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Regional Profile

of the Information Society in Western Asia

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REGIONAL PROFILE OF THE INFORMATION SOCIETY IN WESTERN ASIA

Preface

The last decade of the twentieth century witnessed the emergence of an "information society" in the industrialized countries, characterised by profound changes in the way people live, interact, conduct business, educate, entertain and provide healthcare. These changes are occurring at an accelerated pace, affecting national and global institutions, political systems, economic models and practices, as well as the fabric of society and its organization.

A "digital divide" emerged between developed and developing countries, pausing an eminent threat of marginalizing and isolating developing countries through the impoverishment of their economies and decline of productivity, coupled with an increase in unemployment and poverty. The spectrum of a worst case scenario led to the adoption, by the United Nations General Assembly in December 2001, of a resolution to hold a "World Summit on the Information Society" aimed at reducing the digital divide by increasing awareness of the benefits of the information society, and providing mechanisms to help developing countries move towards an information society that will hopefully flourish within a global knowledge-based economy.

The Summit is to be held in two phases. The first, in Geneva (10-12 December 2003), and the second in Tunis (16-18 November 2005). It led to preparatory activities at the regional and international levels, which should culminate in December 2003 in a Declaration of Principles and a Plan of Action, to be adopted by heads of states during the first phase of the Summit. Western Asia had its own preparatory conference in Beirut, during 4-6 February 2003, which was hosted by the Lebanese Government and organized by ESCWA. The "Beirut Declaration" was the main outcome of this conference and the region's contribution to WSIS preparatory process.

This Regional Profile is a sequel activity to the Western Asia Preparatory Conference for the WSIS. The need to profile ESCWA member countries (EMCs) in selected areas, was felt as a necessary prerequisite for establishing national and regional plans for building the information society. An initiative was launched by ESCWA shortly after the Conference to assess the current status of its member countries and the region as a whole in relation to the information society. Two main activities were launched, namely: preparing national profiles for the thirteen member countries together with a regional profile, and the construction of an online Web-enabled database of information society indicators for the region.

The regional profiling exercise is still at its early stages. ESCWA will strive to make it a periodic activity leading to an annual publication, in order to reflect the dynamic nature of the information society in Western Asia, and to extend it to the Arab region. This profile should provide decision makers and business executives in EMCs with needed data and analysis to help them plan their activities and improve their performance in building the information society. It will hopefully help national authorities in the EMCs to compare their current status to that of other countries, in and outside the region, and to collaborate for the benefit of regional integration in an increasingly globalised economy.

Mervat Tallawy
Under-Secretary-General
Executive Secretary

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Abbreviations and Acronyms

3G	Third Generation Networks
ACI	Amman Chamber of Industry
ADNOC	Abu Dhabi National Oil Company
ADSL	Asynchronous Digital Subscriber Line
AGFUND	Arab Gulf Programme for United Nations Development Organisations
ANERA	American Near East Refugee Aid
ASEAN	The Association of South-eastern Asian Nations
ASP	Application Service Providers
ATM	Automated Teller Machine
B2B	Business to Business
B2C	Business to Consumer
Batelco	Bahrain Telecommunications Company
BETZ	Beirut Emerging Technology Zone
BOT	Build-Operate-Transfer
BSA	Business Software Alliance
CAGR	Compounded Annual Growth Rate
ccTLD	country code Top Level Domain
CIA	Central Intelligence Bureau
CJI	Connecting Jordanians Initiative
CME	Continuing Medical education
CTV	Cable Television
DDN	Defence Data Networks
DIC	Dubai Internet City
DSL	Digital Subscriber Line
DSO	Dubai Silicon Oasis
ECOM	Electronic Commerce Promotion Council
EDCH	Emirates Data Clearing House
EMC	ESCWA Member Country
EMIX	Emirates Internet Exchange
EPP	Enhanced Productivity Programmes
ESCWA	Economic and Social Commission for Western Asia
FDDI	Fibre Distributed Data Interface
FDI	Foreign Direct Investment
FIC	Foreign Capital Investment Committee
FLAG	Fibre Link Around the Globe
FOG	Fibre Optic Gulf
FTP	File Transfer Protocol
GCC	Gulf Cooperation Council
GDI	Global Domestic Income
GDP	Gross Domestic Product
GIS	Geographic Information System
GISNet (Qatar)	Geographic Information Systems Network
globstats	Global statistics
glreach	Global research
GNI	Gross National Income
GPRS	General Packet Radio Services

GSM	Global System for Mobile Telecommunications
HCT	Higher Colleges of Technology
HFC	Hybrid Fibre Coaxial
HIAST	Higher Institute for Applied Science and Technology
HQ	Head Quarters
http	Hypertext Transfer Protocol
ICDL	International Computer Driving License
ICT	Information and Communication Technologies
ICTD	Information and Communication Technologies Division
ID	Identification
IDAL	Investment and Development Authority of Lebanon
IDS	International Dialling Service
IEEE	Institute of Electrical and Electronics Engineers
*info*Dev	The Information for Development Programme
INFORMS	The Lebanese Government Portal for Information and forms
Int@j	Information Technology Association
IntelSat	International Telecommunications Satellite
IP	Internet Protocol
IPO	Initial Public Offering
IPR	Intellectual Property Rights
ISDN	Integrated Service Digital Network
ISP	Internet Service Provider
IT	Information Technology
ITPC	Iraqi Telecommunications and Post Company
ITU	International Telecommunications Union
JIB	Jordan Investment Board
JICA	Japan International Co-operation Agency
JITCC	Jordanian Information Technology Community Centres
JOD	Jordanian Dinar
JONET	Jordan ATM Bank Network
JUST	Jordan University for Science and Technology
KACST	King Abdulaziz City for Science and Technology
Kb/s	Kilo bit per second
KFAS	Kuwait Foundation for the Advancement of Sciences
KISR	Kuwait Institute for Scientific Research
KITS	Kuwait Information Technology Society
KOC	Kuwait Oil Company
KOM	Knowledge Oasis Muscat
LAN	Local Area Network
LTSC	Learning Technology Standards Committee
MB	Mega Bytes
Mb/s	Million bit per second
MCIT	Ministry of Communications and Information Technology
MECIT	Middle East College of Information Technology
MENA	Middle East and North Africa
MIT	Massachusetts Institute of Technology
MMS	Multimedia Message Service
MoC	Ministry of Communications
MoICT	Ministry of Information and Communications Technologies

MPLS	Multi-Protocol Label Switching
MTC	Mobile Telecommunications Company
N/A	Not Available
NAP	Network Access Point
NBK	National Bank of Kuwait
NCIT	National Committee for Information Technology
NGO	Non-Governmental Organization
NIC	National Information Centre
NIIT	National Institute of Information Technology
OECD	Organization for Economic Co-operation and Development
OmanTel	Oman Telecommunications
OMSAR	Office of the Minister of State for Administrative Reform
OS	Operating System
Pal-Tel	Palestinian Telecommunications
PARADIGMA	Participative Approach to Disease Global Management
PC	Personal Computer
PCA	Professional Computer Association
PCT	Patent Cooperation Treaty
PDN	Public Data Network
PKI	Public Key Infrastructure
PLT	Patent Law Treaty
PPP	Private-Public Partnership
QAR	Qatari Rial
Q-Tel	Qatar telecom
R and D	Research and Development
RDI	Research, Development and Innovation
REACH	Regulatory Framework, Enabling Environment, Advancement Programmes, Capital, Human Resource Development
RFP	Request for Proposal
SAMA	Saudi Arabian Monetary Authority
SAR	Saudi Rial
SCS	Syrian Computer Society
SEA-ME-WE3	Optical Fibre Cable starting in South East Asia, going through the Middle East, and ending in Western Europe
SeBIL	Secure Electronic Banking and Information for Lebanon
SHERN	Syrian Higher Education and Research Network
SME	Small and Medium Enterprise
SMS	Short Messaging System
SQU	Sultan Qaboos University
SSL	Secured Socket Layer
STC	Saudi Telecommunications Company
STE	Syrian Telecommunications Establishment
SVU	Syrian Virtual University
SYP	Syrian Pound
Syrian A. R.	Syrian Arab Republic
Tele-Yemen	Telecommunications of Yemen
TLT	Trademark Law Treaty
TRA	Telecommunications Regulatory Authority
TRC	Telecommunications Regulatory Committee

