worthy of moving them upwards from maturity level 2.

4. *Maturity level 4: United Arab Emirates*

The only member country in this maturity level exhibited a strong and mature use of ICT in education, especially e-learning applications, dedicated IT literacy programmes both for the public sector and citizens, an advanced progress in science and technology, and adequate funding for R and D leading to innovation.

[109] Palestine is not included in the database of the United States Patent and Trademark Office (USPTO).

[110] In this context, the Levant is defined as encompassing Egypt, Iraq, Jordan, Lebanon, Palestine and Syrian Arab Republic.

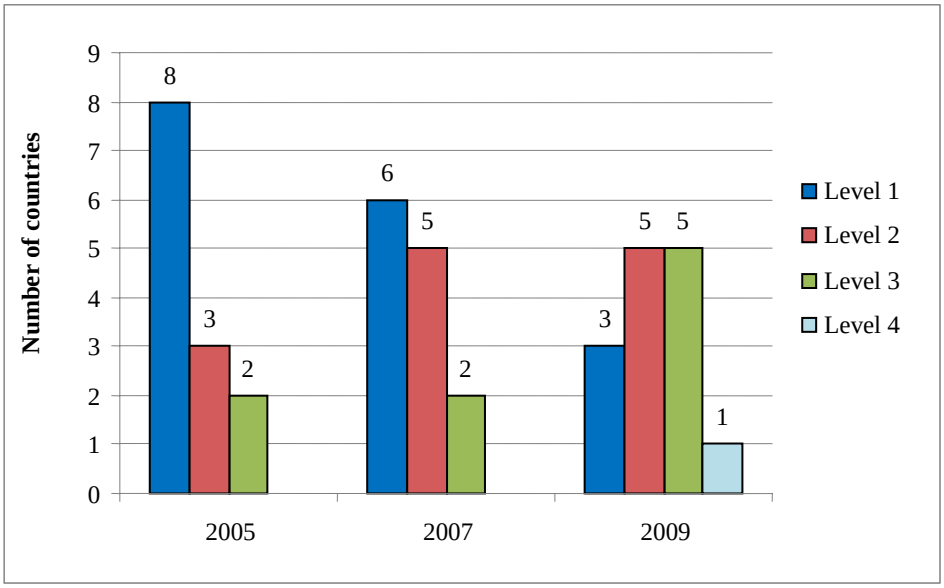
TABLE 36. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN ICT CAPACITY-BUILDING

Country or territory	Maturity level 1			Maturity level 2			Maturity level 3			Maturity level 4		
	2005	2007	2009	2005	2007	2009	2005	2007	2009	2005	2007	2009
Bahrain	✓	✓				✓						
Egypt				✓	✓				✓			
Iraq	✓	✓	✓									
Jordan							✓	✓	✓			
Kuwait	✓				✓	✓						
Lebanon				✓	✓				✓			
Oman	✓	✓				✓						
Palestine	✓	✓				✓						
Qatar	✓				✓				✓			
Saudi Arabia				✓	✓				✓			
The Sudan[a/]			✓									
Syrian Arab Republic	✓	✓				✓						
United Arab Emirates							✓	✓				✓
Yemen	✓	✓	✓									

Source: Compiled by ESCWA.

Note: a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 5. Maturity levels of ESCWA member countries in ICT capacity-building



C. SUGGESTIONS AND RECOMMENDATIONS

While ESCWA member countries exhibited adequate ICT capacity-building programmes, the average spending on R and D remains lower than the world average. In order to build an information society, the region must pay greater attention to this aspect. Naturally this can be done in two tracks over a short or long term, depending on resources, strategies and policies for development in the field of ICT capacity-building.

The following recommendations can be used as guidelines to be developed further, in line with the specificities and circumstances of each country in the region:

(a) Adopt serious strategies and employ greater capabilities in R and D, as well as stimulate initiatives and pledges for the allocation of adequate amounts of funds (a percentage of annual GDP) for R and D, especially in science and technology;

(b) Increase spending on education and focus on adult education to avoid serious incidents in the evolution of societies in the region. In this regard, ICTs can extend the scope of education and training and be instrumental in providing new educational services at all stages in life. It should be used to support innovation and enable lifelong learning for all;

(c) Raise the level of human resource training in public and private sector establishments through ongoing training programmes, and associate employee performance assessment with continued training;

(d) Devise strategies and action plans for capacity-building and place education among the top priorities in Government developmental plans;

(e) Update educational systems, integrate ICT in education and training by equipping schools and training teachers, and incorporate the fields of basic ICT, the Internet and online research as subjects in school curricula;

(f) Build multi-disciplinary networks of human expertise and resources and create dedicated centres of excellence for technology training, knowledge sharing and cross-border cooperation.

V. BUILDING CONFIDENCE AND SECURITY IN THE USE OF ICTs

A. COMPARATIVE ANALYSIS

Confidence and security in the use of ICTs are crucial factors for building an inclusive, secure and robust Information Society as acknowledged by WSIS. However, the future growth and potential of a thriving online environment is being challenged by rising cyberthreats. Organizations and individuals are becoming increasingly dependent on information stored and transmitted over advanced computer and communications networks. Therefore, information and communications security has become vital for users when conducting their online activities whether at home, at the workplace or from anywhere else.

At a regional level, building confidence and security in the use of ICTs was considered one of the main axes of the Arab ICT Strategy – Building the Information Society 2007-2012", which was approved by the Arab Telecommunications and Information Council of Ministers (ATICM) in 2007.[111] In order to build confidence and security in the use of ICTs, the Arab ICT Strategy stressed out the importance of information and network security, privacy and data protection, cyberlegislation and international cooperation to combat cybercrimes and the misuse of ICTs.

In the ESCWA region, all member countries are working towards promoting and building confidence and security in the use of ICTs. While tangible progress has been achieved by some countries, disparities exist among others and initiatives remain scarce, insufficient and inefficient in most ESCWA member countries.

1. *Use of electronic transactions and documents*

Apart from e-banking, the use of electronic transactions and electronic means of authentication have yet to be developed in the ESCWA region. The major aspects of electronic transactions are the validation and acceptance of the source which transmits an electronic document, including its content, as well as authentication, validation and acceptance of e-signature. Building confidence in the use of electronic transactions should tackle the above-mentioned aspects. In this context, most ESCWA member countries are currently working on setting up appropriate and integrated legal frameworks able to drive the use of e-transactions, in addition to parallel efforts exerted in the field of certification and authentication of e-signatures. In this regard, selected initiatives from the region are highlighted below.

The United Arab Emirates became a pioneer in the region for creating a "rule of law" governing electronic transactions when it enacted the Law of Electronic Transactions and Commerce No.2/2002 (Law No. 2) in 2002. The Law consists of 39 articles and 8 chapters, regulating all aspects related to e-contract and e-signature. It also deals with the requirements of electronic transactions, formation and validity of e-contracts, protected electronic records and signature, authentication, certificates, certification services, Government use of electronic records and signature, penalties and other miscellaneous previsions. Since its inception, the Law has developed a business and regulatory environment in which commercial enterprises, Internet-based and media companies are able to operate globally out of the country with significant competitive advantages over local and regional competitors.

Furthermore, a number of creative initiatives have been undertaken by the United Arab Emirates to encourage the move from paper-based to a paperless environment. An example of such an initiative is the Civil Engineering Department's (CED) Paperless Initiative of Dubai Ports, Customs and Freezone Corporation (PCFC), which is illustrated in box 2.

[111] See http://www.aticm.org.eg.

In the financial sector, the United Arab Emirates uses e-Dirham, a secure payment tool developed by the Ministry of Finance, to facilitate collection of revenues. E-Dirham provides the Government with a secure payment method and the public with a convenient payment tool. While this tool was initially intended for the revenue collection of the Federal Government, it gradually became the payment method of choice for local Governments, semi-governmental organizations and some in the private sector. Currently, e-Dirham is widely available and can be used through point-of-sale terminals located at various ministries and departments across the United Arab Emirates; over the Internet through a secure Internet Payment Gateway; and through e-Stamp, a payment channel used to authenticate pre-paid smart forms.[112]

Box 2. The Paperless Initiative of Dubai Ports, Customs and Free Zone Corporation (PCFC)

The Initiative was triggered when the amount of paper being handled had reached enormous proportions. In line with Dubai's development, workload at the Civil Engineering Department (CED) increased manifold with a corresponding increase in paper load. One of the first steps taken by CED in this Initiative was the automation of its core business processes in place, which alone would reduce its dependency on paper. As part of this initiative, CED implemented the following:

(a) *E-Permit*: This takes care of full document handling and workflow management associated with building permit applications. All drawings and other documents are received as digital files and all correspondence between CED, consultants and clients is handled through the Internet and e-mail;

(b) *E-Site*: This is a system based on personal digital assistants (PDAs) and geographic information systems (GISs) used by site inspectors visiting construction sites, who receive all relevant details including location maps online on their handheld devices with no need to carry papers;

(c) *E-Map*: It brings a wealth of geographic information to the computer desktop of any authorized staff member of PCFC through a user-friendly web interface;

(d) *E-Bidding*: A new product enabling effective negotiations with the bidders of large construction projects, which, in addition to reducing papers, is expected to bring the contract value down.

Whereas these electronic products have eliminated the use of paper, the massive amount of already archived paper-based information stored in huge filing rooms has been scanned and is now stored in online storage systems.

The direct benefits of this Initiative have been reflected in terms of reducing the office space, storage spaces, expenditure on stationery, building permit approval time from 3 or 4 days to a few minutes, project documentation time from 4 days to 4 hours, and the comments consolidation time from 21 days to 7 days.

In an effort to promote the use of electronic transactions, Saudi Arabia has made significant strides in developing security solutions as it continues with the implementation of its e-government initiative, Yessir; such an initiative requires an electronically secure environment to thrive and instil in citizens trust for using e-services especially as it rolled out new national ID cards. The MCIT launched its National Centre for Digital Certification (NCDC), which applies Public Key Infrastructure (PKI) technology for managing digital keys used for securing electronic transactions and data exchange in public networks.[113] PKI provides confidentiality and integrity for information, along with identity authentication by performing digital signatures and other cryptographic functions, combined with the registration and verification process. In addition, NCDC manages and hosts the Saudi National Root Certification Authority (CA) along with other certification systems to provide a highly secure and trusted environment, thereby allowing different stakeholders to feel secure when conducting electronic transactions. In addition, during 2009, NCDC developed the security policies, procedures and standards for registering or licensing Certificate Service Providers (CSPs) and the associated mechanisms, including CSPs supervision, by way of auditing and performing compliance checks.

[112] See http://www.e-dirham.gov.ae.

[113] See http://www.pki.gov.sa.

The e-transactions law of Oman, which was enacted in 2008, legalizes the use of digital signatures and communications via e-mail. Organizations wishing to use digital signatures must be approved by ITA through a formal process. This regulation aims to control and regulate electronic transactions and provide a legal framework that facilitates e-transactions, thereby consolidating public trust in the safety and authenticity of e-transactions, messages and records. The law strengthens the adoption of e-transactions at the national and regional levels by using e-signature.[114] In this regard, ITA signed a memorandum of understanding in March 2009 with the Tunisian National Digital Certification Agency to undertake cooperative efforts leading to the establishment of a digital certification system for Oman.[115] This constitutes an important step towards enhancing the use of electronic transactions and documents.

In Kuwait, the use of electronic transactions, electronic documents and electronic signature is still limited due to the absence of necessary laws, legislations and an appropriate national infrastructure capable of enabling and legalizing this form of use. However, sectoral ICT plans have been drawn to include the establishment and management of a national structure for the certification and the use of mechanisms, such as "single sign-on" for e-services provided on e-government portals.

TABLE 37. AVAILABILITY OF E-TRANSACTION LAW, E-SIGNATURE LAW AND INFRASTRUCTURE FOR THE MANAGEMENT OF PKI IN THE ESCWA REGION, 2009

Country or territory	e-transaction law	e-signature law	Management of PKI
Bahrain	✓	✓	×
Egypt	✓	✓	✓
Iraq	×	×	×
Jordan	✓	✓	×
Kuwait	×	×	×
Lebanon	×	×	×
Oman	✓	✓	×
estinePal	×	×	×
Qatar	×	×	×
Saudi Arabia	✓	✓	✓
The Sudan	✓	✓	×
Syrian Arab Republic	×	✓	×
United Arab Emirates	✓	✓	×
Yemen	×	×	×

Source: Compiled by ESCWA.

Table 37 summarizes legal efforts undertaken by ESCWA member countries to build confidence and security in the use of electronic transactions and documents. Bahrain, Egypt, Jordan, Oman, Saudi Arabia, the Sudan and United Arab Emirates have all worked to develop laws and legislations for electronic transactions. Most of these laws cover the management of electronic records, electronic contracts, electronic signatures and the criminalization of certain cyberactivities. Furthermore, in terms of authentication, validation and acceptance of electronic documents and e-signatures, it is important to note that only Egypt and Saudi Arabia have established an appropriate infrastructure for the management of security keys needed to achieve information confidentiality and data integrity, authenticate user identities and use digital signatures.

2. *Online and network security*

The rapid growth in Internet adoption and penetration in recent years has been considered to be the major force behind building the information society. However, the world is witnessing a surge in

[114] Pursuant to Article 2 of the Electronic Transaction Law 69/2008.

[115] See http://www.certification.tn/index.php?id=4.

cybercrimes whereby the security of online networks is being undermined, posing serious challenges to the developmental benefits promised by the advent of ICTs. To avert these threats and protect national ICT infrastructure, countries need to devise comprehensive action plans that can address technical, legal and policy issues related to network security, and intensify regional and international cooperation given that the Internet realm knows no borders. In this regard, ITU published a report in 2008, entitled Best practices for a national approach to cybersecurity, which outlines a management framework for organizing national cybersecurity efforts and in which five key elements were identified, namely: developing a national cybersecurity strategy; establishing national Government-industry collaboration; creating a national incident management capability; deterring cybercrime; and promoting a national culture of cybersecurity.[116]

Safeguarding online networks and responding to mounting cyberattacks, Oman, Qatar, Saudi Arabia and United Arab Emirates have adopted institutional frameworks and established national computer emergency response teams (CERTs). By contrast, the remaining member countries have used a lightweight, non-institutional approach for dealing with cybersecurity issues. Oman National CERT, Q-CERT in Qatar, CERT-SA in Saudi Arabia, and aeCERT in the United Arab Emirates have been set up with the objective of facilitating the detection, prevention and response to cybersecurity incidents by developing and implementing national cybersecurity plans. It is also important to note that these response teams are active in promoting and building a cybersecurity culture in their respective countries.

In addition to the services provided by CERT-SA, Saudi Arabia's CITC launched in 2007 the Saudi National Anti-SPAM Programme in collaboration with MCIT.[117] The Programme aims to develop an anti-spam policy framework by defining the roles and responsibilities of service providers, increasing awareness and finding appropriate measures to combat it.

TABLE 38. AVAILABILITY OF NATIONAL COMPUTER EMERGENCY RESPONSE TEAMS IN THE ESCWA REGION

Country	CERT	Website
Egypt	Egypt-CERT[a/]	http://egypt-cert.net
Oman	Oman National CERT	http://www.cert.gov.om
Qatar	Q-CERT	http://www.qcert.org
Saudi Arabia	CERT-SA	http://cert.gov.sa
United Arab Emirates	aeCERT	http://www.aecert.ae

Source: Compiled by ESCWA.

a/ While Egypt-CERT is still under development, the domain has been registered by the National Telecom Regulatory Authority (NTRA).

Despite the progress exhibited by the establishment of CERTs in the Gulf subregion, the latest figures published by Symantec's annual report on Internet security threat in Europe, Middle East and Africa (EMEA) show that the current situation in the region is alarming. The 2008 report provides an annual overview and analysis of Internet threat activities, a review of known vulnerabilities, and highlights of malicious code in the EMEA region.[118] In its 2008 trends, the top countries of attack origin worldwide were identified whereby the ranking of the United Arab Emirates rose from 43 in 2007 to 10 in 2008. This increase could simply stem from significant broadband expansions, which often results in a growth in malicious activity. Furthermore, the top ranked country for potential virus infections in EMEA region is Egypt, which is also due to a high growth in broadband penetration combined with a possible lack of security awareness in a relatively inexperienced Internet community.

[116] See http://www.itu.int/ITU-D/cyb/cybersecurity/docs/itu-draft-cybersecurity-framework.pdf.

[117] See http://www.spam.gov.sa.

[118] See http://www.symantec.com/business/theme.jsp?themeid=threatreport.

TABLE 39. LOCATION BY TYPE OF MALICIOUS CODE, 2008

Rank	Top countries			
	Back doors	Trojans	Viruses	Worms
1	United Kingdom	United Kingdom	Egypt	Saudi Arabia
2	Spain	France	Turkey	United Kingdom
3	France	Germany	United Kingdom	Spain

Source: Symantec, Internet Security Threat Report, vol. XIV (April 2009).

In 2008, Saudi Arabia had the highest number of potential worm infections in the EMEA region. This is a significant change from 2007, when it was ranked 13 for potential worm infections by the "mabezat worm", which was the third most common malicious code family in the region in 2008.

3. *Privacy and data protection*

The ESCWA region still faces major shortcomings in privacy and data protection owing to the lack of comprehensive legislations and the inadequacy of available legal texts to govern impeding issues.

In Oman, the Electronic Transactions Act (No. 69 of 2008), which laid the ground rules for electronic transactions, devotes a separate section to addressing privacy and data protection. However, the law fell short of covering all the substantive principles and procedural rules for the protection of personal data. In a similar context, Qatar has devised plans to incorporate its stance on data protection as part of its electronic commerce law.

In terms of the wider Arab region, Tunisia has developed the most holistic legislations for privacy and data protection, while in the United Arab Emirates, the Federal Government has put in place a comprehensive legislation to protect data with the enactment of the Data Protection Law in 2006. However, this Law has yet to be implemented fully and is currently only applied within the jurisdiction of the Dubai International Financial Centre (DIFC).

With regard to user awareness, education and capacity-building on online privacy and the means of protecting personal data, all CERTs in the region are working closely with their respective Governments and private-sector entities to promote a "cybersecurity culture" at the national level. This is being achieved through the organization and implementation of specialized awareness-raising campaigns and published guidelines targeted at decision-makers, public sector institutions, the private sector and individuals concerning threats imposed by cyberspace and ways to protect computers and networks in SMEs and in households. Box 3 highlights the major activities and achievements of national CERTs for building and promoting a cybersecurity culture in the ESCWA region.

Box 3. Activities of national CERTs for building and promoting a cybersecurity culture in selected GCC countries

aeCERT has been very active in raising awareness of IT security in the United Arab Emirates. In March 2008, aeCERT launched the second part of its 12-month National Cyber-space Security Awareness campaign. The new programme focuses on raising awareness of online threats for businesses and consumers in the country and includes three education modules focused on e-mail security, instant messaging and web browser security, and best practices and tips for end users.

Q-CERT is working in close collaboration with the public and the private sector to promote and implement a national "culture of cybersecurity" in Qatar. It works with organizations who deliver critical services in order to help them identify their most important information assets and develop appropriate risk management strategies to prevent attacks. Q-CERT accomplishes this by helping critical sector organizations to create and improve their cybersecurity capability and capacity. Furthermore, given that cybersecurity is not confined to national boundaries, Q-CERT works with other security teams across the world to maintain awareness of global trends and coordinate response to international threats.

CERT-SA of Saudi Arabia has been focused on developing, printing and disseminating a number of awareness-raising pamphlets (in Arabic) covering online information security and the protection of services. Another main component, CERT-SA, is the development of policies and procedures guide for information security in Government agencies, which is expected to be completed by the end of 2009.

Oman National CERT provides alerts and warning messages on its website. It is currently carrying out a national security awareness campaign, which began in May 2009, and has also launched a bilingual children's website for protecting children in cyberspace, where youngsters are able to learn more about how to keep themselves safe during their presence on the Internet.

4. *Countering the misuse of ICTs*

Cybercrime is a growing problem worldwide to which no country is immune. The ESCWA region has seen a phenomenal growth in Internet connectivity in recent years and, consequently, a similar increase in cybercriminal activities. This requires increased countering efforts across the region to strengthen the information infrastructure, educate users about security awareness and develop cybercrime regulations. The increase in broadband penetration rates coupled with a decrease in subscription fees has resulted in large numbers of new users in the ESCWA region joining the online community every year at a rate outpacing that of the rest of the world. Indeed, the ESCWA region topped the world in Internet penetration growth during the period 2000-2008, registering a whopping rate of 1,507 per cent.[119] This large number of users has made the Internet the preferred medium of choice for communication and information exchange, as well as creating new opportunities for providing services and conducting business online. However, due to the lack of security awareness programmes, and the absence of virus, spam and spyware protection software, many online users are becoming the victims of rising cybercrime attacks, rendering the online space a risky environment marred by electronic abuse.

While ICT spending in the Middle East reached $73 billion in 2008, driven mostly by Saudi Arabia and the United Arab Emirates, few funds were dedicated to protecting network security.[120] Meanwhile, financial experts in the ESCWA region disclosed that over the past few years, banks in the region lost approximately $1 billion to organized cybercrime on online transactions.[121] Additionally, most banks in the region are vulnerable to phishing attacks.[122] It should be a strong warning to allocate more investments for IT security systems and awareness.

Few member countries are trying to address the misuse of ICTs at the legal level. While the United Arab Emirates, Jordan, the Sudan and Saudi Arabia have all shaped legal definitions for cybercrimes, specific laws combating cybercrime have yet to be enacted. In addition, the lack of regulations signals a lack of law enforcement training, tools and techniques. Legislative authorities in these countries also suffer from a scarcity of legal expertise in this domain.

Regarding the prevention and detection of cybercrimes and the misuse of ICTs, it is important to note that internal security forces in Jordan, Kuwait and Lebanon have instituted special units aimed at fighting Internet crimes and the misuse of ICTs. These units have been equipped with necessary IT systems, software and equipment to properly detect and prevent such crimes.

Saudi Arabia plans to launch an operations unit for network security under the framework of CERT-SA for the purpose of monitoring information security at the national level. The project includes controlling the main communication channels and other critical infrastructures. In addition, all policies and procedures for monitoring, discovering and responding to incidents have already been designed.

B. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

In terms of building confidence and security in the use of ICTs in the ESCWA region, there have been several noteworthy changes in maturity levels compared to previous years. These changes do not necessarily reflect real progress or retreat in maturity levels. Rather they were deemed necessary corrections or

[119] See http://www.internetworldstats.com.

[120] This is according to the World Information Technology and Services Alliance (WITSA), which is available at: http://www.witsa.org.

[121] See https://www.issa.org/Library/Journals/2008/June/El-Guindy-Cybercrime in the Middle East.pdf.

[122] See http://www.infosecnews.org/pipermail/isn/2008-February/015963.html.

adjustments to previous rankings. For example, the previous report ranked Iraq and Kuwait at maturity level 2, while current information and data show that the countries are actually at maturity level 1. None of the ESCWA members achieved maturity levels 3 or 4 in 2009.

1. *Maturity level 1: Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, the Sudan, Syrian Arab Republic and Yemen*

Almost all the countries ranked at this maturity level lacked standards, regulations and policies related to data and network security, privacy policies and laws governing ICT abuse, despite the progress achieved in some countries, such as Oman and the Syrian Arab Republic. During the past two years, both member countries have undertaken a number of important reforms at the legal framework level necessary for building confidence and trust in the use of ICTs and e-transactions, and have devised some laws and legislations related to cyberspace.

2. *Maturity level 2: Egypt, Qatar, Saudi Arabia and United Arab Emirates*

Despite the existence of basic laws countering the misuse of ICTs and ensuring a secure environment for e-transactions, member countries ranked at this maturity level need to adopt better mechanisms that are able to properly detect, report and combat cybercrimes. Current measures placed to secure data and IT networks are often inefficient. However, modest progress was achieved by Egypt, Saudi Arabia and the United Arab Emirates in this regard. It is hoped that this relative interest in building confidence and security will bring about stronger security policies and well-suited cybersecurity awareness plans that will facilitate the rise of these countries to maturity level 3.

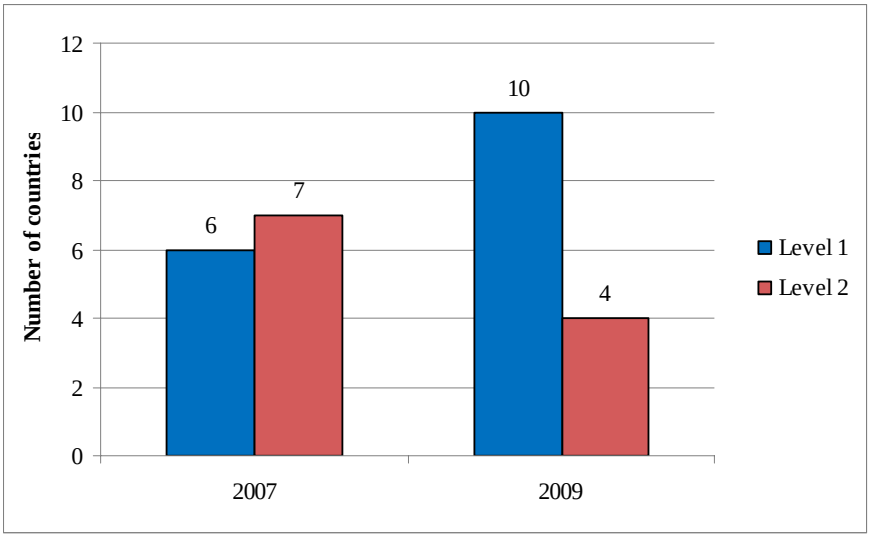
TABLE 40. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN BUILDING CONFIDENCE AND SECURITY IN THE USE OF ICTS

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain	✓	✓						
Egypt			✓	✓				
Iraq		✓	✓					
Jordan	✓	✓						
Kuwait		✓	✓					
Lebanon	✓	✓						
Oman	✓	✓						
Palestine	✓	✓						
Qatar			✓	✓				
Saudi Arabia			✓	✓				
The Sudan[a/]		✓						
Syrian Arab Republic	✓	✓						
United Arab Emirates			✓	✓				
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 6. Maturity levels of ESCWA member countries in building confidence and security in the use of ICTs



C. SUGGESTIONS AND RECOMMENDATIONS

The majority of ESCWA member countries have shown genuine interest for improving confidence and security in the use of ICTs and have, as such, undertaken serious steps towards achieving it. Almost all member countries have shown serious concern for information misuse and securing e-transactions to the extent that a large number of countries have promulgated e-transactions and e-signatures laws, while others are expected to follow suit in the near future. However, all ESCWA member countries still lack proper regulations for protecting personal data and safeguarding the privacy of online users, with the exception of the United Arab Emirates, which devised a related law in 2007.

The following recommendations can be used as guidelines to be developed further, in line with the specificities and circumstances of each country in the region:

(a) Update national legal frameworks in line with the demands of the information society and take the necessary measures to implement related laws at the national level covering privacy and data protection, countering cybercrimes, protection of intellectual property, as well as consumer protection;

(b) Identify ICT-based critical infrastructures in the country, and develop practical plans for their protection from cyberthreats and network attacks;

(c) Ensure that a national business continuity management (BCM) plan is formulated and provide guidelines for Government and private sector organizations for the formulation of BCM plans at the organizational level;

(d) Build effective incident management capabilities through the development of a computer security incident response team (CSIRT) under the frameworks provided by national CERTs. Empower CERTs to become national focal points for all technical matters related to the protection of cyberspace, and ensuring transparency in reporting all cybercrime incidents;

(e) Encourage the public-private cooperation in order to maintain the security of networks and information systems and the protection of national cyberspace;

(f) Raise public awareness through campaigns about ways to protect privacy and secure online transactions, targeting all the stakeholders in cyberspace, especially decision makers, public sector employees, businesses, the private sector and individuals, including children;

(g) Stimulate cooperation between ESCWA member countries and relevant international bodies/organizations in order to gain support for the development of a secure regional cyberspace, and combat cybercrimes given that these crimes do not recognize geographical or political boundaries;

(h) Put in place the tightest security measures for local networks and computer systems connected to the Internet (firewalls, anti-virus applications and spyware), especially in public sector organizations, to close security gaps and decrease the chances of a cyberattack.

VI. ENABLING ENVIRONMENT

The provision of an enabling environment is crucial for building the information society given that it assists in mobilizing resources and creating a climate conducive to the acquisition and dissemination of ICT and its applications. Moreover, a trustworthy, transparent and non-discriminatory legal, regulatory and policy environment constitutes an essential base for cooperation between the public and private sectors and for attracting foreign investments and ICT multinational firms. Harmonization of ICT-based systems and enhancing interoperability through standardization is fundamental for the development of open and competitive markets. Activities and initiatives by the public and private sector aimed at supporting the development of a conducive environment include the nurturing of entrepreneurship through incubation and the fostering of innovation in research centres and the academia.

A. COMPARATIVE ANALYSIS

The ICT sector cannot develop in a vacuum; in order to fully exploit its potential, an appropriate market, as well as regulatory and infrastructure environments must be established.

The environment component subindex of NRI used in the GITR 2008-2009 gauges the openness of a country's environment for ICT development by taking into consideration three main pillars, namely:[123] (a) the market environment pillar, which captures the ICT conduciveness of the business environment in a country; (b) the political and regulatory pillar, which examines the quality of the national legal framework with particular regard to ICT development; and (c) the infrastructure pillar, which measures the extent to which national infrastructure encourages ICT development and diffusion.

Table 41 depicts the global rankings of the nine ESCWA member countries benchmarked by GITR for the environment component sub-index. All the GCC countries have faired better than their counterparts in the Levant, with the exception of Jordan, which made it to the top 50 countries globally on the environment sub-index component.

TABLE 41. RANKING OF SELECTED ESCWA MEMBER COUNTRIES ON THE ENVIRONMENT SUB-INDEX COMPONENT OF NRI, 2008-2009

	Market environment		Political and regulatory environment		Infrastructure environment		Environment sub-index	
Country	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Qatar	26	4.72	33	4.74	35	3.76	29	4.41
United Arab Emirates	24	4.74	39	4.62	40	3.52	32	4.29
Bahrain	27	4.71	49	4.37	49	3.28	37	4.12
Saudi Arabia	38	4.35	42	4.55	44	3.44	38	4.11
Kuwait	34	4.44	58	4.19	45	3.44	44	4.02
Jordan	51	4.12	36	4.70	59	3.01	48	3.94
Oman	42	4.31	44	4.52	78	2.69	51	3.84
Egypt	60	4.00	62	4.12	70	2.78	64	3.63
Syrian Arab Republic	101	3.53	103	3.53	97	2.48	101	3.18

Source: World Economic Forum, *The Global Information Technology Report 2008-2009* (2009).

1. *Legal and regulatory environment*

The presence of a legal and regulatory framework is one of the most important drivers for the development of an ICT sector. Laws that regulate the sector allow individuals and organizations to deal confidently with ICT and encourage growth in national, regional and international investments in that sector.

[123] World Economic Forum, *The Global Information Technology Report 2008-2009* (2009).

An appropriate legal environment means that there are laws and regulations in place that regulate the basic activities related to the sector, including regulation and liberalization of the telecommunications and Internet sectors, protection of intellectual property rights, reduction of piracy and adoption of related cyberlegislations.

Most developed countries, as well as some developing countries, have already modernized their legal and regulatory frameworks to meet the requirements that were brought forth by the advent of ICTs and applications. During the past years, while several ESCWA member countries have started enacting laws to harness building the information society, most are still at an early stage, lacking the implementation of serious Government services and the expertise and experience in ICT legislations. Even the most legislatively advanced ESCWA member countries have still many gaps in their regulatory framework.

(a) *National intellectual property laws, regulations and international agreements*

The protection of intellectual property in cyberspace is considered one of the most important legal issues on which numerous laws and international conventions (Paris and Bern) and treaties, such as the Patent Cooperation Treaty (PCT), WIPO Copyright Treaty (WCT) and Patent Law Treaty (PLT), have been based. The adoption of intellectual property rights (IPRs) and international conventions is conceived to improve the investment environment in the ICT sector, in general, and foster its growth.

Patent rights are being extended across the world through the provisions of the World Trade Organization (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs). The Agreement obliges WTO members to adopt and enforce high standards of IPR protection. Eight ESCWA member countries have joined WTO since 1995, while Iraq and Lebanon gained observer status in 2007. Bahrain, Oman and the United Arab Emirates are the member countries most aligned with international conventions related to IPR, as shown in table 42.

TABLE 42. STATUS OF INTERNATIONAL AGREEMENTS IN THE ESCWA REGION

Country or territory	WTO	Paris Convention	PCT	WCT	Madrid Agreement	Hague Agreement	PLT	TRIPS
Bahrain	☑	1997 ☑	2007 ☑	2005 ☑	2005 Protocol ☑	×	2005 ☑	1995 ☑
Egypt	☑	1951 ☑	2003 ☑	×	1952 Agreement ☑	1952 ☑	×	1952 ☑
Iraq	OB	1976 ☑	×	×	×	×	×	×
Jordan	☑	1972 ☑	×	2004 ☑	×	×	×	2000 ☑
Kuwait	☑	×	×	×	×	×	×	1995 ☑
Lebanon	OB	1924☑	×	×	×	×	2000 □	×
Oman	☑	1999 ☑	2001 ☑	2005 ☑	2007 Protocol ☑	2009 ☑	2007 ☑	2000 ☑
Palestine	×	×	×	×	×	×	×	×
Qatar	☑	2000 ☑	×	2005 ☑	×	×	×	1996 ☑
Saudi Arabia	☑	2004 ☑	×	×	×	×	×	2005 ☑
The Sudan	OB	1984 ☑	1984 ☑	×	1984 Agreement ☑	×	2000 □	×
Syrian Arab Republic	×	1924☑	2003 ☑	×	2004 Protocol Agreement ☑	×	×	×
United Arab Emirates	☑	1996 ☑	1999 ☑	2004 ☑	×	×	×	1996 ☑
Yemen	OB	2007 ☑	×	×	×	×	×	×

Source: World Intellectual Property Organization (WIPO), which is available at: www.wipo.int.

Notes: ☑ denotes member country, □ denotes signatory country, × denotes non-member country and OB denotes observer status.

The dates shown indicate the years of joining a treaty.

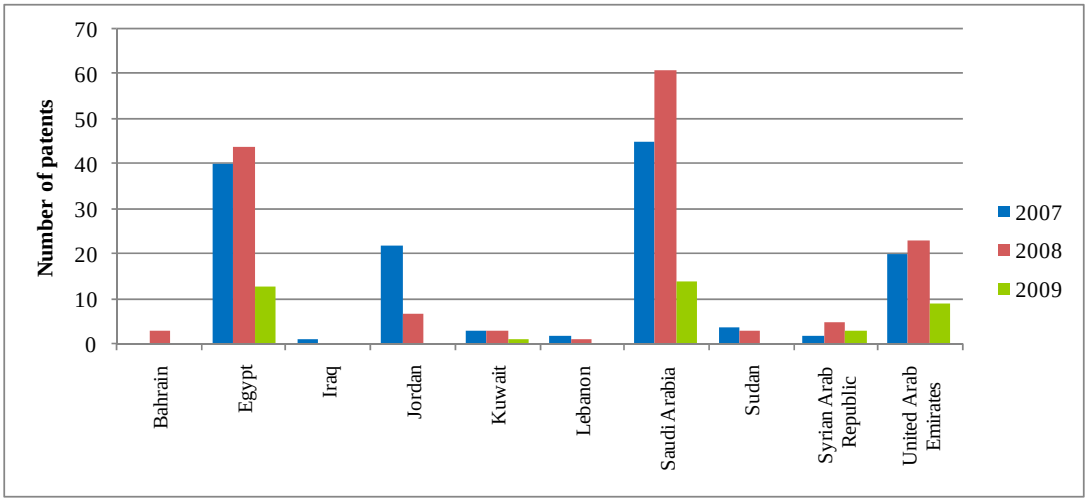
All ESCWA members, with the exception of Kuwait and Palestine, have signed the Paris Convention. Palestine is the only ESCWA member that has not signed any international agreements, mainly due to its political status.

Some member countries are preparing the approval of international conventions. In Lebanon, for example, the Council of Ministers approved the new Trademark Law and sent it to Parliament. The WCT related to copyright over the Internet was sent to the Parliament in December 2008, while the WIPO Performances and Phonograms Treaty (WPPT) was also approved by the Council of Ministers earlier in 2008, and sent to Parliament by decree No. 1086 of 31 December 2008.

At the national level, almost all ESCWA member countries have rectified their national IPR laws to include ICT-related issues.[124] While these national laws do mention the protection granted for computer software and databases, digital trademark, Internet domain name and online copyright-related issues are not expressly defined. The Syrian Arab Republic is preparing an update to its national IPR law, enacted in 2001, to include such issues.

The PCT, which entered into force in 1978, offers inventors and industries an advantageous route for obtaining patent protection internationally.[125] WIPO publishes yearly reviews and statistics on the number of PCT filings by country. Unfortunately, in 2008, none of the ESCWA member countries made it to the top ten countries in terms of the number of PCT filings. However, Saudi Arabia topped the region, with a rank of 36 in 2008, followed by Egypt (at 38), which, moreover, made it among the top 20 countries in the developing world.[126] Figure 7 shows the number of PCT filings by country of origin during the period 2007-2009.

Figure 7. Number of Patent Cooperation Treaty filings by ESCWA member countries, 2007-2009



Source: The statistics database of the World Intellectual Property Organization (WIPO).

Note: Data for 2008 and 2009 are provisional and incomplete. Counts are based on the international filing date and country of residence of the first named applicant.

[124] ESCWA, Models for cyber legislation in ESCWA member countries (E/ESCWA/ICTD/2007/8).

[125] Patent Cooperation Treaty (PCT), *PCT Newsletter* (July-August 2009).

[126] World Intellectual Property Organization (WIPO), *The International Patent System: Yearly Review* (2008).

(b) *Software piracy*

Copyrights and intellectual properties are comparatively less appreciated in the ESCWA region owing to the fact that users in the region are predominantly consumers of software applications and ICT-based products, rather than producers. However, some countries in the region are adhering to copyright laws under the influence of international trade-related treaties and foreign direct investments (FDIs) stipulated by multinational companies and organizations.

Software piracy is defined by Business Software Alliance (BSA) as the illegal use and/or distribution of software protected under intellectual property laws.[127] Given high penetration rates of personal computers globally, software piracy is becoming a serious problem, especially in developing countries, with economical, cultural, educational and social impacts. It is believed that lowering software piracy and enforcing IPR laws has a positive impact on the development of computer software and ICT applications for both multinational and local software companies. A recent software piracy report published by BSA and International Data Corporation (IDC) shows that reducing piracy helps more than the software industry and affects the broader IT industry.[128] IDC estimates that for every dollar of software sold in a country, another $3-4 of revenue is generated as value added services for local service and distribution firms.

Table 43 shows the software piracy rates in selected ESCWA member countries covered by the BSA-IDC annual report during the period 2007-2008.[129] Some member countries have demonstrated a decrease in their software piracy rates, including Bahrain, Egypt, Jordan, Kuwait and Qatar, while others retained the same rates for the period covered, such as Iraq, Lebanon, Oman and Yemen. An alarming situation was demonstrated in Yemen and Iraq, which were ranked among the top 25 countries with high software piracy rates of 89 per cent and 85 per cent, respectively. On the other hand, the United Arab Emirates figures among the top 25 countries with low software piracy rates, at 36 per cent.

TABLE 43. PIRACY RATES AND LOSSES IN SELECTED ESCWA MEMBER COUNTRIES, 2007-2008

	Piracy rates		Piracy losses	
Country	2007 (*percentage*)	2008 (*percentage*)	2007 (*millions of $*)	2008 (*millions of $*)
Bahrain	57	55	27	27
Egypt	60	59	131	158
Iraq	85	85	124	205
Jordan	60	58	20	22
Kuwait	62	61	61	69
Lebanon	73	74	44	49
Oman	61	62	23	26
Qatar	54	51	25	26
Saudi Arabia	51	52	170	272
United Arab Emirates	35	36	94	170
Yemen	89	89	13	14
Average[a/]/total	60	59	732	1 038

Source: Business Software Alliance (BSA) and International Data Corporation (IDC), The Sixth Annual BSA and IDC global software piracy study (2008).

a/ Average piracy rates relate to the Middle East/Africa region; other ESCWA member countries were not covered by the study.

[127] See http://www.bsacybersafety.com/threat/software_piracy.cfm.

[128] See http://global.bsa.org.

[129] Palestine, the Syrian Arab Republic and Sudan were not covered by the BSA-IDC study.

In another sign of the scale of the problem, the monetary value of unlicensed software is considered as "losses" to the industry, including revenues to both international and local in-country software vendors, and mark-up to local distributors and retailers. In the ESCWA region, software piracy losses were relatively low compared to other regions, given that the software industry is still weak. Saudi Arabia, Iraq and the United Arab Emirates incurred high losses from piracy, while Bahrain, Oman and Qatar were less affected by piracy losses due to some national measures that were undertaken to combat piracy. In fact, the Government of Bahrain implemented strict policies against trading in pirated software in 2008 by launching an awareness campaign on combating piracy. Given that Bahrain hopes to become a regional hub for the IT industry, these actions are likely to increase in the near future.

(c) *Cyberlegislations*

In order for high-technology sectors to flourish, a proactive and favourable environment is required. An essential component of a favourable environment is a reliable legal and regulatory framework for cyberspace.

In the ESCWA region, all member countries recognize the importance of cyberlegislation for accelerating the process of building the information society.[130] However, disparities still exist among member countries in the level of adoption of cyberlaws. While some are relatively advanced, such as Bahrain and the United Arab Emirates, others are still in their early stages of development. Member countries lacking enacted cyberlaws are either drafting cyberlaws, such as the Syrian Arab Republic, or have already drafted but have yet to adopt such laws, including Iraq, Lebanon and Yemen. Within that context, Lebanon formulated a complete package of cyberlaws within the framework of the European Union project, E-Commerce in Lebanon (ECOMLEB).[131] However, these laws have not been enacted yet.

(i) *E-transaction and e-commerce laws*

E-transaction and e-commerce laws in the ESCWA region are more developed than other areas. Enacted e-transaction laws tend to include e-signature and e-proof (the acceptance of e-documents). The relative advancement in e-transaction and e-commerce laws in some countries is a result of an increase in foreign investments over the past decade, which is a key source of bringing new technologies to the region. This has pressed Governments and prompted national legislators to actively review existing laws and enact new ones, especially in relation to ICTs.

The United Arab Emirates, Jordan, Bahrain, Egypt, Jordan, Saudi Arabia, Syrian Arab Republic and the Sudan all have laws covering e-transaction or e-signature. These laws fall short of covering consumer protection online and advertising on the Internet. Lebanon is the exception where consumers are protected online as part of its consumer protection laws and not a dedicated e-transaction law.

In Saudi Arabia, the implementation rules of the e-transaction law, enacted in April 2006, was adopted in March 2008. The application of this law and its rules target such different applications as Government transactions, e-commerce, e-health, education and e-payment services.

The Syrian Arab Republic adopted in February 2009 a law on e-signature and network services, and the establishment of a dedicated e-signature authority is underway. In 2008, Oman adopted the Electronic Transactions Law – Royal Decree 69/2008, which was based on best practices from the United Nations Commission on International Trade Law (UNCITRAL) and e-laws of other countries.[132]

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[130] ESCWA, Models for cyber legislation in ESCWA member countries (E/ESCWA/ICTD/2007/8).

[131] ECOMLEB is a project for the preparation of cyberlaw in Lebanon, implemented by the Ministry of Economy and Commerce and funded by the European Union. See http://www.ecomleb.org.

[132] See http://www.ita.gov.om/ITAPortal/Data/DocLibrary/FID2009511101710689/Electronic%20Transactions%20Law.pdf.

(ii) *Data protection, privacy and access to information*

Data protection and privacy legislations are still lacking in most ESCWA member countries. Dubai in the United Arab Emirates is an exception, having adopted the Data Protection Law in January 2007. Otherwise, there is no evidence in the ESCWA region of any law that specifically protects the privacy of users online. Minor provisions for the protection of privacy have been found in the penal codes or the telecommunication law of some member countries. Beside the lack of legislation in the field of data protection, the right of access to information is totally and intentionally ignored in some member countries for national security or political reasons.

With the exception of Jordan, Saudi Arabia, the Sudan and the United Arab Emirates, member countries have not yet enacted laws on preventing or combating cybercrimes. Bahrain, Egypt and the Syrian Arab Republic are preparing draft laws covering cybercrime. The United Arab Emirates was the first country in the region to adopt a cybercrime law in 2006. Jordan adopted a similar law in 2007, which has been applied to some cases of cybercrime during the past two years. On the other hand, the Sudan enacted the Information Technology Crime Law in 2007, following the adoption of its e-transaction law.

(d) *Telecommunication and Internet regulation*

Independent regulatory authorities are national bodies established to oversee aspects related to telecommunications policy in markets that are already competitive or transitioning to partial or full liberalization. In this regard, the experience of developed and developing countries has proven that the establishment of an independent regulatory body accelerates the liberalization and improves the competitiveness in the telecom sector.

By the end of 2007, ten out of the 14 ESCWA members had independent regulatory bodies. Kuwait, Palestine, Syrian Arab Republic and Yemen represent the only four members without dedicated regulatory bodies. The Syrian Arab Republic has prepared a draft of its telecommunication law, which is expected to be adopted in early 2010 and is set to include the establishment of a telecommunication regulatory authority. Kuwait is also following suit.

It is important to note that an important regional initiative at the Arab level was initiated in April 2003 aimed at establishing the Arab Regulatory Network (AREGNET), comprising regulators from 20 Arab countries.[133] In its meeting of April 2008, the AREGNET issued a crucial recommendation related to the reduction of mobile, pan-Arab roaming rates.

2. *Domain name management*

Authorities responsible for managing national Internet domains in ESCWA member countries differ from one country to the other. While in some countries the task is assigned to the national telecom operator, other countries entrust a prominent university or a national information centre with the task. Table 44 provides a list of entities in charge of managing the country code top-level domain (ccTLD) of all ESCWA member countries.

In Jordan, the National Information Technology Centre (NITC) is the authority charged by the Internet Corporation for Assigned Names and Numbers (ICANN) to administer the ".jo" ccTLD. Registration of domain names under the ".om" top-level domain is managed by the Oman Network Information Centre (OMnic) and sponsored by Oman Telecommunications Company (Omantel). In Saudi Arabia, Saudi Network Information Centre (SaudiNIC), which is a department of the CITC, is in charge of administering the domain names under ".sa" ccTLD. In 2008, the number of registered domain names reached 15,033

[133] See http://www.tra.org.bh/en/pdf/AREGNETPressReleaseEnglishFinal.pdf.

under ".sa". During the same year, the Centre increased the number of servers for the management of Saudi Arabia's ccTLD from 4 to 36. This addition helped in improving the quality and reliability of the services offered.

Qtel, the only player in the fixed sector in Qatar, manages and supervises Qatar's top-level domain name. However, ictQATAR will assume this responsibility by the end of 2009. STE is currently managing and controlling the top-level domain name in the Syrian Arab Republic. This responsibility will be shifted to the Network Service Commission upon its creation, which is projected in early 2010. In the United Arab Emirates, the TRA manages the ".ae" domain through its .ae Domain Administration (.aeDA) and has recently launched a marketing and awareness campaign to promote the ".ae" namespace.[134]

The Lebanese Domain Name Registry (LBDR), which is supervised and administered by the American University of Beirut (AUB), manages the ".lb" top-level domain.

In Kuwait, while the Ministry of Communications is officially managing domain names under the ".kw" domain, this responsibility has been delegated to the Kuwait Institute for Scientific Research (KISR) since 1999. In that regard, the number of registered domains in Kuwait reached 2,090 by the end of 2007.

TABLE 44. ENTITIES IN CHARGE OF MANAGING CCTLD OF ESCWA MEMBER COUNTRIES

Country or territory	ccTLD	Entity in charge of managing ccTLD	Entity type
Bahrain	.bh	Bahrain Telecommunications Company (BATELCO)	Telecom operator
Egypt	.eg	Egyptian Universities Network (EUN)	Educational
Iraq	.iq	Communications and Media Commission (CMC)	Regulatory authority
Jordan	.jo	National Information Technology Centre	National authority
Kuwait	.kw	KISR/Ministry of Communications	Government
Lebanon	.lb	LBDR/America University of Beirut (AUB)	Educational
Oman	.om	OMnic /Oman Telecommunications Company (Omantel)	Telecom operator
Palestine	.ps	Palestinian National Internet Naming Authority/MTIT	Government
Qatar	.qa	Qatar Telecom (Qtel)	Telecom operator
Saudi Arabia	.sa	SaudiNIC/ Communications and IT Commission (CITC)	Telecom operator
The Sudan	.sd	The Sudan Internet Society	Private sector
Syrian Arab Republic	.sy	STE	Telecom operator
United Arab Emirates	.ae	TRA/.aeDA	Regulatory authority
Yemen	.ye	TeleYemen	Telecom operator

Source: The Internet Corporation for Assigned Names and Numbers (ICANN) as of September 2009.

The responsibility of the domain name management in Egypt is more complex. The Supreme Council of Universities has entrusted the Egyptian Universities Network with managing the top-level domain in Egypt. It provides its services for ".edu.eg", ".sci.eg", ".eun.eg" and ".org.eg" subdomains. The Information and Decision Support Centre (IDSC) provides its services for the ".gov.eg" domain and MCIT is responsible mainly for serving the subdomains under ".gov.eg", while private sector gateways are providing connectivity services for the commercial sector. In total, Egypt has more than 4,640 domains registered under top-level domain ".eg".

3. *Standardization in ICT*

A technical standard is an established norm or requirement, usually a formal document that establishes uniform engineering or technical criteria, methods, processes and practices. Standards are important both for the interoperability of systems and applications, and for the harmonization of processes and practices within

[134] See http://www.uaeinteract.com/docs/TRA_targets_200,000_new_registrants_at_.ae_/37434.htm.

a country or region. Standards usually support the development of open and competitive markets for the benefit of both consumers and industry.

The ITU is the world's most recognized organization for developing telecommunication standards.[135] In 2008, ITU organized a regional forum on Bridging the ICT Standardization Gap in Developing Countries (Damascus, 20-22 July 2008).[136] In this forum, Arab countries agreed on the need to support the interoperability of equipment and services conforming to ITU recommendations. At the Arab regional level, there is no initiative for the standardization of ICT, with the exception of the initiative related to establishing an Arabic domain name system.[137]

At the national level, ESCWA member countries have taken proactive steps towards ICT standardization. ICT standards are useful for achieving interoperability between e-government applications in the public sector. Consequently, Qatar and Oman are developing their standards for this purpose. The focus of standardization in Saudi Arabia and Egypt is to promote the software industry and to extend the market for ICT products. In the Syrian Arab Republic, however, the objective of standardization is twofold, namely: improving the interoperability between the ICT applications in the public sector, and supporting the IT software industry.[138]

In Qatar, ictQATAR fully supports the development, use and promotion of open, interoperable and non-discriminatory demand-driven standards. As part of its e-government programme, it is working to set up Government-wide IT architecture frameworks. The Oman e-government Architecture Framework and Standards (OeGAF) was developed to facilitate the development of e-government in Oman and is being used in the development of e-government portals.

In Saudi Arabia, the CITC is responsible for standardization, particularly for matters related to procedures for authorization of telecommunications and IT equipment as well as for issuing technical specifications. In Egypt, the Software Engineering Competence Centre (SECC) started work on the enhancement of local software standards. In February 2008, SECC was certified by the European Software Institute (ESI), which constitutes a step towards promoting a more competitive ICT industry in Egypt.

The Arab Organization for Internet Standards (interstandards), which was established in the United Arab Emirates, is focusing on the development of the Internet industry by developing a set of quality standards that are applicable to all types of websites.[139] It focuses on website design, content, security, engineering and advertizing. Standards are being developed in association with British Standards (BSI).

4. *ICT investments and Government-supported facilitation measures*

(a) *Venture capital funds*

Venture capital (VC) is identified as one of the most important financing alternative for start-ups and SMEs in the ICT sector, especially given that the ICT sector is a major investment vehicle for the development market.[140] VC is still very limited in the ESCWA region as shown in table 45, which is based

[135] See http://www.itu.int/net/ITU-T/info/Default.aspx.

[136] International Communication Union (ITU), Report of the ITU Regional Development Forum 2008: Bridging the ICT Standardization Gap in Developing Countries (Damascus, the Syrian Arab Republic, 20-22 July 2008).

[137] See http://www.escwa.un.org/information/meetingdetails.asp?referenceNum=881E.

[138] This is the result of a joint project with the European Union, namely, the Institutional and Sector Modernisation Facility (ISMF).

[139] See http://www.interstandards.org/.

[140] ESCWA, Report of the Workshop on Investment in ICT Sector (Cairo, 5-7 May 2009) (E/ESCWA/ICTD/2009).

on the 2009 Global Competitiveness Report for the evaluation of the availability of VC in nine ESCWA member countries.

Egypt's experience in ICT venture capital funds is one of the rare experiences in the ESCWA region. The funds are part of the Technology Development Fund (TDF) that started in 2004, with a mandate for driving the growth of innovative Egyptian start-ups in the ICT sector. Another example is the Gulf Venture Capital Association (GVCA), which aims to promote a risk-taking investment culture, develop skills and provide information on VC and private equity industry.[141]

Other member countries have institutions that facilitate financing or investment through other means. In Lebanon, for example, Kafalat is a financial company established to assist SMEs in accessing commercial bank funding. In addition, the Investment Development Authority of Lebanon (IDAL) was established by the Government in 2001 in order to attract private capital investments to Lebanon and assist investors in the development and implementation of their projects.

TABLE 45. STATUS OF SELECTED ESCWA MEMBER COUNTRIES ON VC AVAILABILITY AND FDI TECHNOLOGY TRANSFER, 2009-2010

Country	Venture capital availability score[a/]	Ranking (133) 2009-2010	FDI and technology transfer score[b/]	Ranking (133) 2009-2010
Bahrain	3.9	11	5.4	15
Egypt	3.4	34	5.1	30
Jordan	3.1	46	5.0	52
Kuwait	3.4	32	3.8	123
Oman	3.7	20	5.0	46
Qatar	3.2	40	5.7	5
Saudi Arabia	3.5	27	5.4	13
Syrian Arab Republic	2.3	100	3.9	117
United Arab Emirates	3.9	13	5.7	6

Source: World Economic Forum, *The Global Competitiveness Report 2009-2010* (2009).

a/ This is based on a seven-point total score whereby 1 = very difficult; and 7 = very easy.

b/ This is based on a seven-point total score whereby 1 = brings little new technology; and 7 = is an important source of new technology.

The Global Competitiveness Report also evaluates the extent to which FDI brings new technologies to nine ESCWA member countries. Qatar and the United Arab Emirates topped the region, with global ranks of 5 and 6, respectively. In addition, Qatar has been named the "fastest growing economy in the Gulf region" owing to its wealth of resources, its concern with building and maintaining its economic stability and a modern education system, as well as opening up to FDI.[142]

(b) *Entrepreneurship and incubators*

Business incubation is a unique and highly flexible combination of business development processes, with infrastructure and expertise, designed to nurture the growth of new SMEs by supporting them through the early stages of development and change.[143] In recent years, activities related to entrepreneurship and incubation have been encouraged in the ESCWA region. ICT incubation is one mechanism adopted by some countries in the ESCWA region to promote the creation of start-ups and SMEs in the ICT sector, and to

[141] See http://www.gulfvca.org.

[142] World Economic Forum, *The Global Competitiveness Report 2009-2010* (2009).

[143] See http://www.ukbi.co.uk.

encourage entrepreneurship. Egypt, Jordan, Lebanon, Palestine, Saudi Arabia, Syrian Arab Republic and Yemen have had ICT incubators, some of which have been operational for several years. Other countries host business or technology incubators rather than mere ICT incubators, such as Bahrain, Jordan and Qatar. However, the full circle of the incubation process is not complete in ESCWA member countries, owing either to a missing link between the incubators and R and D institutions, or to non-existent funding mechanisms.

Some examples from the region include ITIDA in Egypt, which supports incubators at the Smart Village. The incentive packages include payment of salaries based on a pre-defined scale and supporting conferences and international exhibitions worldwide for start-ups. There are nearly 50 employees in incubation management programmes, of which 85 per cent are recent graduates. Oman has also undertaken several activities to encourage entrepreneurship through competitions and awareness programmes. In particular, ITA launched several initiatives to promote young entrepreneurs, including Big Business Idea Competition, Imagine Cup 2009, Oman Web Awards and ITA's eOman road show.[144]

The commercialization of new knowledge is central to Qatar's plans, which is being championed by Qatar Science and Technology Park (QSTP) that provides support programmes to enable research and business ventures to materialize in the marketplace.[145] QSTP is Qatar's first free trade zone and to date has attracted more than $300 million in investment by such companies as the European Aeronautic Defense and Space Company (EADS), General Electric (GE), Microsoft, Shell, ExxonMobil and Total.

There are at least two active networks for incubators in the region, namely: the Arab Incubators Network, which was established by Mohammed bin Rashid al-Maktoum Foundation;[146] and InfoDev's Incubator Network Middle East and North Africa.[147]

B. Classification and ranking of ESCWA member countries according to maturity level

1. *Maturity level 1: Iraq, Palestine, the Sudan and Yemen*

ESCWA members at this maturity level have outdated legal and regulatory frameworks that are inadequate for the ICT sector and consumer needs, as well as poor enforcement of existing laws. They are still experiencing very high software piracy rates, and lack initiatives for ICT standardization. In addition, investment funds and entrepreneurship support are not found.

2. *Maturity level 2: Kuwait, Lebanon, Oman and Syrian Arab Republic*

Countries at this maturity level have signed a fair number of international agreements or treaties related to IPR and patents. They have few laws regulating cyberspace, with modest progress achieved in the enforcement of cyberlaws. High software piracy rate is common. Some initiatives for standardization, the attraction of investments and promotion of entrepreneurship are visible.

3. *Maturity level 3: Bahrain, Egypt, Jordan, Qatar and Saudi Arabia*

These countries have signed a relatively large number of international agreements and treaties on IPR and patents, and have made considerable progress in adapting ICT-related laws and regulations. They have

[144] See http://www.ita.gov.om/ITAPortal/MediaCenter/NewsDetail.aspx?NID=240 and http://www.omanwebawards.org.

[145] See http://www.qstp.org.qa.

[146] See http://www.mbrfoundation.ae/English/Entrepreneurship/Pages/ArabIncubatorsNetwork.aspx.

[147] See http://www.infodev.org/en/Project.76.html.

lowered software piracy rates and have had success with initiatives for ICT standardization, attraction of investments and the promotion of entrepreneurship.

4. *Maturity level 4: United Arab Emirates*

This level indicates sustainable maturity in ICT-related laws and regulations. Countries at this level participate in most international agreements and treaties on IPR and patents, have low piracy rates in software, and have adopted either international or national standards related to ICTs. Initiatives for attracting investments and the promotion of entrepreneurship are widely available. The United Arab Emirates has been placed at this level owing to the maturity level of Dubai in providing an enabling environment which is conducive to the establishment of the information society. However, this maturity level is not present in the other Emirates of that country.

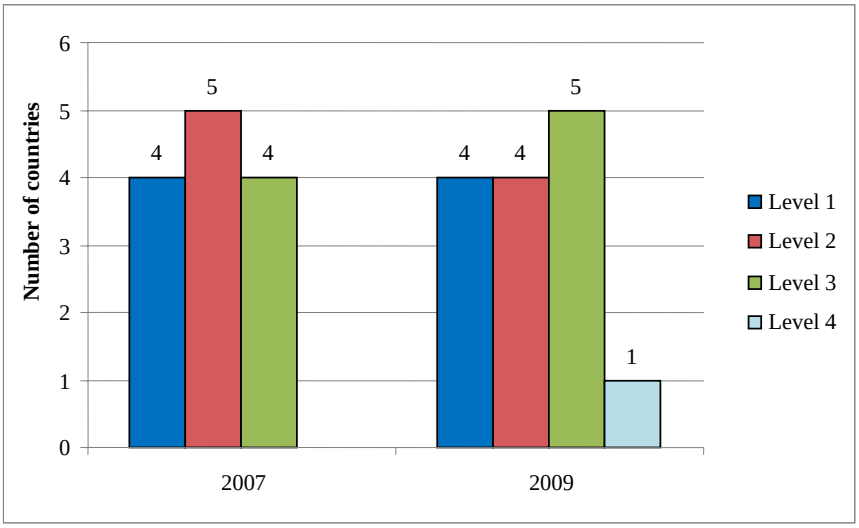
TABLE 46. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN ESTABLISHING AN ENABLING ENVIRONMENT

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain					✓	✓		
Egypt					✓	✓		
Iraq	✓	✓						
Jordan					✓	✓		
Kuwait			✓	✓				
Lebanon			✓	✓				
Oman			✓	✓				
Palestine	✓	✓						
Qatar			✓			✓		
Saudi Arabia			✓			✓		
The Sudan[a/]		✓						
Syrian Arab Republic	✓			✓				
United Arab Emirates					✓			✓
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 8. Maturity levels of ESCWA member countries in establishing an enabling environment



C. SUGGESTIONS AND RECOMMENDATIONS

The following recommendations address the limitations in the ESCWA region that prevent the establishment of a mature enabling environment:

(a) Accelerate the process of signing, ratifying and joining international agreements on IPR and ensure their synergy with national laws;

(b) Accelerate the issuance and implementation of cyberlaws, especially cybercrime laws, data protection and privacy laws as well as consumer protection laws;

(c) Harmonize cyberlegislation in the ESCWA region in order to improve regional integration and promote e-transaction laws and e-commerce in the region;

(d) Promote ICT standardization to ensure the interoperability between different ICT applications and services;

(e) Proceed with the liberalization of the telecommunication sector, especially the fixed-line and Internet sectors; and take measures that encourage national and foreign investments in the ICT sector;

(f) Establish venture capital and investment funds to support the creation of start-ups and SMEs in the ICT sector, in cooperation with all stakeholders in the information society;

(g) Encourage entrepreneurship in the ICT sector through the creation of incubators and science and technology parks.

VII. ICT Applications

A. Comparative analysis of ICT applications in Governments

1. *ICT in public administration*

The use of ICT in public administration, when coupled with proper management, leads to improved efficiency and modernization of front and back office operations in Government agencies. This, in turn, leads to the delivery of improved services to citizens and, subsequently, to e-services. The ESCWA member countries vary in the degree they have implemented ICTs in public administration entities. It is important to note that practically all member countries have initiated in one way or another programmes or projects for the computerization and automation of some or all public administrations. The security situation, financial resources and political will are the main causes of variation.

To measure the presence of ICT in Government offices, the World Economic Forum ranks nine of the ESCWA member countries (see table 47). With a global rank of 17 for 2008-2009, the United Arab Emirates score of 5.71 is a result of the Government's strategy and push for ICT diffusion and use, although mostly evident at the Emirate-level, with Dubai being the foremost example.

In second position, at 23 globally, Qatar has been aggressive in its adoption of ICT. In 2008, the ratio of PCs per 100 employees stood at 88.2. However, about 85.7 per cent of Government agencies in Qatar have already automated their core processes or are still in the process of doing so.[148]

TABLE 47. PRESENCE OF ICT IN GOVERNMENT OFFICES IN SELECTED ESCWA MEMBER COUNTRIES, 2007-2009

Country	Score[a/] 2007-2008	Ranking (127) 2007-2008	Score[a/] 2008-2009	Ranking (134) 2008-2009
United Arab Emirates	5.53	17	5.71	17
Qatar	5.26	26	5.33	23
Bahrain	4.86	42	5.13	30
Jordan	4.71	45	4.73	40
Saudi Arabia	4.4	60	4.7	42
Oman	4.36	63	4.6	50
Egypt	3.87	87	4.13	76
Kuwait	4.11	78	4.02	81
Syrian Arab Republic	3.34	106	3.38	108

Sources: World Economic Forum, *The Global Information Technology Report 2007-2008* (2008); and *The Global Information Technology Report 2008-2009* (2009).

a/ This is based on a seven-point total score whereby 1 = very rare; and 7 = commonplace and pervasive.

In 2008, Kuwait accelerated automation projects from various Government agencies, particularly the Ministries of Social Affairs and Labour, Defence and Finance. Additionally, the Ministry of Finance recently launched a portal, which allows individuals and institutions to pay property taxes electronically.[149] Despite this progress, excessive bureaucracy remains a major challenge to Kuwait's e-services, which constitutes one of the causes for Kuwait's global ranking of 81.

The Syrian Arab Republic, at 108 globally, recently launched a strategy for ICT and e-government, thereby representing a first stage (2009-2010) for e-government services. Separate automation activities

[148] Supreme Council of Information and Communication Technology, *Qatar's ICT Landscape* (ictQATAR, 2009).

[149] See http://www.mof.gov.kw.

undertaken in ministries in the Syrian Arab Republic will have to be technically and administratively integrated within this strategy. As an example, the Ministry of Interior has automated all of its criminal records and civil registration systems, resulting in a large civil registry database containing some 30 million records.[150] This is seen as an important accomplishment on the road towards providing modern Government e-services in the future.

Iraq, Palestine and the Sudan are still at the planning or survey levels. While isolated computerization efforts by different offices in these ESCWA members are evident, these do not necessarily pave the way for administrative ICT-based reform. As an example, the Ministry of Labour and Social Affairs in Iraq is in the process of adopting automated systems in its various departments, including payroll systems, industrial services systems and corporate profits systems.

ESCWA member countries have adopted different approaches to integrate ICTs into public administration in terms of assigning responsibilities and establishing governance structures (see box 4). Bahrain and Qatar have established higher authorities, reporting directly to their respective Cabinets or Councils of Ministers. This structural choice ensures political support to such projects and increases chances for improved results. Rather than being part of ministerial bureaucracy, the new authorities have been established with the power to integrate activities among different Government institutions. These authorities develop strategies and activities of ICT integration in public administrations as well as propose e-government initiatives. The size and availability of Government funding, in addition to a clear vision have facilitated the rapid advancement of computerization in Bahrain and Qatar.

Egypt, Saudi Arabia and the United Arab Emirates have opted to assign e-government initiatives and computerization of Government and public organizations to existing ministries. In Egypt, the Ministry of State for Administrative Development is the lead agency in implementing e-government applications in Egypt, including the networking and integration of national databases, and the automation of public administration functions in all ministries, particularly through Enterprise Resource Planning (ERP) systems. MCIT is implementing a sizable set of projects and initiatives as part of its ICT for Government programme.

Box 4. Authorities in charge of ICT in public administration and/or e-government in the ESCWA region

Bahrain	Supreme Council of Information and Communication Technology (SCICT) eGovernment Authority (eGA)
Egypt	Ministry of State for Administrative Development Ministry of Communication and Information Technology (MCIT)
Iraq	Iraqi Commission for Computers and Informatics
Jordan	E-government Programme at the Ministry of Information and Communications Technology (MoICT).
Kuwait	Central Agency for Information Technology (CAIT)
Lebanon	Office of the Minister of State for Administrative Reform (OMSAR)
Oman	Information Technology Authority (ITA)
Palestine	e-government General Directorate
Qatar	The Supreme Council of Information and Communications Technology (ictQATAR)
Saudi Arabia	Ministry of Communications and Information Technology (MCIT)
The Sudan[a/]	-
Syrian Arab Republic	Ministry of Communications and Technology
United Arab Emirates	Ministry of Finance
Yemen	Council of Ministers Ministry of Telecommunications and Information Technology

a/ While the Sudan has a Ministry of Information and Communications, it is not specifically assigned as an authority for computerization or e-government.

[150] ESCWA, National Profile of the Information Society in the Syrian Arab Republic (2009).

Jordan, Kuwait, Lebanon and Oman have offices or centres affiliated with existing ministries in charge of e-government applications. In Lebanon, OMSAR, which was established in 2000, is assigned to integrate, strategize and plan ICT projects in the public sector. Whereas, in Kuwait, CAIT originally reported to the Council of Ministers and was moved in 2008 to the authority of the Ministry of Communications.[151]

In terms of using ICTs in public administration, Bahrain, Jordan, Kuwait, Lebanon, Qatar, the Sudan and United Arab Emirates have computerized the operations of customs management. Jordan, Lebanon, the Sudan and Syrian Arab Republic opted for UNCTAD developed software, namely ASYCUDA, for this purpose, and introduced Arabic as a working language in the software. Lebanon, the Syrian Arab Republic and the United Arab Emirates have also implemented taxation management systems. In general terms, financial operations, particularly those of ministries of finance, such as taxation management systems and customs processing systems, have received priority attention for automation in view of the financial importance of these systems. For example, the Ministry of Finance in the Syrian Arab Republic was one of the first ministries to complete the automation of its systems related to income and real estate tax collection.

Equally critical is the automation of civil registration and national identification systems. The United Arab Emirates is implementing a project for an electronic ID card targeting its entire population. The Emirates Identity Authority (EIDA), which is supervising this project, has developed a registration database and recently opened its eighteenth registration centre.[152] In Oman, the National Registration System (NRS), developed by the Directorate General of Civil Status (DGCS), is an integrated computer system with an archive of information concerning the social status of all citizens and residents of Oman. The system generates a unique civil number for each individual at the time of registration. This civil number is set to be printed on national ID cards and will be used to verify the individual's identification while accessing e-government services.

2. *E-government implementation*

The increasing adoption and use of ICTs in public administration is enabling the global transformation of the functions and core business process used by all Governments. More than merely providing citizens with speedy and convenient services, e-government implementations improve public sector efficiency, transparency and accountability, thereby allowing for considerable cost savings across all Government administrations.

Box 5. Stages of e-government evolution: definitions

In its UN E-Government Survey 2008, the United Nations Public Administration Network (UNPAN) measures the level of sophistication of a Government's online presence and service delivery based on a five stage model of e-government evolution, namely:

(a) Stage I-Emerging: Governments with online presence through websites with static information and links to ministries/departments;

(b) Stage II-Enhanced: Governments that provide information on public policy and governance with access to archived information;

(c) Stage III-Interactive: Governments deliver such online services as downloadable and online forms that can be filled and submitted online;

(d) Stage IV-Transactional: Governments introduce fully online two-way interactions with online payments for certain transactions between citizen and Government; and allowing a follow-up through the net or via SMS;

(e) Stage V-Connected: Governments transform themselves into a connected entity that responds to the needs of their customers through seamless networked back office infrastructure.

Source: Department of Economic and Social Affairs (DESA), *UN E-Government Survey 2008: From e-government to connected governance* (2008).

[151] Business Monitor International, *Kuwait Information Technology Report* (2009).

[152] Business Monitor International, *United Arab Emirates Information Technology Report* (2009).

Countries in the ESCWA region, like many others across the world, have started their e-government initiatives with a focus on providing information and services to their citizens through advanced delivery platforms, namely, the Internet. These e-government initiatives went through the UNPAN stages at different speeds and are now at varying points of development within the five stages of evolution.

According to UNPAN, the concept of e-government has evolved. The second generation focuses on the provision of services at the front end, supported by integration, consolidation and innovation in back-end processes and systems to achieve maximum cost savings and improved service delivery.

In developed countries and some GCC countries, the focus of the second-generation e-government initiatives started to shift from the provision of services to the use of ICTs to increase the value of these services.[153] Government to Citizen (G2C) services saw the introduction of two-way interactions between citizens and Governments, allowing options for paying utility bills and taxes, applying for or renewing ID cards, certificates, passports and licences, and many other services, with the ability to conduct all transactions online from anywhere and at any time. At an advanced stage, only a few Governments were able to transform themselves into connected entities that were capable of providing sophisticated levels of interoperable online services through their connections with citizens, other Government agencies, central and local Government agencies, private sector, academic institutions, NGOs and civil society.

The 2008 UNPAN e-government survey measured the implementation of online Government services as a percentage of the maximum number of services defined for each stage of e-government evolution for all United Nations Member States, including those in the ESCWA region, with the exception of Palestine. The different stages of e-government evolution are defined in box 5. Table 48 provides percentages of implementation of online Government services of the total Government services for the five evolution stages for ESCWA member countries.

TABLE 48. RANKING OF ESCWA MEMBER COUNTRIES BY TOTAL PERCENTAGE OF IMPLEMENTATION OF ONLINE GOVERNMENT SERVICES

Country	Stage I: Emerging (*percentage*)	Stage II: Enhanced (*percentage*)	Stage III: Interactive (*percentage*)	Stage IV: Transactional (*percentage*)	Stage V: Connected (*percentage*)	Total (*percentage*)
Tier 2: 34 – 66%						
United Arab Emirates	88	68	68	60	37	64
Egypt	100	71	63	29	22	54
Jordan	100	73	63	23	33	54
Bahrain	88	70	44	27	26	46
Oman	88	53	55	19	19	43
Saudi Arabia	100	58	53	8	19	41
Kuwait	0	60	40	14	26	37
Lebanon	100	48	44	8	15	35
Qatar	88	39	42	26	0	35
Tier 1: 1 – 33%						
Syrian Arab Republic	0	30	27	8	11	21
Iraq	100	14	6	1	7	10
Yemen	88	11	4	0	0	7
The Sudan	50	7	7	0	0	6

Source: Department of Economic and Social Affairs (DESA), *UN E-Government Survey 2008: From e-government to connected governance* (2008).

[153] Department of Economic and Social Affairs (DESA), *UN E-Government Survey 2008: From e-government to connected governance* (2008).

By 2008, almost all ESCWA member countries had a good percentage of implementation of online Government services at the emerging stage (stage I), and a fair implementation of services at the enhanced and interactive stages (stages II and III, respectively). However, most countries in the region recorded low percentages of implementation at the transactional and connected stages (stages IV and V, respectively), with the exception of the United Arab Emirates.

On a global scale, the 2008 UNPAN e-government survey categorized countries in four tiers based on the total percentage of implementation of Government services, from the lowest, at tier 0, to the highest, at tier 3. Within that definition, none of the ESCWA member countries qualified in tier 3, which grouped countries based on a total implementation score of 67 per cent and above. Out of the nine ESCWA member countries qualifying in tier 2 (34-66 per cent), GCC countries led by the United Arab Emirates scored better than the rest of the ESCWA member countries, with the exception of Egypt and Jordan which ranked second and third, respectively. On the other hand, the Syrian Arab Republic, Iraq, Yemen and the Sudan lagged behind in tier 1 (1-33 per cent), with total implementation scores falling below a threshold of 34 per cent.

The progress witnessed in the region was highlighted by the United Nations Department of Economic and Social Affairs (DESA) through its Public Service Awards (UNPSA) Programme. In 2007, two ESCWA member countries, namely, Lebanon and the United Arab Emirates (Dubai) out of 14 winners in total collected two public service awards. Under category 2 on improving the delivery of services in Western Asia, Lebanon Taxpayer Service, which was developed by the Ministry of Finance, won an award for improving services delivered to taxpayers. The quality and timeliness of the service was comparable to international standards. Another award in the same category went to Dubai Government Excellence Programme for the implementation of the Executive Council of Dubai Government of a number of initiatives that have positively influenced the performance of Government departments and enforced a customer oriented mentality, thereby providing better, more reliable, and more efficient and effective public services.[154]

Apart from its efforts for a comprehensive e-government initiative, Bahrain has also launched an e-government awards programme, which recognizes innovation among individuals and organizations that have implemented e-government activities and projects in Bahrain. The award reflects the Government's interest in improving service quality and diversity, as well as customer satisfaction and take-up, thereby ensuring that citizens are actually using e-services to meet their needs and improve efficiency and transparency of the service.[155]

In Oman, the Ministry of Commerce and Industry offers a one-stop shop (OSS) service for setting up businesses. The service provides a single access point for application of company registration, thereby reducing costs and improving efficiency. As of December 2008, the OSS service processed a total of 221,544 e-applications.[156]

In Iraq, activities towards an e-government are still at their infancy. At this stage, activities are focused on infrastructural connectivity and networking among Government institutions. A Wireless Broadband Network (WBN), which currently connects 10 public institutions, is being expanded in Baghdad. While it is used for information sharing only, it is supposed to pave the way for a move towards e-government in general and Government to Government (G2G) applications in particular.