TRIPS	The Agreement on Trade related Aspects of Intellectual Property Rights
TV	Television
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNCITRAL	United Nations Commission on International Trade
UNDP	United Nations Development Programme
UNDESA	United Nations Department of Economic and Social Affairs
UNESCO	United Nations Education, Scientific and Cultural Organization
UNISA	University of South Africa
UNRWA	United Nations Relief and Works Agency for Palestinian Refugees
UOG	UAE Offset Group
USA	United States of America
USD	United States Dollar
VAS	Value Added Services
VAT	Value Added Tax
VB	Visual Basic
VSAT	Very Small Aperture Terminal
WAP	Wireless Application Protocol
WCT	Wireless Communications Technology
Web	World Wide Web
WIPO	World Intellectual Property Organization
WITSA	World Information Technology and Services Alliance
WLL	Wireless Local Loop
WSIS	World Summit on the Information Society
WTO	World Trade Organization
YER	Yemeni Rial

Executive Summary

As a contribution to the preparatory activities for the World Summit on the Information Society (WSIS), this report presents the current profile of ESCWA member countries (EMCs) in this regard. The profile is mainly based on detailed information provided in 13 country profiles, including indicators, of the Information Society commissioned by ESCWA. It incorporates a relative ranking and comparative analysis of the EMCs among themselves, and with respect to other regions of the world.

The profile covers different areas related to the information society, starting with the components of the enabling environment such as policies, strategies, legal environment and infrastructure, all the way through assessment of the process of capacity building and strengthening of the Information and Communications Technology sector, and ending with a detailed review of the most important ICT applications across various sectors.

This regional profile gives an overview of the current status of ICT in the region. Regarded as an initial snapshot, it is crucial for the purposes of monitoring progress and benchmarking, especially when performed on periodical basis.

A brief summary of each of the areas tackled in the regional profile is given below.

ICT POLICIES AND STRATEGIES

Anticipating that proper ICT strategic planning will help improve overall economic conditions, create working opportunities and contribute to social advancement, EMCs are formulating ICT strategies to migrate towards an information society model.

Some ESCWA member countries devised national ICT strategies, whilst few have taken effective operational steps to significantly implement these strategies. Others, with no apparent ICT strategy but with solid public spending on infrastructure, PC dissemination and connectivity, have accomplished goals that other countries have planned through national strategies.

Excessive focus on promotional and awareness campaigns in several countries in the region, with very little planning and implementation, is attributed to budget weakness and to lack of operational mechanisms. Shortage of funds and political instability prevent them from reaching tangible results.

LEGAL AND REGULATORY ENVIRONMENT

The legal and regulatory framework is a crucial component of the enabling environment necessary for ICT uptake. Criteria of evaluation in this domain include assessment of both the status of national legal and regulatory IPR, and the degree of the country's involvement in

Multilateral ICT Agreements. They also involve analyzing the telecommunication regulatory framework, the degree of regulation of the Internet, the existence of security laws and regulations, and the extent of protection of the consumer and citizens privacy.

The assessment of these criteria indicates that the legal and regulatory environment in several EMCss is still out of phase with global developments in ICT and/or not properly adapted to the local needs of the ICT sector. It also indicates the poor existence of the enforcement of IPR laws, with high rates of software piracy that is jeopardising investor's as well as inventor's confidence. Furthermore, there is ongoing concern still for increasing the protection of consumer privacy and rights. Western Asia has to synchronize its legal and regulatory frameworks to cope with the global ICT movement, take serious steps in drafting relevant laws and regulations, and give more attention to issues related to enforcement and implementation.

ICT INFRASTRUCTURE

Besides the legal and regulatory framework, ICT infrastructure is another major foundation of the enabling environment essential for harnessing ICT across all sectors with the aim of achieving sustainable socio-economic development. ICT infrastructure encompasses several components that complement and feed into each other. Assessment of ICT infrastructure includes the analysis of voice services penetration, both fixed and wireless. It also involves analysis of the telephony market structure and major players, the existence of other advanced telephony or data services and the level of international connectivity. Furthermore, the study of ICT infrastructure also involves the assessment of the degree of Internet and PC dissemination, the identification of major data networks, Internet backbones and major players.

A significant contrast is revealed in the overall status of infrastructure in Western Asia representing several "digital divide" patterns. However, within the region, mobile and wireless uptake was found to be generally very significant. The cumulative average growth rates, for both fixed and mobile telephony are generally above the world average. There are clear indications of an uneven commitment of EMCs to liberalization and deregulation. However, some EMCs are increasingly considering the adoption of innovative public-private partnership models to allow faster dissemination of the Internet. It should be highlighted that the necessity for establishing a regional Internet backbone calls for the formulation of major initiatives in this regard.

ICT CAPACITY BUILDING

EMCs are making strides at raising ICT awareness, but are not always successful in achieving a critical mass of ICT specialists. Although EMCs are conscious of the concept that

education in technology starts at the primary and secondary school levels, they have not all extended the same level of effort, nor committed sufficient budget to achieve results.

Most EMCs conducted awareness campaigns with a view to deliver rapid general training in ICT. National ICT associations have been put in charge of this effort, in cooperation with national education ministries. Personal computer dissemination campaigns proved fruitful, on a limited scale, in those countries where purchasing power remains low; with budgets being set forth, and positive equipment-to-population ratios being achieved.

As for vocational training, models chosen by most EMCs rely on partnerships with large multinational vendors. The least developed field in the region is the area of research, development and innovation (RDI) where poor performance is evident across EMCs, leading in a direct manner to the weakness of ICT export capabilities.

ICT SECTOR

EMCs are taking effective measures to promote the creation of an ICT sector. Although EMCs are achieving different degrees of success in building their national ICT sectors, yet the majority of the region faces fundamental challenges in achieving successful uptake of ICT industries. Most ICT companies are small and micro enterprises, the majority of which are mere vendors of foreign technology. Limited investments directed towards ICT firms remain the most demanding challenge in this regard.

Despite the fact that in some EMCs, legislators, government officials, and technology associations are revisiting their tax and incentive schemes to foster investments in such firms, few successful companies have emerged. In general, the majority of EMCs have not reached a critical mass of such companies.

Collectively, EMCs have not yet displayed leadership in ICT innovation; they did not secure large-scale funding and investment schemes, and they still lack ICT-skilled human resources.

ICT APPLICATIONS IN GOVERNMENT

A significant number of ESCWA member countries have already engaged in projects aimed at integrating ICT in their public institutions. However, few countries were able to achieve substantive results and overall efforts in the region are still in a developing stage.

In fact, computerisation of public administration is not always used as an opportunity for re-engineering government processes. A common practice is still to develop applications isolated from each other, without capitalising on the advantages offered by integration applications. Often, enterprise-wide automation is started without workflow analysis for the purpose of simplifying and streamlining work routines and practices. Digitisation of information is still not fully implemented and missing from the priority list of most EMCs.

In addition, e-procurement is underdeveloped in EMCs, with all countries getting low rating in e-procurement with the exception of the UAE. Although, most EMCs have e-government plans, they still need to be supported by realistic objectives along with serious implementation plan. In order for the latter to be enforceable, EMCs need to revise their execution procedures and dedicate more financial and human resources to their e-government initiatives.

ICT APPLICATIONS IN EDUCATION

EMCs are still a long way from effectively using ICT to transform education. Although schools are being increasingly supplied with personal computers (PCs), no real transformation is occurring in conventional education methods to move towards learner-centered education. The "rethinking education" process to reap maximum benefits of ICT in education is still lacking.

Few EMCs, outside of the Gulf States, offer effective distance education services, which is an essential component of life-long learning. Connectivity to the Internet is starting in public schools in several EMCs, with private schools showing more activity in this area, and many building their own Web sites.