The Integrated e-government (i-Gov) programme in Qatar aims to centralize services of Government agencies. The i-Gov programme has already accomplished a number of projects, including the digitization of more than 300 services, of which 60 fully transactional e-services; and the digitization of content from 48 public entities. A milestone achievement in 2008 was the launching of Hukoomi, a new OSS e-government portal.[157] It is estimated that some 33 per cent of Government services are currently online.

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[154] See http://unpan1.un.org/intradoc/groups/public/documents/un/unpan027170.pdf.

[155] See http://www.egovawards.bh.

[156] This is based on data by the Ministry of Commerce and Industry.

[157] Business Monitor International, *Qatar Information Technology Report* (2009).

The Government of the Syrian Arab Republic has formulated a plan whereby most Government services will be transformed to e-services by the end of 2013. In the current phase of the plan (2009-2010), ministries and Government agencies are defining their services, consolidating databases and improving the enabling environment.[158]

3. *E-government readiness*

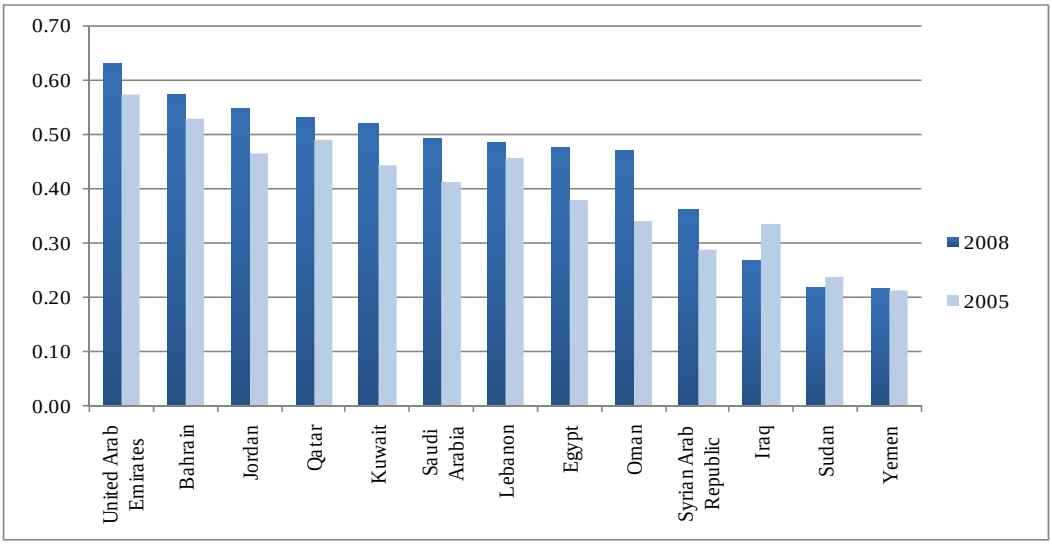
DESA conducts an annual e-government survey that includes a section, entitled "E-government readiness". It is a comparative analysis and ranking of all Member States according to the status of their e-government readiness and based on an assessment of online presence of governments, their telecommunication infrastructure, and the skills and knowledge of their citizens.

Based on the previous two e-government surveys, which were conducted in 2005 and 2008, all ESCWA member countries, with the exception of Iraq, the Sudan and Yemen, have witnessed an increase in their e-government readiness indices (see figure 9). Leading the way is the United Arab Emirates, with a global rank of 32 in 2008 and an index of 0.6301, which represents an increase of ten positions from its position of 42 in 2005. The increase owes mainly to the political support given to e-government projects and the availability of adequate funding at the federal level.[159]

Bahrain came second in the region, with an index of 0.5723. Benefiting from a high-level vision that aims towards an integrated e-government, Bahrain is rapidly moving to digitize all its Government services combined with a variety of delivery options and innovative access methods aimed at reaching its customers through portals, call centres, kiosks and mobile communications. As an example, the national e-government portal in Bahrain was the first to provide a mobile version accessible through a smart phone.

In Jordan, which came third in the region with an index of 0.5480, the e-government initiative focuses on front-end e-services, process re-engineering, vertical integration and change management, all of which represent elements that are highly crucial for achieving value of service.

Figure 9. E-government readiness index scores of ESCWA member countries, 2005-2008



Source: Department of Economic and Social Affairs (DESA), *UN E-Government Survey 2008: From e-government to connected governance* (2008).

[158] UNDP, E-government strategy: general framework (in Arabic), which was presented to the Expert Group Meeting on ICT Applications and E-Services in the Public Sector (Beirut, 20-21 July 2009).

[159] The Federal Government portal is still under construction; however, functional portals exist at the level of individual emirates.

The United Arab Emirates, Bahrain and Jordan ranked among the top 50 countries globally, at 32, 42 and 50, respectively. Out of all ESCWA member countries, Oman and Egypt witnessed impressive improvements between 2005 and 2008 in terms of world ranking, moving up 28 positions and 20 positions, respectively.

Iraq, the Sudan and Yemen are still lagging behind, both regionally and globally. The unstable security situation in both Iraq and Yemen has been a hindrance to all types of development and rapid technological advances. It is noteworthy that Yemen formulated and approved an e-government strategy in 2008.

When compared to other ESCWA members, efforts in Palestine for computerizing public administrations services are still at the planning or early implementation stages. Focus has been on automation of financial processes.

4. *E-government portals in the ESCWA region*

A glance at e-government portals in the ESCWA region portrays the level and sophistication of e-government implementation and the availability of services. A preliminary assessment of these portals was based upon the services depicted in the five-stage model of e-government evolution discussed above. In order to ensure consistency, the same number of services and functionalities were assessed during the same period, namely, August 2009.

With the exception of four ESCWA members, all the countries in the region have online functional Government portals aimed at combining in one location all e-government services and at addressing different beneficiaries, including citizens, businesses and other Government agencies. The portals vary in their level of development and the type of services they provide. Table 49 lists the portals of all ESCWA member countries and highlights the type of services delivered and information and functionalities available.

TABLE 49. ASSESSMENT OF NATIONAL E-GOVERNMENT PORTALS OF ESCWA MEMBER COUNTRIES

Country or territory	Website	Information			Services						Citizen participation		Additional services		
		General	Laws	Directories	Static info	Downloadable forms	Interactive	e-payment	Online account	Bilingual	Blogs	Polls	RSS	Web statistics	Search
Bahrain	www.bahrain.bh	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Egypt	www.egypt.gov.eg	✓	×	✓	✓	✓	✓	✓	✓	✓	×	×	×	×	✓
Iraq	..	..													
Jordan	www.jordan.gov.jo	✓	✓	✓	✓	✓	×	×	×	✓	×	×	×	×	✓
Kuwait	e.gov.kw	✓	✓	✓	✓	✓	×	×	×	✓	×	×	✓	×	✓
Lebanon	www.informs.gov.lb	✓	×	✓	✓	✓	×	×	×	✓[a/]	×	×	×	×	✓
Oman	www.oman.om	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×	✓
Palestine	egov.gov.ps	✓	×	×	✓	×	×	×	✓	×	×	×	×	×	✓
Qatar	www.gov.qa	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×	✓
Saudi Arabia	www.saudi.gov.sa	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	×	×	✓
The Sudan	..	..													
Syrian Arab Republic	www.egov.sy	Experimental version													
United Arab Emirates	www.government.ae	Under construction[b/]													
Yemen	www.yemen.gov.ye	Under construction													

Source: Compiled by ESCWA.

Notes: Information in the table is as of August 2009.

Two dots (..) indicate that data are not available.

a/ The portal of Lebanon is trilingual, with Arabic, English and French versions.

b/ The United Arab Emirates has functional portals at the level of individual emirates.

In recognition of its achievement in e-government, the Union of Arab ICT Associations (Ijma3) awarded Bahrain's e-government portal with the 2008 Arab Golden Chip Award under the category of "Best online application in government".[160]

While e-government services are often thought of as traditional Web-based services, many other technologies are being used in the region to deliver Government information and novel services to citizens. For instance, Egypt, Lebanon, Oman and United Arab Emirates use e-mail service to update their citizens through e-mail alerts; and Bahrain, Kuwait and the United Arab Emirates use RSS web feeds to update and involve citizens. Moreover, Bahrain, Egypt, Oman, Qatar and Saudi Arabic provide e-payment services to allow for the payment of services or utility bills; and Bahrain provides its citizens with a high level of participation through the use of open web forums and discussion blogs.

B. COMPARATIVE ANALYSIS OF ICT APPLICATIONS IN BUSINESS AND COMMERCE

The Internet has proved to be a viable global platform for conducting business and commerce as more robust and advanced ICT applications are developed to support e-business, and as a sound legal framework is developed and strengthened. The ESCWA region is increasingly adopting the use of ICT applications in business and commerce, albeit to varying degrees. While in some ESCWA member countries the mainstream business use of the Internet is mostly limited to communication, such as e-mail and other Internet applications, other countries feature more developed uses, including online shopping, online transaction processing, e-payments and electronic funds transfer, e-banking and other electronic financial services, supply chain management, Internet marketing, Electronic Data Interchange (EDI), e-transportation and freight services, and many other advanced e-business applications.

1. *Availability and quality of e-banking*

E-banking services continue to increase in number and quality within the ESCWA region. In the Syrian Arab Republic, private banks have started to offer online banking with a limited range of such services as account inquiries, online statements and money transfer between internal accounts (see table 50).[161]

It is also important to note that in Yemen, the Cooperative and Agricultural Credit Bank started to offer limited e-banking services in May 2009. This is the first bank in Yemen to launch such a service. Additionally, in Iraq, the Ministry of Communications in collaboration with the Central Bank launched a project in early 2009 aimed at connecting all domestic banks using WiMAX technology. This will pave the way for increased use of online transactions for conducting business and for developing electronic banking services.

In terms of quality and diversity, the GCC countries led the way with an array of such services as account statements, bill and credit card payments, money transfer services among different accounts either within the same bank or in other banks in the same country. Specialized banking institutions are also providing such services as mobile payment. For example, the Shared Electronic Banking Service Company in Kuwait provides an online portal, namely, KNET, for e-payment and is connected to all banks in Kuwait to facilitate financial settlements. KNET is characterized by a high level of security and provides services such as M-Pay, which enables prepaid mobile customers to recharge their phones through an SMS to the service operator, who in turn processes the financial payment through KNET.[162]

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[160] See http://www.ameinfo.com/177111.html.

[161] See http://www.fw-magazine.com/content/retail-banking-boom-syria.

[162] See http://www.mpay.com.kw and http://www.knet.com.kw.

TABLE 50. AVAILABILITY OF E-BANKING IN THE ESCWA REGION, 2009

Country or territory	Availability of e-banking services
Bahrain	✓
Egypt	✓
Iraq	×
Jordan	✓
Kuwait	✓
Lebanon	✓
Oman	✓
Palestine	✓
Qatar	✓
Saudi Arabia	✓
The Sudan	×
Syrian Arab Republic	✓
United Arab Emirates	✓
Yemen	×[a/]

Sources: Compiled by ESCWA, based on national profiles of the information society of individual member countries (see bibliography) and on Regional Profile of the Information Society in Western Asia (E/ESCWA/ICTD/2007/15).

a/ In Yemen, e-banking services are provided by one bank and limited to selected customers only.

By contrast, an increasing number of commercial banks in such countries as Egypt, Jordan, Lebanon and Syrian Arab Republic provide e-banking services with varying levels of quality. In Palestine and Yemen, e-banking services exist, albeit on a limited scale, while no such services are available in Iraq and the Sudan.

2. *B2B and B2C e-commerce*

E-commerce is the process of procurement (business) and purchase (consumer) of goods and services remotely through electronic systems, primarily the Internet. Electronic payments generally settle the charges for goods and services acquired through electronic systems.[163] E-commerce is generally considered to be the sales aspect of e-business and is referred to as business-to-business (B2B) when conducted between businesses, and business-to-consumer (B2C) when conducted between businesses and consumers.

There are no exact statistics on the value of the e-commerce market in the ESCWA region. However, the current volume of B2C and B2B e-commerce in the GCC countries exceeds $100 billion, with an expected annual growth of some 20 per cent.[164] Studies have shown that e-commerce in the United Arab Emirates is set to total $36 billion by 2010.

Countries with higher GNI, particularly those in the GCC region, were seen to have adopted e-commerce faster than other ESCWA members. A series of country surveys conducted by the Arab Advisors Group during the period 2007-2008 shows that B2C e-commerce in the ESCWA region is very promising. The surveys revealed that half of the Internet users in selected ESCWA member countries are also e-commerce users, ordering and receiving goods through local and foreign electronic marketplaces, with a total transaction value reaching $5.29 billion per year.

Table 51 shows that over 73 per cent of Internet users in the United Arab Emirates are also e-commerce users; the figure was lower for Saudi Arabia, at around 55 per cent, followed by Oman with 49 per cent. Non-GCC countries covered by the surveys included Jordan and Lebanon, which had dramatically lower numbers of some 21 per cent and 8 per cent, respectively.

[163] Killen and Associates, eCommerce B2B and B2C (November 2000).

[164] See http://www.zawya.com/story.cfm/sidZAWYA20090705034011/E-commerce%20Growing.

TABLE 51. E-COMMERCE USERS TO INTERNET USERS IN SELECTED ESCWA MEMBER COUNTRIES, 2007-2008
(*Ranked by ratio*)

Rank	Country or territory	Population	Internet users	Internet penetration rate (*percentage*)	E-commerce users	E-commerce to Internet users ratio (*percentage*)
1	United Arab Emirates	4 488 000	1 582 000	35.25	1 160 044	73.33
2	Saudi Arabia	23 981 000	6 400 000	26.69	3 540 811	55.33
3	Oman[a/]	2 812 900	319 851	11.37	158 000	49.40
4	Kuwait	3 400 000	1 110 000	32.65	360 984	32.52
5	Jordan[a/]	5 817 500	954 667	16.41	198 775	20.82
6	Lebanon	3 857 000	780 000	20.22	61 269	7.86
	Total/average	44 356 400	11 146 518	25.13	5 479 883	49.16

Source: Arab Advisors Group.

a/ Data refer to 2008.

The ratio of e-commerce users to Internet users in table 51 does not necessarily indicate a higher level of e-commerce spending per user per year in the countries covered by the survey. For example, table 52 shows that while Lebanon had the lowest e-commerce penetration at 7.86 per cent of Lebanese Internet users conducting e-commerce between 2007-2008, it registered one of the highest e-commerce expenditure per user, with each user spending on average around $1,247. This amount, which is higher than the amount spent by most GCC users with the exception of Oman, owes probably to a selective group of online users in Lebanon that are more affluent and better educated e-commerce users, thereby translating into higher spending habits than counterparts in other member countries.

TABLE 52. ANNUAL SPENDING BY EACH E-COMMERCE USER IN SELECTED ESCWA MEMBER COUNTRIES, 2007-2008
(*Ranked by amount spent in United States dollars*)

Rank	Country or territory	Population	E-commerce users	E-commerce penetration rate (*percentage*)	Total amount spent in the past year (*millions of $*)	Annual spending by each e-commerce user (*$*)
1	Oman[a/]	2 812 900	158 000	5.62	236	1 494
2	Lebanon	3 857 000	61 269	1.60	76	1 247
3	United Arab Emirates	4 488 000	1 160 044	25.85	1 158	998
4	Kuwait	3 400 000	360 984	10.62	356	987
5	Saudi Arabia	23 981 000	3 540 811	14.77	3 281	927
6	Jordan[a/]	5 817 500	198 775	3.42	181	912
	Total/average	44 356 400	5 479 883	12.35	5 290	965

Source: Arab Advisors Group.

a/ Data refer to 2008.

While data was unavailable for the rest of ESCWA member countries, studies in Egypt revealed a limited adoption of e-commerce, with only 1.3 per cent of Egyptian Internet users reportedly buying products, services or paying bills online.[165] Out of an estimated 5,000 websites based in Egypt, an estimated 250 were dedicated to e-commerce at the end of 2003, and fewer than 20 had established strong name recognition in the consumer market. Further consolidations of dotcom start-ups have reduced these sites to approximately 12.[166]

[165] This is based on user surveys by the Arab Advisors Group, which were undertaken between 2007 and 2008.

[166] See http://viewswire.eiu.com/index.asp?layout=ib3PrintArticle&article_id=644734449&printer=printer&rf=0.

Leading products and services purchased through e-commerce in the ESCWA region were mainly related to ticketing and reservations. Within that context, most Arab airline websites offer electronic ticketing and e-payment options, in addition to major travel and tourism sites such as Hoojoozat.com. Other products and services purchased electronically were bill payment, stock market trading, books, flowers, electronic equipment, food products and food delivery services.[167]

Box 6. Selected B2C e-commerce portals in the ESCWA region

Souq.com (www.souq.com) is a leading e-commerce auction portal in the Arab world, currently operating in Egypt, Jordan, Saudi Arabia and the United Arab Emirates. Established in 2005 and headquartered in Dubai Internet City, the portal offers its users an auction platform as well as fixed-price retail buying and selling. It offers numerous safe and secure payment options, such as credit card, prepaid online shopping cards, online bank transfers, as well as cash-on-delivery service. As of July 2008, Souq.com recorded around 140,000 registered users and over 270,000 unique visitors.[a/] Souq.com is a member of the Maktoob group of companies.

Taufeer.com (www.taufeer.com) is an online shopping portal based in Saudi Arabia. It avails products from worldwide sellers by channelling them through its website. In 2008, Amazon.com joined the e-channel retailers programme of Taufeer.com, thus allowing it to present and offer its goods to customers in Saudi Arabia and the Middle East. The Saudi Arabian market is a lucrative one for Amazon.com, which has shipped, since 2007, $280 million worth of goods to the Kingdom.[b/]

a/ See http://www.arabianbusiness.com/press_releases/detail/24692.
b/ See http://findarticles.com/p/articles/mi_hb6465/is_200903/ai_n31557428/.

3. *Enabling e-commerce in the ESCWA region*

Building confidence in the electronic environment is one of the most important factors that facilitate the use and proliferation of e-commerce services among all stakeholders. To that effect, most ESCWA member countries are undertaking proactive steps towards the formulation of e-commerce and e-signature laws. Bahrain, Egypt, Jordan, Saudi Arabia and United Arab Emirates have previously enacted such laws, while Saudi Arabia approved its e-signature law in March 2007.[168] Recent additions to this list include Oman with its e-transactions law, and the Syrian Arab Republic with its adoption of an e-signature law. Table 53 provides an updated snapshot on the availability of e-commerce and e-signature laws in the ESCWA region. Instead of issuing dedicated e-commerce laws, some member countries have issued instead e-transaction laws covering e-commerce or at least facilitating its activities.

It is noteworthy that the laws for e-signature and e-transactions have been drafted and are in the process of approval for enactment in Iraq, Kuwait, Lebanon, Qatar and the Sudan. In the Syrian Arab Republic, the law for e-transactions, including e-commerce, is also in progress.

In spite of the above efforts, the e-commerce sector in the region has not realized its full potential, with several obstacles hindering its growth. These obstacles vary in nature and include inadequate ICT infrastructure, additional legal challenges, social and cultural resistance to using and adopting technology, and low levels of ICT literacy.

Additionally, lack of Government support was identified as a key factor that limits the growth of e-commerce in the region. Most legislations in the region have still to be developed and updated to tackle the many challenges associated with using technology for conducting business and commerce. For instance, some of the enacted e-commerce laws have stopped short of addressing consumer protection and dispute resolution, and more effective measures are still required for the protection of IPRs.[169]

[167] See http://www.otlob.com.

[168] See http://www.mof.gov.sa/en/docs/rules/Doc/ElectronicTramsactionsLaw.doc.

[169] See chapter V for additional information on a number of initiatives in the region aimed at developing a legal framework that can provide overall protection for e-commerce transactions.

TABLE 53. AVAILABILITY OF E-COMMERCE AND E-SIGNATURE LAWS IN THE ESCWA REGION, 2009

Country or territory	E-commerce law	E-signature law
Bahrain	✓	✓
Egypt	✓	✓
Iraq	×	×
Jordan	✓	✓
Kuwait	×	×
Lebanon	×	×
Oman	✓a/	✓
Palestine	×	×
Qatar	×	×
Saudi Arabia	✓a/	✓
The Sudan	✓a/	✓
Syrian Arab Republic	×	✓
United Arab Emirates	✓	✓
Yemen	×	×

Sources: Compiled by ESCWA, based on national profiles of the information society of individual member countries (see bibliography) and on Regional Profile of the Information Society in Western Asia (E/ESCWA/ICTD/2007/15).

a/ Oman, Saudi Arabia and the Sudan have e-transaction laws.

From the consumer point of view, the issues of trust, online security and privacy topped the list of concerns of most e-commerce users, especially those settling their payments electronically through credit or debit cards. In fact, e-commerce users in the region are still cautious about using their credit cards for settling their payments online. While a growing number are using their credit cards on such international sites as Amazon.com, few users opt for this payment method when dealing with domestic e-commerce sites.

To alleviate this problem, most local and international banks operating in the ESCWA region have introduced pre-paid Internet credit and debit cards through issuers designed for online shopping. These cards with restricted credit limits are easier to obtain than regular credit cards, thereby providing a safer way for shopping or paying bills online. Other private companies have also developed novel and alternative online payment methods as shown in box 7.

4. *E-payment solutions and services*

As one of the main impediments hindering the growth of e-commerce in the region, Governments and the private sector have taken considerable steps to address the lack of confidence and trust in using e-payment systems.

For instance, the SADAD Payment System was established by the Saudi Arabian Monetary Agency (SAMA) to be the national Electronic Bill Presentment and Payment (EBPP) service provider for Saudi Arabia. [170] The System aims to facilitate and streamline bill payment transactions of end consumers through all channels of Saudi banks and at any time, day and night. Since its launch in 2004, it has promoted greater efficiency, transparency, minimized fraud and reduced costs by eliminating Government subsidies. In addition, the System has boosted the employment of women in the Saudi job market given that they constitute more than 60 per cent of its workforce. In recognition of the success of SADAD, the Sixth Public Service Awards Ceremony, held by DESA in June 2008, awarded the System with the most prestigious recognition of excellence in the public service under category 2 on improving the delivery of services in Western Asia.[171]

[170] See http://www.sadad.com.

[171] United Nations, Report of the Sixth United Nations Public Service Day and Awards Ceremony (2008).

Capitalizing on skyrocketing mobile penetration rates in the United Arab Emirates, Dubai eGovernment launched mPay, an electronic payment service provided for the payment of Government fees in Dubai. The service is intended to simplify the interaction between citizens and businesses with the Government for the purpose of paying for a set of selected services, such as police fines, utility bills and other services. Users of mPay register their financial credit card information on a dedicated and secure portal and later send their payment requests through SMS from their own mobile devices.[172]

Box 7. Alternative e-payment solutions in the ESCWA region

OneCard - (www.onecard.net) is an online electronic payment solution using prepaid cards. Once cards have been recharged, a dedicated portal allows users to purchase a variety of services using their OneCards. Launched in 2004 in Saudi Arabia, it has emerged as the most comprehensive online payment solution in the Middle East and North Africa. OneCard's services currently cover all GCC countries, in addition to Egypt, Jordan, Palestine, Syrian Arab Republic and Yemen; its portal won the "Best Strategic e-Commerce Portal" by the Pan Arab Web Awards.[a/]

cashU - (www.cashu.com) is a prepaid Internet-based payment solution launched in 2002 offering alternate solutions to payment services through traditional credit cards. The service offers a high level of security. Once a cashU account is funded, using a variety of payment methods, the service can be used to purchase products and services from merchants using the service in 28 countries worldwide.

a/ See http://www.panarabwebawards.org/winner09.shtml.

5. *E-procurement applications*

Electronic procurement or e-procurement is the B2B, B2C or B2G (Business go Government) purchase and sale of supplies and services through the Internet as well as other information and networking systems. Despite their role in increasing transparency, speeding up purchasing processes and eliminating or decreasing corruption, e-procurement applications are obviously not among top Government priorities in the ESCWA region, and some of the region's Government initiatives have not even considered e-procurement as a priority. However, some ESCWA member countries have already developed and launched e-procurement applications, particularly in Egypt and the United Arab Emirates. Other such countries as Jordan, are still in the implementation phases of e-procurement systems; and some use them partially by publishing information on tenders and bids on Government websites as in the case of Bahrain and Qatar.

In the United Arab Emirates, the Government of Dubai issues procurement of local departments on the nationwide Tejari.com website.[173] While Tejari.com is a private company, it has become a leading online B2B marketplace for emerging markets by signing agreements with many Government organizations across the ESCWA region (Egypt, Jordan, Kuwait, Lebanon, Oman, and Saudi Arabia) as well as countries in Asia in order to provide them with e-procurement services. Since its inception in 2000, Tegari.com has maintained a steady growth in trading volumes, with total transactions topping $7.5 billion globally. By 2008, the number of companies that joined Tegari.com marketplace reached 200,000. In 2009, a Forrester research report ranked Tejari.com eighth in the world among global e-sourcing vendors.[174]

In Egypt, the Ministry of State for Administrative Development (MSAD) completed in 2007 the first implementation phase of a Government procurement portal project in cooperation with the General Authority for Government Services.[175] The project provides an online platform for Government contractors and suppliers and those who wish to bid for Government contracts. The portal provides many services, including

[172] See http://mpay.dubai.ae.

[173] See http://www.tejari.com.

[174] See http://www.reuters.com/article/pressRelease/idUS50838+11-Jan-2009+BW20090111.

[175] See http://www.etenders.gov.eg.

e-registration of suppliers to the various Government departments, and access to information on tenders and bids put forward by Government departments. The second phase of implementation is expected to begin in mid-2009.

In Jordan, the Ministry of Finance, in partnership with UNDP, is implementing a comprehensive e-procurement system in the General Supplies Department (GSD). Once completed, the system will include, among others, an integrated e-procurement portal, document management system, work flow system, e-tendering system and auction system. With a budget of $1,641 million, the second phase of the project has already started and is expected to conclude by November of 2010.[176]

C. Comparative analysis of ICT applications in education

The digital divide has had its effects on a variety of domains and sectors in the ESCWA region with the education sector being no exception. Countries in the region are undertaking new initiatives and strategies to enhance education with due regard to the importance of using new technology-based teaching and learning techniques through the deployment of ICT tools and applications.

Being entrusted with improving the availability and quality of ICT data and indicators related to the information society, the global Partnership on Measuring ICT for Development only recently added to its core list of ICT indicators eight basic indicators on measuring ICT in education, which were adopted in 2009.[177] Limited data is currently available from ESCWA member countries to calculate these indicators.

However, the expenditure allocated by any one country to education gives an indication of its commitment to improving the sector. As Governments increase their spending on education, it is expected that modern technologies, mainly ICTs, will be employed as tools to facilitate the learning process and take the educational system to the next level. Table 54 lists the latest data available on public expenditure on education in the ESCWA region. As a percentage of total Government expenditure, Yemen and Oman have the highest values, followed by the United Arab Emirates and Saudi Arabia. Lebanon comes at the bottom of this list owing mainly to the higher demand placed on private education.

In fact, to maximize benefits and ensure cost effectiveness of increased Government expenditure on education, an adequate amount must be directed towards acquiring those ICT tools and applications that aid in the education process. Suggested and available modes for using ICTs in education range from the availability of computers and Internet in the classroom, to school management systems, digital libraries, teacher training, support to in-class teaching, improved teacher-student communication, course planning, e-content, e-curricula, and online learning or e-learning.

Several member countries have launched initiatives for reforming the education system. The World Economic Forum, through its Global Education Initiatives (GEI), has been a partner to the Governments of Egypt, Jordan and Palestine in terms of initiating and developing national education initiatives based on a PPP model.[178] Jordan is considered a success story in the ESCWA region in that context, exerting significant efforts to improve its education system. Box 8 contains highlights of Jordan's JEI.

[176] See http://www.undp-jordan.org/Default.aspx?tabid=129.

[177] These indicators were developed by the UNESCO Institute for Statistics (UIS). More information on the Partnership is available at: http://www.itu.int/ITU-D/ict/partnership.

[178] See http://www.weforum.org/en/initiatives/gei/index.htm.

TABLE 54. PUBLIC EXPENDITURE ON EDUCATION IN ESCWA MEMBER COUNTRIES, 2006-2008

Country or territory	GDP *(billions of $)*	Public expenditure on education	
		As a percentage of GDP	As a percentage of total Government expenditure
Bahrain	12.9	..	..
Egypt[a/]	130.5	3.8	12.6
Iraq	12.6	..	..
Jordan[b/]	12.7	4.9	20.6
Kuwait[a/]	112.1	3.8	12.9
Lebanon[a/]	24.3	2.7	9.6
Oman[a/]	35.7	4	31.1
Palestine	4	..	..
Qatar[b/]	42.5	1.6	..
Saudi Arabia[c/]	349.1	6.8	27.6
The Sudan	46.2	..	..
Syrian Arab Republic	37.7	..	..
United Arab Emirates[a/]	163.3	1.4	28.3
Yemen[b/]	15.1	9.6	32.8

Sources: United Nations Development Programme (UNDP), *Arab Human Development Report 2009*; the World Bank, *World Development Indicators 2008*; and *World Development Indicators 2009.*

Notes: Where public expenditure values are not available, the most recent GDP value is included.
a/ 2007.
b/ 2002-2005.
c/ 2006.
Two dots (..) indicate that data are not available.

The use of ICT in education is not only limited to primary, secondary and higher education; rather it plays a major role in lifelong learning and skills development as well. The importance of ICT was recognized at the Preparatory Conference in the Arab States (Tunis, 5-7 January 2009), which was organized by UNESCO in preparation of the Sixth International Conference on Adult Education (CONFINTEA VI). Their statement stresses that ICTs must be "used as tools for education and learning".[179]

Box 8. The Jordan Education Initiative (JEI) at a glance

Launched in 2003, the Jordan Education Initiative (JEI) aims to improve the development and delivery of education in Jordan though the integration of the latest ICT tools and applications. The Initiative commenced in collaboration with the World Economic Forum and is a model for public-private partnerships having brought together more than 17 global corporations, 17 Jordanian entities, and 11 governmental and non-governmental organizations.
An assessment conducted in 2008 revealed that 73 per cent of teachers in discovery schools use ICT for planning and 66 per cent use it with students. By 2008, the Initiative had developed e-content in six areas, namely: maths, Arabic, science, ICT, English as a foreign language and civics. The e-content of these six areas is deployed over EduWave as an e-learning platform. The second phase of the initiative was officially launched in mid-2008.

Sources: Jordan Education Initiative (JEI), Jordan Education Initiative brochure (October 2004), which is available at: http://www.jei.org.jo/; and Queen Rania launches second stage of Jordan Education Initiative, *Jordan Times* (13 December 2009), which is available at: http://www.jordantimes.com/?news=9042.

1. *ICT in primary, secondary and higher education*

The availability of basic ICT hardware, namely, PCs, and good Internet connectivity are key to the success of ICT-assisted education. Table 55 highlights the student-to-computer ratio and proportion of schools with Internet access in selected ESCWA member countries.

[179] United Nations Educational, Scientific and Cultural Organization (UNESCO), Statement on investing in adult education: Building learning and knowledge societies in the Arab States (2009), p. 3.

Ranking first in both indicators is Saudi Arabia. These numbers are a reflection of the Government's spending on education and human resources development, which reached a value of $28 billion in 2008, representing an increase from the total of $25.8 billion in 2007. It is important to note that $3.1 billion was also allocated for improving the IT infrastructures in educational institutions.[180]

TABLE 55. ICT INDICATORS IN EDUCATION FOR SELECTED ESCWA MEMBER COUNTRIES, 2008

Country	Student to computer ratio *(ratio)*	Proportion of schools with Internet access *(percentage)*
Egypt	47:1	31
Jordan	25:1	30
Oman	7:1	37
Qatar	8:1	72
Saudi Arabia[a/]	3:1	74

Sources: ESCWA, national profiles of the information society (2009) for each member country.

a/ Data for Saudi Arabia relate to 2007.

In its Global Competitiveness Report 2008-2009, the World Economic Forum evaluates Internet access in schools in selected countries. The United Arab Emirates, Qatar and Bahrain topped the region, followed by Oman and Jordan (see table 56).[181] This is the result of efforts by these countries aimed at building knowledge-based advanced economies, starting with a highly supported school system.

In Bahrain, for example, King Hamad's Schools of the Future project aims to provide schools with modern educational tools that keep abreast with the latest technological advancements. The project incorporates wide-scale educational improvements and developments to integrate ICTs into the system and ultimately build a knowledge-based economy in Bahrain.

TABLE 56. AVAILABILITY OF INTERNET ACCESS IN SCHOOLS IN SELECTED ESCWA MEMBER COUNTRIES, 2007-2009

Country	Score[a/] 2007-2008	Ranking (127) 2007-2008	Score[a/] 2008-2009	Ranking (134) 2008-2009
United Arab Emirates	5.0	30	4.96	27
Qatar	4.76	35	4. 95	28
Bahrain	4.40	40	4.55	37
Oman	3.80	51	3.89	50
Jordan	3.91	47	3.87	51
Kuwait	4.24	45	3.43	64
Saudi Arabia	3.50	59	3.34	71
Egypt	3.07	81	2.50	99
Syrian Arab Republic	1.84	118	2.02	123

Sources: World Economic Forum, *Global Information Technology Report 2007-2008* (2008); and *Global Information Technology Report 2008-2009* (2009).

a/ This is based on a seven-point total score whereby 1 = very limited access; and 7 = extensive; most children have frequent access.

In Kuwait, ICT is being used as a supportive tool for school education and vocational training. The Ministry of Education is currently implementing an electronic education project that will ultimately digitize all school curricula. The Ministry is cooperating with Microsoft and the Regional Centre for Development of Educational Software (RedSoft) to implement its educational plans.

[180] *Madar Research Journal*. Vol. 6, Issue 3 (August 2009).

[181] It is worth noting, however, that by 2007, all public schools were linked to the Ministry of Education in Bahrain.

The least developed or crisis-stricken ESCWA member countries were not included in the above table. However, while the use of ICT in education in the Sudan is still comparatively basic, a few services pave the way for online educational support. The Ministry of Education is providing the following online services: exam results through the Ministry's website and by SMS, request for student certificates through a downloadable form, an archive of official exams, including optimal answers, and a teacher online application to participate in official exams committees.

Yemen is also still lagging behind in the use of ICT in education. One exception is the Innovations in Technology-Assisted Learning for Educational Quality (INTALEQ) project aimed at improving the educational process through the use of ICT.[182] In February 2009, the project provided online access to content in mathematics and science subjects to students from selected schools at the first secondary level.

In education as in such other sectors as Government, online learning portals are emerging as valuable tools supporting the educational process. These portals provide management features and online learning in addition to other services targeting the stakeholders, namely, students, teachers and parents. Portals are usually deployed at a national level from which all schools are able to benefit. The portals are usually built using Learning Management Systems (LMS), thereby providing alternative modes of delivery for learners in different countries.

Within that context, SchoolNet-Lebanon is an educational portal, which constitutes the first of its kind in Lebanon.[183] It aims to connect all public and private schools and provide continuing education through multimedia learning, as well as through facilities and resources for this purpose. One of SchoolNet-Lebanon services is to provide access to libraries over a secure connection and infrastructure with a gateway to the Internet.

Oman Educational Portal integrates a variety of services addressing the needs of students, teachers and parents. The portal provides e-learning services, including a virtual classroom through which students can interact with teachers via the Internet. Teachers are also given the facilities to develop their own virtual classrooms and lectures. The system also allows them to follow up on the progress of their students.[184]

Knowledge Net (KNet) is a school knowledge network in Qatar that provides portal services for sharing education applications and student data.[185] It allows for three-way communication between students, teachers and parents. In 2009, KNet was implemented in 50 per cent of independent schools in Qatar, or 37 schools. By the end of that year, KNet is expected to reach all independent schools and, subsequently, 300 schools by 2011.

In February 2008, the Ministry of Education in the United Arab Emirates launched its new portal, which aims to facilitate interaction between teachers, students and parents.[186] In its first phase, the online portal features services that allow access to information, reports, meetings and activities related to public education. The portal will also provide such services as licensing, academic accreditation, fees structure and accredited curricula, in addition to services provided by each school. It also includes links to e-learning, distance education and video-conferencing in learning rooms; and provides staff services, including access to salaries and evaluation.

[182] See http://www.sabanews.net/ar/news169652.htm.

[183] See http://www.schoolnet.edu.lb.

[184] See http://www.moe.gov.om/portal/SiteBuilder/Sites/EPS/English/home.aspx.

[185] See http://www.knet.edu.qa.

[186] See http://www.moe.gov.ae.

2. *E-learning for higher and adult education*

The United Arab Emirates and Saudi Arabia have given special attention to the domain of online education and e-learning to support all levels of education. Together, they share around 80 per cent of all spending in the Gulf subregion on e-learning.[187] In Saudi Arabia, for example, the Ministry of Higher Education (MoHE) developed a comprehensive educational system for the National Centre for E-Learning and Distance Learning, which uses e-learning and distance learning tools. The system supports the educational process at all levels of higher education.

In the United Arab Emirates, the e-learning market was valued at $42 million across all sectors in 2008.[188] Various options and systems exist for online learning offered by the public and private sectors. Hamdan bin Mohammed University, which was formerly known as the E-Total Quality Management College, is an e-university based in Dubai that offers e-learning programmes and continuing education in addition to its academic programmes in business and quality management, education, and health and environmental studies.[189] Among its activities, the University organizes the Annual Forum on e-Learning Excellence in the Middle East, whose third meeting will be held in 2010. Another example is the Knowledge Village in Dubai, a host to several private companies, such as Universal Knowledge Solutions (UKS) and Xpert Learning, both offering e-learning solutions.

Egypt is also one of the ESCWA member countries where a number of initiatives and projects for developing e-learning through universities and specialized centres are taking place. A partnership between MCIT and Cisco, the e-Learning Competence Centre (eLCC), handles the development of the lifelong e-learning curriculum. At eLCC, such activities as training of trainers, content development, customization of Cisco materials and development of the physical network are taking place.

In Oman, MoHE has partnered with Edutech Middle East to provide e-learning opportunities to six colleges across the country.[190] The initiative has provided a centralized learning platform that is now facilitating information sharing and dissemination among 10,000 students enrolled across the geographically dispersed colleges.

In May 2007, the Supreme Council of Information and Communication Technology in Qatar (ictQATAR) launched an e-learning portal targeting Government employees, university students as well as the general adult population.[191] The portal, which is available anytime and from anywhere, aims to provide up to 4,000 cost-free courses in the business and IT domains.[192]

3. *Virtual universities and distance education*

There are very few virtual university projects in the ESCWA region, though traditional universities are increasingly adopting e-learning methods within their educational plans as stated above. Among the most important virtual universities is the Arab Open University (AOU), which was launched in 2002 in three member countries and has since expanded to encompass four more, thereby currently covering Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman and Saudi Arabia. AOU adopts an open system for distance

[187] See http://www.prlog.org/10255418-uks-and-cegos-group-launch-elearning-and-blended-learning-solutions-for-the-middle-east-market.html.

[188] *Madar Research Journal*. Vol. 6, Issue 2 (June 2009).

[189] See http://www.hbmeu.ac.ae/.

[190] Edutech is a leading provider of technology-enabled information and learning solutions. See http://www.edutech.com/.

[191] See http://www.ict.gov.qa/output/page18.asp.

[192] See http://www.ict.gov.qa/output/NewsPage.aspx?PageID=403.

education based on tutoring, textbooks, audiovisuals, CDs and Internet-based content.[193] The University adopted a virtual learning environment through its Arab Campus E-Learning System (ACES). ACES tools fall within four broad categories, namely: content-delivery tools, synchronous and asynchronous communication tools, assessment tools and course-management tools. Currently and in coordination with UNESCO, the University is developing a network connecting all its branches in Arab countries. In addition to teleconferencing, this network will allow the live and/or recorded transmission of lectures delivered in any branch to all other branches.

The Egyptian E-learning University (EELU) is a private non-profit university that was inaugurated in August 2008 to provide distance access to the education system through e-learning.[194] EELU gives educational opportunity to learners who cannot attend a campus university. Through the system, EELU provides students with the ability to access courses, lectures and other relevant information.

The Syrian Virtual University (SVU) is the most prominent e-learning example for distance education.[195] The University deploys an LMS for the delivery of online courses, scientific digital content and general administration of the educational process at the University.

With support from CRDF, the Ministry of Higher Education and Scientific Research in Iraq developed a virtual science library in collaboration with 25 Iraqi universities and five ministries.[196] Currently, some 6,350 users are registered for services of this library, which contains more than 4,000 books and articles from major scientific publishers.[197]

D. Comparative analysis of ICT applications in health care

The use of ICT in the health sector has led to improvements in terms of health-care delivery and management. It has led to the emergence of services and health fields that answer to the needs of different societies worldwide. Constituents of ICT applications in health care include electronic health records, telemedicine, and health-care information and management systems. In general, these constituents expedite the process and cut cost, as well as assist in reducing errors in the delivery of health care, promote information sharing, and facilitate policy and strategy making.

While the efficient exchange of information among different public and private medical institutions in ESCWA member countries is still limited, advances have been made by private and public medical institutions. Some are even equipped with highly advanced medical equipment and information systems, especially when affiliated/partnered with hospitals in developed countries. Noteworthy is the increased interest in the region in the use of ICT in the health sector. The subsections set forth below provide a few examples.

1. *Telemedicine and innovative e-health applications*

Telemedicine is available in several member countries, such as Jordan, Lebanon and Saudi Arabia. Recent advances of telemedicine in Jordan include the development of a telemedicine system based on mobile telephony. The system was developed at Princess Sumaya University for Technology and allows

[193] See http://www.arabou.org/home.htm.

[194] See http://www.eelu.edu.eg.

[195] See http://www.svuonline.org.

[196] See https://www.ivsl.org.

[197] See http://www.crdf.org/factsheets/factsheets_show.htm?doc_id=676089.

sending via Bluetooth information on a patient's temperature, oxygen concentration and electrocardiography.[198]

In Saudi Arabia, MoH has designed a national telemedicine network that will interconnect three hospitals dispersed across the country. In Lebanon, a private hospital, namely, the Clemenceau Medical Centre (CMC) uses telemedicine through its affiliation with Johns Hopkins University.[199] The American University of Beirut Medical Centre (AUBMC) and the Nabatiyeh Governmental Hospital are also connected through a telemedicine link supported by Intel.[200]

Other countries have resorted to innovative solutions, including the Women Mobile Health Unit Project in Egypt, which is a joint collaboration between the Ministry of Health and Population and the Ministry of Communications and Information Technology. Launched in 2007, the Unit provides mammography scans for women aged 45 and over as well as blood pressure and blood sugar measurements. The Unit is connected via satellite to central health centres through which data and images are exchanged electronically. The project won the Technology in Government in Africa Award (TIGA) in 2009 for category 2 on improved health services through the use of ICTs.[201]

Other innovative services include the sharing of medical information, awareness campaigns, updates and vaccination reminders via e-mail and SMS. The Ministry of Public Health (MoPH) provides this service in Lebanon.

Box 9. Increased interest in the use of ICT applications in health care in selected ESCWA member countries

Governments have come to realize the importance of using ICT as a cross-cutting tool capable of sustaining most economic and social sectors, including the health sector. A national e-Health Strategy was the choice for renovating the health sector in Oman. The Ministry of Health (MoH) has already started to implement this strategy aimed at digitizing all health centres and institutions, including patient records, and implementation of e-referral and e-notification engines. By mid-2009, three governorates/regions in the country had been fully computerized.

In Qatar, there are recent efforts to survey the availability and use of ICT in the medical sector. The Health Professionals Survey of 2008 addressed the use of ICT by the medical system. Statistics were collected on the use of ICT by health professionals, Internet access in hospitals, use of health-care portals and ICT training of health professionals. However, this is only part of Qatar's e-health strategy targeted for final implementation in 2010. The strategy's services will facilitate the management of medical information and its exchange between the providers of health care and patients.

The Saudi Commission for Health Specialties is responsible for the monitoring and programme planning of medical specialties and training in Saudi Arabia. It is also responsible for certifying medical educational institutions and formulating standards for health professionals. The Commission has recognized the importance of ICT training in the medical field by introducing the International Computer Driving License (ICDL) programme as a standard for ICT literacy for its staff and associated medical students.

The Bahrain e-Content Award has recognized the importance of including e-health as one of the eligible categories. Websites of the Ministry of Health and the International Hospital of Bahrain were winners of the award in 2009.

Sources: Supreme Council of Information and Communication Technology, *Qatar's ICT Landscape* (ictQATAR, 2009); Zawya, which is available at: http://www.zawya.com/story.cfm/sidZAWYA20090620043648/?query=ict%_20in%20health&pass=1; ictQATAR, which is available at: http://www.ictqatar.qa/output/NewsPage.aspx?PageID=1307; and http://www.ameinfo.com/189827.html.

[198] See http://arabic.cnn.com/2009/scitech/7/27/jordan.therapy_mobile.

[199] See http://www.cmc.com.lb.

[200] See http://www.aub.edu.lb/news/archive/preview.php?id=70901.

[201] See http://www.mcit.gov.eg/NewsDetails.aspx?id=EXSmr9CuPwE=.

2. *Health records and health information systems*

According to the World Bank, a health information system (HIS) is a "system for the collection/processing of data from various sources, and using the information for management of health services and policymaking […] a strong HIS is a key component of any health system. However, currently data sources are often incomplete and fragmented." [202] To that end, many ESCWA member countries have initiated plans and/or programmes to establish national health information systems spearheaded in principles by the ministries of health.

In Egypt, the Integrated Health Record System project aims to build a complete medical record of citizens, including diseases, treatment methods and medications received. The System consists of an information database enabling retrieval of data and health indicators. The project has already covered 270 medical units out of the total target of 400, and has provided training to 950 doctors, nurses and technicians on ICT use. The project also aims to build an information network connecting 700 hospitals. Oman has also an advanced health information management system, which was developed by its Ministry of Health and is referred to as Al-Shifa System.

The medical system in Iraq was one of the most advanced in the region in the 1970s and 1980s. Since the 1990s, however, Iraq's medical system has been in dire need of vital improvements in terms of basic service delivery and patient care. Pilot efforts for computerization of patient records have started in some health centres. Other projects implemented in collaboration with international organizations, such as the World Health Organization (WHO), include networking the Ministry of Health with all health departments as part of an HIS project. However, progress has been slow owing to the adverse political and security situation that prevails in the country. Similar efforts are taking place in Palestine with aid from various donor agencies.

In Lebanon, MoPH is in the process of implementing a number of projects, such as the pilot project for connecting hospitals in the greater Beirut region aimed at sharing patient records. Another project is the National Health Information System, which will link the various departments of MoPH in order to gather and provide information for follow up and decision-making, and ensure transparency and accountability on all levels.

Smart Cards are also gaining popularity in member countries. These cards store personal information, including medical data, in order to facilitate access to hospitals and retrieval of information. Lebanon, Oman and Saudi Arabia are all developing such cards. In Saudi Arabia, the Smart Card has a 32 Kbyte capacity. The Syrian Arab Republic is in the process of implementing a similar system with assistance from WHO.

In December 2008, the Ministry of Health in the United Arab Emirates awarded a $85 million contract for a national electronic patient records system. The contracted company will install its electronic ERP software, clinical solutions and a national single electronic patient record at 12 hospitals and 60 clinics in the northern regions of the country. Implementation of the system will require three to five years for completion.[203]

3. *Health-care management systems*

Health-care management systems are intended to improve the administration process of hospitals, clinics and health centres. In several ESCWA member countries, such as Bahrain, Egypt and Kuwait, public hospitals deploy special management applications. In Bahrain, the system provides services for patient admission, transfer, discharge and appointments as well as financial services. Towards the end of 2008, a total of 100 hospitals in Egypt had deployed health-care management systems.

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[202] See http://go.worldbank.org/X0ZQJ72Z00.

[203] See http://www.ameinfo.com/171955.html.

In Kuwait, the Ministry of Health initiated a plan to computerize processes in hospitals and health centres. The plan covers the development of three main systems, namely: primary health-care system, hospital management system and dental system. All three systems will be interconnected through one network to the Ministry.

4. *Online access to medical knowledge and services*

As part of their services, all ministries of health in ESCWA member countries, with the exception of Iraq, have websites with varying levels of services from static information to e-services. For example, the website of the Ministry of Health in Bahrain contains valuable information about health services, facilities, activities, health education, health conferences and health societies. The website of the Ministry of Health in Palestine also includes a wealth of information on medical laws, statistics, latest news, a directory of medical centres and a number of publications.

In a highly interesting step, the Bahrain Medical Bulletin was converted to an open access journal towards the end of 2008, thereby allowing free access to medical information.[204] Its website provides access to all archived issues of the bulletin since 2000 and most of the issues prior to 2000.[205]

Jordan has developed an online portal for family health in cooperation with Johns Hopkins University and with funding from USAID.[206] The portal provides information in Arabic relating to all groups of the community, namely, school children, adolescents, newlyweds and the elderly. The portal also provides online consultation supported by medical doctors.

The WHO Regional Office for the Eastern Mediterranean (WHO EMRO) regularly updates its website with latest medical and health information, and provides links to publications in Arabic on various health issues.[207]

E. COMPARATIVE ANALYSIS OF ICT APPLICATIONS IN EMPLOYMENT

The past few years have seen considerable progress in the use and promotion of ICT in recruitment and job search fuelled by a strong demand of highly skilled, ICT trained workforce in the ESCWA region. The Internet is the medium of choice used to advertise job opportunities and receive jobseeker applications online. Additionally, other means have proven successful in the recruitment process, such as the use of e-mail and SMS to receive related information and updates.

From the public sector perspective, many Government institutions have opted to advertise their job openings online in addition to publishing interview decisions and test results for a given post. On the other hand, private sector entities, banks and universities offer the option of online recruitment via their own websites whereby they post their job openings and jobseekers can send in their resumés in response.

Online recruitment agencies and job marketplaces have also gained considerable success whether at the national or regional level, offering, through online portals, job opportunities to graduates and jobseekers from various fields. These agencies provide the resumes to all types of employers from the public and private sectors.

1. *National employment offices and job databases*

In Bahrain, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia and the United Arab Emirates, public and private institutions are increasingly using online portals that offer e-recruitment services.

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[204] See http://www.zawya.com/story.cfm/sidZAWYA20081223113706/?query=online%20medical%20knowledge.

[205] See http://www.bahrainmedicalbulletin.com.

[206] See http://www.sehetna.com.

[207] See http://www.emro.who.int/index.asp.

The Labour Market Regulatory Authority (LMRA) in Bahrain has provided an excellent ICT-based system, which aims to protect the rights of immigrant workers and reach out to both employees and employers in a transparent manner.[208] Furthermore, it provides a single point of access for recruitment services, and helps workers seeking a job in Bahrain to check their work visa status and details regarding their new job. The status of application can be tracked online as well.

In Qatar, HRsmart, the leading talent management software company, was awarded a contract to provide employment and recruitment e-service solutions to the Government of Qatar. As part of this agreement, HRsmart is responsible for developing an integrated OSS e-service that connects Qatari residents, international jobseekers and employers by providing users with necessary employment and recruitment information and transactional services in support of the national labour market.[209]

In Saudi Arabia, the Ministry of Civil Service provides an online recruitment site through which interested citizens can apply for jobs in the Government sector, track the progress of their application and view the results.[210] The website also provides ample information and forms on employee affairs.

In Jordan, the National Centre for Human Resources Development (NCHRD) developed Al-Manar Project.[211] The project aims to improve the collection, analysis and distribution of human resources information. It specializes in the development of human resources (HR) and relies on the support of ministries and institutions directly involved in education, training and employment in the provisioning of its services. The project objectives are to enhance the development and utilization of Jordanian human resources in support of national economic development in a globally competitive environment. In addition, a primary concern of the Al-Manar Project is that labour market decisions are made on the basis of comprehensive, timely and regularly updated, and gender-sensitive information systems that are supported by continuous technical and Internet-based services.

In Oman, the Ministry of Civil Service developed the Human Resource Management System (HRMS) to administer and manage HR transactions electronically. The unified database helps Government entities obtain online information, reports and statistics that will help them to plan and make the right decisions in terms of human capital. Moreover, the Ministry of Manpower has a comprehensive national human resources database, which includes the collection of and regular follow-up on data and information for updating purposes.[212]

Dubai e-government online recruitment portal, which is supported by the Department of Government Information and Resource Planning, provides job opportunities for all national graduates and jobseekers.[213]

Many ESCWA member countries have demonstrated progress in building their national human resources databases. For instance, the Ministries of Civil Service and Labour in the Syrian Arab Republic and Yemen have each built centralized information systems and databases for employment in order to collect and register applications.

It is also important to note that, in 2003, ESCWA built a database for skilled Iraqi workers inside and outside Iraq. The "Professionals for Iraq Reconstruction" database facilitates the collection of data on skilled professionals in order to profit from their experiences in the effort made for the reconstruction of Iraq.[214]

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[208] See http://www.lmra.bh.

[209] See http://www.hrsmart.com/index.php/news-010509.

[210] See http://www.mcs.gov.sa.

[211] See http://www.almanar.jo/almanarweb/Default.aspx?tabid=36.

[212] See http://www.manpower.gov.om.

[213] See http://www.irecruitment.ae.

[214] See http://www.escwa.un.org/information/iraq/IPR/background.asp.

2. *Employment portals*

There are many specialized recruitment agencies with their own portals that advertise job opportunities on behalf of other companies and receive job applications online. These employment websites provide services to the public at the national and regional levels. Most of these sites do not charge employers or jobseekers any fees. However, some do require a service fee from employers in order to provide a proper list of registered jobseekers and even to assist employers in selecting appropriate candidates. A prominent example is bayt.com, which acts as an online marketplace for employers and jobseekers. Table 57 provides a selected list of the employment websites in the ESCWA region.

A showcase of the Transfer of Knowledge through Expatriate Nationals (TOKTEN) Programme needs to be highlighted as an interesting initiative in the region aimed at temporarily bringing back talented expatriate nationals to their home countries based on the spirit of volunteerism. This Programme was initiated by UNDP in 1977 to counter the effects of the brain drain from developing countries. Experts are traced through a database of emigrant professionals and graduates. TOKTEN was implemented in Egypt, Lebanon, Palestine, the Sudan and Syrian Arab Republic.[215]

TABLE 57. LIST OF SELECTED EMPLOYMENT WEBSITES IN THE ESCWA REGION

Country/region	Website
Regional	http://www.bayt.com
Regional	http://www.mihneti.com
Regional	http://www.jomea.com
Gulf subregion	http://gulfjobseekers.com
Gulf subregion	http://www.naukrigulf.com
Gulf subregion	http://www.monstergulf.com/
Egypt	http://www.jobsinegypt.com
Lebanon	http://www.hirelebanese.com
Lebanon	http://www.jobs.com.lb
Lebanon	http://www.lebanonrec.com
Saudi Arabia	http://www.wadhefa.com
The Sudan	http://www.sudanjob.com
Syrian Arab Republic	http://www.ejob.sy
United Arab Emirates-Dubai	http://www.jobsindubai.com

Source: Compiled by ESCWA.

3. *Teleworking and increasing employment opportunities*

As a result of the increasingly widespread use of ICT in the workplace, the notion of teleworking has emerged in the ESCWA region during the past few years, allowing citizens to work from their homes. This work mode will have a direct impact on the labour market in terms of increasing employment opportunities, especially for women and those with special needs.

Despite the absence of accurate numbers measuring the actual extent of this practice, the current economic boom in the Gulf subregion, especially in business activities that do not require the employee to be physically located at the office (such as media, research, translation, webdesign and consulting) has paved the way for individuals and companies to opt for this mode of work. Several companies in the GCC countries, particularly the United Arab Emirates, are outsourcing part of their business to persons or companies located outside in such countries as Egypt, Jordan and the Syrian Arab Republic, where work tasks are being carried out over the Internet.

[215] See http://www.unv.org/fileadmin/docdb/pdf/2008/TOKTEN_factsheet_01.12.2008.pdf.

ESCWA and other United Nations entities in the region have resorted to teleworking as a result of a broader business strategy in response to worsening situations, including riots, war and security threats, particularly in the case of Iraq, Lebanon and Palestine. For example, ESCWA has been working on enhancing its internal ICT systems and infrastructure in order to meet the demand of working from home and allowing access to its intranet, thereby providing Internet-accessible webmail, reverting to IP telephony for voice communications, and providing external storage for data safeguarding and backups.

F. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

1. *Maturity level 1: Iraq, Palestine, the Sudan, Syrian Arab Republic and Yemen*

This level is characterized by poor use of ICT applications in Government, weakness or absence of e-commerce and related legislation, limited usage of ICT in education (while the Syrian Arab Republic has a virtual university, computers and Internet access in schools are rare), inferior usage of ICT in health care, and barely perceptible use in the employment sector.

2. *Maturity level 2: Egypt, Kuwait and Lebanon*

This level is characterized by average progress in ICT applications in all areas covered by the study. Egypt and Lebanon have made modest progress, while Kuwait is leading with good progress in the area of e-government. However, such progress was insufficient in the period under study for Kuwait to sustain previous maturity level attained in 2007 owing to its lag in other areas.

3. *Maturity level 3*: *Jordan, Oman, Qatar and Saudi Arabia*

This level is characterized by progress in at least two of the five areas researched. While Saudi Arabia, for instance, had made reasonable progress in e-commerce and e-health, Jordan surged ahead in both education and health. As for Oman and Qatar, they showed improvement in both e-government and education. These countries made average progress in the other areas.

4. *Maturity level 4: Bahrain and United Arab Emirates*

The fourth level is characterized by progress in four areas. Bahrain and the United Arab Emirates have made significant progress in all areas except education, where they were ranked as average.

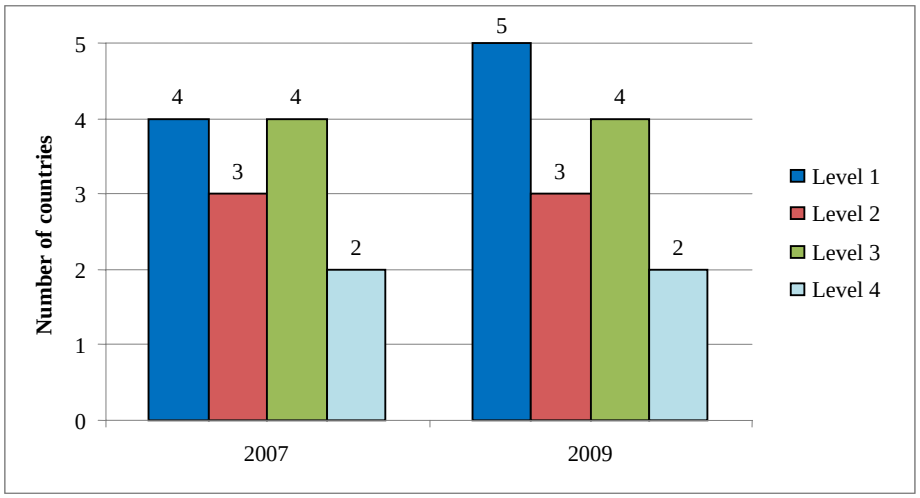
TABLE 58. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN ICT APPLICATIONS

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain							✓	✓
Egypt			✓	✓				
Iraq	✓	✓						
Jordan					✓	✓		
Kuwait				✓	✓			
Lebanon			✓	✓				
Oman			✓			✓		
Palestine	✓	✓						
Qatar					✓	✓		
Saudi Arabia					✓	✓		
The Sudan[a/]		✓						
Syrian Arab Republic	✓	✓						
United Arab Emirates							✓	✓
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 10. Maturity levels of ESCWA member countries in ICT applications



G. SUGGESTIONS AND RECOMMENDATIONS

(a) *ICT applications in Governments*

(i) Increase Government commitment as well as political and financial support to implement rapidly plans and strategies relating to ICT applications in general and e-government in particular;

(ii) Establish a separate authority for e-government planning, implementation and monitoring where this authority directly reports to the highest authority in the country, such as the council of ministers, rather than a specific line ministry. This will give the e-government project the leverage and power to implement e-government applications in all ministries according to a national priority set by the highest authority in the government;

(iii) Increase staff and citizen awareness on e-government, with a focus on empowerment gained by citizens as a result of e-government services. Staff awareness should come as part of change management with due regard to resistance to change through process re-engineering in all Government institutions;

(iv) Improve and make affordable the access of rural and marginalized areas as well as attend to the requirements of citizens with special needs by using available modern technologies and varied access points such as the Internet, fixed telephone, mobile telephone, call centres and public kiosks;

(v) Promote collaboration among ESCWA member countries for sharing experience and develop applications that apply to more than one country in the region. ESCWA could provide the platform for such collaboration.

(b) *ICT applications in business and commerce*

(i) Formulate and implement national plans for building trust through increased technical security and enactment of e-transaction/e-commerce and e-signature laws;

(ii) Provide secure online payment and enable a variety of means for online payment to meet different needs.

(c) *ICT applications in education and training*

(i) Education, as a sector, is awarded considerable attention by Governments of the member countries. However, it is recommended to integrate ICTs into the national strategy for school education whether for digitizing curricula, supporting the classroom teaching process, and providing appropriate teacher training. A selected number of pilot schools could serve as a starting point;

(ii) Improve availability and access of quality lifelong e-learning programmes to meet the needs of the constantly changing job market today;

(iii) Encourage the use of e-learning in professional skills development and motivate the development of instructional content and use of course authoring for courses;

(iv) Encourage the development of specialized learning portals for various sections of knowledge and disciplines.

(d) *General recommendations*

(i) Update ICT strategies whenever a strategy has expired or has been completed which should then be evaluated for formulating a new strategy. The new strategy should include benchmarks and processes for evaluating results and monitoring progress. While some member countries have formulated new five-year strategies for the use of ICT, others have not;

(ii) Train staff (teachers, business professionals, Government employees and health-care providers, among others) such that there are plans for annual number of training days on ICTs, ranging from basic ICT literacy to advanced ICT applications in all domains;

(iii) Give special attention to new, innovative services that can ensure better access to all citizens, such as the use of mobile applications or any other future technologies which should be exploited as new venues for service delivery;

(iv) Increase general public ICT literacy through skill development and training programmes in order to reap more and fuller benefits of ICT applications in general. Selected social groups, including women, should be given priority;

(v) Implement awareness campaigns on the benefits of e-services, particularly e-commerce with focus on all stakeholders, namely, the private sector and consumers.

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

A. COMPARATIVE ANALYSIS

1. *ICT in support of cultural and linguistic diversity*

ICT is an effective tool for the protection of cultural identity by preserving historical documents and manuscripts, archiving and indexing resources, thereby offering worldwide access to cultural and historical materials, and generating and promoting interest in culture and heritage. Consequently, this issue became one of the main axes of the Arab ICT Strategy – Building the Information Society 2007-2012, which was approved by the Arab Telecommunications and Information Council of Ministers in 2007.[216] The region is home to several initiatives undertaken by Governments and the private sector in a number of ESCWA member countries aimed at preserving its identity and cultural diversity. In this regard, ESCWA realized the importance of Digital Arabic Content (DAC) in 2003 when it launched its initiative on DAC. Since then, several activities dedicated to the promotion of DAC and its development into an industry have been launched and implemented. Moreover, owing to its importance, DAC is included as one of the action lines of ESCWA's Regional Plan of Action (RPoA) for Building the Information Society, which was first published in 2004 and its recent update adopted in 2009.[217]

In line with the "Memory of the World" programme launched by UNESCO in 1992, several efforts are being undertaken in the region to safeguard and publish endangered documentary heritage.[218] In the Arab region, the "Memory of the Arab World" project aims to establish a bilingual (English/Arabic) portal dedicated to Arab heritage, and introduce it to the world.[219] It also contributes to the development of Arabic content on the Internet and promotes similar initiatives related to the preservation of heritage through digitization. In addition, the project seeks to highlight achievements of Arab scientists throughout several historic eras, take stock of possessions from museums, and provide information on the folkloric heritage of the region.

Within that context, "Memory of the Arab World" is a four-year project (2007-2011), which is being implemented through the joint collaboration of several Arab countries and territories, namely: Egypt, Jordan, Kuwait, Lebanon, Mauritania, Morocco, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic and United Arab Emirates, as well as a number of international and regional organizations, including UNESCO, ITU and the League of Arab States.

Extensive work has been carried out in Egypt in an effort to maintain and protect its national heritage. The NAE digitization project was first piloted in 2003 as a partnership between MCIT, the Centre for Documentation of Cultural and National Heritage (CULTNAT) and other IT companies headed by IBM. Its main objective is to preserve Egypt's national archives by producing watermarked, high-resolution digital images of 130,000 valuable documents, thereby reducing the need for physical access to them. The project will also produce digital versions of more than 90 million documents held by NAE for inclusion in a searchable indexed database, which can be accessed via the NAE website.[220] The project was launched in 2005 and is scheduled to be completed by the end of 2009.

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[216] See http://www.aticm.org.eg.

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

[218] See http://www.unesco.org/webworld/memory/abid.html.

[219] See http://memoryarabworld.net.

[220] See http://www.nationalarchives.gov.eg.

Additional projects have been earmarked and some are being implemented in Egypt as part of its ICT Strategy (2007-2010). The objective is to preserve the identity and cultural diversity of the country. Projects include, among many others, the digitization of historical maps and Arabic papyri at the National Library of Egypt, the digitization of the Egyptian Geographic Society (EGS) archives, CULTURAMA or cultural panorama, Eternal Egypt, the digital documentation of rare manuscripts and architectural drawings, Egypt Memory online shop and the archaeological map of Egypt.[221]

In Kuwait, a project was launched by the National Library of Kuwait for the preservation of national heritage, which aims to conserve national heritage and related resources through optical scanning and digitization.[222] Selected books, periodicals, rare documents and manuscripts will be stored electronically as text, thereby allowing them to be fully searchable within the national bibliographic database. Another project is being implemented under the framework of the National Bibliography Programme, which aims to create an electronic bibliographical net that can be used by other major libraries in Kuwait. So far, the project has successfully produced two unified lists on national books and periodicals, a unified national list of manuscripts and a unified national list of audiovisuals. All these lists are nationally integrated and include all kinds of books, periodicals and manuscripts that are available in major Kuwaiti libraries, including, most prominently, the Kuwait University Library, the Amiri Diwan Library, the Library of the Kuwait Foundation for the Advancement of Sciences and the Faqh (Islamic jurisprudence) Encyclopaedia Library.

Qatar places great emphasis on preserving cultural and linguistic heritage. Recognizing the potential of ICT in the preservation and development of cultural heritage, the National Council for Culture Arts and Heritage and Qatar Museums Authority have developed an impressive bilingual online presence, both to inform users and spur interest in Qatar's culture, heritage and language.[223]

2. *Local and foreign digital content development*

An established digital Arabic content industry could bring about investment opportunities to the region given the potentials of a large market with more than 300 million Arabic speakers, the high growth in Internet penetration rates, and the limited availability of Arabic content online. Hence, in an effort to promote a DAC industry, ESCWA launched in 2007 a regional project on the Promotion of the Digital Arabic Content Industry through Incubation (see box 10). The project intends to contribute to the growth of the DAC industry in the region by supporting and promoting the development of DAC applications through technology incubators. It comprises two main implementation tracks. During the first track, ESCWA prepared several studies aimed at assessing the current status of the DAC industry and produced three reports.[224] In the second track, which is scheduled to be completed by the end of 2009, ESCWA is implementing a number of DAC applications using the facilities of five selected ICT incubators in the region.

In 2009, two separate initiatives were launched by the eGovernment Authority of Bahrain and Bahrain Internet Society to increase digital content through creativity and competitiveness at the national and regional levels. The Arab eContent Award (AEA) and Bahrain eContent Award (BEA)[225] were inspired by the World Summit Award (WSA), which is a global initiative for selecting and promoting the best e-content and applications across the world. Winners of both initiatives will represent the region at WSA. In the 2009 BEA, 399 participants qualified for the competition in ten categories, namely, e-government, e-health, e-inclusion, e-science, e-business, e-banking, e-media, e-entertainment, e-learning and e-culture.

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[221] See http://www.mcit.gov.eg/ict_e-content.aspx.

[222] See http://www.nlk.gov.kw.

[223] See http://www.cnc.com.qa and http://www.qma.com.qa.

[224] See http://www.escwa.un.org/divisions/projects/dac/docs.asp.

[225] See http://www.bea.bh and http://www.aea.bh.

The eSyria national blog, which was launched in 2008 by SCS, is considered one of the most important projects in the country for the development of local digital content.[226] It promotes the development of cultural, social, economic and scientific content in the Syrian provinces.

Box 10. Promotion of the Digital Arabic Content Industry through Incubation Project

ESCWA launched during June-July 2008 a series of Digital Arabic Content (DAC) competitions to promote innovation and provide opportunities for university graduates and young entrepreneurs to implement DAC-related initiatives. The competitions drew in over 55 applications from Jordan, Lebanon, Palestine, Syrian Arab Republic and Yemen on a variety of subjects, including software for Arabic language processing and websites offering education, culture, employment, tourism and e-commerce services. The partnerships established with technology incubators in the respective countries were fundamental during the evaluation stage of the competition.

"Alf Mile", which was selected as the winner of the incubation award in Lebanon, aims to develop a regional, interactive educational game on the countries and cultures of the Arab world; the project was incubated at Berytech. In Jordan, the Innovation Centre at Philadelphia University will incubate the "Arab Entrepreneur" website and "Itqan", a tool for the automatic generation of cases in software testing. The "Arabic Optical Character Recognition System" project was won in Palestine and was incubated at the Palestine Information and Communication Technology Incubator (PICTI). In the Syrian Arab Republic, two projects were selected for incubation at the Syrian Computer Society, namely: the "Automatic Text-to-Speech Engine", which will recognize Arabic text for conversion into speech; and "academia.sy", an interactive portal that aims to provide educational services and media information for students and institutions of higher education.

Witnessing the largest number of applications, the competition in Yemen concluded with three winners, namely: "Aden Tourism Portal", providing a range of tourism services on Aden; the "Electronic Mediator", which acts as an online mediator for such services as employment, project funding and real estate; and the "E-Learning" project, which provides comprehensive educational management services. All three projects are being incubated at the Aden ICT Incubator.

Source: ESCWA. More information is available at: http://www.escwa.un.org/divisions/projects/dac/index.asp.

In the United Arab Emirates, two content initiatives related to the digitization of Arabic content are being implemented, namely: in the Emirates Centre for Strategic Studies and Research (ECSSR), whereby books written on the region in foreign languages are being translated into Arabic before getting digitized; and another initiative by the Mohammad bin Rashid al Maktoum Foundation aimed at translating and digitizing selected Arabic books.

In 2006, the Government of Oman launched a digital society initiative, "eOman", which aims to create an effective Government-community-citizen infrastructure that provides better public services to people, thereby resulting in efficient information flow between the Government and citizens. ITA, which is leading the implementation, is planning to develop a digital content strategy, which will include setting up an e-content centre of excellence to provide consultancy in content development, conduct training and skills development programmes and produce their own digital content locally.[227]

In Egypt, "Fekr Rama" was launched in 2008 as one of the projects within the Arabic e-Content Initiative.[228] It is a portal with rich Arabic content provided in many fields of culture for online users. The portal is a product of collaboration by MCIT, Al Azhar University, the Ministry of Culture, the Ministry of Information, the Egyptian Publishers Union and others. Currently, the portal contains more than 6,000 titles, 3,000 of which are freely available. By 2009, some 20,000 titles will be available online.

In Saudi Arabia, the King Abdullah Initiative for Arabic Content was launched in line with recommendations made at the nineteenth session of the Council of the League of Arab States (28-29 March

[226] See http://www.esyria.sy.

[227] See http://www.ita.gov.om/ITAPortal/Pages/Page.aspx?NID=269&PID=1202.

[228] See http://www.fekr-rama.com.

2007).[229] It aims to promote the presence of the Arabic language in all domains, including media, the Internet and science and technology. KACST was charged with monitoring the implementation of the Initiative in collaboration with other partners. The Initiative encompasses a number of projects, including a digital library, an interactive dictionary and building open-source content.

3. *ICT tools and R and D programmes*

In the Arab region, "Sakhr Software", a company dedicated to research and development in ICT tools, has contributed to the enrichment of Arabic content.[230] Box 11 highlights some of the products and tools developed by Sakhr.

Box 11. A selection of products and tools by Sakhr supporting the Digital Arabic Content industry

- **IDRISI** is a bilingual Arabic-English search engine for electronic data, documents, databases and websites
- **OCR** (Optical Character Recognition) converts scans of Arabic printed documents into digital text
- **Arabdox** is an Arabic-English-French document management system that offers an integrated solution to manage increasing amounts of information by using Sakhr's unique Arabic language technologies for OCR, text mining and search. It is uniquely suited as an Arabic document management system
- **SET** is a bidirectional machine translation (MT) system for Arabic-English, translating any text in Arabic to English and vice versa
- **Text-To-Speech (TTS)** engine converts any Arabic/English text into a human voice, which gives businesses the opportunity to provide their customers with the latest static and dynamic information anytime and anywhere using their telephones and mobiles
- **ASR** (Automatic Speech Recognition) technology which is an important component of any telephony application or a call centre. The engine supports many Arabic accents, including, among others, Levantine, Gulf and Egyptian Arabic
- **Johaina** (http://johaina.sakhr.com) is a news monitoring service, which scans hundreds of Arabic and English news sites targeting the Middle East region by using Sakhr's powerful machine translation technology to display in English the original Arabic articles, thereby increasing the reach of information for non-Arabic speaking users

In spite of the progress achieved by Sakr's products, their use is still insignificant given that most of these products are not available freely for public use. In addition, development carried out by Microsoft for multilanguage support under Windows and Office programmes has rendered work that was developed by regional companies, such as Sakhr in Kuwait and "01 System" in Bahrain, almost useless owing to the fact that users generally prefer the embedded solutions provided by the international company to the solutions provided by the relatively small regional companies.

Progress in the development of tools and applications required for the enhancement of DAC is still at an early stage. Some R and D activities in such areas as OCR, TTS and Arabic speech recognition are being carried out by universities and research centres in the region. Unfortunately, these research activities remain at a pilot stage owing both to the lack of cooperation between universities, and the lack of funding from the private sector. Nevertheless, some efforts by the private sector have led to the development of basic tools and search engines. However, these products are not up to par with those developed by multinational giant firms, such as Google. Box 12 depicts some of the main Arabic search engines that have been developed in the region.

Several attempts have been made to Arabize ICT terms, and produce bi- and tri-lingual e-glossaries (English-French-Arabic). In this regard, the Arab Telecommunications and Information Council of Ministers

[229] See http://www.econtent.org.sa.

[230] See http://www.sakhr.com.

adopted in 2005 a project on Translation and Arabization of ICT Terminology.[231] The project was submitted to the World Telecommunication Development Conference (WTDC-06) for funding, which was held in Doha in 2006. WTDC-06, called upon ITU's Telecommunications Development Bureau (BDT) to implement this initiative in cooperation with the League of Arab States and Arab countries.