ICT APPLICATIONS IN BUSINESS AND COMMERCE

ESCWA member countries are still not fully prepared to gain competitive advantage from ICT-based applications and services in commerce and business. A main issue that characterizes the region is the huge disparity in e-business and e-commerce applications between companies in the oil-rich countries and those in other countries of the region.

Applications are not a goal in themselves. In fact, they do not generate business or trade, but can be considered as enablers of automating procedures, and enhancing practices. Businesses in EMCs are far behind in deploying ICT in their business operations and most implementations miss the opportunities offered by ICT for business process reengineering. In addition, the majority of e-banking initiatives are realized through partnerships with foreign countries or corporations.

However, there are some success cases, mainly in the United Arab Emirates and Saudi Arabia, where tremendous effort is being deployed to build a sound ICT enabling environment and to launch successful e-commerce initiatives in the new global e-marketplace. Indeed, these countries need to further pursue such initiatives and to gain more credibility from the international community by investing more in ICT capacity building and ICT projects, and by marketing their initiatives on the local, regional, and global levels.

ICT APPLICATIONS IN HEALTHCARE

In the ESCWA region, ICT is only used for basic applications in hospitals and ministries of health. The majority of EMCs have strategies and plans with a variety of approaches; one can identify a bottom-up approach which aims at networking available separate databases together to ultimately reach a national database, on the other hand, the top-down approach aims at developing a central national database as part of a strategic initiative. In EMCs in general, databases for national healthcare are not fully functional yet, and telemedicine has hardly been exploited. There are still segments of the population who are biased and lack confidence in using ICT especially when it comes to health issues.

DIGITAL ARABIC CONTENT

All EMCs have limited use and low production levels of digital Arabic content. Obstacles for local digital content development include: low use of ICT across EMCs, low inter-regional online business and cultural activities, high level of illiteracy, limited number of applications in Arabic, and lack of ICT tools for Arabic language processing.

COMPARATIVE ANALYSIS

A classification of EMCs into homogenous groups based on similarities and synergies. Finally, a quantification is attempted for country performance in building the information society, as well as regional maturity on the ten areas under consideration. A comparative analysis of EMC performance, both individually and in homogenous groups, to other countries and peer groups worldwide is conducted to help benchmark EMC performance on a global scale. Finally, a brief description of the ICT indicators database for Western Asia developed by the ICT Division in ESCWA is presented, with samples of output to illustrate its capabilities.

Introduction

The expression "information society" refers to a society in which the development, sharing, and management of information have become the most significant economic, social and cultural activities. Unlike the industrial or agrarian societies, the information society is primarily based on the use of information and communications technology (ICT), which constitutes the main tool and vehicle for processing and disseminating information, and to continuously generate, acquire and manage knowledge. The information society cuts across conventional boundaries by employing ICT as a critical catalyst for accelerating and sustaining the transformation of all aspects of society including social, commercial, economic, medical, political, educational, and cultural facets. It allows traditional organisational structures to become more flexible, more collaborative and more decentralised; thus, preparing the groundwork for transition to knowledge-based economies.

Given the above, it becomes clear that the information society is essential for developing the economic and social environment in the ESCWA member countries (EMCs). Otherwise, these countries may face the threat of being marginalized. Consequently, EMCs need to lay down the foundations for building a sound and robust information society to reap its benefits by leapfrogging into higher income generating knowledge-based industries, thus bypassing earlier development processes and saving in both investment and time.

This regional profile of the information society aims at paving the way for future initiatives in the region and at contributing to the preparatory activities for the WSIS. It depicts the status of a number of ICT areas in each country, enables the evaluation of the current status of the region and its sub-regions[1], and provides recommendations to establish an enabling platform in EMCs for information society development. In addition, this first attempt to profile Western Asia will eventually serve as a baseline for monitoring and gauging progress in the different areas related to the information society in the region.

The methodology used by ESCWA to develop this report started by elaborating country profiles for all EMCs, following a template developed to ensure maximal completeness and consistency while minimizing variations in the levels of detail. Thus, this regional profile presents a perspective of Western Asia based on the 13 country profiles[2], as well as additional sources of data that are explicitly referenced.

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(1) Since the EMCs are not homogenous with respect to their level of advancement towards the information society, sub-regions are formed by clustering similarly ranked countries within Western Asia, thus allowing for comparison of sub-regions with other regions of the world.

(2) It should be noted that in this report, all country data, unless otherwise specified, originates from EMC country profiles listed in the "Sources and References".

The concept of maturity levels is used in each of the major areas constituting the basis of the information society. This technique is useful for grouping countries into homogenous clusters, thus revealing the main characteristics of the regional profile. Due to the nature of some information provided in the country profiles, the ranking process may seem subjective since it is based on a mixture of qualitative and quantitative data. Details on information related to selected key indicators, on which the ranking process is based, are presented in an annexes in tabular form.

The regional profile is structured in 11 chapters. The first ten chapters cover each of the main areas related to the information society. Each chapter starts by introducing the area under consideration, describing its importance, and presenting key indicators used in measuring the maturity level of that area. A comparative analysis of EMCs follows, resulting in a ranking and classification of EMCs by maturity level. Concluding remarks and recommendations are also offered for countries according to their maturity level or for the region as a whole.

Chapter 11 has three parts. The first part presents a comparative analysis of the performance of EMCs, both individually and in homogenous groups, to other countries and peer groups worldwide with the aim of benchmarking the region's performance on a global scale. The second part presents a brief description of the ICT indicators database for Western Asia developed by the ICT Division in ESCWA, with samples of output to illustrate the capabilities of the database. The third and final part of this chapter attempts to give overall ranking of EMCs.

Finally, a brief recap of the ten main areas under review, and their significance in the development of the information society is in order. ICT policies and strategies are defining clear objectives and a roadmap to reach them; they are essential for developing countries to accelerate the building of the information society and the move towards a knowledge-based economy. The ICT legal and regulatory framework, including intellectual property rights (IPR) as well as the adoption and enforcement of international treaties, provides an enabling environment necessary for building the information society. A developed ICT infrastructure is the foundation for disseminating ICT to all segments of society. ICT capacity building covers all aspects related to the development of human capabilities in ICT, mainly through the education sector and through research and development. Building the ICT sector remains a fundamental task for a sustainable information society. It encourages investment in ICT and the establishment of ICT firms. ICT applications in government, also referred to as e-government, improve services to citizens, enhance interaction with business and industry, empower citizens through access to information, and increase efficiency of government administration and management. A wide variety of learning solutions to citizens and corporate organisations are provided by ICT applications in education. Typical solutions include distance learning, and computer based education, both of which enable life long learning. ICT applications in business and commerce, commonly referred to as e-business and e-commerce,

yield a variety of advantages. They help increase revenue by reaching existing and new markets at decreasing cost, and reduce inventory as well as the expenses associated with order management and logistics. They also contribute to the development of micro-enterprises, in addition to small and medium enterprises, which are important contributors to national economies. As for healthcare, ICT applications play an increasingly important role by empowering doctors, patients, and medical staff with timely access to vital healthcare information. They also empower citizens by providing vital data required to improve their standards of living. Finally, digital Arabic content development requires the emergence of a promising industry that should help promote the Arabic language and culture in the digital age.

I. INFORMATION AND COMMUNICATION TECHNOLOGY POLICIES AND STRATEGIES

INTRODUCTION

The exploitation of the potential of ICT for improving productivity and quality of life is a serious issue for many ESCWA member countries (EMCs). To minimize the risk of being left behind in the global development process, EMCs are required to commit seriously to the formulation of policies and strategies to transform the existing society into an information society. Governments are the primary actors, in concert with the private sector and civil society, in pursuit of ICT policies and strategies to help gear countries towards the establishment of an information society.

It is obvious that ICT cannot offer instant cure for the challenges and concerns of any society. Therefore, excessive expectations should be avoided. However, ICT can be a tremendous enabler for the development process of society and can accelerate achievements in productivity, innovation, the quality of services and products, access to knowledge and information, and in the promotion of transparency and reduction of bureaucracy. Thereby helping citizens, organisations, and economic players adapt to the challenges posed by globalisation. Finding ways of making the information society more directly serve the needs of the EMC in domains such as poverty alleviation, employment, education, literacy, health services, and empowerment, requires the formulation and implementation of targeted ICT strategies and policies.