It should be noted that the lack of unified and agreed upon ICT terms across the Arab speaking countries is having negative impacts on the spread of ICTs, as well as on education in the region. The planned e-glossary will be updated, improved and used for compiling an English-French-Arabic dictionary that will be available online as well as on CD-ROM and printed versions. ITU has been collaborating, since April 2009, with the Syrian Government (represented by the Ministry of Communication and Technology and the Syrian Computer Society) on implementation, which should be completed by the end of 2011. In the same context, ESCWA adopted in its 2008-2009 work programme a project, entitled Development and Refinement of Arabic Terminology in the Field of ICT, which will result in a database for a glossary of ICT terms that will be available online.

Box 12. Main Arabic search engines developed in the region

www.araby.com: In 2008, Araby, which is a subsidiary of Maktoob Group, launched a new design and a number of new functionalities and services aimed at promoting a more user-friendly site. Among the new services is a thematic search feature, where the most used keywords on Araby are grouped and categorized by theme. These themes cover all interests, from sports to technology, Islam, women's issues, art and celebrity news, finance and business-related topics. The themes are displayed on the homepage with their most popular keywords that are clickable, enabling users to directly access their search results.

www.ayna.com: Ayna offers its users different levels of search options through its search engine, thereby enabling them to search the Web, video, news, dictionary, blog, local, guide, images and religion sections with an advanced search option, and a virtual Arabic keyboard for computers without a keyboard for typing Arabic alphabet.

www.tayait.com: Through the combination of Exalead's search engine and Tayait's Arabic Natural Language Processing technology, this search application examines words in context to understand their meaning by looking at their position in a sentence or group of words. Tayait.com was the first Arabic search engine based on morphology and inflection search. This functionality allows users to access quickly and precisely the information required from across the entire Web (Arabic and non-Arabic) including multimedia.

www.onkosh.com: Onkosh is an Arabic-English search engine that scours the Web to find Arabic blogs, websites, news, forums and files, among others. It proposes an interesting feature, called "Bel-3araby", which allows users to search for Arabic using English characters with a virtual keyboard.

www.yamli.com: Yamli.com is focused on addressing the problems specific to the Arabic Web by offering two main products, namely: the Smart Arabic Keyboard, and Yamli Arabic Search. The first allows users to type in Arabic from within their Web browsers without the need for an Arabic keyboard. The technology is based on a real-time transliteration engine which converts words typed in Latin characters to their closest Arabic equivalent. The Yamli Arabic Search focuses on providing more relevant search results for an Arabic query by expanding it to its most frequently used Latin representations.

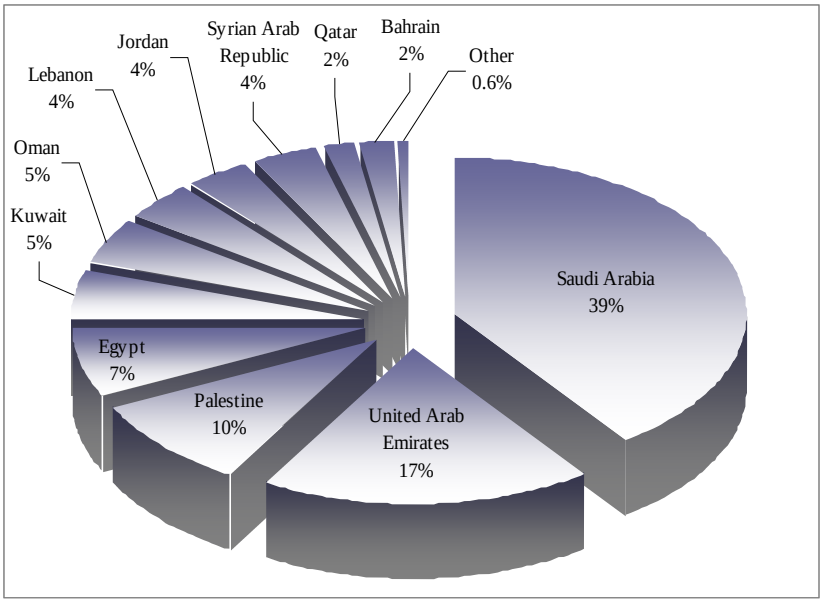
Finally, it is important to note that in the ESCWA region, Governments are not giving sufficient attention to promoting or supporting R and D projects in such language-related areas as machine translation engines and tools, electronic dictionaries, terminology and thesauri, multilingual search engines and content referencing.

Using the Google search engine, ESCWA has adopted a methodology to determine the total number of websites deployed under the ccTLD of every member country. Comparing these numbers to the ones obtained in 2007, it appears that the total number of Web pages of all member countries have more than doubled in 2009, signalling a significant growth in the region's content on the Internet. However, Arabic Web pages grew more modestly by 43 per cent compared to 2007.

[231] See http://www.itu.int/ITU-D/projects/display.asp?ProjectNo=ARB08-005.

While data gathered using this methodology is not very accurate, it provides a rough estimate of electronic content available on the Internet. Based on these results, figure 11 shows that Saudi Arabia has the most Web content among ESCWA member countries, accounting for 39 per cent of total Web pages (as of September 2009), followed by the United Arab Emirates with 17 per cent. Further analysis indicates that the GCC region contributes to more than 70 per cent of the total electronic content on the Internet by comparison to the contribution of the remaining ESCWA member countries. This is due to the high penetration rates, adoption and affordability of ICTs, especially broadband technologies, witnessed by all GCC countries. In addition, the economic and social growth seen in the GCC region is transforming it to a regional and international hub for finance and technology sectors, thereby attracting additional foreign investments and spurring further growth.

Figure 11. Contribution of ESCWA member countries to total Web content of the Internet



B. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

1. *Maturity level 1: Iraq, the Sudan and Yemen*

The political and social instability in these countries has undermined progress towards the preservation of cultural identity and the development of local content, which is not deemed a national priority.

2. *Maturity level 2: Bahrain, Jordan, Lebanon, Oman and Palestine*

ESCWA members at this level have a number of initiatives to preserve cultural and linguistic diversity, and a growing development of Arabic content, albeit insufficient for shaping a DAC industry. In addition, there is a nascent presence of R and D programmes in applications and tools supporting a DAC industry.

3. *Maturity level 3: Egypt, Kuwait, Qatar, Saudi Arabia, Syrian Arab Republic and United Arab Emirates*

Despite a lack of funding in certain projects, it is important to note that these countries continue to exert efforts in the preservation of cultural identity, heritage, national archives, cultural identity and heritage

whereby a growing number of dedicated initiatives are being implemented. Furthermore, these countries are home to projects promoting the development of DAC. While Egypt still outranks member countries in the number of projects/initiatives, Saudi Arabia ranks first in terms of developing online Arabic content with an emerging DAC industry. The absence of a clear DAC strategy and the lack of adequate funding and R and D programmes in DAC applications and tools are hindering the progress of these countries to maturity level 4.[232]

TABLE 59. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN CULTURAL DIVERSITY AND IDENTITY, LINGUISTIC DIVERSITY AND LOCAL CONTENT

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain			✓	✓				
Egypt					✓	✓		
Iraq	✓	✓						
Jordan			✓	✓				
Kuwait					✓	✓		
Lebanon			✓	✓				
Oman			✓	✓				
Palestine	✓			✓				
Qatar			✓			✓		
Saudi Arabia					✓	✓		
The Sudan[a/]		✓						
Syrian Arab Republic					✓	✓		
United Arab Emirates					✓	✓		
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 12. Maturity levels of ESCWA member countries in cultural diversity and identity, linguistic diversity and local content

[232] None of the ESCWA members achieved maturity level 4 in 2009.

C. SUGGESTIONS AND RECOMMENDATIONS

(a) Set up strategies for the development of DAC and its industry at national and regional levels;

(b) Improve university curricula in order to produce skilled graduates in fields related to DAC development, and encourage the establishment of training centres providing hands-on education software applications, technologies and platforms needed for DAC development;

(c) Support an enabling environment conducive to the growth of DAC, ensuring IPR protection and encouraging the private sector to participate effectively in the building and development of a DAC industry;

(d) Strengthen cooperation between universities and the private sector in R and D related to the development of applications and tools needed for the development of DAC;

(e) Accelerate the implementation of e-government projects and the launch of e-services by allocating additional funds and resources. These projects could dramatically increase online Arabic content;

(f) Launch governmental initiatives supporting endeavours taken by the private sector, individuals and NGOs to preserve the diversity and cultural heritage of the region through digitization;

(g) Enhance the cooperation between Arab countries as part of a regional integration initiative in the field of DAC, and strengthen cooperation with international organizations working in this field;

(h) Create national and regional funds supporting the creation of start-ups and SMEs in the field of DAC development.

IX. MEDIA

A. OVERVIEW OF THE ROLE OF THE MEDIA IN BUILDING THE INFORMATION SOCIETY IN THE ESCWA REGION

The media sector and its different and diverse forms are part of the digital world, which encompasses all sectors of the economy, and play a significant role in developing the information society. Digital media and its systems make information, knowledge and educational resources available to all citizens. ICTs are extensively used in media systems whether in audiovisual, printed or electronic format, and these technologies are becoming essential in terms of supporting the means for media development.

With democracy and human rights at the heart of the media sector, the framework of operation of this sector requires that the right to access information be ensured. The media sector should be governed by the principles of press freedom that include free information flow, independence, pluralism and diversity. Media is based on Article 19 of the Universal Declaration of Human Rights on the people's right to freedom of opinion and expression, including the right to acquire, exchange and use information and ideas.

Moreover, the 2003 WSIS Geneva Declaration of Principles reaffirmed that communication and participation are at the foundation of the information society, and that commitment to the "principles of freedom of the press and freedom of information, as well as those of the independence, pluralism and diversity of media … are essential to the information society".[233] It also emphasized the important role of traditional media and supporting ICTs in the information society. The WSIS Geneva Plan of Action designated one of its eleven action line for media, which in its various forms and diverse ownership contributes "to freedom of expression and plurality of information".[234]

The action line on media seeks to promote media and the development of legislation that ensures its independence and plurality; attend to the content of media and its consistency with freedom of expression; support partnerships and networking for media development and field training; promote a balanced media portrayal of both women and men; reduce imbalances affecting media compatibility in terms of technological resources; and encourage bridging the knowledge and digital divide in remote areas through traditional media.

The 2005 WSIS Tunis Agenda reaffirmed the international commitment to promote the use of media for enabling all people to access information, culture and knowledge, and to make digital and traditional media serve as educational and learning tools, in addition to their use for the transmission of information and news. It also stressed the "independence, pluralism, and diversity of media, and freedom of information", and recognized the role of media as an integral part of the process towards the multilingualism on the Internet.[235]

The media sector in the region is not preparing for the upcoming convergence of television, Internet and telephony, and could therefore be faced with many challenges. Furthermore, the region needs to consider the way information, expression and freedom are handled, in addition to the means of enhancing scientific research in order to advance from a consuming to a sustainable productive society.

1. *Media diversity, independence and pluralism*

The opportunities made available through the different media outlets support freedom of expression and plurality of information. Media outlets also serve as tools through which oppressed societies could pave the way towards their democracy.

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[233] World Summit on the Information Society (WSIS), Declaration of Principles (12 December 2003), para. 4.

[234] World Summit on the Information Society (WSIS), Plan of Action (12 December 2003), para. 24.

[235] World Summit on the Information Society (WSIS), Tunis Agenda for the Information Society (18 November 2005), paras. 53 and 90.

(a) *Media Sustainability Index*

The Media Sustainability Index (MSI) was developed in 2000 by the International Research and Exchanges Board (IREX), a non-profit organization that was established in 1968 aimed at improving the quality of education, strengthening independent media and fostering pluralistic civil society development. Specifically, MSI assesses the development of media systems through an assessment of five objectives, namely, free speech, professional journalism, plurality of news sources, business management and supporting institutions. The estimated value of MSI ranges from zero to four and indicates one of four levels of sustainability (see box 13).

Box 13. The four levels of the Media Sustainability Index (MSI)

Index 0-1: Unsustainable, anti-free press – A country does not meet or only minimally meets objectives. Government and laws actively hinder free media development; professionalism is low; and media-industry activity is minimal.

Index 1-2: Unsustainable mixed system – A country minimally meets objectives, with segments of the legal system and Government opposed to a free media system. Evident progress in free-press advocacy, increased professionalism, and new media businesses may be too recent to judge sustainability.

Index 2-3: Near sustainability – A country has progressed in meeting multiple objectives, with legal norms, professionalism, and the business environment supportive of independent media. Advances have survived changes in Government and have been codified in law and practice. However, more time may be needed to ensure that change is enduring and that increased professionalism and the media business environment are sustainable.

Index 3-4:Sustainable – A country has media that are considered generally professional, free, and sustainable, or to be approaching these objectives. Systems supporting independent media have survived multiple Governments, economic fluctuations, and changes in public opinion or social conventions.

Source: International Research and Exchanges Board (IREX), which is available at: http://www.irex.org/programmes/MSI_EUR/2009/methodology.asp.

Table 60 provides the ranking of member countries according to the overall score MSI for 2007. Furthermore, figure 13 indicates the change in the overall score of MSI from 2005 to 2007, thereby showing that the sustainability indices for Egypt, Lebanon, Syrian Arab Republic and United Arab Emirates have shown positive change.

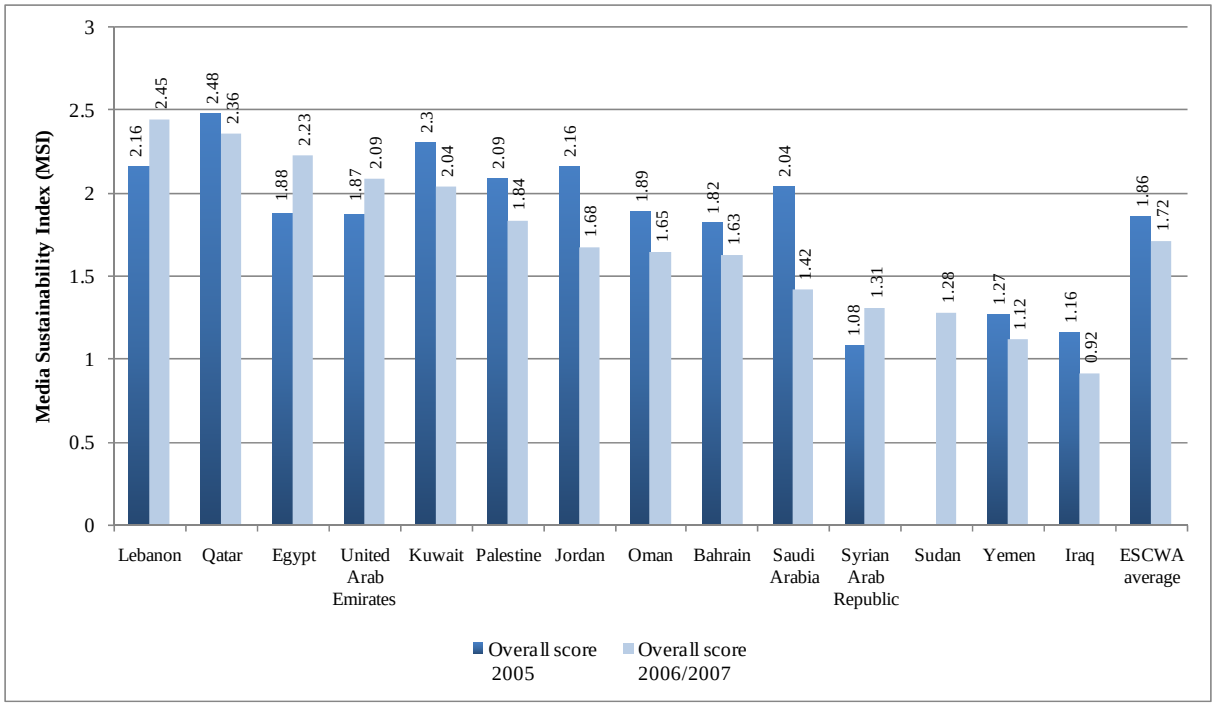
TABLE 60. MSI RANKING OF ESCWA MEMBER COUNTRIES, 2006-2007
(*Ranked by overall score*)

Country or territory	Free speech	Professional journalism	Plurality of news sources	Business management	Supporting institutions	Overall score
Lebanon	1.24	2.44	2.88	2.27	2.42	2.45
Qatar	2.97	2.43	2.28	2.27	1.83	2.36
Egypt	1.97	2.25	2.38	2.23	2.34	2.23
United Arab Emirates	1.92	2.26	2.04	2.50	1.74	2.09
Kuwait	1.78	2.31	2.16	2.71	1.24	2.04
Palestine	1.77	1.58	2.10	1.75	2.01	1.84
Jordan	1.70	2.00	2.00	1.80	1.80	1.68
Oman	1.84	1.70	1.71	1.75	1.28	1.65
Bahrain	1.52	1.61	1.35	1.99	1.71	1.63
Saudi Arabia	1.38	1.62	1.38	1.67	1.07	1.42
Syrian Arab Republic	1.36	1.58	1.24	1.27	1.08	1.31
The Sudan	0.99	1.63	1.09	1.34	1.37	1.28
Yemen	0.97	1.35	0.75	0.98	1.53	1.12
Iraq	0.89	1.00	0.94	0.70	1.04	0.92
ESCWA average	1.59	1.84	1.74	1.80	1.60	1.72

Source: International Research and Exchanges Board (IREX).

Based on the MSI overall scores of ESCWA member countries for 2007, five countries, namely Egypt, Kuwait, Lebanon, Qatar and United Arab Emirates, were ranked at near sustainability (MSI 2-3). Furthermore, eight ESCWA members were in the unsustainable mixed system (MSI 1-2), namely, Bahrain, Jordan, Oman, Palestine, Saudi Arabia, the Sudan, Syrian Arab Republic and Yemen. Only Iraq's MSI score was unsustainable, anti-free press (MSI 0-1). The average MSI of all ESCWA member countries of 1.72 places the region in the indexing process within the unsustainable mixed system (MSI 1-2).

Figure 13. Ranking of ESCWA member countries based on the overall score of MSI, 2006-2007



Source: International Research and Exchanges Board (IREX), MSI Middle East & North Africa 2006/7, which is available at: http://www.irex.org/programs/MSI_MENA/index.asp.

(b) *Media diversity and independence*

While ICTs have accelerated the work of media and communications, technology tools do not reduce the restrictions practised in relation to war and national security issues. Table 61 is based on the report on press freedoms in the Arab countries, which was published in 2007 by the Federation of Arab Journalists (FAJ). It indicates the number and ownership of newspapers in the ESCWA member countries.

Governmental news agencies are the trend in the region, with only three countries possessing private news agencies. This reflects the strong influence of Governments on national media.

The radio and television ownership were not included in the report of 2007. According to the previous report, in 2006, all countries had a mixture of government and private sector ownership of audiovisual media institutions, with the exception of Bahrain, Egypt, Oman, Qatar and Yemen, which had only government ownership (see table 62).

TABLE 61. NEWSPAPER OWNERSHIP AND GOVERNMENT-MEDIA RELATIONSHIP IN ESCWA MEMBER COUNTRIES, 2007

Country or territory	Newspaper ownership				Government support for reporters	Government support for media institutions	Electronic newspapers	Private news agency
	Private	Mixed	Government	Foreign				
Bahrain	10		11	1	Yes	No	Yes	No
Egypt	330	165	54	10	Yes	No	Yes	No
Iraq	265[a/]	90[a/]	2[a/]	1	Yes	Yes	Yes	Yes
Jordan	..	..		2	No	No	Yes	No
Kuwait	45	56	..	5	..	..	Yes	No
Lebanon	All				No	Yes/No	Yes	Yes
Oman	30		56	6	No	Yes	Yes	No
Palestine	1	..	2	1	No	Yes	Yes	Yes
Qatar	4		1		Yes	Yes	Yes	..
Saudi Arabia	20		1		No	No	Yes	No
The Sudan	..	..	..	5	Yes	..	Yes	No
Syrian Arab Republic	151	..	8	3	Yes	Yes	Yes	No
United Arab Emirates	7	1	5	21	No	Yes	No	No
Yemen	68	..	21	4	No	Yes/No	Yes	No

Source: Federation of Arab Journalists (FAJ), Report on press freedoms in the Arab nation (2007).

Notes: a/ Calculated average or rounded number of newspapers.
Two dots (..) indicate that data are not available.

TABLE 62. RADIO AND TV OWNERSHIP IN ESCWA MEMBER COUNTRIES, 2006

Country or territory	Radio and TV ownership			
	Private	Mixed	Government	Foreign
Bahrain			✓	
Egypt			✓	
Iraq	✓	✓	✓	✓
Jordan	✓		✓	
Kuwait	✓		✓	
Lebanon	✓	✓	✓	
Oman			✓	
Palestine	✓		✓	
Qatar			✓	
Saudi Arabia	✓		✓	✓
The Sudan	✓		✓	
Syrian Arab Republic	✓		✓	
United Arab Emirates	✓	✓	✓	✓
Yemen			✓	

Source: Federation of Arab Journalists (FAJ), Report on press freedoms in the Arab nation (2006).

(c) *Press Freedom Index*

Reporters Without Borders (RWB) publishes the Press Freedom Index (PFI) for countries across the world. Table 63 provides the PFI ranking of ESCWA member countries for 2008.

TABLE 63. RANKING OF ESCWA MEMBER COUNTRIES ON THE PRESS FREEDOM INDEX, 2008

Rank	Country or territory	Index value		Global ranking		Change in global rank
		2007	2008	2007	2008	
1	Kuwait	20.17	12.63	63	61	+2
2	Lebanon	28.75	14.00	98	67	+31
3	United Arab Emirates	20.25	14.50	65	69	-4
4	Qatar	24.00	15.50	79	76	+3
5	Bahrain	38.00	21.17	118	96	+22
6	Oman	..	32.67	..	123	-6
7	Jordan	40.21	36.00	122	128	+5
8	The Sudan	55.75	42.00	140	135	+5
9	Egypt	58.00	50.25	146	146	0
10	Yemen	56.67	59.00	143	155	-12
11	Iraq	67.83	59.38	157	158	-1
12	Syrian Arab Republic	66.00	59.63	154	159	-5
13	Saudi Arabia	59.75	61.75	148	161	-13
14	Palestine	69.83	66.88	158	163	-5

Source: Reporters Without Borders (RWB), Press Freedom Index 2008, which is available at: http://www.rsf.org/en-classement794-2008.html.

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

Kuwait, Lebanon, United Arab Emirates, Qatar and Bahrain ranked within the top 100 countries in terms of PFI. The Index for Lebanon and Bahrain increased by 31 and 22 places, respectively, on the global ranking scale between 2007 and 2008, and the ranking of other countries either maintained almost the same status or decreased by more than 10 places, such as the ranking of Yemen and Saudi Arabia.

According to RWB, the main lesson learned and drawn from PFI is that "only peace protects freedoms".[236] Palestine lies at the bottom of the list, at 163. Government policy and laws in terms of press freedom could be enhanced in almost all ESCWA member countries by bringing about more freedom of opinion and expression, and opening up State institutions to public monitoring and scrutiny, thereby contributing to national development.

2. *Role of the media in bridging the knowledge divide*

For the public, media outlets are the basic means for knowing about their surroundings. The infrastructure of media ICT enables citizens to connect with the world. The new media systems also enable the transmission of educational resources and facilitate people to seek continuous learning.

The Arab satellite broadcasting is in a booming state that goes in parallel to international broadcasting, presenting an opportunity to open up to the diversity of world cultures. However, the television and broadcasting industry is facing challenges that include the need for some regulation that sets basic guidelines and standards rather than limit media freedoms and broadcasting licensing. Currently, the media in the region is concentrated in Beirut, Cairo, Doha and Dubai.[237] Given the availability of free media zones, people with enough capital are able to start a television channel as long as it follows guidelines that include "avoiding programming deemed inappropriate or inciting civil unrest". The need lies in following up on these channels to continue their compliance with basic guidelines, and attend to their content. However, legislation to regulate the media sector should not be a means to legitimize more censorship.[238]

[236] Reporters Without Borders, "Only peace protects freedoms in post-9/11 world", which is available at: http://www.rsf.org/spip.php?page=impression&id_rubrique=794.

[237] See http://www.pbs.org/frontlineworld/stories/newswar/war_arabmedia.html.

[238] North Africa Times, Sunday 02-08/12/2007, p. 20, and http://www.bi-me.com/main.php?c=3&cg=3&t=1&id=15173.

Opening up to the world through satellite broadcasting enables a two-way flow of information and knowledge and could transform the region's status from receivers of cultures from other regions to promoters of the Arab culture, language and local values. The audiovisual media is the most viewed in the Arab region, and is the most effective outlet in the media sector to transmit information to citizens. With its impact on the minds of the public opinion and youth in particular, monitoring the quality of these outlets could be considered a priority over other mass media tools. Conformity to guidelines of professionalism, press freedom, plurality of sources are basic aspects for monitoring. Moreover, the public benefit could be sought by instigating media institutions aimed at addressing national issues of priority in development.

The content of the audiovisual media sector revolves mainly around the subject of entertainment, which receives less censorship than programmes on political issues and themes. The field of entertainment could be the only arm of media that is approaching regional integration.

3. *Gender portrayal by the media*

While the participation of women in the Arab media is growing, their presence is still marginal and rarely deals with serious political issues. The way the media portrays and treats women is still a subject of debate in the region and considered challenging for women in the media sector. Specifically, some observers still consider that the Arab media often focuses on youth and beauty over ability. Nevertheless, generalization cannot be the rule, and the situation of women in the Arab media varies across countries and is a reflection of their position in their societies in terms of education, freedom and openness.[239]

Perhaps the wide exposure enabled through media outlets sheds light on the degree of marginalization of women in Arab societies. Moreover, considering the media influence on these societies, the development of media institutions in general and the way they present and treat women could constitue the best leading model for empowering women in the region.

Table 64 shows that the highest percentage of female journalists occur in Lebanon and the United Arab Emirates, both at 40 per cent of the total number of journalists; followed by the Syrian Arab Republic, at 36 per cent of the total.

TABLE 64. PERCENTAGE OF FEMALE JOURNALISTS IN ESCWA MEMBER COUNTRIES, 2006-2007

	Number of journalists[a/]		Percentage of female journalists	
Country or territory	2006	2007	2006	2007
Lebanon	2 125	1 060	40	40
United Arab Emirates	1 500	2 000	43	40
Syrian Arab Republic	1 306	1 869	33	36
Egypt[b/]	5 600	5 776	29	28
Iraq[b/]	6 166	4 633	21	22
Jordan	900	900	20	22
Qatar	500	500	8	20
Oman	100	300	15	15
Saudi Arabia[b/]	2 047	2 350	11	15
Kuwait[b/]	1 734	2200	15	14
The Sudan	1 500	4000	20	13
Palestine	700	600	14	12
Yemen	1 146	1137	..	9
Bahrain[b/]	225	200	..	..

Source: Federation of Arab Journalists (FAJ), Report on press freedoms in the Arab nation (2006); and Report on press freedoms in the Arab nation (2007).

Notes: a/ The number includes journalists who are not members of press authorities and novice journalists.
b/ The number of journalists is either the total number of male and female journalists, or calculated average record.
Two dots (..) indicate that data are not available.

[239] See http://www.magharebia.com/cocoon/awi/xhtml1/en_GB/features/awi/features/2009/08/20/feature-01.

B. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

Four maturity levels categorize countries in relation to media development, with the first maturity level as the lowest and the fourth maturity level as the highest. The assessment of member countries in terms of their category within the maturity levels was based on the results shown in a number of specialized reports, particularly by RWB and IREX. None of the ESCWA members achieved maturity level 4 in 2009.

1. *Maturity level 1: Iraq, the Sudan and Yemen*

Countries ranked at this level have laws that restrict press freedom and hinder independent press, and have weak professional journalism and business management. The MSI score of the three countries in this level was less than 1 and the overall rank of Iraq falls in the unsustainable, anti-free press level (MSI 0-1), while those of the Sudan and Yemen fall in the bottom of the list for unsustainable mixed system level (MSI 1-2).

2. *Maturity level 2: Bahrain, Egypt, Jordan, Oman, Palestine, Saudi Arabia and Syrian Arab Republic*

Countries attaining this maturity level have some laws and legislations that go against press freedom in spite of improvements in media freedom and journalistic professionalism. Overall, the MSI score for the Syrian Arab Republic increased from 2005 to 2007, and the rise in MSI was evident in four out of the five objectives of the Index, which shape the media system and determine its sustainability. The overall increase and improvements in individual categories (free speech, professional journalism, business management and supporting institutions) resulted in the change in the maturity level, from 1 to 2.

3. *Maturity level 3: Kuwait, Lebanon, Qatar and United Arab Emirates*

This maturity level indicates clear improvements in independent media and its governing laws. These countries continued to be ranked in maturity level 3, and have an overall MSI score that ranks them within the near sustainability level (MSI 2-3).

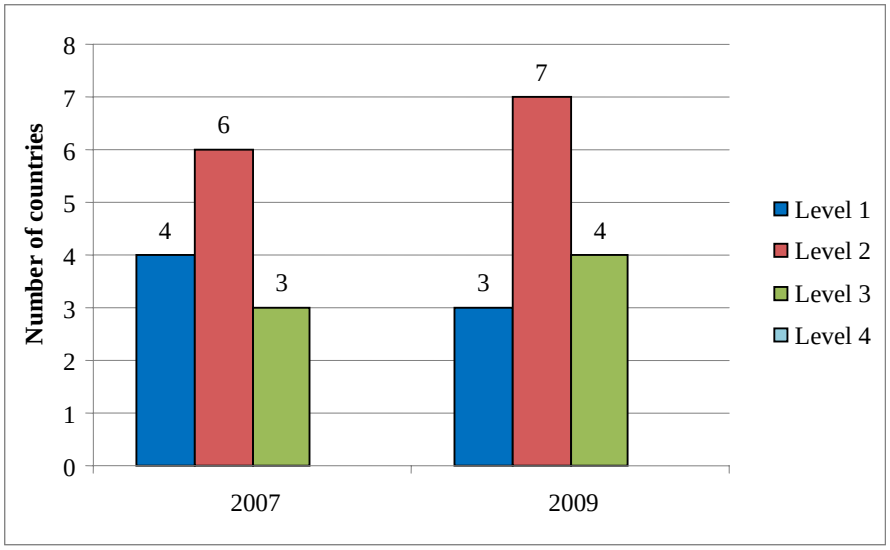
TABLE 65. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL OF THE MEDIA ENVIRONMENT

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain	✓			✓				
Egypt			✓	✓				
Iraq	✓	✓						
Jordan			✓	✓				
Kuwait					✓	✓		
Lebanon					✓	✓		
Oman			✓	✓				
Palestine			✓	✓				
Qatar					✓	✓		
Saudi Arabia			✓	✓				
The Sudan[a/]		✓						
Syrian Arab Republic	✓			✓				
United Arab Emirates			✓			✓		
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 14. Maturity levels of ESCWA member countries in the media environment



C. SUGGESTIONS AND RECOMMENDATIONS

(a) There is a strong need to promote professional journalism and instigate the training of journalists for building their capabilities in the media sector across the region;

(b) Media institutions could direct their programmes and allocate part of their content to addressing the important issues that face the region, whether these relate to social or political reform. The media sector could be worked upon at the regional level to be a model, which, in turn, could impact the development of societies and the information society;

(c) Content management in the media industry could be enhanced to include more than entertainment, and encompass programmes that build content that relate to all citizens and address the challenges they face in their daily lives;

(d) Content and professionalism could be given special attention in the ubiquitous radio and television media formats, and given priority in order to ensure that information, knowledge, education and culture reach all areas.

X. REGIONAL AND INTERNATIONAL COOPERATION

A. OVERVIEW OF REGIONAL AND INTERNATIONAL COOPERATION IN THE ESCWA REGION

The successful implementation of the information society requires cooperation among all stakeholders at both an international and regional level, especially in the financing and implementation of ICT development initiatives, and the establishment of plans of action for building the information society.

Regional cooperation in the field of ICT serves to promote regional integration and is reflected in the regular meetings of the Arab ICT Council of Ministers. The sharing of expertise and joint initiatives among ESCWA member countries, despite their dearth, can link them to each other as well as to other Arab countries outside the ESCWA region. This serves, in turn, to develop the basic infrastructure and facilitate the establishment of information societies in individual countries. Moreover, countries in the region can benefit from their collective advantages, including a common language and homogenous culture. Indeed, the diversity of resources in the ESCWA region should ultimately lead to economic integration. While a number of member countries have huge oil reserves, others have the human resources needed for development. However, few joint projects have emerged so far to benefit from those resources.

In that regard, the twelfth meeting of the Arab Telecommunications and Information Council of Ministers (ATICM), which was held in Amman in 2008, followed up on the output of the twenty-third meeting of the Arab Permanent ICT Committee that put into action the Arab ICT Strategy – Building the Information Society 2007-2012. The meeting discussed the outcome of the joint meeting between ATICM and the Council of Arab Information Ministers, and the expected role of the ITU Arab Regional Office in the coming phase.[240]

Currently, the ITU Arab Regional Office is working on the implementation of the recommendations of the World Telecom Development Conference in the Arab Region, which was held in Doha, in March 2006;[241] the Doha Action Plan (DAP); and the outcomes of the ITU Plenipotentiary Conference (Antalya, Turkey, 6-24 November 2006). In addition, the ITU Arab Regional Office provides indispensable support to member countries, especially in areas related to cybersecurity, e-government, e-commerce, Internet protocol, integrated rural development, relief in cases of emergency, protection of the environment, telemedicine and distance learning, to name a few.[242] The ITU Regional Development Forum on Bridging the ICT Standardization Gap in Developing Countries (Damascus, 20-22 July 2008) was attended by 53 delegates and participants from 13 Arab countries, the League of Arab States, GCC and the Arab Regional ISPs and DSPs Association (ARISPA).[243]

The first Joint Coordination and Follow-up Meeting for the Translation and Arabization of ICT Terminology (Damascus, 18-19 October 2008) attracted experts from seven ESCWA member countries, namely, Egypt, Kuwait, Oman, Saudi Arabia, the Sudan, Syrian Arab Republic and Yemen, in addition to representatives from the League of Arab States, the World Health Organization Regional Office for the Eastern Mediterranean (WHO-EMRO), the Arab League Educational, Cultural and Scientific Organization (ALECSO), ESCWA, the Islamic Educational, Scientific and Cultural Organization (ISESCO) and the Arab States Broadcasting Union (ASBU). This initiative aims to unify the efforts carried out for the translation of ICT terminology and to set up an electronic dictionary in three languages (Arabic, English and French), which will be made available online in addition to the production of hard and soft copies.[244]

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

[241] See http://www.itu.int/ITU-D/wtdc06/.

[242] See http://www.itu.int/ITU-D/arb/.

[243] See http://www.itu.int/ITU-D/arb/ARO_2008_work/Arabization-ICT/.

[244] See http://www.itu.int/ITU-D/arb/ARO_2008_work/wtsa-08/.

Regional and international cooperation helps to transfer expertise, highlight success stories and share best practices among countries, as well as provide technical and financial aid to ICT sectors in developing countries that is deemed a cornerstone for the establishment of an information society. Accordingly, in order to implement their plans for the establishment of the information society, countries in the region are striving to benefit from initiatives launched by developed countries and regional and international organizations. Among the leading initiatives are those of the United Nations and its regional agencies to achieve the recommendations of WSIS. These projects represent only one source for the financial and technical support needed by developing countries to realize their development goals.

1. *Financing of ICT network and services*

The operation of mobile phone networks in the ESCWA region by telecommunication providers and satellite communications projects, such as Thuraya, ArabSat and IntelSat, represent some of the most successful regional projects.

Etisalat in the United Arab Emirates, Mobily in Saudi Arabia and Etisalat Misr in Egypt have invested some $150 million in a major international fibre optics cable. This project is known as "E-Cable", wherein the "E" stands for Etisalat. The cable, part terrestrial and part submarine, will establish a connection from Fujairah in the United Arab Emirates across Saudi Arabia, passing through Jeddah, across the Red Sea through the Suez Canal, to Alexandria in Egypt, crossing finally the Mediterranean to land in France. The consortium aims to allow for more Internet and voice traffic to originate and terminate in the region. The project, which is set to be completed before the end of 2009, should translate into higher bandwidth capacities and lower costs.[245]

In 2008, customers of Zain (formerly MTC, Mobile Telecommunication Company) in Bahrain, Iraq, Jordan and the Sudan were part of a pan-Arab mobile community. They were provided the opportunity to communicate across these countries while using their home network, and be treated as local customers in terms of pricing. The One Network service, a non-burdening experience, is automatically activated when customers from the four countries cross borders, thereby enabling them to communicate at a reduced cost.[246]

Private sector joint ventures continue to finance ICT networks and rolling out new services in the region. In March 2009, an alliance of companies in Jordan and Kuwait announced the establishment of a joint venture based in the United Arab Emirates, namely, SmartSat, with an investment of $500 million. Ushering the region's first private company specialized in satellite technology, SmartSat announced a project that will send into orbit the first private satellite in the Arab region. This initiative will help broadband and broadcast service providers to add more value to their satellite-enabled services and ultimately ensure better quality offerings for end-users in the region. The SmartSat satellite will primarily target regional ISPs, GSM providers, broadband technology solutions providers, television stations and companies dealing with data systems, among others. This project will enable users to tailor broadband packages that satisfy the demands of specific market segments and, subsequently, optimize business opportunities. With the satellite's powerful signals and two-way links, SmartSat will be able to support regional broadcasters, home satellite providers, news organizations, satellite conference centres and other content providers with regular programming or on-demand requirements, thereby enabling high-definition viewing at home and live, in-studio broadcasts.[247]

In 2008, Microsoft announced a partnership with the Mohammed bin Rashid al Maktoum Foundation to enhance research and knowledge creation in the Arab region. Specifically, Microsoft will support the Foundation's objectives by designing and implementing a state-of-the-art technology platform that enables

[245] Arab Advisors Group, The Etisalat Group leverages the synergies of its regional subsidiaries with an FO cable connecting UAE, Saudi and Egypt to Europe, *Strategic Research Service* (25 June 2009).

[246] See http://www.zain.com.