Key criteria for measuring ICT policies and strategies are:

- **National information society policies and strategies**: Including vision, strategies, coordinated plans, and programmes managing the transition of all or selected parts of the society, economy, or civil society towards the information society;
- **Sectoral plans for building the information society**: Including implementation plans, operational sector strategies, development programmes and projects, and other related measures emanating from the public and private sectors.

A. COMPARATIVE ANALYSIS OF EMCS ICT POLICIES AND STRATEGIES

1. National information society policies and strategies

EMCs can be categorised into four main model groups according to the level of development of their national and sectoral ICT policies and strategies: (1) “building the ICT model”, is the most fundamental level where countries are still trying to catch-up with global trends by creating the education base and raising awareness of ICT benefits; (2) “the ICT user model”, where the public, private, and civil society are using mainly imported ICT to improve productivity, service, and communication, but where little advancement is being achieved in

the building of local ICT production or export base as a source of income generation; (3) the "industrialising ICT model" where mostly Gulf states with powerful funding capabilities are using ICT for widespread and sometimes sophisticated productivity, service, and communication purposes. These countries are simultaneously trying to establish themselves as niche players in the global pool of ICT players through some local and export oriented ICT development and production activities for selected niche markets, mostly in Arab speaking countries; (4) countries with no explicit ICT policies and strategies. This group is typically engaged in reorganizing its government models by leveraging ICT techniques to render them more efficient.

2. Sectoral plans for building the information society

ESCWA member countries display significant interest in technology building initiatives. However, it is currently not viable or realistic for all countries, at their present levels of development, to aim for being centres for ICT development, such as for instance India, Ireland, and Israel. Most EMCs are more realistically striving towards the above mentioned "model (2)" and "model (3)", trying to transform themselves into information societies, thereby benefiting from the potential of ICT for enabling and spurring wider socio-economic development. The most ambitious plans have so far materialized in launching of technopoles and/or technology incubators. The benefits of these initiatives include: providing an environment for research and development in collaboration with private initiatives; developing technology diffusion, benefiting the social and economic fabric by creating new employment possibilities; building the environment for business development; and enhancing technology transfer between the public and private sectors. Technology-dedicated research facilities are operational components of some ESCWA member countries' national strategies. Countries such as Kuwait, Saudi Arabia, and the UAE stand out in terms of research facilities. Saudi Arabia's King Abdulaziz City for Science and Technology evolved from its petroleum focus to include atomic energy, astronomy and geophysics, computer and electronics, and aerospace. Other countries, such as Jordan, with its Regulatory Framework, Enabling Environment, Advancement Programmes, Capital, Human Resource Development (REACH) programme, have adopted a narrower focus. Although overall technology incubators plans are ready, few are operational facilities contributing to national industrialisation and significantly generating export revenue. As venture funding is still marginal in the area, most technology incubators and entrepreneurs have yet to flourish.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURITY LEVEL

The ranking provided reflects the clarity of ICT policies and strategies, and the operational effectiveness displayed with these policies and strategies, as reflected in sectoral plans in the ESCWA member countries. As the data provided is not quantitative, ranking is

based on the presence or absence of ICT policies and strategies, how realistic are they, and the effectiveness of sectoral plans. Four maturity levels are used:

- **Maturity level 1**: ICT policies and strategies indicate: (1) absence of clearly articulated vision and national strategy; and (2) limited implementation plans and initiatives.
- **Maturity level 2**: ICT policies and strategies indicate: (1) articulated vision and existence of a national strategy; and (2) somewhat operational implementation plans and initiatives.
- **Maturity level 3:** ICT policies and strategies indicate: (1) clear vision and developed national strategy; with (2) operational and somewhat efficient implementation plans and initiatives.
- **Maturity level 4**: ICT policies and strategies indicate: (1) clear vision and developed national strategy; with (2) operational and efficient implementation plans and initiatives.

Table 1 summarizes the maturity levels and ranking of countries covered. This is followed by a discussion of the main features of the maturity groups.

TABLE 1. RANKING OF EMCS ACCORDING TO THEIR MATURITY IN ICT POLICIES AND STRATEGIES

Country	Level 1	Level 2	Level 3	Level 4
Bahrain		✓		
Egypt		✓		
Iraq	✓			
Jordan			✓	
Kuwait		✓		
Lebanon	✓			
Oman		✓		
Palestinian Authority	✓			
Qatar		✓		
Kingdom of Saudi Arabia	✓			
Syrian Arab Republic	✓			
United Arab Emirates			✓	
Yemen	✓			

1. Maturity level 1: Iraq, Lebanon, Palestinian Authority Territories, Saudi Arabia, Syrian Arab Republic, and Yemen

Countries at this stage have either not devised national ICT policies or strategies, or have done so at a theoretical level, with unclear implementation programmes. A common trait for these countries is the breadth of areas targeted, and the appreciation of how ICT can be leveraged to accomplish a variety of objectives. The operational implications of stated objectives are of large magnitude. However, they need to become more specific and aligned with dedicated resources to operationally succeed. Although some of the EMCs in this level have ICT-driven initiatives underway, these are not presented as part of an overall strategy, but rather as independent projects with ICT at their core. All these countries share the following characteristics:

- They do not have an articulated ICT policy or strategy;
- They have not set-up dedicated budgets for a national ICT programme;
- They did not engage with the private sector to devise a plan.

2. Maturity level 2: Bahrain, Kuwait, Egypt, Oman and Qatar

Not all countries at this maturity level have devised clear ICT policies and strategies. However, they all have, to varying extent, clearly articulated ICT-enabled programmes. Most have devised clear plans, and milestones to measure success. They have also created legal and investment frameworks making them attractive targets for ICT investment and export platforms. However, they are not yet successful in achieving a critical mass in terms of results. These countries share the following characteristics:

- They have clear ICT operational plans, as well as clear milestone plans;
- They have dedicated national information technology (IT) associations or groups to accomplish the objectives;
- They have budgeted for their ICT programmes.

3. Maturity level 3: Jordan and the UAE

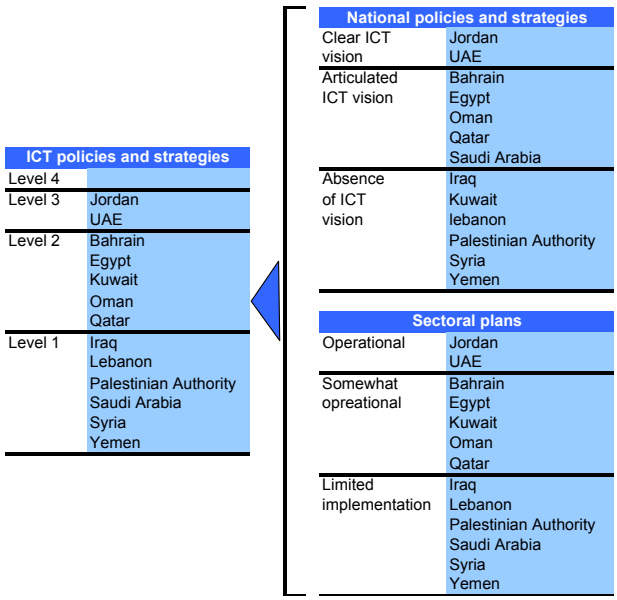
Jordan and the UAE, the only countries at this maturity level, have clear strategic goals, leveraging strong local funding capabilities. Jordan goes so far as to qualify expected benefits of the national ICT strategy. ICT dissemination, and hence literacy, is improving, and in the case of the UAE is quite high, on par or exceeding that of some developed economies. Building on these capabilities, the UAE is prioritising ICT objectives and gearing towards industrialisation, whilst using ICT tools to improve business efficiency. The main characteristics are:

- Clear vision for ICT policies and strategies;
- Operational ICT projects, recognised on a regional level;

- Effective results in creating employment, generating revenues, and attracting foreign direct investment (FDI), which occurs at a large scale in the case of the UAE.