[247] See http://www.ameinfo.com/184200.html.

collaborative research and knowledge creation across the Arab region. In the first phase of its partnership with the Foundation, Microsoft will build the critical communications capabilities required for effective collaboration. These will include the latest knowledge-sharing solutions, which will help to develop an Arab research database, and an extensive e-library. Microsoft's world leading communication platforms, online chat and discussion boards, newsletters, and blogging and social networking sites will also form the core of the project.[248]

2. *Regional and subregional development projects and initiatives*

The initiatives and projects earmarked by international, governmental and non-governmental organizations constitute another form of cooperation, represented by direct assistance or joint ventures between countries in the region and various organizations. UNDP leads by the number and breadth of initiatives while ESCWA, UNESCO, the World Bank, ITU Arab Regional Office, ALECSO and the League of Arab States have all launched some initiatives and contributed to their implementation. Meanwhile, the European Union contributes to ICT sector development programmes in cooperation with a number of Arab and especially Mediterranean countries by providing technical and financial support for the implementation of these programmes.

UNDP works with partners in the Arab region to support efforts to improve the state of knowledge in their societies;[249] moreover, it is the lead agency for one of the most important programmes in the ICT arena, namely, the Information and Communications Technology for Development in the Arab Region (ICTDAR).[250] ICTDAR assists the Arab region and its people in their effort to move towards knowledge-based societies by harnessing ICT to bridge the digital gap, reduce poverty and improve public administration performance.

One of the regional projects initiated by ICTDAR is Information and Communications Technology in the Arab Region for the Blind (ICTARB), which aims to use ICT to help reintegrate the visually impaired into society as independent, productive citizens and to provide them with access to new job opportunities. The ICTARB programme is currently being implemented in Egypt and the Syrian Arab Republic.[251] In 2009, ICTDAR launched its initiative on Promoting the Rights of Women and Children through access to Information (WRCATI) in Jordan. WRCATI is a women empowerment initiative that uses ICT as a tool aimed at providing women with greater understanding and knowledge of their rights, thereby leading to more access to those rights and, ultimately, to a better quality of life.[252]

Moreover, UNDP is committed to implementing projects at the national level aimed at supporting the drive by Arab countries towards knowledge societies. Initiatives to strengthen the knowledge base at the national level are implemented within the framework of the strategies of country offices, and in collaboration with national and international partners, including Governments, civil society and other United Nations agencies.

Many ESCWA initiatives have been carried out in partnership with international and regional organizations. Collaborative efforts are coordinated primarily with other United Nations regional commissions and specialized agencies, UNDP regional offices and the League of Arab States.

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[248] See http://www.microsoft.com/gulf/citizenship/Potential.aspx and http://emasc.com/content.asp?contentid=8378.

[249] See http://arabstates.undp.org.

[250] See http://www.ictdar.org.

[251] See http://www.ictdar.org/Projects/ICTARB/ICTARB.htm.

[252] See http://www.ictdar.org/Projects/WRCATI/WRCATI.htm.

Fruitful collaboration with ESCWA during 2008 led to preparing the groundwork for the project on establishing the Arab domain name system (ADNS), developing the Arab ICT Strategy, and updating the RPoA for building the information society. The primary objective of implementing ADNS is to extend and integrate it with the global Internet name resolution schemes. This implementation will create a system that renders service to Web servers and Internet browsers attempting to resolve Universal Resource Locator (URL) names written using the Arabic script. ADNS will also accommodate other accompanying Internet applications, including, for example, e-mail and File Transfer Protocol (FTP) that support or build upon the new domain name system, thereby completing the innovation diffusion cycle. Dissemination and widespread use of the Internet at the popular level will lead to the proliferation of DAC, with ADNS being a catalyst for more serious adoption by the content industry in all its segments. Multimedia content delivery across boundaries will play a key role in improving the quality of life for people in the region.[253]

One of the more important ESCWA activities requiring regional cooperation is the establishment of the ETC aimed at building linkages between supply and demand for STI in Western Asia. This project constitutes a typical manifestation of regional cooperation and integration given that it is based on a partnership between ESCWA and its member countries.[254]

Since 2003, political turmoil in Iraq has had a negative impact on capacity-building in that country. ESCWA and UNESCO, acting as partners, have launched an initiative aimed at addressing some of the problems affecting education that have been brought over by political instability, the lack of security as well as degraded Government services. The tasks in the initiative, entitled ICT in Education for Iraq, were subdivided whereby ESCWA is responsible for infrastructure issues, while UNESCO assumes the tasks related to training and e-learning. During 2008, the initiative facilitated capacity-building sessions on education strategy formulation, ICDL instructor training as well as the creation of courseware aimed at teaching Arabic to non-Arabic speaking Iraqi schoolchildren. On the infrastructure side, the main activity was the procurement and installation of equipment necessary for the creation of ICT training centres in five Iraqi governorates as well as the provision of ICT equipment necessary for the creation of ten ICT labs in five schools for girls and another five schools for boys.[255]

Since its launch in 2008, ESCWA has continued to maintain and update its Information Society Portal for the ESCWA Region (ISPER).[256] The Portal was conceived and constructed to serve as a regional online tool for follow-up activities to RPoA; and caters for Arabic and English speakers and provides stakeholders with a unique entry point to essential information on the current status of the information society in the region. Cooperation and regional integration opportunities are facilitated by the Portal through a database on donors and project, real-time discussion forums, as well as a bilingual library of documents.

World Links Arab Region (WLAR), which is the regional branch of World Links, aims to improve educational outcomes, economic opportunities and global understanding for youth in the Arab region through the use of technology and the Internet and through the professional development of teachers to learn how to employ participatory learning in order to achieve better educational results. These skills allow youth to contribute to the success of the global knowledge economy after graduation.[257] In 2009, WLAR signed a memorandum of understanding with the Ministry of Education in Yemen and Al Awn Foundation for Development regarding the joint two-year World Links Teachers' Professional Development Programme in

[253] Commission on Science and Technology for Development (CSTD), Submissions from entities in the United Nations system and elsewhere on their efforts in 2008 to implement the outcome of WSIS (2009), which is available at: http://www.unctad.org/sections/wcmu/docs/ecn232009_c14.pdf.

[254] Ibid.

[255] Ibid.

[256] See http://isper.escwa.org.lb.

[257] See http://www.wlar.org.

Yemen for 2009-2011, which aims to train 1,200 teachers and to reach some 200,000 students in Sana'a, Aden and Hadhramout.[258]

The Middle East Partnership Initiative (MEPI) of the Department of State in the United States supports efforts aimed at strengthening civil society, empowering women and youth, creating educational opportunities, and fostering economic reform throughout the Middle East and North Africa (MENA). Since its establishment in 2002, MEPI has contributed over $530 million to more than 600 projects in 17 countries and territories. Within that context, Yemen is implementing an experimental e-learning project to be carried out over three phases. The first phase seeks to establish an e-learning network comprising 24 secondary schools nationwide, in association with MEPI. Jordan has also benefited from MEPI, which aims to support democratic reform in the region.

In Egypt, MCIT has launched a joint project with the World Bank to develop a new price index (Deflator) for the communications and information technology component of GDP in Egypt. The project aims to review and validate the ICT component of real GDP, in addition to the ICT sector growth rates after being deflated by a new index that consists of a representative basket of ICT services.[259]

At a subregional level, a leading project is the GCC cooperation on biometric smart ID cards, which aims to provide personal identification cards to GCC citizens. The project covers five out of the six GCC countries, namely, Bahrain, Oman, Qatar, Saudi Arabia and United Arab Emirates, with plans, eventually, to issue smart personal IDs to all their citizens and legal residents. Until May 2009, a total of 1.2 million cards had been issued in the United Arab Emirates. The registration started with nationals and is continuing with other residents. Holders of the ID card will soon be able to use it to access available e-gates at airports.[260]

3. *Realization of WSIS objectives and the regional plan of action*

The main objectives of WSIS are to bridge the digital divide between developing and developed countries and to promote the creation of an equitable and all-inclusive information society.[261] The Geneva phase adopted a Plan of Action that advocates the use of information and knowledge for the achievement of internationally agreed development goals, while the Tunis phase reviewed the progress made and re-affirmed the commitment of participants to building a people-centred, inclusive and development-oriented information society.[262]

WSIS has stated that setting up specific targets for building information societies must take into account the specificities of each country and should be aligned with national development strategies. In that context, ESCWA member countries participated in both phases of the Summit and committed themselves to the WSIS outcomes. While some countries have set up official plans, others, lacking these, are nevertheless working to realize WSIS goals by developing their ICT sectors and promoting the use of ICT by businesses and individuals. However, all ESCWA member countries need to put greater effort into implementing the WSIS action lines and into monitoring and following up on those activities that have already been implemented.[263]

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[258] See http://www.ameinfo.com/204727.html and http://wlar.org/files/newsletters/7%20spring%202009/TourYemen.htm.

[259] See http://www.egyptictindicators.gov.eg/NewsAndEvents/News/Developing+a+New+Price+Index+%28Deflator%29.htm.

[260] B. Abdul Kader, ID cards can be used at e-gates, *Gulf News* (8 May 2009), which is available at: http://www.gulfnews.com/nation/Government/10311928.html.

[261] The World Summit on the Information Society (WSIS) was held in two phases, namely, in Geneva in 2003 and in Tunis in 2005.

[262] See http://www.itu.int/wsis.

[263] See http://www.itu.int/wsis/stocktaking/help-action-lines.html.

ESCWA member countries are striving to implement the WSIS outcomes, especially those related to the formulation of ICT policies and electronic strategies. Some have made considerable progress towards their transformation into information societies, while others are still lagging behind. Moreover, a number of ESCWA member countries face multiple challenges due to inadequate ICT infrastructure, funding shortages and weak support for the ICT sector in their national strategies.

ESCWA has been following up on the implementation of the RPoA for building the information society, which was initially formulated in 2004, within the context of preparatory activities for WSIS. The RPoA originally included ten specified programmes and their constituent 38 projects, and involved the collaboration of partners from the private sector and international and regional organizations. Within that framework of cooperation and coordination, starting in 2006 and extending into 2008, ESCWA contributed substantively to the formulation of the Arab ICT Strategy and of its companion plan of action which covers the period extending from 2007 to 2012. Much of the planning and many of the initiatives suggested within the RPoA were adopted by the League of Arab States and backed by the Arab Telecommunications and Information Council of Ministers (ATICM).[264]

In line with its commitment to develop the capabilities of member countries, ESCWA organized a number of workshops, expert group meetings and training courses, including, for example, a conference dedicated for the regional follow-up to the WSIS outcome. ESCWA member countries endeavour to participate in international and regional conferences and workshops that support the realization of the goals of the Summit and that address development issues, capacity-building and IT sector development.[265]

The Conference on the Regional Follow-up to the Outcome of the World Summit on the Information Society (Damascus, 16-18 June 2009) was organized by the ICT Division of ESCWA under the patronage of the Government of the Syrian Arab Republic, in collaboration with the two leading facilitators of WSIS, namely, ITU and UNESCO, and in partnership with several leading Arab and international organizations.[266]

The main objective of the Conference was to provide a forum where various WSIS stakeholders in the ESCWA region could meet in order to present, discuss and review the progress made towards the implementation of the 11 WSIS action lines, as well as the execution of the RPoA for Building the Information Society and similar regional strategies and plans of action. The Conference resulted in updating the RPoA, launching the Global Alliance for ICT and Development (GAID) Regional Arab Network and adopting the Damascus Proclamation for the Promotion of the Arab Knowledge Society for Sustainable Economic and Social Development.[267]

ESCWA member countries are also continuing their efforts at the national level towards achieving and realizing the WSIS objectives. As a result of and owing to the importance of the core indicators adopted at the WSIS meetings, Egypt hosted the seventh ITU indicators annual meeting in Cairo in March 2009, which is considered one of the most important forms of international and regional cooperation with 78 participating countries and international organizations in the field.[268]

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[264] Commission on Science and Technology for Development (CSTD), Submissions from entities in the United Nations system and elsewhere on their efforts in 2008 to implement the outcome of WSIS (2009), which is available at: http://www.unctad.org/sections/wcmu/docs/ecn232009_c14.pdf.

[265] Ibid.

[266] ESCWA, Report on the Conference on Regional Follow-up to the Outcome of the World Summit on the Information Society (Damascus, 16-18 June 2009) (2009).

[267] Ibid.

[268] See http://www.itu.int/ITU-D/ict/wict09/index.html.

B. Classification and ranking of ESCWA member countries according to maturity level

Regional and international cooperation in ESCWA member countries remains weak, with maturity levels not exceeding level 2.

Analysis of available data places Egypt, Iraq, Jordan, Kuwait, Qatar and the United Arab Emirates at maturity level 2, with the remaining countries ranked at maturity level 1.

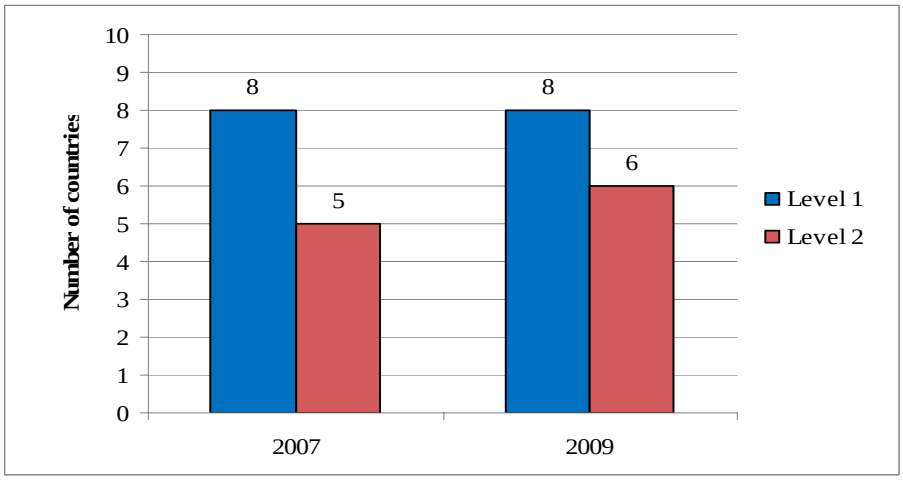
TABLE 66. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN REGIONAL AND INTERNATIONAL COOPERATION

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain	✓	✓						
Egypt			✓	✓				
Iraq	✓			✓				
Jordan			✓	✓				
Kuwait			✓	✓				
Lebanon	✓	✓						
Oman	✓	✓						
Palestine	✓	✓						
Qatar			✓	✓				
Saudi Arabia	✓	✓						
The Sudan[a/]		✓						
Syrian Arab Republic	✓	✓						
United Arab Emirates			✓	✓				
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

Figure 15. Maturity levels of ESCWA member countries in regional and international cooperation



C. Suggestions and recommendations

Despite efforts of member countries and regional and international organizations during the past decade, cooperation in building an information society in the region still needs to be strengthened. All

ESCWA member countries have taken tangible steps towards regional integration in such economic sectors as tourism, electricity, communications and natural gas pipelines. In order to build an information society in the region, however, further regional cooperation in ICT is necessary. The suggestions and recommendations to strengthen regional cooperation in ICT are set forth below.

(a) Highlight the necessity of regional cooperation and its effect on the national development;

(b) Enhance the roles and activities of international and regional organizations in establishing networking and hubs for regional cooperation;

(c) Establish national task forces to coordinate with regional task forces and follow up the activities within the framework of regional cooperation;

(d) Develop a coordinated approach on issues of common concern among member countries in international telecommunication;

(e) Strengthen existing regional cooperatives by developing support and follow-up mechanisms;

(f) Promote the establishment of a network for information sharing by stakeholders in the region, creating communities of practice;

(g) Develop frameworks for sharing expertise, especially in education, ICT capacity-building, cyberlegislations and e-government;

(h) Encourage regional and subregional application projects that enhance harmonization efforts;

(i) Enhance national and regional mechanisms that support FDI for regional integration;

(j) Improve the efficiency of human capabilities and resources found in the ESCWA region to meet the requirements of regional cooperation and integration;

(k) Give special consideration to such members with special needs as Iraq, Palestine, the Sudan and Yemen;

(l) Encourage the formulation of projects with multiplier effects across countries of the region;

(m) Encourage joint projects and initiatives aimed at minimizing disparities within and among member countries in the telecommunication field.

XI. MILLENNIUM DEVELOPMENT GOALS

During the Millennium Summit, which was held at United Nations Headquarters in New York City between 6 and 8 September 2000, the General Assembly adopted the United Nations Millennium Declaration.[269] The Declaration reaffirmed the commitment of United Nations Member States to the work and principles of the organization and asserted that equality, freedom, peace, security, development, access to education, gender equality and health are among the basic rights of citizens of all nations. Assembled leaders effectively committed their countries to a set of eight time-bound, measurable goals aimed at eradicating extreme poverty and improving the living conditions of women, men and children. All United Nations Member States have since adopted what has become collectively known as the Millennium Development Goals (MDGs), which encompass pledges to achieve the following:

Goal 1. Eradicate extreme poverty and hunger;
Goal 2. Achieve universal primary education;
Goal 3. Promote gender equality and empower women;
Goal 4. Reduce child mortality;
Goal 5. Improve maternal health;
Goal 6. Combat HIV/AIDS, malaria and other diseases;
Goal 7. Ensure environmental sustainability; and
Goal 8. Develop a global partnership for development.

During the World Summit, which took place at United Nations Headquarters between 14 and 16 September 2005, 170 heads of State and Government, including many from ESCWA member countries, made a strong commitment towards achieving MDGs by 2015.[270]

A. THE ROLE OF ICT IN THE ACHIEVEMENT OF MDGS

Stakeholders have acknowledged on several occasions the role that ICT can play in the achievement of MDGs. In 2003 and 2005, during the two phases of WSIS, participants and delegates from developed and developing nations renewed the commitment of their countries to MDGs and underscored the part that ICT can play in their timely achievement.[271] Subsequent global and regional WSIS follow-up meetings highlighted ICT initiatives that were successful in advancing human development goals. Recently, the opening ceremony of the Global WSIS Forum, which took place in Geneva in May 2009, was entitled ICTs for Millennium Development Goals.[272]

Table 67 contains various correlations and interactions that can take place between ICT and MDGs and is used to illustrate the role that ICT can play in achieving those Goals. The information contained therein is indicative and non-exhaustive. For a more complete outlook, refer to the comprehensive table compiled by the Organisation for Economic Co-operation and Development (OECD).[273]

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[269] See http://www.un.org/millennium/declaration/ares552e.htm.

[270] See http://documents-dds-ny.un.org/doc/UNDOC/GEN/N05/487/60/pdf/N0548760.pdf?OpenElement.

[271] See http://www.itu.int/wsis/docs/geneva/official/dop.html.

[272] See http://www.itu.int/wsis/implementation/2009/forum/geneva/hg_lev_opn_cerm_icts_mdgs.html.

[273] Organisation for Economic Co-operation and Development (OECD), How ICTs can help achieve the Millennium Development Goals, which is available at: http://www1.oecd.org/dac/ictcd/docs/otherdocs/Forum_0303_roomdoc6.pdf.

TABLE 67. THE ROLE OF ICTS IN HELPING TO ACHIEVE THE MILLENNIUM DEVELOPMENT GOALS

MDG	Goal	Role of ICT
1	Eradicate extreme poverty and hunger	Increase access to market information and lower transaction costs for poor farmers and traders
2	Achieve universal primary education	Increase supply of trained teachers through ICT-enhanced and distance training of teachers and networks that link teachers to their colleagues
3	Promote gender equality and empower women	Deliver educational and literacy programmes specifically targeted to poor girls and women using appropriate technologies
4	Reduce child mortality	Enhance delivery of basic and in-service training for health workers
5	Improve maternal health	Increase access of rural caregivers to specialist support and remote diagnosis
6	Combat HIV/AIDS, malaria and other diseases	Increase access to reproductive health information, including information on AIDS prevention, through locally appropriate content in local languages
7	Ensure environmental sustainability	Remote sensing technologies and communication networks permit more effective monitoring, resource management and mitigation of environmental risks
8	Develop a global partnership for development – in cooperation with the private sector, make available the benefits of new technologies, especially information and communications	Develop a critical mass of knowledge workers with the technical capabilities to provide and maintain ICT infrastructure

1. *How ICT is helping ESCWA member countries to achieve MDGs*

Notwithstanding differences in the progress towards achieving MDGs, ESCWA member countries face a common set of issues and challenges, namely: peace, security, the eradication of poverty, sustainable development, regional partnership and integration, good governance, respect for human rights and democracy as well as protection of the environment.

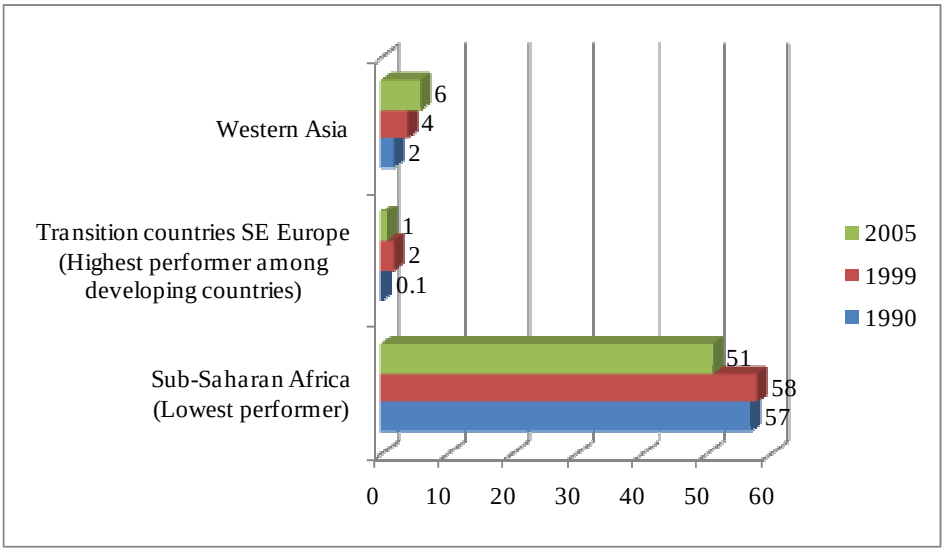
The sections set forth below summarize the current status of the eight MDGs in the ESCWA region, comparing each Goal to the highest and lowest global performers and identifying key regional ICT initiatives that are contributing towards its achievement.

(a) *Goal 1. Eradicate extreme poverty and hunger*

Extreme poverty, as defined in Target 1 of MDG 1 is not present in most ESCWA member countries.[274] Redefined in accordance with regional and national standards, it is still absent from the wealthier GCC countries, but may be found in the poorer ESCWA members, namely, Palestine, the Sudan and Yemen. Taken as a whole, the ESCWA region bucked the international trend towards improvement of the lot of the poorest of the poor by tripling the proportion of its population living on less than $1.25 a day. While most of the rest of the world reduced this same proportion, it is unlikely to attain the poverty reduction target by 2015.

[274] Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day.

Figure 16. Percentage of people living on less than $1.25 a day (Lower=Better)



Box 14. Examples of ICT initiatives helping to achieve MDG 1 in ESCWA member countries

In Jordan, pockets of poverty persist in various parts of the country. The Ministry of Social Development, in partnership with the United Nations Development Programme (UNDP), has ongoing ICT projects in the Governorate of Zarka aimed at strengthening poverty monitoring with the ultimate goal of eradicating poverty. The United Nations Development Program (UNDP) Jordan is actively involved in improving the quality of poverty and social statistics produced by the Department of Statistics (DOS). Two initiatives identified as "Early Warning System" and "Capacity Development of Micro and Small Enterprises through ICT" have been launched in order to meet Goals 1 and 8.[a/]

In the Sudan, the European Commission launched the Sudan Post-conflict Community-based Recovery and Rehabilitation Programme, at an estimated 54 million euros.[b/] The Programme is managed by UNDP and is implementing 300 projects aimed at improving the lives and livelihoods of 800,000 people throughout the country and at helping the Sudan in its efforts to achieve MDG 1. Initiatives being implemented with the help and in partnership with various non-governmental organizations (NGOs) include the fight against poverty with the building of schools, health-care centres, multipurpose ICT centres and water networks; the improvement of people's livelihoods through vocational training, agricultural projects, peace-building initiatives and the microfinancing of small businesses; and the development of the public sector through training programmes targeted at local Government administrations.

a/ http://www.undp-jordan.org/Default.aspx?tabid=111.

b/ See UNDP, Capacity development: empowering people and institutions, which is available at: http://www.undp.org/publications/annualreport2008/pdf/IAR2008_ENG_low.pdf; and http://www.sd.undp.org/Presspdf/mdg.pdf.

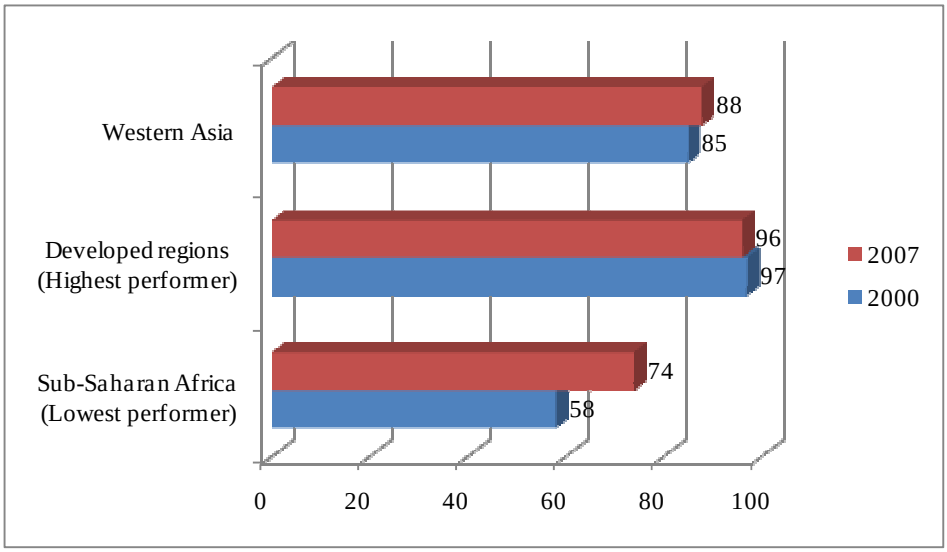
(b) *Goal 2. Achieve universal primary education*

In 2000, the combined rate of enrolment in primary schools for boys and girls in the ESCWA region was 85 per cent, progressing to 88 per cent in 2007. While this increase of 3 per cent is a clear step in the direction towards the achievement of the target, the rate of progress in the ESCWA region is too slow and will need to be speeded up significantly if the target is to be achieved in the six years until 2015.[275]

[275] Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

Comparatively, sub-Saharan Africa, while still lagging behind by 14 percentage points, has managed to improve its standing at a rate which is equal to more than five times the one realized by the ESCWA region. If each region continued to progress at the same rate during the next six years, sub-Saharan Africa would manage to catch up with the ESCWA region by 2015. However, both regions would still fail to meet the target.

Figure 17. Percentage of enrolment in primary education (Higher=better)



Box 15. Examples of ICT initiatives helping to achieve MDG 2 in ESCWA member countries

The AjialCom initiative, part of a regional programme being implemented by ICT for Development in the Arab World (ICTDAR), has created several community access centres that are specifically targeted at youth in underprivileged communities in Egypt and Yemen.[a/] The immediate objective of the project is to address the needs of the younger generation through ICT training.[b/]

In Lebanon, Jordan and Yemen, a partnership assembling HP, Intel, CISCO and Microsoft has launched the Network Academy, with the following objectives:[c/] (a) to help classroom teachers to integrate technology effectively in order to enhance learning; (b) to connect private and public schools; and (c) to create ICT training centres in rural areas.[d/]

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a/ http://www.ictdar.org/Projects/AjialCom/AjialCom.htm.

b/ For more on the role of community centres in education, see http://www.telecentre.org/group/telecentreforeducation.

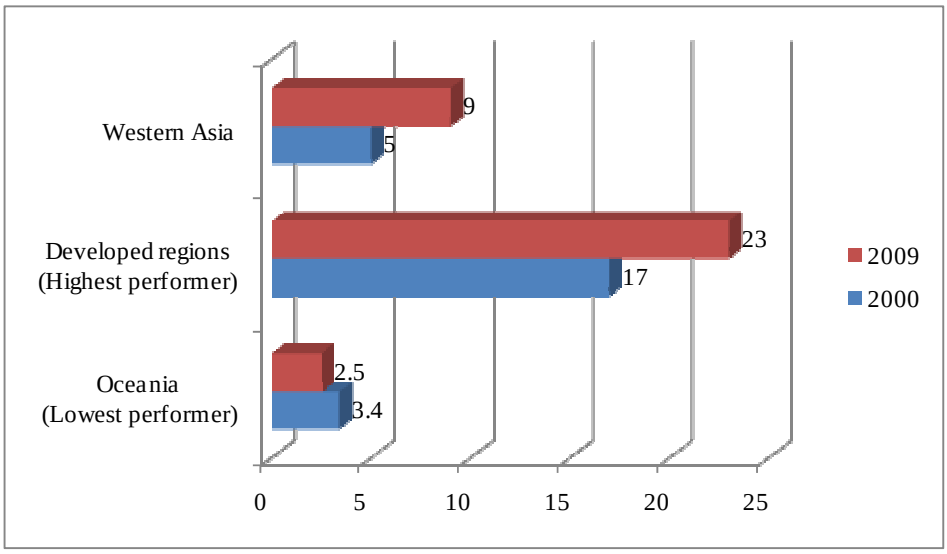
c/ See http://newsroom.cisco.com/dlls/2009/prod_011309.html; and "Bus-based Cisco Networking Academy Programs give students a new route to acquire IT skills", which is available at: http://newsroom.cisco.com/dlls/2006/ts_080306.html?Event=NetworkingAcademy10yrs&Position=FeatureArticle7&Referring_site=NetworkingAcademyPressKit. See also http://css.escwa.org.lb/ICTD/850/List_Presentations_Track3.pdf (Lebanon Case Study).

d/ WSIS conference follow-up (June 2009), which is available at: http://css.escwa.org.lb/ICTD/850/List_Presentations_Track3.pdf; relate community centers case studies in Egypt, Jordan, Lebanon, the Sudan, and the Syrian Arab Republic. See also Empowering Youth experience in Lebanon, the Syrian Arab Republic and Yemen.

(c) *Goal 3. Promote gender equality and empower women*

There are several MDG indicators that are used to gauge a region's attainment of gender equality.[276] Since 2000, ESCWA member countries have made significant inroads, gradually shrinking the difference in the ratio of girls to boys in primary, secondary and tertiary education. Major disparities between men and women remain in the employment and political indicators, the most obvious being the representation of women in national parliaments where the share of women is a low 9 per cent compared to the higher, albeit still unequal 23 per cent achieved in developed regions. As low as this representation is, the figure for 2009 still represents an improvement of 80 per cent compared to the statistics for 2000.

Figure 18. Percentage of seats held by women in national parliaments (Higher=better)



Box 16. Examples of ICT initiatives helping to achieve MDG 3 in ESCWA member countries

In the Sudan, the Sudan Post-conflict Community-based Recovery and Rehabilitation Programme has benefited 4,520 women who received support in the form of microfinancing to establish small businesses.[a/] The Programme also enrols young women into trainer programmes that enable them to help their communities.

In Saudi Arabia, the Eighth Development Plan promotes improvements to the status of women and endorses their participation in economic and social development.[b/] The Plan emphasizes the importance of removing obstacles hindering the participation of women in development activities. Various chapters include objectives and policies that address issues relevant to the development of the status of women in education, health, social care and manpower.

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a/ See UNDP, Capacity development: empowering people and institutions, which is available at: http://www.undp.org/publications/annualreport2008/pdf/IAR2008_ENG_low.pdf; and Towards achieving MDGs in the Sudan: Centrality of women's leadership and gender equality, which is available at: http://www.arab-hdr.org/publications/other/undp/mdgr/sudan-nmdgr-06.pdf.

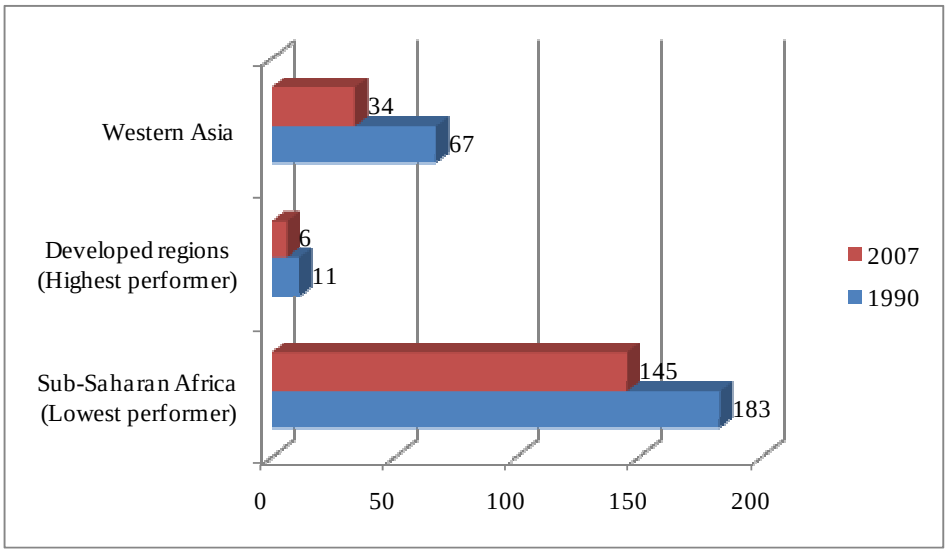
b/ Saudi Arabia MDG Report (2008), which is available at: http://www.undp.org.sa/sa/documents/mdg/mdgr_sa.

[276] Ratio of girls to boys in primary, secondary and tertiary education; ratio of literate women to men, 15-24 years old; share of women in wage employment in the non-agricultural sector; proportion of seats held by women in national parliament.

(d) *Goal 4. Reduce child mortality*

The main indicator for this Goal seems to be within easy reach of the countries of the ESCWA region.[277] Over a period of 17 years, from 1990 to 2007, ESCWA member countries have managed to cut the under-five mortality rate almost by half, reducing the number of deaths from 67 to 34 per 1,000 live births. Assuming that this rate of reduction has not reached a plateau and that it will continue at the same pace for the remaining six years until 2015, member countries should be able to achieve the target of a two-third cut around 2012. While this is commendable, ESCWA member countries should strive to reach the much lower figure of 6 deaths per 1,000 live births achieved by the more developed regions.

Figure 19. Under-five mortality rate per 1,000 live births (Lower=better)



Box 17. Examples of ICT initiatives helping to achieve MDG 4 in ESCWA member countries

E-health applications and health-care information systems are widely implemented in ESCWA member countries and contribute towards the achievement of Goal 4. In Lebanon, the National Health Information Centre (NHIC) is a computerized centre specialized in processing and disseminating public health information. It was initiated by the World Health Organization (WHO) in collaboration with the Ministry of Public Health and the Lebanese University.[a/]

In Yemen, through mobile health teams and renovated facilities, the United States Agency for International Development (USAID) has brought health-care services to more than 53,000 people. USAID also supports the national Health Information System, which allows the Ministry of Public Health and Population and governorate health offices to improve the collection and use of health statistics for better resource management.[b/]

a/ See http://www.emro.who.int/Lebanon/nhic.htm.
b/ See http://www.usaid.gov/locations/middle_east/countries/yemen/.

(e) *Goal 5. Improve maternal health*

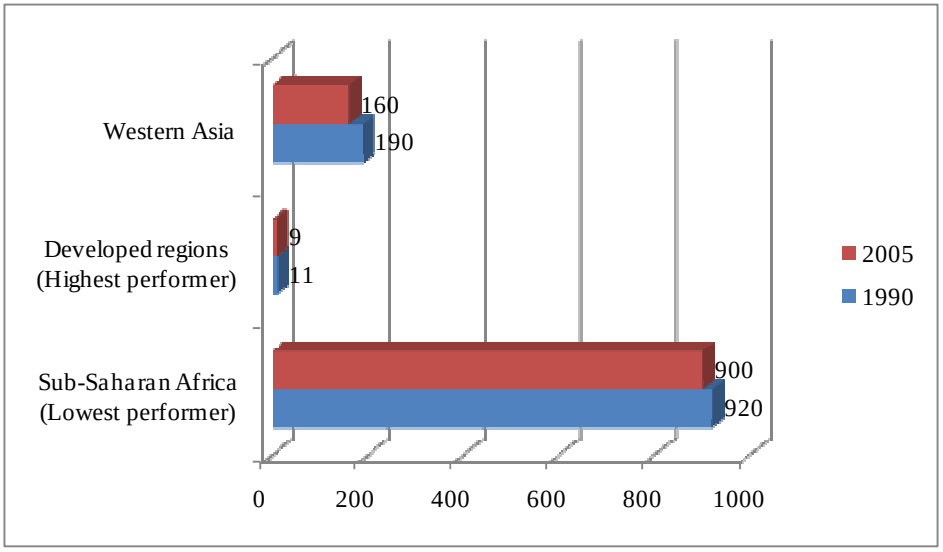
ESCWA member countries have made scant progress towards meeting the target set for this Goal.[278] Figures show that in 2005, there were 160 maternal deaths per 100,000 live births compared to 190 deaths in 1990. This reduction in the number of maternal deaths, which took place over a period of 15 years, is equivalent to less than 16 per cent of the 1990 figure and is a far cry from the targeted 75 per cent that should

[277] Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.

[278] Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio.

take place during the 25 years between 1990 and 2015. If the ESCWA region is to reach the target set for this Goal, the number of maternal deaths in 2015 must not exceed 48 per 100,000 live births.

Figure 20. Maternal deaths per 100,000 live births (Lower=better)



Box 18. Examples of ICT initiatives helping to achieve MDG 5 in ESCWA member countries

Maternal death is the leading cause of death for women of reproductive age in ESCWA member countries. By facilitating access to information and health-care services through established health databases, the incidence of maternal death is critically reduced. Many e-health applications have been implemented in ESCWA member countries to help improve maternal health.[a/] In Egypt, the Ministry of Health and Population, in collaboration with the United States Agency for International Development (USAID), has implemented the National Maternal Mortality Surveillance System (NMMSS), which tracks maternal deaths more accurately than the traditional civil registration system.[b/]

The Telecommunication Development Bureau of the International Telecommunication Union (ITU) leads a project that aims at linking Arab national telemedicine projects with the African-Arab Telemedicine Network (ArtNet).[c/] Egypt has established a national telemedicine network with seven locations that are connected to a diagnostic node situated at the Nasser Bone Marrow Institute in Cairo. In addition to Egypt, the countries in the first phase of the ArtNet telemedicine network include Ethiopia, Jordan, Libyan Arab Jamahiriya, Mali, Morocco, the Sudan, Tunisia and Uganda.

a/ See http://www.who.org/. See also individual MDG reports.
b/ Egypt MDG Report (2008), which is available at: http://www.undp.org.eg/Default.aspx?tabid=77.
c/ See http://www.medetel.lu/index.php?rub=newsletter&page=newsletter_0006.

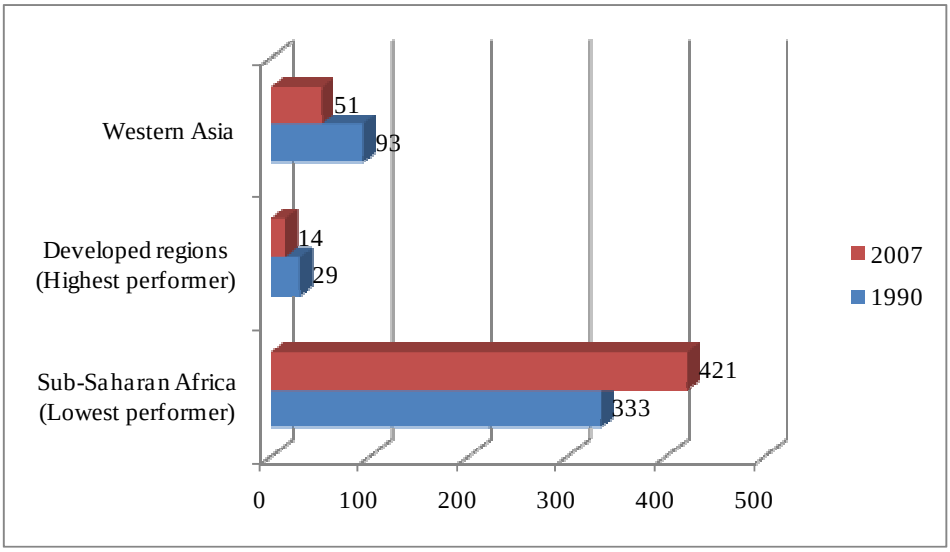
(f) *Goal 6. Combat HIV/AIDS, malaria and other diseases*

The incidence of HIV/AIDS in Western Asia is still much lower than it is in other regions across the globe. Accurate figures on its prevalence in ESCWA member countries are difficult to come by owing to social stigmas. In most ESCWA member countries, HIV/AIDS is still viewed as a foreigner's disease with many countries instituting mandatory HIV tests for foreigners seeking a residence or a work permit.

Tuberculosis cases in the ESCWA region have been decreasing gradually echoing the fall in most other regions in the world, the main exception being Sub-Saharan Africa where the number of cases has continued to grow. If the trend continues, ESCWA member countries are very likely to meet the MDG target for Goal 6 by 2015.[279]

[279] According to MDG 6, target c, have halted and begun to reverse the incidence of malaria and other major diseases.

Figure 21. Number of tuberculosis cases per 100,000 inhabitants[280] (Lower=better)



Box 19. Examples of ICT initiatives helping to achieve MDG 6 in ESCWA member countries

Under the supervision of the World Health Organization (WHO), most ESCWA member countries have used ICT to develop a comprehensive information network that links health facilities with public and private health agencies. Various initiatives include the East Mediterranean Health Observatory and the Communicable Disease Global Atlas.[a/]

Egypt has implemented case reporting, screening and surveillance systems. The Ministry of Health and Population has created the National Egyptian Disease Surveillance System (NEDSS), which is designed to include data on 26 priority infectious diseases.[b/] The data is collected and electronically monitored by public hospitals, laboratories, teaching hospitals, the Health Insurance Organization and the private sector.

The above-mentioned youth community access centres, launched by the Information and Communications Technology for Development in the Arab Region (ICTDAR) under an initiative called AjialCom, address major health issues that include drug dependency, HIV/AIDS and sex education.[c/] The initiative has been replicated in several ESCWA member countries.

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a/ East Mediterranean Health Observatory is available at: http://gis.emro.who.int/PublicHealthMappingGIS/. See also Use and potential of geographic information systems for health mapping in the eastern Mediterranean region, which is available at: http://www.emro.who.int/HIS/ehealth/healthmapping.pdf.

b/ Egypt MDG Report (2008), which is available at: http://www.undp.org.eg/Default.aspx?tabid=77.

c/ See http://www.ictdar.org/Projects/AjialCom/AjialCom.htm; and http://css.escwa.org.lb/ICTD/850/List_Presentations_Track3.pdf (ICTDAR presentation on Youth).

(g) *Goal 7. Ensure environmental sustainability*

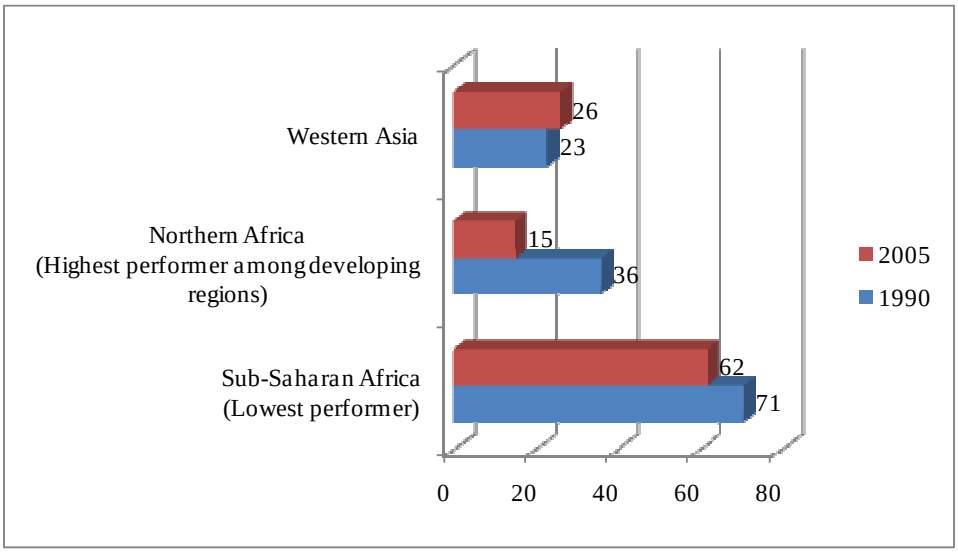
Most regions of the world have moved forward in their efforts to improve the lives of their urban populations, with the notable exception of Western Asia. It is interesting to note that the two main world regions containing Arabic-speaking populations, namely, North Africa and Western Asia, have moved in opposite directions in their quest to attain the target for the improvement of the lot of slum-dwellers.[281]

[280] This excludes the prevalence in HIV positive patients.

[281] According to MDG 7, target d, have achieved, by 2020, a significant improvement in the lives of at least 100 million slum dwellers.

Between 1990 and 2005, North Africa managed to outperform all other developing regions by more than halving its urban population living with shelter deprivations, while Western Asia saw an increase of 3 per cent. The difference between the two regions and the percentage increase in Western Asia owe mainly to conflicts that took place in Iraq, Lebanon and Palestine.

Figure 22. Percentage of urban population living with shelter deprivations (Lower=better)



Box 20. Examples of ICT initiatives helping to achieve MDG 7 in ESCWA member countries

ICT provides researchers with critical tools for the observation, simulation and analysis of environmental processes. As an example, telecommuting and online activities can indirectly lower carbon dioxide (CO^2) emissions by reducing vehicular traffic to offices, shops, banks, doctors and schools.[a/] The use of spatial information collected by satellites or through remote sensing, coupled with geographical information systems and databases, help ESCWA member countries gauge the environmental limitations in the territory and ensure that natural resources are used in a sustainable manner.[b/]

Community telecentres, which are present in most ESCWA member countries, promote greater participation in environment-protection activities to their users.[c/] They rely on networking and information exchange as main tools for the dissemination of environment-friendly messages.

Paperless offices and e-transactions, now common in most ESCWA member countries, reduce the consumption of paper and the destruction of rainforests. The Arab Urban Development Institute (AUDI) has launched the Arab City ICT Strategy (CICTS) to raise awareness and to encourage the use of ICT to address the challenges and problems of urbanization, including those affecting the environment.[d/]

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a/ See http://stdev.unctad.org/docs/icttf.pdf (Figure 8: Ireland case study).
b/ A list of databases and software is available at: http://www.fao.org/nr/water/infores_databases_climwat.html.
c/ See http://www.telecentre.org/ and http://css.escwa.org.lb/ICTD/850/List_Presentations_Track3.pdf.
d/ See http://www.itu.int/wsis/stocktaking/scripts/documents.asp?project=1142593100&lang=fr.

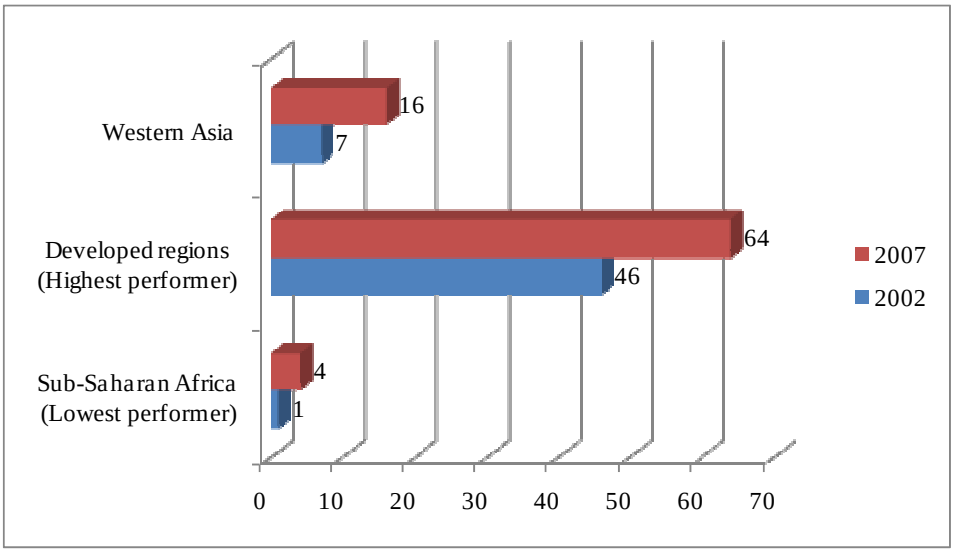
(h) *Goal 8. Develop a global partnership for development*

In view of the economic crisis, which has gripped much of the world during the past two years and factoring in rapidly rising food prices and energy shortages, the development of regional and global partnerships may have become more difficult as countries turn inwards to solve their internal problems.

Poorer countries currently face a combination of predicaments that include shrinking markets for their exports, bigger debts to finance rising food prices and less aid from traditional donor countries.

Looking at this MDG from a more positive angle, most countries and all world regions have edged closer towards achieving Target 18, which has the most evident correlation between information and communications technology and MDGs.[282] Western Asia is no exception, having more than doubled its number of Internet users between 2002 and 2007. Unfortunately, the figure associated with this significant improvement still represents no more than one-quarter of that attained by developed regions.

Figure 23. Number of Internet users per 100 inhabitants (Higher=better)



Box 21. Examples of ICT initiatives helping to achieve MDG 8 in ESCWA member countries

The mobile sector has opened up new communication means. The boom of the mobile industry in much of Western Asia has not just created new jobs and revenues, but also contributed to economic growth by widening markets, creating better information flow, lowering transaction costs and substituting for costly physical transport. Several ESCWA member countries have initiated projects that implemented technology incubators and technology parks. A list of incubators/parks and their characteristics can be found on the website of the United Nations Industrial Development Organization (UNIDO).[a/]

From simple online availability of administrative forms to full online automation, many Governments in the ESCWA region are moving their operations online.[b/] Several countries are also in the process of migrating their procurement, customs and civil registry management capabilities onto electronic platforms.[c/]

a/ See http://www.unido.org/index.php?id=o5067.

b/ See http://www.informs.gov.lb; and ESCWA WSIS follow-up conference (June 2009), which is available at: http://css.escwa.org.lb/ICTD/850/List_Presentations_Track2.pdf.

c/ See http://www.customs.gov.lb/customs/index.htm.

[282] In cooperation with the private sector, make available the benefits of new technologies, especially information and communications technologies.

B. Classification and ranking of ESCWA member countries according to maturity level

1. *Maturity level 1: Iraq, Palestine, the Sudan and Yemen*

For many years, Iraq has suffered from oppressive circumstances, including wars, sanctions and political instability, which have greatly eroded its chances of achieving MDGs. Yemen, for its part, continues to be hampered by a shortage of funding and adequate technical experience. In Palestine, the ongoing plight in relation to Israel has also greatly crippled the human development efforts across the occupied territory.

2. *Maturity level 2: Egypt, Jordan, Lebanon, Saudi Arabia and Syrian Arab Republic*

Jordan, Lebanon and the Syrian Arab Republic all managed to register some significant achievements in certain goals as reflected by the related indicators, especially in education and gender equality. However, they still need to make more progress on the other Goals, especially in the eradication of poverty and the reduction of unemployment. For instance, Egypt continues to suffer setbacks in the areas of unemployment and poverty, despite marked improvement in other indicators, particularly education. Wealthy as it is, Saudi Arabia's economic progress has not yet enabled the country to realize all MDGs, particularly in education and gender equality as these two Goals are constrained by social culture rather than finance.

3. *Maturity level 3: Bahrain, Kuwait, Oman, Qatar and United Arab Emirates*

The progress made at this maturity level varies from country to country. While Bahrain and Qatar have excelled in terms of total net enrolment ratios in primary education, they do not differ much from Kuwait and the United Arab Emirates when it comes to promoting the participation of women in their political processes. All these countries are still in need of progressing further on several other goals to achieve parity with developed countries.[283]

TABLE 68. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN ACHIEVING THE MILLENNIUM DEVELOPMENT GOALS

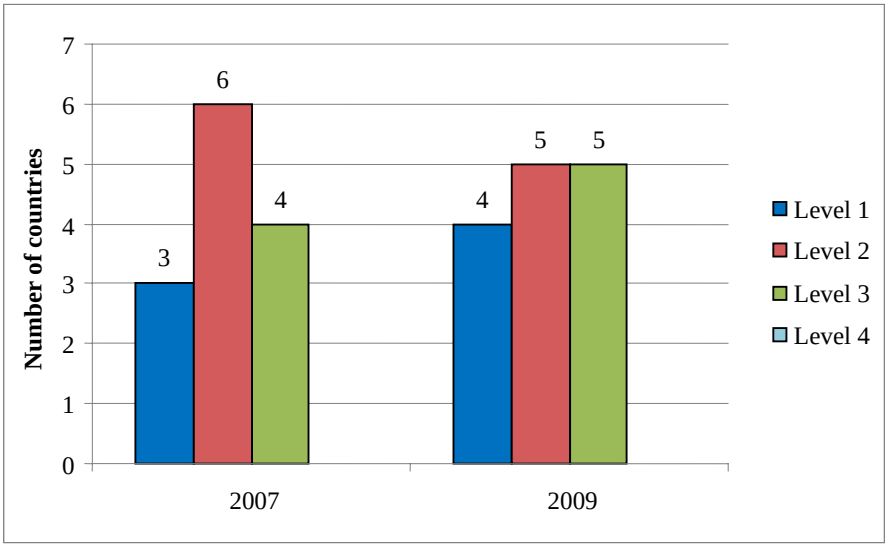
	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2007	2009	2007	2009	2007	2009	2007	2009
Bahrain					✓	✓		
Egypt			✓	✓				
Iraq	✓	✓						
Jordan			✓	✓				
Kuwait					✓	✓		
Lebanon			✓	✓				
Oman			✓			✓		
Palestine	✓	✓						
Qatar					✓	✓		
Saudi Arabia			✓	✓				
The Sudan[a/]		✓						
Syrian Arab Republic			✓	✓				
United Arab Emirates					✓	✓		
Yemen	✓	✓						

Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

[283] None of the ESCWA members achieved maturity level 4 in 2009.

Figure 24. Maturity levels of ESCWA member countries in achieving the Millennium Development Goals



C. SUGGESTIONS AND RECOMMENDATIONS[284]

(a) Democratize the use of ICT by lowering the cost of access to ICT services with the abolishment of taxes on ICT equipment and services and the reduction of the cost of local and international bandwidth;

(b) Facilitate access to ICT in underprivileged areas by improving ICT infrastructure and by connecting schools, universities and public institutions;

(c) Alleviate the problem of brain drain, which is especially acute in the poorer countries of the region, by promoting better salaries, social benefits as well as regular training for ICT specialists and workers;

(d) Accelerate the deployment of citizen-centred e-government applications by implementing measures and enacting laws to make e-government and e-services viable;

(e) Encourage the creation of new business ventures by improving ICT enabling environments for local and foreign investors, implementing measures to build trust, developing a culture of transparency and accountability, and by drafting cyberlegislation that would guarantee and protect the rights of businesses and citizens alike;

(f) Foster ICT R and D by initiating partnerships between universities, government institutions, research entities, think tanks and ICT businesses;

(g) Implement projects and initiatives that would be beneficial to the region as a whole, specifically in the areas of communication infrastructure where the development of a shared infrastructure could lower the costs of digital access;

(h) Promote cooperation with more developed countries, particularly those which score high on the ICT Development Index (IDI), which would allow ESCWA member countries to avoid growing pains by learning from and adapting the experience of those countries to national realities.[285]

[284] This section updates the recommendations made in an earlier ESCWA publication, entitled The Millennium Development Goals in the Arab Region 2007: A Youth Lens (E/ESCWA/EAD/2007/3).

[285] International Telecommunication Union (ITU), *Measuring the Information Society: The ICT Development Index* (2009).

XII. BUILDING THE ICT SECTOR

The worsening global and regional economic conditions will make it harder for the nascent ICT sector in the ESCWA region to grow. The regional growth rate is expected to slow down significantly in 2009 and 2010.[286]

It is expected that investment in the ICT sector, financing new ventures and accessing development funds, which were already limited in Western Asia during the elapsing period, could become even scarcer in the wake of the global financial crisis and its impact on the region.

There are many issues at stake that may help to develop the ICT sector in the region from the national and regional perspectives, including ICT financing, venture capital and entrepreneurship; human and financial resources needed for the development of the ICT sector; national ICT strategies and policies and their implementation; regulatory status of the sector in member countries; trade considerations for ICT products; contributions of the sector to the GDP of ESCWA member countries; measuring performance of the sector; and tools for sustainability of the sector.

Information technology industry development agencies contribute to the development of local companies operating in this sector in order to increase their competitiveness and help them increase their share of the domestic market and improve their ability to export and enter new markets.

In order to build the ICT sector, a number of ESCWA member countries have sought to provide the enabling environment necessary to promote the ICT sector by creating a telecommunication regulatory authority, liberalizing the telecommunication sector, launching Government initiatives and e-services, reducing taxes to attract external capital for investment in the ICT sector, encouraging the use of technology, and disseminating information on the transition to the information society and knowledge-based economy.

A. COMPARATIVE ANALYSIS

1. *Contribution of the ICT sector in the national economy*

While the ICT sector is rapidly growing in the ESCWA region, there is an absence of accurate and useful data from member countries that allows assessing and monitoring the contribution of the ICT sector to national economies and the measurement of its impact on sustainable development. This is due to the fact that most, if not all ESCWA member countries, do not separate the ICT sectors from other such traditional sectors of the economy as transportation and industry.

Given the proper support from Governments, the ICT sector could cause a tangible growth in GDP through the creation of jobs, better country competitiveness and overall efficiency, new business models and transparent governmental reforms.

2. *ICT revenues*

At the regional level, ICT contributes to an average of 3.33 per cent of GDP, which shows that there is ample possibility of growth for this sector in the ESCWA region. In 2008, the ICT sector in Saudi Arabia contributed to 8 per cent of the country's GDP, or approximately $37 billion; whereas it only contributed to 0.8 per cent, or $95 million, of the GDP of Palestine. Bahrain, Iraq, Lebanon, Palestine, and Qatar are below the regional average (see table 69).

[286] World Information and Technology Services Alliance (WITSA), *Digital Planet 2008* (May 2008).

TABLE 69. ICT REVENUES OF SELECTED ESCWA MEMBER COUNTRIES, 2008

Country or territory	GDP (*billions of $*)	ICT revenue (*percentage of GDP*)	ICT revenue (*millions of $*)
Saudi Arabia	467.60	8.0	37 408.00
Egypt	162.82	3.5	5 698.70
Kuwait	112.11	4.5	5 044.95
Syrian Arab Republic	55.20	5.0	2 760.00
Iraq	92.30	1.8	1 661.40
Qatar	52.72	2.0	1 054.40
Bahrain	15.83	3.0	474.90
Lebanon	28.66	1.4	401.24
Palestine	11.95	0.8	95.60

Source: The World Bank, *World Development Indicators 2009*.

It can be noticed from table 69 that the only three ESCWA members where the ICT sector has contributed less than 2 per cent of national GDP are Iraq, Lebanon and Palestine. These have all suffered from political instability and conflicts, which constitute a hurdle for the building and development of the ICT sector.

While telecom revenue is much higher in Saudi Arabia than in other ESCWA member countries, that country's lead in IT market value is less dramatic (see table 70).

TABLE 70. COMPARISON OF TELECOM REVENUES AND IT MARKET VALUE IN SELECTED ESCWA MEMBER COUNTRIES, 2008

Country	GDP (*billions of $*)	Telecom revenue (*millions of $*)	IT market value (*millions of $*)
Bahrain	15.83	689.76	342
Egypt	162.82	4 958.08	1 200
Kuwait	112.11	3 924.07	774
Lebanon	28.66	1 948.18	251
Oman	35.73	964.60	294
Qatar	52.72	806.80	402
Saudi Arabia	467.60	11 450.48	3 400
United Arab Emirates	163.30	3 501.95	3 100

Sources: The World Bank, *World Development Indicators 2009*; and Business Monitor International, which is available at: www.businessmonitor.com.

The United Arab Emirates, with a GDP of $163 billion, has an IT market value almost equal to that of Saudi Arabia, whose GDP is $467 billion. However, given that the United Arab Emirates is a regional hub for IT products distribution in the region, a good percentage is exported to neighbouring countries. As for the remaining ESCWA member countries, their ICT sector still has a high potential for growth.

3. *ICT spending*

Most countries in the ESCWA region have ICT expenditures at or below the world average, stemming at 6.41 per cent of GDP. While Jordan has a relatively high rate of ICT spending, even at this high rate, Jordan's expenditure value is significantly low when compared to such countries as Egypt, Kuwait, Saudi Arabia and United Arab Emirates.

TABLE 71. ICT SPENDING IN SELECTED ESCWA MEMBER COUNTRIES, 2003-2008

Country	GDP (*billions of $*)	ICT spending (*millions of $*)	ICT spending (*percentage of GDP*)	GDP (*billions of $*)	ICT spending (*millions of $*)	ICT spending (*percentage of GDP*)
	2003			2008		
Egypt	71.36	3 540.10	4.96	149.02	9 775.20	6.56
Jordan	10.20	1 016.60	9.97	17.46	1 643.60	9.42
Kuwait	47.83	2 404.30	5.03	134.54	5 832.80	4.34
Saudi Arabia	214.57	10 539.60	4.91	423.07	20 407.90	4.82
United Arab Emirates	87.61	5 456.10	6.23	148.08	11 458.60	7.74
World	36 221.92	2 383 312.10	6.58	59 071.76	3 786 380.00	6.41

Source: World Information Technology and Services Alliance (WITSA), *Digital Planet 2008*.

Table 71 shows that developing the ICT sector in Jordan is one of the top national priorities. While expenditure in 2008 reached $1.6 billion, it constituted almost 9.5 per cent of the country's GDP.

Egypt and the United Arab Emirates both showed an increase of about 1.5 per cent during the same period. Indeed, these two countries along with Jordan are the only ESCWA member countries with higher percentages than the world average. It is also worth noting that Jordan is still in the forefront of the region, if not worldwide, in spending on ICT.

4. *Export of ICT goods and services*

ICT industries contribute moderately to the national economy mainly through system integration (software outsourcing) and computer assembly plants. Table 72 summarizes the exports and imports of ICT goods and services.

TABLE 72. ICT IMPORTS AND EXPORTS IN SELECTED ESCWA MEMBER COUNTRIES, 2000-2007

	Goods				Services	
	ICT exports (*percentage of total goods exports*)		ICT imports (*percentage of total goods imports*)		ICT exports (*percentage of total service exports*)	
Country	2000	2007	2000	2007	2000	2007
Bahrain	0.1	0.1	3.6	2.3	..	..
Egypt	..	..	..	..	3.4	4.2
Iraq	..	..	..	..	..	1.9
Jordan	3.7	4.8	5.9	7.0	..	..
Lebanon	1.6	1.2	4.5	4.0	1.4	2.2
Oman	0.6	0.8	3.7	3.8	..	..
Qatar	0.1	0.0	5.1	7.6	..	..
Saudi Arabia	0.1	0.3	5.1	7.8	..	..
The Sudan	0.0	0.0	6.5	7.5	3.4	5.4
Syrian Arab Republic	0.0	0.1	1.3	2.5	..	5.8
United Arab Emirates	..	4.3	..	8.6	..	..

Source: The World Bank, ICT at a glance tables (2008).

*Note*s: ICT goods exports and imports include telecommunications, audio and video, computer and related equipment, electronic components, and other information and communication technology goods. However, software is excluded.

Two dots (..) indicate that data are not available.

ICT firms have different activity types, including provision of hardware, development of software and capacity-building. They can be classified into three main categories: telecommunication firms, IT firms and

systems technology services. Currently, most ICT firms in the Arab region are involved in the retail of computers and software tools and applications, without neglecting the growing number of companies, especially in the Gulf subregion, that provide total ICT solutions, including system integration and customization.

Given that telecommunication providers earn the highest annual profit, especially following the liberalization of this sector in most ESCWA member countries, they constitute the dominant category of companies in the ICT sector in the ESCWA region.

It is evident from table 72 that the import rates largely exceeded the export rates, which owes to the absence of a real ICT industry. Moreover, it can be noticed that Jordan and the United Arab Emirates have substantially higher ICT goods export rates than other ESCWA member countries.

5. *Employment in the ICT sector: number of ICT workforce*

Increasing ICT adoption in many Arab countries requires a more skilled ICT workforce, which becomes readily available in the market due to influx of expatriate ICT professionals drawn back to the Arab region as a result of the global economic downturn. Large countries such as Egypt report that 175,000 persons work in the telecommunication sector; that number is 80,000 in Saudi Arabia; and 22,000, 13,000 and 2,500, respectively, in the smaller countries of Jordan, Qatar and Bahrain.

6. *Investments in the ICT sector*

The contribution of the ICT sector to national growth increases linearly with ICT investments, which play a significant role in promoting regional and international integration. Data show that ICT investments foster higher long-term economic growth. Specifically, foreign investment helps to finance ICT infrastructure and develop telecommunication services, providing additional sources of revenue in licensing fees in many countries. This has been manifested in the mobile market where its liberalization permitted the entry of national, regional and international investments, and led to high returns on investment in many countries, such as Bahrain, Oman and Saudi Arabia.

However, ICT investments in ESCWA member countries, despite its increase, have not yet reached the desired level. This limits the contribution of the telecommunication sector to the economic integration between Arab countries and other regions. Despite the weakness of these investments, the achievements of two Arab telecommunication companies that have made remarkable developments in this region must be noted, namely: Zain of Kuwait, with capital exceeding $28 billion in mid-2008;[287] and Orascom Telecom of Egypt, with a total market value of some $17 billion as of end 2007.[288]

Keen to promote investment in the ICT sector, many Governments in the ESCWA region have formulated a series of innovative incentives aimed at creating an appropriate climate to attract local and foreign investments, and have striven to encourage innovation in the ICT industry, such as Bahrain Technology Park and Egypt's General Authority for Investment and Free-Zone. The Centre of Excellence for Applied Research and Training (CERT) in the United Arab Emirates operates two science and technology parks, in Abu Dhabi and in Dubai, thereby providing access to world-class experts in technology through more than 20 multinational partners. These parks aim to foster the use of the latest technologies in the United Arab Emirates while building the technological infrastructure required for further sustained development. Dubai Internet City (DIC) is a strategic base for companies targeting emerging markets in a vast region.

[287] See http://www.zain.com.

[288] See http://www.orascomtelecom.com.

Berytech, the Lebanese technological pole, Bahrain Technology Park, Qatar Science and Technology Park (QSTP), the Prince Abdullah Bin Abdulaziz Science Park (PASP) in Saudi Arabia and Knowledge Oasis Muscat (KOM) in Oman all represent examples of public-private sector-led initiatives that are totally committed to creating an environment in which entrepreneurs, researchers, SMEs as well as established multinationals can innovate and flourish while building the ICT sector. Those clusters comprise companies providing a variety of services, including software development, business services, e-commerce, consultancy, sales, marketing and back office support.

Jordan represents a leading example of a developing country committed to economic expansion through ICT investment. Jordan has sought to attract Arab and foreign capital for investment in the local ICT sector in an attempt to promote the full development and liberalization of the sector and to turn it into a genuine industry. In that context, the Ministry of Information and Communication Technology, in collaboration with the Jordan Investment Board, have been promoting investments in the development of Arabic content products and services, which constitutes one of the most significant ICT areas of investment in Jordan and the wider Arab region. It is an initiative that is expected to create about 13,000 new job opportunities and to increase the revenues from the Jordanian ICT sector.[289]

However, investments undertaken by Governments and the private sector in the ESCWA region are essentially spent on marinating, upgrading and expanding telecommunication infrastructure. Table 73 reveals that the total value of telecom investments as a percentage of total GDP is still very modest in selected ESCWA member countries.

TABLE 73. TELECOM INVESTMENT IN SELECTED ESCWA MEMBER COUNTRIES, 2003-2007

	GDP (*billions of $*)	Telecom investment (*millions of $*)	GDP (*billions of $*)	Telecom investment (*millions of $*)
Country	2003		2007	
Jordan	10.20	146.85	15.83	157.69
Oman	21.78	130.70	35.73	617.35
The Sudan	17.78	..	46.23	564.44

Source: The World Bank, Development Indicators database.

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

The latest international financial crisis has affected global industrial production and global trade, affecting national economies in the ESCWA region. However, the ICT sector in the region is still very dynamic and has opportunities in spite of some risks due to the financial crisis, while the telecommunication sector is still growing in the region.

7. *Research and development in the ICT sector*

R and D in the ICT sector is mainly confined to research centres and universities. The expenditure on all types of R and D in the ESCWA region is modest. Specifically, a large portion is viewed as ad hoc activities rather than systematic programmes that reflect core values and business practices and development. The United Arab Emirates represents an exception in this region due to its high investment in R and D in the ICT sector, thereby earning it the top position on the Innovation Index in the Middle East.[290] R and D in the United Arab Emirates is concentrated in the faculties of computer science and management information systems, colleges and universities in Dubai Knowledge Village, the Centre of Excellence in Dubai International Financial Centre (DIFC) and Dubai Silicon Oasis (DSO).

[289] See http://www.ict.gov.jo.

[290] This Index was developed by the European Institute of Business Administration (INSEAD) with the support of Moutamarat and PricewaterhouseCoopers. More information is available at: http://www.managementtoday.co.uk/ search/article/ 625442/the-worlds-top-innovators-index.

Part of R and D activities in the ICT sector focuses on developing content and Arabization, including, most prominently, the role of the Arab Regional Centre for Development of Educational Software (ReDSOFT) and Sakhr in Kuwait.[291] Moreover, the Information Technology Academic Collaboration (ITAC) in Egypt aims to promote industry-university collaboration by linking academic research with industry and market needs. In Yemen, for instance, MTIT is working on the establishment of an ICT technology city, which includes a centre for software development. In the United Arab Emirates, DIC is evaluating a proposal to boost R and D, which would include a fund that focuses on investing in knowledge initiatives to create talent pools and regulatory changes. With the exception of Qatar, which spent 2.8 per cent of its national GDP on R and D, other ESCWA countries dedicate between 0.2 and 0.3 per cent of their GDPs on R and D. Table 74 summarizes the status of current and prospective ICT research facilities, industrial clusters and incubators in the ESCWA region.

TABLE 74. ICT RESEARCH FACILITIES, INDUSTRIAL CLUSTERS AND INCUBATORS IN THE ESCWA REGION

	ICT research facilities		ICT industrial clusters		ICT incubators	
Country or territory	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	Yes	Yes	Yes	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	Yes	Yes
Palestine	No	No	No	No	Yes	No
Qatar	Yes	..	Yes	No	Yes	No
Saudi Arabia	Yes	Yes	Yes	Yes	Yes	Yes
Syrian Arab Republic	No	Yes	No	..	Yes	No
United Arab Emirates	Yes	Yes	Yes	Yes	Yes	Yes
Yemen	No	Yes	No	Yes	Yes	Yes

Sources: Compiled by ESCWA, based on national profiles of the information society of individual member countries (see bibliography) and on Regional Profile of the Information Society in Western Asia (E/ESCWA/ICTD/2007/15).

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

8. *Government facilitation*

The support of Governments is a key element of success in building the ICT sector. By using various methodologies, Governments can greatly assist SMEs in using ICT as a main resource to increase their competitiveness.

All Governments in the ESCWA region do provide support for the ICT sector in one way or another. Their contributions or facilitation come at various levels. While some countries merely provide funding for small projects, others adopt laws to encourage the use of ICT and dispense ICT products from taxation, and others simply promote operations of their SMEs.

The Government of Iraq, for example, supports SMEs by simplifying the procedure for getting low-interest loan approvals. Furthermore, Iraq signed the Arab agreement for regulating electronic signature, which provides support for research and studies on digital signature and certification and their use by SMEs. In Oman, the ITA initiated the ICT Incubation Programme aimed at facilitating the growth of industries and improving innovation and capabilities of SMEs for better access to global markets and opportunities. The Palestinian Authority facilitates investment in the sector by reducing taxes and liberalizing the

[291] See http://www.redsoft.org and http://www.sakhr.com/default.aspx.

telecommunication sector. While the Sudan and Yemen provide funding for SMEs, the Syrian Arab Republic launched, towards the end of 2008, a national dialogue for the development of ICT industry aims at strengthening private-public partnerships in the area of software development.

B. CLASSIFICATION AND RANKING OF ESCWA MEMBER COUNTRIES ACCORDING TO MATURITY LEVEL

1. *Maturity level 1: Iraq, Palestine, the Sudan, Syrian Arab Republic and Yemen*

This maturity level depicts scarce presence of local ICT firms with a low level of investment, a limited or inefficient facilitation role played by the Government and the scarcity or absence of ICT product exports.

2. *Maturity level 2: Bahrain, Kuwait, Lebanon, Oman and Qatar*

This maturity level indicates the presence of nascent local ICT firms with limited investments, an improved Government facilitation role and the existence of some ICT product exports.

3. *Maturity level 3: Egypt, Jordan, Saudi Arabia and United Arab Emirates*

This maturity level designates a growing number of local, regional and global ICT firms with an increasing investment level, an increasingly efficient governmental facilitation and increased growth in ICT product exports.[292]

TABLE 75. RANKING OF ESCWA MEMBER COUNTRIES BY MATURITY LEVEL IN BUILDING THE ICT SECTOR

	Maturity level 1		Maturity level 2		Maturity level 3		Maturity level 4	
Country or territory	2005	2009	2005	2009	2005	2009	2005	2009
Bahrain	✓			✓				
Egypt			✓			✓		
Iraq	✓	✓						
Jordan					✓	✓		
Kuwait	✓			✓				
Lebanon			✓	✓				
Oman	✓			✓				
Palestine	✓	✓						
Qatar	✓			✓				
Saudi Arabia			✓			✓		
The Sudan[a/]		✓						
Syrian Arab Republic	✓	✓						
United Arab Emirates					✓	✓		
Yemen	✓	✓						

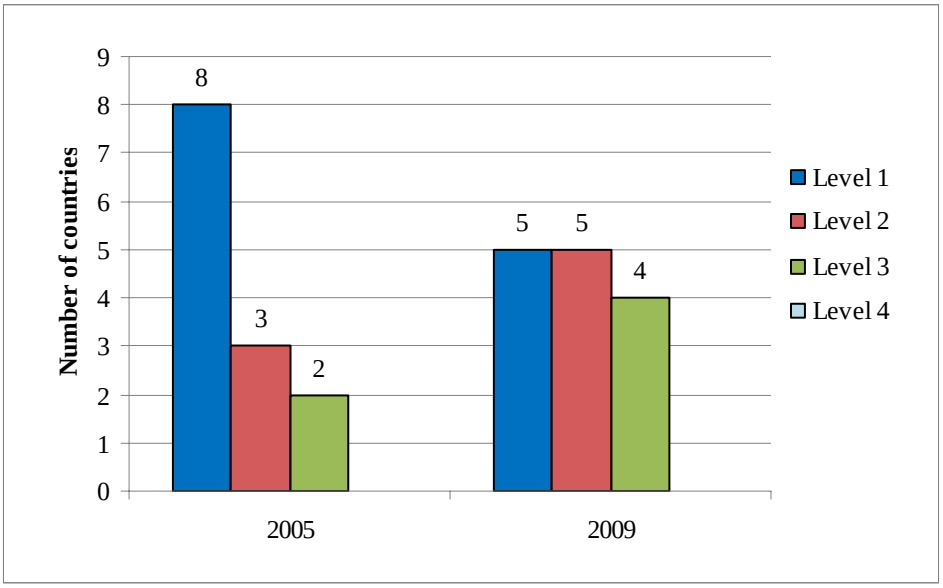
Source: Compiled by ESCWA.

a/ No assessment was provided for the Sudan prior to 2009, which only joined ESCWA in 2008.

b/ In terms of building the ICT sector, the comparison is made with 2005 given that this indicator was not evaluated in 2007 and figured within chapter VI of that report.