Figure 1 provides a summary of EMCs ranking regarding ICT policies and strategies.

Figure 1. EMC ranking for ICT policies and strategies



C. CONCLUSIONS

Only two countries, Jordan and the UAE, devised clear ICT policies and strategies. Six EMCs do not have any ICT strategic plan, whereas the remainder have, to varying degrees, planned ICT in their national economy. The absence of serious commitment to such plans is apparent in the lack of operational steps taken, where few countries have established credible sectoral plan and centres of excellence. Most EMCs pay "lip service" only to ICT strategic planning, and focus on the most apparent elements such as awareness campaigns. Table 2 displays commitment levels of political leadership in ICT strategic planning and implementation.

TABLE 2. ASPECTS OF POLITICAL LEADERSHIP TO PROMOTE USE OF ICT

Country	Clear ICT strategy	Clear ICT Operational plan	Operational ICT research facilities	Planned ICT research facilities	Existing telephone initiative	Planned telephone initiative	Existing technology incubator initiative	Planned technology incubator initiative
Bahrain	✓	✓	✓	X	X	✓	✓	✓
Egypt	✓	✓	✓	✓	✓	✓	✓	✓
Iraq	X	X	X	X	X	X	X	X
Jordan	✓	✓	✓	✓	✓	✓	✓	✓
Kuwait	X	X	X	✓	X	✓	X	✓
Lebanon	X	X	✓	✓	X	✓	X	✓
Oman	✓	✓	X	✓	X	X	X	✓
Palestinian Authority	X	X	X	X	X	X	X	✓
Qatar	✓	✓	X	X	X	✓	X	✓
Saudi Arabia	✓	X	✓	✓	✓	✓	X	✓
Syrian A.R.	X	X	X	✓	X	X	X	X
UAE	✓	✓	✓	✓	✓	✓	✓	✓
Yemen	X	X	X	X	X	✓	X	✓

Source: ESCWA research

X= NO;

✓ = YES

On the issue of clarity of ICT strategy, operational components, and sector building initiatives (technopoles and technology incubators), it appears that EMCs do not transform plans into operational realities. Two key causes are depicted: (1) shortage of funding, where reliance on the donor community is not compliant with the countries' national ICT agendas, or is insufficient, and (2) lack of operational mechanisms to implement decisions. Private-public partnerships (PPPs), an axis of operational ICT delivery, are inadequately conceived and have been scarcely used, except in awareness and promotion campaigns. In-depth programmes such as technopoles or incubators remain mostly "empty shells", due to weak funding and weak local research and development.

D. RECOMMENDATIONS

Recommendations for improving the status of ICT policies and strategies across the 13 ESCWA member countries include:

1. **For countries at maturity level 1**: This level includes countries with no or unclear ICT strategic plans and policies. These countries should extend the effort to assess the most relevant priorities in their national economic development, and analyse whether ICT has a role

to play in their future economic development, and if so, how will ICT contribute to national growth in the future. This requires assessment of capabilities, and clearly targeted objectives that are within reach, in light of other priorities the country has.

2. **For countries at maturity level 2**: Countries where ICT has been deemed important for national growth, and where plans have been set forth, should focus on the operational means to achieve critical mass in investments and ICT uptake. These countries could move more rapidly in adapting the legal and investment environment, to create confidence in these measures as sustainable and long-term commitments. Areas of improvement could include focusing on creating a stronger human resources base, by developing ICT education in line with their needs and capabilities.

3. **For countries at maturity level 3**: In the case of the most developed EMCs, Jordan and the UAE, dissemination of national centres of excellence and increase in mass will be key to ensure the wide spread benefit from the ICT sector through "spill over" effects to other industries and services. In the case of the UAE, it is important to ensure that the entire country benefits from ICT growth, and not only the Emirates of Dubai and Abu Dhabi. This requires building a common vision for the country, and creating centres of excellence in other Emirates. As for Jordan, more ICT firms and businesses need to be launched ensuring proper transformation of the ICT strategy into reality.

4. **For the 13 ESCWA member countries**: Regional or sub-regional dimensions are almost absent, despite the multitude of common characteristics and needs in the entire region. Cooperative strategies always yield more benefit for all players.

II. LEGAL AND REGULATORY ENVIRONMENT FOR ICT

INTRODUCTION

The legal and regulatory environment is a crucial component of the enabling environment necessary for the ICT uptake. This does not only concern Intellectual Property Rights (IPR) protection and enforcement of international treaties. It also encompasses the way in which the industry is internally regulated, the extent of citizen participation in the ICT industry, and how well they are protected as both consumers and agents. These frameworks, whether national or multilateral, should ultimately aim at protecting the rights of consumers and investors. Therefore, countries are not only evaluated according to their capability in devising such frameworks but also according to the extent of their enforcement. The implications of poor enforcement can result in the reluctance to invest on the one hand and the lack of incentive to invent on the other. Criteria of evaluation in this domain are:

- **National legal and regulatory IPR status**: Existing/planned laws, implementation, and enforcement;
- **Telecommunications regulatory framework**: Indicating ownership structure, status of privatisation, public-private partnership, as well as existence of regulatory bodies;
- **Regulating the Internet**: Covering how Internet service providers (ISPs) and Internet agents are created, operated, restricted and controlled;
- **Consumer privacy and security laws and regulations**: covering the privacy of individuals accessing, sharing and transacting content (e.g. e-signature law) and including the expression of personal choices, beliefs, lifestyles, values and political preferences;
- **Multilateral Agreements**: Including membership and commitments vis-à-vis the World Intellectual Property Organization (WIPO), and the World Trade Organisation (WTO).

A. COMPARATIVE ANALYSIS OF EMCS' LEGAL AND REGULATORY ENVIRONMENT

1. National legal and regulatory IPR status

Some ESCWA member countries abide by global multilateral legal arrangements pertaining to IPR, including those stipulated in WIPO and WTO treaties (see box 1 for background information). There are two types of ESCWA member countries, in terms of IPR law enactment and participation in the global IPR movements (table 3), regardless of efficiency in IPR protection enforcement:

- **WTO members with ongoing TRIPS commitments**: WTO signatories have legal obligations to comply with TRIPS by 2005 at the latest. Some laws are already taking effect, in parallel with improved enforcement policies;
- **Countries preparing for WTO membership**: Saudi Arabia and Lebanon are applicants to the WTO. These countries are in the process of issuing laws that reflect TRIPS requirements. In the case of Lebanon, several new laws are being drafted. Syrian Arab Republic shows no recent actions towards implementing WTO IPR requirements.

Most ESCWA member countries have enacted, or are in the process of enacting, laws for IPR protection. Not all countries have ICT-specific laws, covering the needs of the software industry. Software piracy remains high in the region, with few examples of effective enforcement. Noteworthy initiatives include those of Egypt, which partnered with global vendors to fight off software piracy, and Jordan, where the University of Jordan collaborated with WIPO to introduce the country's first Masters programme in IPR. Others include the UAE where the enforcement of the IPR law has substantially reduced piracy rates. As for Iraq, most treaties signed have been frozen under the combined effect of UN sanctions and wars, leaving room for renewed Iraqi participation in world standard IPR treaties.

2. Telecommunications regulations

The majority of ESCWA member countries plan for telecommunications deregulation: be it due to pressures linked to imminent WTO membership or pursuits of privatisation benefits. Deregulation materialised in the GSM and ISP domains. With regard to GSM, most non-Gulf countries present clear commitment to deregulation, with foreign entrants leading competitive offerings. Two groups emerge:

- **Countries with non-liberalized telecommunications sector**: mostly Gulf countries; they have been discussing deregulation and privatisation possibilities over the last few years, but have not yet implemented GSM or fixed line telephony deregulation. Land lines, fibre optic connectivity and most broadband offerings remain government monopolies, with little deregulation and privatisation;
- **Countries with liberalized telecommunications sector**: mostly non-Gulf countries, where deregulation now covers GSM, data communications, Internet backbone, and ISPs. Solid examples are to be found in Egypt and Jordan, where regulatory authorities have been reorganised, with large degrees of autonomy.

Box 1 - Intellectual Property Rights (IPR) governing treaties

Several treaties govern intellectual property rights, with arrangements signed on a global basis, under the aegis of the World Intellectual Property Organization (WIPO). In summary, they include:

- *The Paris Convention for the Protection of Industrial Property (1880)*: the founding principle of the WIPO system, with main provisions covering the "*substantive rule"* on national treatment in each of the member countries;
- *The Hague Agreements (1934 and 1960)*: discussed over several years, these arrangements concern "*International Deposits of Industrial Designs*";
- *The WIPO Copyright Treaty (1967)*: this treaty standardizes global appreciation of copyright laws, with an area of governance extending to all countries, be they WIPO members or not;
- *The Patent Cooperation Treaty (PCT) (1978)*: provides for the administrative and process norms of international cooperation in the field of patents;
- *The Madrid Agreement (1981)*: regulates the system of international registration of marks, adding an additional layer of formalism and procedures to IPR registration, fee collection, and protection status;
- *The Trademark Law Treaty (TLT) (1994)*: building on the previous ones, this treaty aims at simplifying and harmonizing administrative procedures in respect of national applications and protection of marks;
- *The Patent Law Treaty (PLT) (2000 and not yet enforced)*: additional treaty facilitating the international registration of Industrial Property;

WIPO and World Trade Organization (WTO) stipulations are converging, and tariffs considerations are now part of IPR legislations: in 1995, the Agreement on Trade Related Aspects of IPRs (TRIPS), extended IPR protection mechanisms heretofore reserved to WIPO member countries to all WTO member countries, thus placing the onus on national governments to enforce the arrangements, TRIPS deadlines are:

Concerns	Deadline
Developing nations accessing "market economy" status	January 2000
Developing countries extending IPR protection to items previously not covered on national basis	January 2005
Least developed countries	January 2006

WTO membership is accelerating:
- Kuwait and Bahrain joined in January 1995;
- Egypt joined in June 1995;
- Qatar joined in January 1996;
- The UAE joined in April 1996;
- Jordan joined in April 2000;
- Oman joined in September 2000.

TABLE 3. ESCWA MEMBER COUNTRIES MEMBERSHIP ON SELECTED IPR TREATIES

	WTO Member	Paris Convention	WCT	PCT	Madrid Agreement	Hague Agreement	PLT	TRIPS
Bahrain	✓	✓ (1997)	×	×	×	×	×	✓ (1995)
Egypt	✓	✓ (1951)	×	×	✓ (1952)	✓ (1975)	×	✓ (1995)
Iraq	×	✓ (1976)	×	×	×	×	×	×
Jordan	✓	✓ (1972)	✓ (1972)	×	×	×	×	✓ (2000)
Kuwait	✓	×	✓ (1998)	×	×	×	×	✓ (1995)
Lebanon	×	✓ (1924)	✓ (1986)	×	✓ (1924)	×	✓ (2000)	×
Oman	✓	✓ (1999)	×	✓ (2001)	×	×	×	✓ (2000)
Palestinian Authority	×	×	×	×	×	×	×	×
Qatar	✓	✓ (2000)	✓ (1976)	×	×	×	×	×
Saudi Arabia	×	×	✓ (1982)	×	×	×	×	×
Syrian A. R.	×	✓ (1924)	×	×	✓ (1924)	×	×	×
UAE	✓	✓ (1996)	✓ (1974)	✓ (1999)	×	×	✓ (1999)	✓ (1996)
Yemen	×	✓ (1979)	×	×	×	×	×	×

Source: The Global Information Technology Report 2002-2003, World Economic Forum, INSEAD and *info*Dev.

3. Internet regulations

The Internet, a true mass medium, inherently open and decentralised, allows for the free dissemination of ideas and information. In some countries, governments or spiritual authorities, regulate and limit access and diffusion. For e-commerce regulations, most countries do not offer consumer protection frameworks.

4. Consumer privacy and security laws and regulations

Paving the way for WTO membership and integration in the global e-commerce and e-transactions arena, few ESCWA member countries prepared themselves with adequate privacy and security laws. These are lengthy processes as they entail governmental direction, effective

partnering between the telecommunications regulatory body, and a wide spectrum of stakeholders including central banks, financiers, network operators, and the private sector. Difficulties lie not only in the drafting of laws, but also in their implementation, especially in terms of certification, electronic signatures, and Public Key Infrastructure (PKI). At the national and regional levels, it will become exceedingly important to establish the infrastructure and institutions for certifying and processing transactions. At this stage, very few countries display such advances, as technology requirements and timeframe implications require careful planning. Egypt, Jordan, and, to a more advanced stage, the UAE have taken operational steps to ensure the development of proper frameworks.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR LEVEL OF MATURITY

The ranking of ESCWA member countries on legal and regulatory environment reflects the overall success and commitment to creating and implementing adequate legal and regulatory framework for ICT. The maturity levels assigned are a function of the existence of ICT-specific framework, and their effective implementation. Four maturity levels are used:

- **Maturity level 1:** Outdated legal and regulatory frameworks inadequate to ICT industrial and consumer needs, and poor enforcement of existing laws.
- **Maturity level 2:** Legal and regulatory frameworks increasingly being updated and adapted; yet insufficient to ICT industrial and consumer needs, with poor performance on enforcement.
- **Maturity level 3**: Legal and regulatory frameworks adapted to ICT industrial and consumer needs, with progress in enforcement.
- **Maturity level 4:** Legal and regulatory frameworks fully adapted to ICT industrial and consumer needs, with full enforcement.

1. Maturity level 1: Iraq, Palestinian Authority Territories, Saudi Arabia, Syrian Arab Republic and Yemen

These countries are either not parties to WIPO treaties, or non-members of the WTO. In both cases either of the two cases, their legal and regulatory framework is either not adapted to ICT industry needs, or being planned to adapt to those needs. The laws concerning IPRs are outdated and do not respond to the ICT industry needs.

2. Maturity level 2: Bahrain, Egypt, Lebanon, Kuwait, Qatar and Oman

These countries, with the exception of Lebanon, are part of the WTO, and committed to ensuing TRIPS commitments. They are all in the process or reviewing laws to adapt to ICT-specific IPR issues. Their characteristics are:

- The legal environment is being updated, with new laws being drafted and reviewed;
- They show evidence or commitment to law enforcement.

TABLE 4. THE MATURITY LEVELS AND RANKING OF THE EMCS COVERED

Country	Level 1	Level 2	Level 3	Level 4
Bahrain		✓		
Egypt		✓		
Iraq	✓			
Jordan			✓	
Kuwait		✓		
Lebanon		✓		
Oman		✓		
Palestinian Authority	✓			
Qatar		✓		
Kingdom of Saudi Arabia	✓			
Syrian Arab Republic	✓			
United Arab Emirates			✓	
Yemen	✓			

3. Maturity level 3: Jordan and the UAE

Although they have different deregulation status, these two countries are formulating laws adapted to ICT and e-commerce, effectively implementing their previous agreements, and cracking down on software piracy. They are both members of the WTO and TRIPS.

Figure 2 provides a summary of EMCs ranking regarding ICT legal and regulatory environment.

C. CONCLUSIONS

Several indicators including Intellectual Property Rights (IPR) protection, the telecommunications regulatory framework, Internet regulations, consumer privacy and security laws, and participation in multilateral agreements, show that the region displays fragmentation in readiness, and provides little, if any, protection to consumers and corporations. This is particularly reflected in the protection of ICT IPRs (figure 3), where only five EMCs devised ICT-specific protection laws. Whilst EMCs protect IPRs in general, most of their laws are outdated, and require redrafting in the light of current industrial and consumer developments. Consequently, EMCs do not offer the confidence levels necessary for technologists and financiers, regional or global, to invest and engage in ICT dissemination and industrialisation. The exceptions are Jordan and the UAE.