[292] None of the ESCWA members achieved maturity level 4 in 2009.

Figure 25. Maturity levels of ESCWA member countries in building the ICT sector



C. SUGGESTIONS AND RECOMMENDATIONS

Countries in the ESCWA region still have to overcome a number of challenges in order to build a strong ICT sector and reach levels comparable to developed countries. Despite the economic slowdown as a result of the economic crisis, the future of ICT in the ESCWA region remains relatively bright. While initiatives to develop the ICT sector in the region have been carried out by a number of ESCWA member countries, the sector remains underdeveloped.

In fact, many such ESCWA members, as Iraq, Palestine and Yemen, suffer from political instability and conflicts, while other such countries as the Sudan and the Syrian Arab Republic, suffer severe sanctions and/or embargoes on imports of high-technology products. Other reasons that also hinder the development and building of the ICT sector in the ESCWA region are shortages of electrical power, limited infrastructure, shortage of national human resources and limited financial resources.

Within that context, the United Arab Emirates, Egypt and Jordan are considered leaders in building the ICT sector in the ESCWA region. As for the Syrian Arab Republic, Yemen and the Sudan, the liberalization of the ICT sector should effectively contribute to its development.

Generally, the ICT sector suffers from being part of other, such economic and service sectors as transport, high-tech or media, thereby lacking its own autonomy and necessary focus. Moreover, the ICT sector remains consumption-based rather than production-based, with minimal production and export activities. The ICT sector is predominately telecom-based with very little contribution from software and professional service industries, thereby no real added value exists that provides a competitive advantage.

Local companies, constituting an important segment of the sector, require support from Governments, giving them priority in bidding for Government projects and tenders. Without effective market share in their local markets, such companies could hardly be in a position to compete in markets abroad.

Some suggestions to develop the ICT sector in the ESCWA region are as follows:

(a) Continue the liberalizing of the telecommunication sector, which helps to attract investments in the ICT sector;

(b) Separate the ICT sector from other economic sectors on the macroeconomy level;

(c) Promote the implementation of software and value-added services geared towards the regional competitive advantage, including location, language and specialized skills;

(d) Intensify research and conduct studies to assess the current status of the ICT sector in the region and its contribution to economic growth;

(e) Urge Governments to build an enabling legislative, regulatory and financial environment aimed at promoting the ICT sector and its components, such as software development and DAC industry among the areas for value-added services and at providing incentives for SMEs specialized in ICT.

XIII. REGIONAL AND GLOBAL COMPARATIVE ANALYSIS

A. PERFORMANCE OF THE ESCWA REGION IN BUILDING THE INFORMATION SOCIETY

In order to depict the current status of the information society in the ESCWA region and measure the progress made in building it, the regional profile of the information society has been divided into 12 basic components. Member countries were rated on every component based on a four-level maturity scale, with level 1 indicating the lowest level of maturity and level 4 the highest. The average score of the ESCWA region on each information society component is then calculated by adding up the respective point scores of every member country divided by a total of 14 (see table 76).

While each chapter provided maturity level assessment scores (1 to 4) for every member country on a particular information society component, by contrast to previous versions, this 2009 regional profile report does not provide final member country scores in building the information society. As stated in the introduction, the four subjective maturity levels adopted by this report cannot be translated into comparable statistical indicators. The maturity level assessment results provided in each chapter should be used by member countries as tools aimed at identifying gaps and at outlining corrective measures, rather than merely focusing efforts on improving national rankings.

Table 76 depicts the average scores of the ESCWA region in various information society components. While a fair comparison cannot be established between the region's scores of 2007 and 2009 owing to the admission of the Sudan to ESCWA in 2008, this table presents a time series perspective. Moreover, while this represents a short time series, some interesting patterns emerge as do some of the impediments for realizing the information society in the region.

TABLE 76. AVERAGE SCORES OF THE ESCWA REGION IN VARIOUS INFORMATION SOCIETY COMPONENTS, 2007-2009
(*Ranked from lowest to highest*)

Information society component	ESCWA average 2007	ESCWA average 2009
Building confidence and security in the use of ICTs	1.46	1.29
Regional and international cooperation	1.38	1.43
Building the ICT sector[a/]	..	1.93
Media	1.92	2.07
Millennium Development Goals	2.08	2.07
Access to information and knowledge	2.00	2.21
Enabling environment	2.00	2.21
Cultural diversity and identity, linguistic diversity and local content	2.15	2.21
ICT applications	2.31	2.21
ICT capacity-building	2.46	2.29
ICT infrastructure	2.46	2.43
Role of Governments and stakeholders	2.46	2.50
Overall average	2.06	2.07

Source: Compiled by ESCWA.

Notes: a/ In terms of building the ICT sector, this component was not evaluated in 2007 and figured within chapter VI of the 2007 Regional Profile report.

Two dots (..) indicate that data are not available.

The region scored lowest on "building confidence and security in the use of ICT" as a result of the absence of laws and regulations aimed at ensuring the privacy and confidentiality of people and the delay in promulgating laws and regulations to counter the misuse of ICT. The ESCWA region also scored low on regional and international cooperation, due to the absence or inadequacy of regional and international joint initiatives leading to a common vision for building the information society.

In addition to a shortage of finance and venture capital mechanisms, the ICT sector component was still considered by most member countries as part of other economic and service sectors, thereby contributing to the low regional score of 1.93 points attained by that sector.

The role of governments and all stakeholders and ICT infrastructure components registered the highest average scores of 2.50 and 2.43 points, respectively. This is reflective of the effective roles played by governments in the region and to the relatively high ICT penetration rates attained, especially by the GCC countries.

B. Performance of the ESCWA region compared with other countries and regions

1. *Performance of the ESCWA region in the role of governments and all stakeholders*

Despite the formulation of national strategies in line with WSIS objectives that call for the integration of ICT-related programmes with national and regional development strategies, the differences in development strategies among countries make it difficult to establish common international standards that can be used to measure or quantitatively compare performance. Nevertheless, while efforts in this regard differ from one country to another, depending on local conditions, the region has witnessed a greater participation of Governments and all stakeholders in building the information society. Specifically, most member countries are seriously striving to formulate, update and implement ICT-related policies.

2. *Performance of the ESCWA region in ICT infrastructure*

Most member countries have sought to focus on building ICT infrastructures by establishing telecommunication regulatory authorities (TRA), liberalizing the telecommunications sector and attracting foreign investments. Across the region, there is a significant positive correlation between the liberalization of telecommunications and higher phone and Internet penetration rates. Mobile penetration rates in particular have witnessed considerable increase in all ESCWA member countries. As competition enters the market, the quality of service increases and costs are reduced. These conditions have been shown to promote the development of the information society.

(a) *Internet penetration*

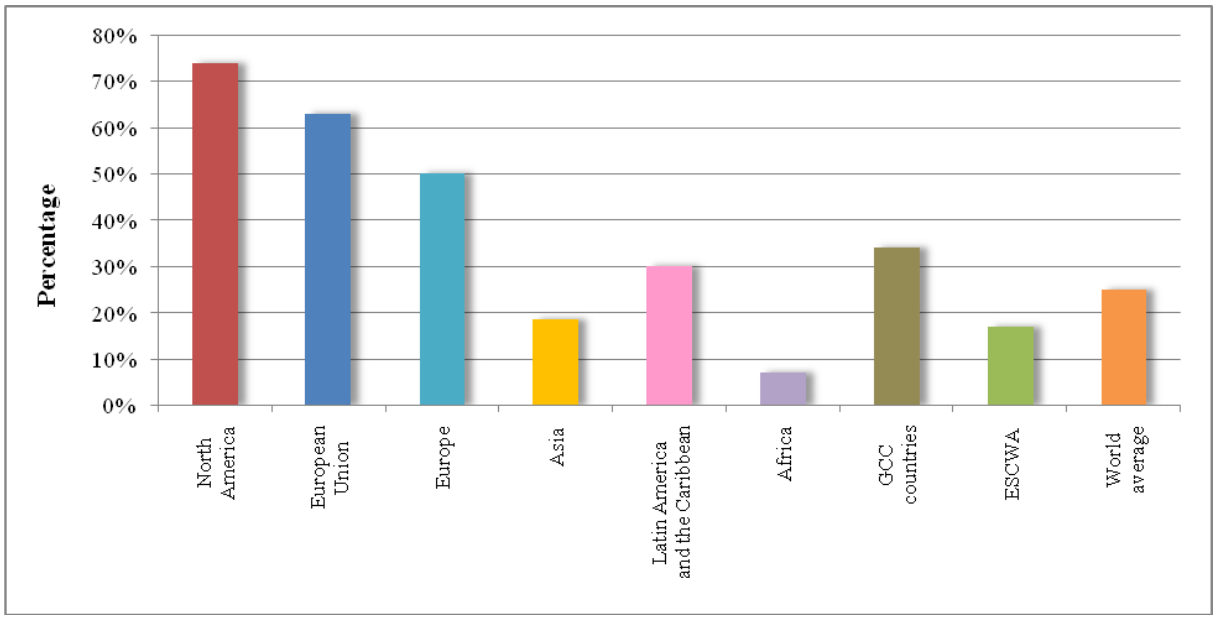
While the Internet penetration rate of the ESCWA region increased by 65 per cent between 2005 and mid-2009, the current penetration rate at 17 per cent is lower than the world average at 25 per cent. The ESCWA region falls behind most regions of the world, with the exception of Africa (at 7 per cent). However, the Internet penetration rate in GCC countries averages at 34 per cent, thereby overtaking Latin America and Asia, albeit falling significantly behind the rates in the European Union (at 63 per cent).

TABLE 77. INTERNET PENETRATION RATES IN SELECTED REGIONS, MID-2009

Region	Internet penetration (*percentage*)
North America	74
European Union	63
Europe	50
Asia	18.5
Latin America and the Caribbean	30
Africa	7
GCC countries	34
ESCWA	17
World average	25

Source: Internet World Stats, which is available at: http://www.internetworldstats.com.

Figure 26. Internet penetration rates in selected regions, mid 2009



Source: Internet World Stats, which is available at: www.internetworldstats.com.

(b) *Mobile phone penetration*

Mobile service markets in the region have gone a long way in terms of competition and sophistication. An impressive growth rate of around 67 per cent has been observed between 2006 and 2008. One of the interesting trends in mobile phone markets in the region is the increased number of regional operators investing in other ESCWA member countries, thereby inducing more regional integration.

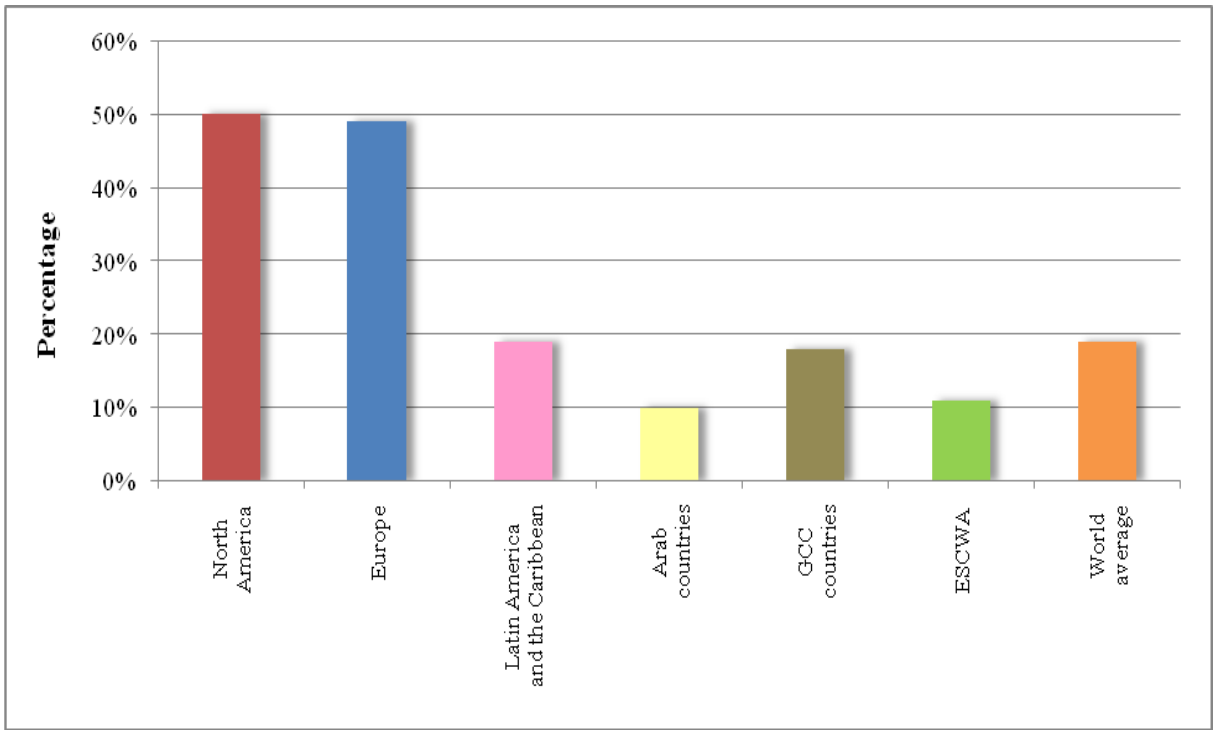
TABLE 78. MOBILE PHONE PENETRATION RATES IN SELECTED REGIONS, 2008

Region	Mobile phone penetration (*percentage*)
North America	87
European Union	122
Latin America and the Caribbean	80
East Asia and Pacific	52
GCC countries	145
MENA	57
ESCWA	62
World average	60

Source: International Telecommunication Union (ITU).

When comparing regional mobile phone penetration rates, it is evident that the ESCWA region surpasses East Asia and the Pacific region by a good margin, while drastically falling behind the European Union (at 122 per cent). By stark contrast, the penetration rate of 145 per cent in the GCC countries exceeds the North American rate of 87 per cent. While the ESCWA region's average is higher than the world average, the MENA region's average (at 57 per cent) is slightly lower than the world average.

Figure 27. Mobile phone penetration rates in selected regions, 2008



Source: International Telecommunication Union (ITU).

(c) *Fixed-line penetration*

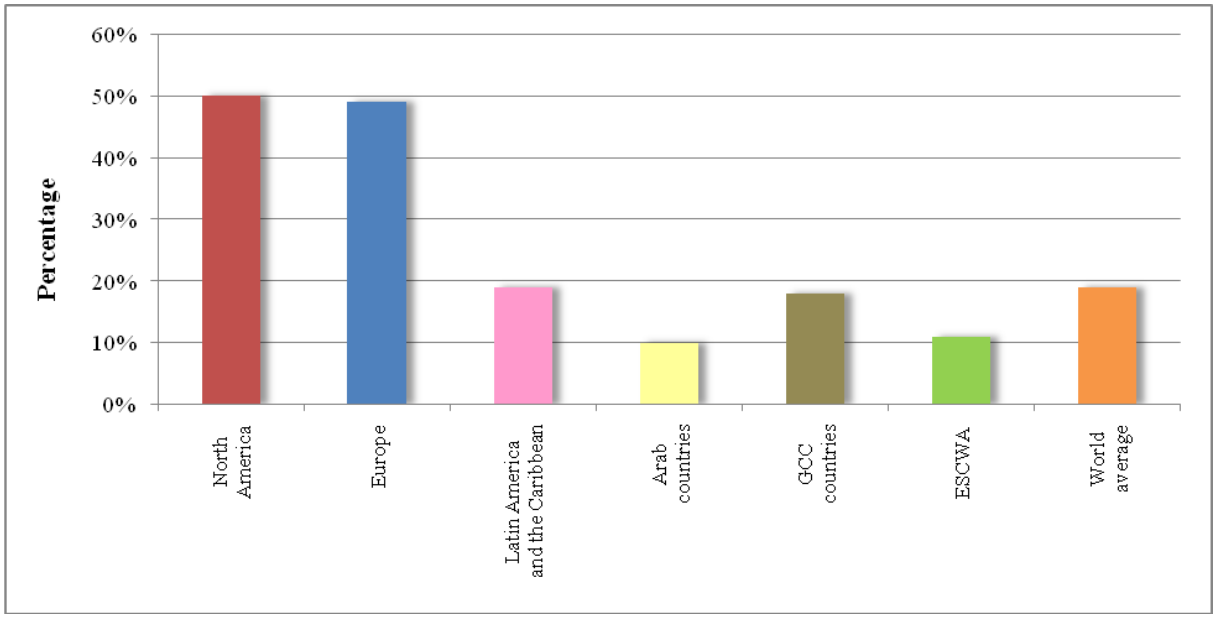
With regard to fixed-line phone services, ESCWA regional markets are becoming more competitive, albeit far less competitive than the mobile and Internet markets. The fixed-line penetration rate of the ESCWA region remains low at an average of 11 per cent, which is well below the world average at 19 per cent and only slightly higher than the Arab average at 10 per cent. While GCC countries are on relatively higher ground, the penetration rate of that subregion, at an average of 18 per cent, is still far below that of developed regions such as North America and Europe, each approximately at 50 per cent.

TABLE 79. FIXED-LINE PENETRATION RATES IN SELECTED REGIONS, 2008

Country or region	Fixed-line penetration (*percentage*)
North America	50
Europe	49
Latin America and the Caribbean	19
China	26
GCC countries	18
Arab countries	10
ESCWA	11
World average	19

Source: International Telecommunication Union (ITU).

Figure 28. Fixed-line penetration rates in selected regions, 2008



Source: International Telecommunication Union (ITU).

3. *Performance of the ESCWA region in access to information and knowledge*

Access to information and advocating knowledge sharing remain a challenge in the region. The challenge is only exacerbated by the emergence of the global knowledge society as most member countries have not yet recognized that knowledge and digitization of information are becoming factors of production and a driver for economic and social development. The disparity between ESCWA member countries in terms of access to information owes to a disparity in the availability of advanced ICT infrastructure and low Internet penetration rates in some countries. While the region is making some progress in this regard, efforts are still needed to enhance further accessibility to digital content.

Moreover, access to information through multipurpose community access centres is still limited in the ESCWA region by comparison to such developed and developing countries as Spain and Brazil. The latter has established access centres all along the area bordering the Amazon. Furthermore, community access centres in the ESCWA region that enable all citizens to benefit from ICTs cannot even be compared with the "Rural Internet" programme in Spain, which provides free access to citizens in rural areas.

Indicators measuring access to ICTs include the following: fixed line penetration, mobile cellular penetration, international Internet bandwidth per Internet user, the proportion of households with computers and the proportion of households with Internet access. The IDI access sub-index measures these indicators and provides a country comparison (see table 80).

TABLE 80. RANKING OF ESCWA MEMBER COUNTRIES AND SELECTED COUNTRIES ON THE IDI ACCESS SUB- INDEX, 2007

Country or territory	Global ranking	Selected countries for comparison	Global ranking
United Arab Emirates	34	Sweden	1
Bahrain	35	Hong Kong	3
Qatar	39	Norway	12
Saudi Arabia	48	Ireland	16
Kuwait	51	United States of America	22
Oman	67	Israel	28

TABLE 80 *(continued)*

Country or territory	Global ranking	Selected countries for comparison	Global ranking
Lebanon	73	Malaysia	60
Syrian Arab Republic	77		
Jordan	78		
Palestine	83		
Egypt	98		
The Sudan	116		
Yemen	120		
Iraq	..		

Source: International Telecommunication Union (ITU), *Measuring the Information Society: The ICT Development Index* (2009).

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

4. *Performance of the ESCWA region in ICT capacity-building*

Measurements of ICT capacity-building mainly reflect the use of ICT in education, training and literacy programmes, the status of R and D and the development of an enabling environment for innovation. To illustrate the situation in the ESCWA region, a number of criteria have been selected for comparison with other regions and countries.

Illiteracy is still widespread in the region, especially among women in the less developed member countries. Despite great strides in fighting illiteracy, the region has one of the highest rates in the world, demonstrating that these countries have yet to benefit from the use of ICT to reduce prevailing high illiteracy rates.

Furthermore, spending on R and D and the number of working scientists in the region remain very limited and far below the world average. When comparing patent registration in ESCWA member countries with that in other countries, the ESCWA region outperforms the Arab countries by a margin of 30 per cent, but lags behind Malaysia by a great margin. While the Gulf subregion, whose average of 0.823 patents per million people exceeds the ESCWA average, and is ahead of Turkey (at 0.179), it slightly lags behind India (at 1.1) and is dramatically behind Israel (at 139.2).

TABLE 81. AVERAGE PATENTS PER PERSON: ESCWA REGION AND SELECTED COUNTRIES, 1999-2008

Country or region	Average number of registered patents (*per annum*)	Patents granted per million people (*per annum*)
ESCWA	40.9	0.166
Arab countries	43.4	0.127
GCC countries	30.2	0.823
Middle East	9.8	0.074
North Africa	2.3	0.029
World	161 029	23.7
Germany	10 131.7	123.3
India	1 268.2	1.1
Israel	1 017.2	139.2
Japan	33 552.7	262.7
Malaysia	80.7	3.0
Turkey	13.2	0.179
United States of America	83 719.4	275.3

Source: United States Patent and Trademark Office (USPTO).

5. *Performance of the ESCWA region in building confidence and security in the use of ICTs*

Most countries in the ESCWA region are working towards promoting and building confidence and security in the use of ICTs. While tangible progress has been achieved by some countries, disparities exist among others and initiatives remain scarce, insufficient and inefficient in most ESCWA member countries.

The region still faces major shortcomings in privacy and data protection owing to the lack of comprehensive legislations and the inadequacy of available legal texts to govern impeding issues. However, almost all member countries have shown serious concern for information misuse and securing e-transactions. Most member countries have promulgated e-transactions and e-signatures laws, while others are expected to follow suit in the near future. Despite the progress exhibited, the region lags behind the developed countries in terms of building confidence and security in the use of ICT.

6. *Performance of the ESCWA region in establishing an enabling environment*

Most developed countries as well as some developing countries have already modernized their legal and regulatory frameworks to meet the requirements that were brought forth by the advent of ICTs and applications. While several ESCWA member countries have started, during the past years, to enact laws aimed at building the information society, most are still at an early stage, lacking the implementation of serious government services and the expertise and experience in ICT legislations.

Despite the exceptional performance of some ESCWA member countries in combating software piracy, the region still suffers badly from high piracy rates. The 2008 software piracy report published by Business Software Alliance (BSA) and International Data Corporation (IDC) indicates that pirated software accounts for 59 per cent of software in use in the Middle East and Africa region, namely, 1.5 times higher than the world average, at 41 per cent, and 3 times higher than the corresponding rate in North America. Meanwhile, most software piracy rates of GCC countries were lower than the Middle East and Africa rate. Despite a recent drop in rates compared to 2007, software piracy is still a major problem in most ESCWA member countries, with the exception of the United Arab Emirates which registered the lowest rate at 36 per cent.

TABLE 82. SOFTWARE PIRACY RATES IN SELECTED COUNTRIES AND REGIONS, 2008

Country or region	Software piracy (*percentage*)
North America	21
Western Europe	33
European Union	35
Middle East and Africa	59
Asia-Pacific	61
Latin America	65
United Arab Emirates	36
Egypt	59
Lebanon	74
Russian Federation	68
China	80
World average	41

Source: Business Software Alliance (BSA) and International Data Corporation (IDC), The Sixth Annual BSA and IDC global software piracy study (2008).

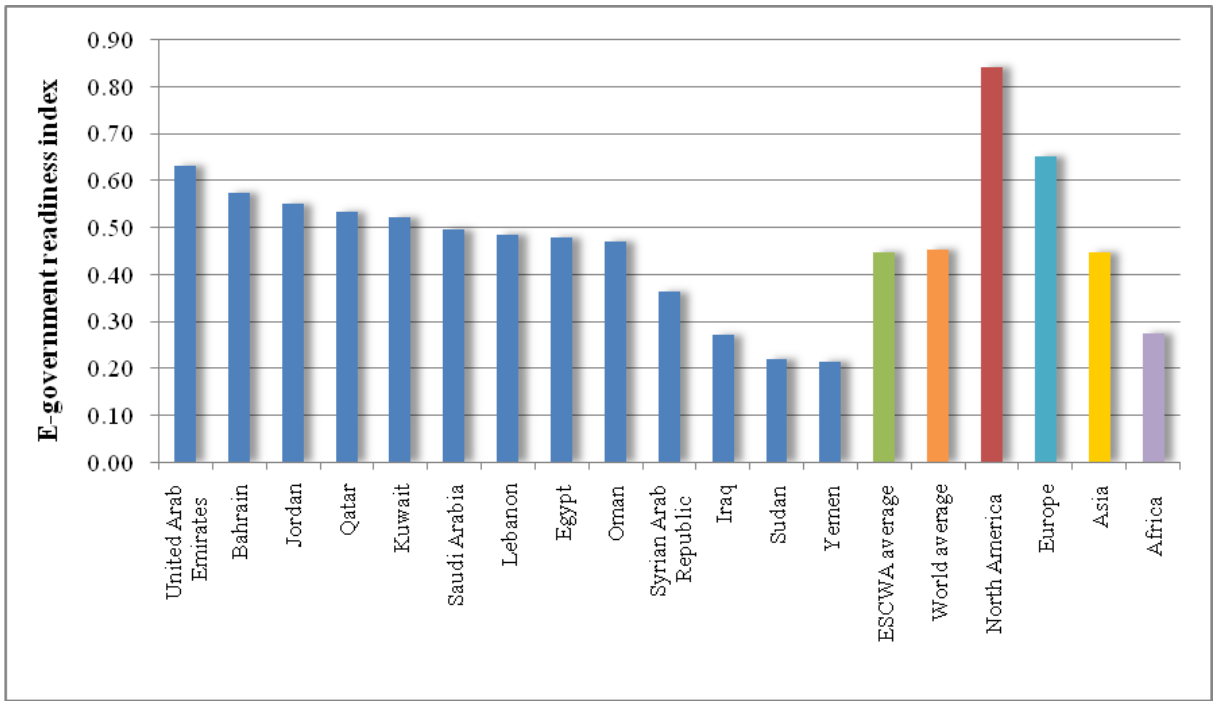
7. *Performance of the ESCWA region in ICT applications*

Most of the ESCWA region's early efforts in developing and using ICT applications focused on e-government implementation. The majority of governments in the region, similarly to other regions, have

started their e-government initiatives with a focus on providing information and services to their citizens through advanced delivery platforms, namely, the Internet. As these initiatives progressed, dedicated e-government websites have provided links to digitized and archived public information. These websites have quickly turned into interactive portals with online functionality and capable of delivering a number of online services, such as downloadable forms and applications for licence renewals.

In developed countries and some GCC countries, the focus of latest e-government initiatives started to shift from the provision of services to the use of ICTs to increase the value of these services. The e-government survey by DESA measures the implementation of online government services for all member States and found that the e-government readiness index score of the ESCWA region was comparable to the world average, at 0.45, albeit far lower than that of North America (at 0.84) and of Europe (at 0.65).

Figure 29. E-government readiness index scores of ESCWA member countries and other regions, 2008



Source: Department of Economic and Social Affairs (DESA), *UN E-Government Survey 2008: From e-government to connected governance* (2008).

8. *Performance of the ESCWA region in cultural diversity and identity, linguistic diversity and local content*

As more people in the region enter the global communications system, it is the accessibility of knowledge and content that has been a key issue. Per capita, there are proportionally fewer sources on information available to Arab speakers than to other language groups in comparable regions. In order to empower the citizens of the region to make use of their growing capacity to communicate, several initiatives to promote the use of Arabic in digital media have been launched. Arabic Web content has improved since 2006, when it accounted for only 0.16 per cent of total web pages. Compared to 2007, the total number of web pages (in all languages) of all member countries has more than doubled in 2009, thereby signalling a significant growth in the region's content on the Internet. During this same period, hoverer, Arabic language web pages grew more modestly by 43 per cent.

Table 83 further shows that the Arabic language made the top 10 list of languages used on the Internet in 2008. While the Arabic language was ranked eighth on that list, it registered by far the highest growth rate among all other languages followed by Russian and Chinese.

TABLE 83. TOP TEN LANGUAGES USED ON THE INTERNET, 2008

Language	Percentage of all Internet users	Internet penetration by language (*percentage*)	Language growth rate 2000-2007 (*percentage*)
English	29.10	37.20	226.70
Chinese	20.10	23.50	894.80
Spanish	8.20	32.00	619.30
Japanese	5.90	73.80	99.70
French	4.60	17.80	503.40
Portuguese	4.50	29.70	857.70
German	4.10	67.70	135.50
Arabic	2.60	14.20	1545.20
Russian	2.40	27.00	1125.80
Korean	2.30	51.90	93.30
Other languages	16.20	11.20	342.20

Source: Internet World Stats, which is available at: http://www.internetworldstats.com.

9. *Performance of the ESCWA region in the media*

Despite the diversity of media in ESCWA member countries, the media's role remains weak in developing information societies. One of the findings of the report is that media freedom in all countries in the developing region is at its lowest level compared with developed countries. According to the 2008 Reporters Without Borders (RWB) Press Freedom Index (PFI), the GCC countries did fare better than others such as India, Malaysia and Turkey, but less than the world ranking of Canada, the USA and Israel. Nevertheless, social issues continue to be portrayed in a stereotypical way by most media outlets in the ESCWA region, unlike their coverage in developed countries of the world.

TABLE 84. RANKING OF ESCWA MEMBER COUNTRIES ON THE PRESS FREEDOM INDEX, 2008

Country or territory	Global ranking	Selected countries	Global ranking
Kuwait	61	Norway/Iceland	1
Lebanon	67	Canada	13
United Arab Emirates	69	USA	36
Qatar	76	Israel	46
Bahrain	96	Hong Kong	51
Oman	123	Turkey	102
Jordan	128	India	118
The Sudan	135	Malaysia	132
Egypt	146		
Yemen	155		
Iraq	158		
Syrian Arab Republic	159		
Saudi Arabia	161		
Palestine	163		

Source: Reporters Without Borders (RWB), Press Freedom Index 2008, which is available at: http://www.rsf.org/en-classement794-2008.html.

10. *Performance of the ESCWA region in regional and international cooperation*

Despite the importance of international and regional cooperation, it is difficult to measure what has been achieved in this regard by different countries and regions. Consequently, it is difficult to make quantitative comparisons between the level of cooperation in the ESCWA region and that in the rest of the world.

The critical importance of regional and international cooperation for capacity-building in developing countries is underlined by MDG 8, which calls for developing a global partnership for development. Some of the targets set for attaining this Goal focus on developing strategies to create decent and productive job opportunities for youth, spread the benefits of modern technology, address the special needs of the least developed countries and increase official aid for development. Despite falling into the "least developed countries" category, Yemen receives very little aid relative to other ESCWA member countries, especially Jordan, Iraq and Egypt, and not nearly enough to meet its dire needs for development. Hence, it is necessary to increase the amount of aid pledged to the least developed countries and to intensify projects and initiatives, especially regional ones, in order to help the development of these countries.

11. *Performance of the ESCWA region in achieving MDGs*

The UNDP human development index (HDI) is an international standard for measuring national development and is linked to the likelihood of achieving the MDGs. The ESCWA region scored slightly higher than the world average at 0.753. Specifically, its index score of 0.783 translates into a medium level of human development assessment. Latin America and the Caribbean region (at 0.821) fared slightly better than the ESCWA region on HDI, but the gap widens when the region is compared with the countries in the European Union (at 0.937), Israel (at 0.935), Cyprus (at 0.914) and Malaysia (at 0.829). Even GCC countries, whose subregional average of 0.868 topped the ESCWA region, had lower scores than those of the OECD countries and Portugal.

TABLE 85. HUMAN DEVELOPMENT INDEX (HDI) FOR SELECTED COUNTRIES AND REGIONS, 2009

Region	Human development index
ESCWA member countries (except Iraq)	0.783
Arab countries	0.719
GCC countries	0.868
European Union (EU-27)	0.937
Latin America and the Caribbean	0.821
OECD countries	0.932
World	0.753
Other countries	**Human development index**
Israel	0.935
Portugal	0.914
Cyprus	0.914
Malaysia	0.829
Turkey	0.806

Source: United Nations Development Programme (UNDP), *Human Development Report 2009*.

Certain initiatives aimed at using ICTs for achieving MDGs are easier to measure qualitatively than other similar initiatives. For example, Grameen Telecom's "Village Phone Programme" in rural Bangladesh has extended telephone services to more than 50,000 villages and yielded significant positive social and economic impacts.[293] In the case of the ESCWA region, projects carried out in collaboration with donors and international organizations are difficult to compare with other regional projects owing either to their unique context or to as yet indefinite impact.

[293] This project has been copied in a number of countries, including Uganda and Rwanda.

12. *Performance of the ESCWA region in building the ICT sector*

The ICT sector in the ESCWA region is a study in contrasts. Wide disparities exist in general levels of development, economic strategy and the adoption and use of ICTs. While some countries have taken a top-down approach, others have used market-based and laissez-faire strategies. In addition, external forces such as exposure to the global economic crisis, changing commodity prices and political turmoil affect member countries in unique ways.

In fact, the global economic crisis is expected to take its toll on the growth of the ICT sector in the ESCWA region. This sector already lacks its own autonomy given that it is still largely considered part of other economic and service sectors, such as transport or media. Additionally, the ICT sector in the ESCWA region remains a consumption-based rather than a production-based sector. It relies heavily on telecommunications, with very minimal contribution from software or professional service industries. Consequently, no real value-added exists that encapsulates a genuine competitive advantage.

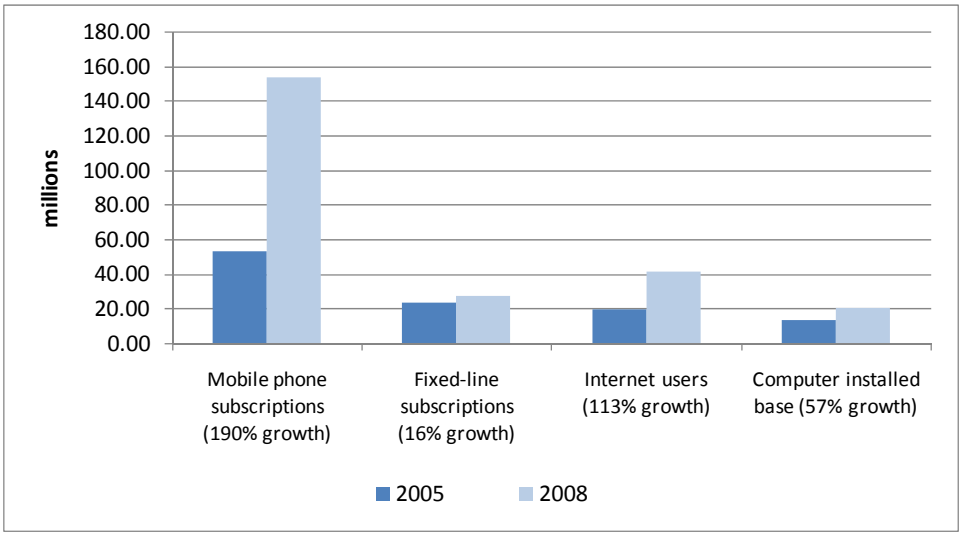
Countries in the ESCWA region still have many milestones to overcome in order to build a productive ICT sector and reach comparable levels with other developed nations. Despite the economic slowdown as a result of the economic crisis, the future of the ICT sector in the ESCWA region remains bright. In fact this sector enjoys high growth potentials, especially as oil-producing countries have sought to reduce their dependency on oil and invest massively in building an ICT industry.

C. FINDINGS AND RECOMMENDATIONS

The development of the information society in the ESCWA region encompasses many different facets and variables. Broad trends are very hopeful. Most countries are performing better now than four years ago. ICT adoption and use rates are higher, costs are lower and more attention is being focused on the ICT sector.

The ESCWA region has taken significant steps towards bridging the digital divide and building the information society. Figure 30 shows that the prominence of ICTs has grown across the region, with dramatic increases in telecommunications penetration rates and mounting adoption of broadband technologies. Consequently, the region has witnessed an increasing adoption and use of ICT applications and e-services, and a greater participation of the governments and all stakeholders in building the information society.

Figure 30. Growth of the ESCWA region in ICTs, 2005-2008



Source: Compiled by ESCWA.

In addition, significant investments are underway to increase integration with regional and global communication networks. These efforts will make it easier for ESCWA member countries to address such issues as access to information and knowledge, building capacity for regional integration and the availability of digital Arabic content.

While bright spots have been observed in realizing the information society in the region, the analysis presented in this report clearly indicates that GCC countries have made greater strides than other ESCWA member countries in building information societies. Nevertheless, all ESCWA member countries, including the most advanced ones, still need to exert considerable efforts before reaching the levels attained by developed countries in this regard.

Besides the traditional applications of ICT for socio-economic development, creative solutions are necessary to achieve MDGs. For many reasons, including armed conflicts and high population growth, the percentage of people living in poverty has increased in the ESCWA region over the past 15 years. While ICT has a key role to play in creating job opportunities and alleviating poverty, the difficulties of development in conflict prone areas preclude any role for ICT for development, and require different priorities and focus. While much remains to be done, realistic options exist for making concrete improvements throughout the ESCWA region.

Based on the analysis and findings of this report, several initiatives and projects can be launched to reduce the existing digital divide between rural and urban areas, among ESCWA member countries, and between the region and the more developed regions of the world. Within that context, ESCWA is fostering support for important regional projects through its Regional Plan of Action (RPoA). The RoPA has been adopted by 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.

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