Figure 2. EMC ranking for ICT legal and regulatory environment

Legal and regulatory environment	
Level 4	
Level 3	Jordan UAE
Level 2	Bahrain Egypt Kuwait Lebanon Oman Qatar
Level 1	Iraq Palestinian Authority Saudi Arabia Syria Yemen

National legal and reg . IPR status	
ICT-specific IPR laws in place	Egypt Jordan Oman UAE Yemen
General IPR laws in place	Bahrain Iraq Kuwait Lebanon Qatar Saudi Arabia Syria
NO IPR protection	Palestinian Authority

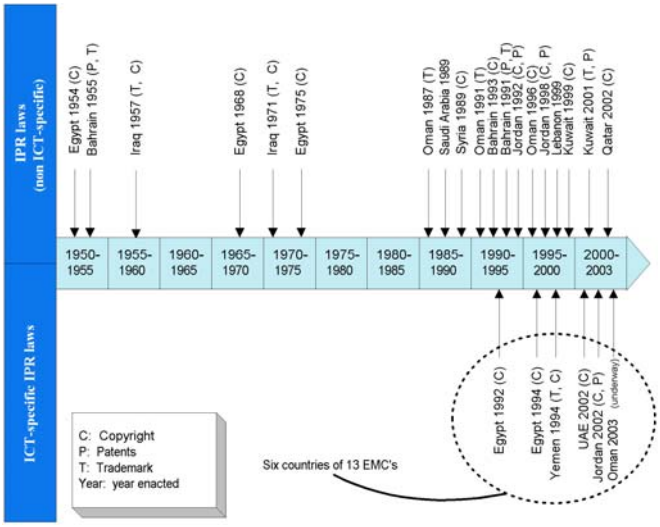
Internet regulation	
Deregulated	Egypt Jordan Lebanon Oman Qatar
Regulated	Bahrain Iraq Kuwait Palestinian Authority Saudi Arabia Syria UAE Yemen

Telecom regulatory framework	
Deregulated	Egypt Jordan Kuwait Lebanon Syria
Regulated	Bahrain Iraq Oman Palestinian Authority Qatar Saudi Arabia UAE Yemen

Consumer privacy and security laws and regulations	
Individual privacy and transactions protected	Jordan Egypt UAE
Limited Individual privacy and transactions protection	Bahrain Iraq Kuwait Lebanon Oman Palestinian Authority Qatar Saudi Arabia Syria Yemen

Membership in multilateral IPR arrangements	
Up to date	Bahrain Jordan Egypt UAE Oman Qatar
Limited	Kuwait Lebanon Syria Yemen
Outdated or inexistent	Iraq Palestinian Authority Saudi Arabia

Figure 3. Chronology of drafting general and ICT-specific IPR laws in the region



Sources: EMC country profiles and World Intellectual Property (WIPO) handbook.

Consumers are still not given proper importance in some ESCWA member countries. As the legal and regulatory environment does not yet extend to e-commerce, and with some laws restricting online content, consumer rights are not yet sufficiently valued and protected. It follows, for example, that the concept of business-to-consumer e-commerce remains marginal, and that the Internet is not a safe haven for personal expression.

D. RECOMMENDATIONS

Most of the EMCs are new entrants into, or in the process of joining, the World Trade Organisation (WTO). Since WIPO and WTO joined requirements in IPRs, EMCs should focus on updating their external and internal ICT protection levels to global standards, by joining multilateral arrangements, and adapting national IPR laws. EMCs are required to enforce such arrangements, and act to settle rampant copyright and patent infringements, by showing the lead within large national corporations and administrations. Large ICT corporations and local small and medium ICT enterprises need to rely on adequate enforcement of the legal and regulatory system. By taking the lead, governments can credibly build an environment appropriate for promoting technology transfer to the country. Furthermore, EMCs should recognise the importance of consumer protection for ensuring uptake of ICT applications and services such as e-commerce and transactions.

The following are specific recommendations for improving the status of legal and regulatory frameworks addressing the different levels of maturity of the 13 ESCWA member countries:

1. **For countries at maturity level 1**: To become credible partners with the global ICT movements, initiatives aiming at fighting piracy should be conducted. These countries should focus first on implementing appropriate national IPR framework, and on updating and rethinking their future legal and regulatory systems while combating software piracy. Also, they need to assess priorities in building the legal and regulatory framework, and compare with some global best practices to effectively create the necessary environment.

2. **For countries at maturity level 2**: It is important to ensure that proper decisions are taken while drafting the ICT laws to incorporate all aspects of consumers' and corporations' needs. These countries could benefit from best practices in Western Europe and North America to better define these laws, in a comprehensive manner. Any proposed regulations should be examined carefully, to ensure that adequate legislation is passed, without the need for extensive future review.

3. **For countries at maturity level 3:** It is essential to provide effective operational models for the region, in promoting e-commerce and e-transactions, while further focusing on implementing laws and regulations pertaining to ICT applications.

III. ICT INFRASTRUCTURE

INTRODUCTION

ICT infrastructure is a major foundation of the enabling environment. Such environment is essential for harnessing ICT across all sectors with the aim to achieve sustainable socio-economic development.

The benefits of setting-up efficient ICT infrastructure are numerous. They include: reducing divide patterns within countries and within regions, fostering employment opportunities, and enhancing competitiveness across different economic sectors.

ICT infrastructure encompasses several components. Besides fixed-line and mobile telephony, ICT infrastructure extends to include data and satellite communications, Internet services and other devices used for processing data and/or voice such as personal computers (PCs). Several aspects are studied while performing an assessment of the status of infrastructure. These aspects include: level of dissemination of ICT services, features of the public network, market structure, and the nature of players providing the major ICT services. The various components of ICT infrastructure complement and feed into one another, creating an overall system through which the entire society migrates towards the information society.

Criteria for assessing ICT infrastructure are:

- **Voice service penetration and market**: Fixed and mobile voice telephony, in urban and rural areas;
- **Telephony market structure and major players**: Number of fixed and mobile voice services operators and tariff structure;
- **Network highlights and other telephony services**: Breadth and level of technological advancement of offerings; and major features of the national network;
- **International links**: Satellite, sub-marine cable, regional and international fibre optic connections;
- **Internet and PC dissemination**: Internet and PC equipment penetration rates, for the individual and corporate segments;
- **Internet backbone and major supporting networks**: Quality and capillarity of the national Internet backbone, including policies towards rural areas;
- **Internet players**: Number of Internet service providers (ISPs), application service providers (ASPs) and other major players.

A. Overview of country capabilities for ICT infrastructure

1. Voice service penetration and market

There is significant contrast in the overall status of infrastructure within the region. On the one side, Gulf countries, with monopolistic telecom environments, are accomplishing some of the highest teledensity rates globally, while other countries are still lagging behind world averages on both the fixed-line and mobile fronts, deregulating the latter to substitute for fixed infrastructure weaknesses.

All fixed-line markets of the region are monopolistic. Incumbent operators are majority state-owned, and landline markets will remain protected at least until 2004, when countries are expected to start enforcing liberalization of their markets in line with their commitments towards WTO. All incumbent operators in the area are sole operators of international gateways.

Incumbent operators delivered on national teledensity upgrade programmes. Countries with the particularly low teledensity, namely Syrian Arab Republic and Yemen are coordinating between their incumbents and national telecom boards to implement measures for telephony infrastructure improvement. In countries with high teledensity rates, monopolies tend to behave as private companies, expanding quality and breadth of services. Lower teledensity countries believe they can use telecom expansion projects to create jobs, and promote awareness in telephony-related applications such as Internet dial-up, and the establishment and servicing of community centres. In the case of countries such as Egypt, a strategy of partnering with foreign firms is being implemented both on the production side (joint-ventures to produce switches) and the operator side, especially in GSM.

Mobile communications are increasingly liberalised. Five countries have duopoly operators (Egypt, Jordan, Kuwait, Lebanon and Syria). By 2002, the number of cellular subscribers exceeded that of landlines in countries such as Bahrain, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia and the UAE Also, new data communication schemes for delivery of telephony and Internet services using ISDN, DSL and cable media are emerging. Key offerings are available in the regulated markets, but increasingly on the agenda of emerging countries described above.

2. International links

Some successful regional connectivity solutions currently link the area within, and with the rest of the world. In the satellite field, ArabSat is a prime example of capabilities of Arab states to collaborate in creating a solid and resilient regional communications network. Other projects include the Fibre Optic Gulf (FOG) network, a 1,300 km cable system jointly owned by the national telecommunications operators of Kuwait, Bahrain, Qatar and the UAE. Gateways are being set-up as part of a decisive national strategies to increase connectivity and

bandwidth availability. This is especially the case for Egypt and Yemen. Yemen integrated this approach with its national improvements programme and its project to connect rural areas.

3. Internet and PC dissemination

PC affordability and the cost of connectivity are two main factors, among several others, affecting Internet dissemination. In Gulf countries, where levels of income per capita are high, dissemination of PC equipment per household surpasses Western dissemination standards, even without the support of consumer credit and funding programmes that exist in the West. Other countries are setting-up ubiquitous IT kiosks, offering access through community centres, and displaying creativity in pricing schemes. Egypt has gone as far as to offer free Internet for all, with countries such as Yemen and Syrian Arab Republic seeking to emulate this example. Lebanon is subsidising access and creating solutions to alleviate high unit costs. Other ESCWA member countries, particularly Jordan , are actively acting to foster PC dissemination. Local PC production is scarce, with the exception of Egypt, Lebanon and Saudi Arabia, where local assembly allows for relatively low prices. After the launch of "Free Internet", Egypt has recently introduced the "PC for every home" initiative which aims at making PCs more affordable through the provision of credit facilities using the contractual relation between Telecom Egypt and the subscriber as the collateral.

4. Internet backbone and major supporting networks

Most ESCWA member countries are taking some steps to build national Internet backbones. The objectives are to offer access across the entire country and reduce infrastructure divides, especially between urban and rural areas on the one side, and allow for operators to offer higher quality of service and faster Internet connections on the other. Most countries utilise national incumbent infrastructure to increase Internet backbone density, with no private initiative identified.

Despite the importance and benefits of having a regional backbone connecting the different national backbones across the region; there are still no real plans for such crucial strategic endeavour. The absence of a regional backbone contributes to the high cost of connectivity, which is reflected in lower penetration rates of basic Internet services. Furthermore, such absence hinders the electronic integration of the region and delays the wide-scale dissemination of e-commerce and e-transactions.

5. Internet players

ISPs are deregulated in several ESCWA countries, either due to the historical context through which the Internet was initially introduced, or in such cases where a strategic plan to provide Internet access to masses is in place while national incumbents and overall budgets do not allow for monopolistic positions. This is the case for Jordan, where ISP deregulation is an

integral part of the REACH project and of the "Connecting Jordanians" initiative. In the Gulf, monopolistic behaviours remain prevalent, with national incumbents complementing their ISP activities with related services at competitive rates. On the other side of the spectrum, a group of countries exercising strict control on ISPs remain with very limited Internet penetration despite the proliferation of Internet Café and other access devices. On the corporate side, there is very little evidence of development of ASP Industry, and related services to small and medium size enterprises SMEs.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR LEVEL OF MATURITY

The ranking of ESCWA member countries' capabilities in ICT infrastructure reflects the degree of overall success in building viable and resilient ICT infrastructure, measured through quantitative indicators. It also takes into account the plans for deployment of ICT infrastructure, and efforts deployed by countries relative to size and GDP. Finally, they incorporate market considerations such as market structure and pricing to give an overview. Four maturity levels are used:

- **Maturity level 1:** ICT infrastructure shows (1) low telephony density rates and unattractive telephony market conditions for users in the individual and business segments relative to other ESCWA member countries; (2) scarce international links for telephony and to the Internet backbone; (3) poor Internet dissemination, inadequate national backbone, and limited number of Internet players in the market.
- **Maturity level 2:** ICT infrastructure shows (1) average telephony density rates and increasingly attractive telephony market conditions for users in the individual and business segments relative to other ESCWA member countries; (2) developing international links for telephony and to the Internet backbone; (3) improving Internet dissemination, improving national backbone, and active Internet players market.
- **Maturity level 3:** ICT infrastructure shows (1) above average telephony density rates and attractive telephony market conditions for users in the individual and business segments relative to other ESCWA member countries; (2) solid international links for telephony and to the Internet backbone; (3) somewhat strong Internet dissemination, adequate national backbone, and active Internet players market.
- **Maturity level 4**: ICT infrastructure shows (1) world class telephony density rates and very attractive telephony market conditions for users in the individual and business segments relative to other ESCWA member countries; (2) highly developed international links for telephony and to the Internet backbone; (3) strong Internet dissemination, world class national backbone, and a recognised Internet players market.

1. Maturity level 1: Iraq, Palestinian Authority and Yemen

These countries display very low teledensity rates, their level of performance is well below world standards, and equipment are unsufficiently equipped. Their characteristics are:

- All have realised the importance of improving teledensity and have some plans for development; however, they display strong divide patterns between urban and rural areas;
- They are not well connected with the global Internet backbone;
- ISPs may be non liberalized and service is limited to a few corporations and Internet Cafés;
- Access is highly constrained, mostly due to high relative costs;
- PC dissemination is low.

2. Maturity level 2: Egypt, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia and Syrian Arab Republic

These countries are taking action at increasing teledensity, and have succeeded in reducing differences between rural and urban areas. Equipment is increasingly available, albeit on a limited scale. They all share the following characteristics:

- Teledensity improvement projects and campaigns are underway;
- They are connected or have plans to connect to the global Internet backbone;
- ISPs may be regulated but service is available to a larger base of users;
- Access is increasingly developing, thanks to subsidies in price or to reduction in costs;
- PC dissemination is on the rise, with local assembly PCs available.

3. Maturity level 3: Bahrain and Qatar.

In these countries, teledensity is on par or exceeds some Western standards. Use of Internet and PC equipment is high, thanks to high income levels and purchasing power, as well as strong literacy. Both are regulated markets with national incumbents playing a critical role in ICT infrastructure build-up.

4. Maturity level 4: UAE

In the case of the UAE, the Emirate of Dubai alone would warrant ranking in maturity level 4, as its ICT infrastructure is clearly positioned as one of the top global performers in terms of fixed voice telephony, mobile telephony, internet dissemination in addition to ISDN, DSL and other advanced satellite and cable services.

TABLE 5. MATURITY LEVELS AND RANKING OF EMCS

Country	Level 1	Level 2	Level 3	Level 4
Bahrain			✓	
Egypt		✓		
Iraq	✓			
Jordan		✓		
Kuwait		✓		
Lebanon		✓		
Oman		✓		
Palestinian Authority	✓			
Qatar			✓	
Kingdom of Saudi Arabia		✓		
Syrian Arab Republic		✓		
United Arab Emirates				✓ (Dubai)
Yemen	✓			

Figure 4 provides a summary of EMCs ranking regarding ICT infrsatructure.

C. CONCLUSIONS

1. ICT infrastructure: a growing divide

The ESCWA region suffers from digital divide patterns, mainly along national wealth and personal income levels, as illustrated in Figure 5, with three distinct categories of countries, each with its own set of characteristics: (1) those with structural issues and little effectiveness in bringing about breakthrough solutions; (2) countries where public initiative and deregulation allowing for progress, which remains slow compared to world standards; and (3) wealthy areas where teledensity and PC equipment is a none issue. Foreseen risks include having a further fragmented region, as well as the inability of some countries to effectively achieve the expected benefits of information society.

Some EMCs are able to provide better backbone connectivity than others thanks to funding capabilities and to participation in international telecom operations, as illustrated in Figure 6. Several EMCs clearly lag behind in international backbone connectivity, despite regional satellite solutions.

Figure 4. EMC ranking for ICT infrastructure

ICT Infrastructure	
Level 4	UAE (Dubai)
Level 3	Bahrain Qatar
Level 2	Egypt Jordan Kuwait Lebanon Oman Saudi Arabia Syria
Level 1	Iraq Palestinian Authority Yemen

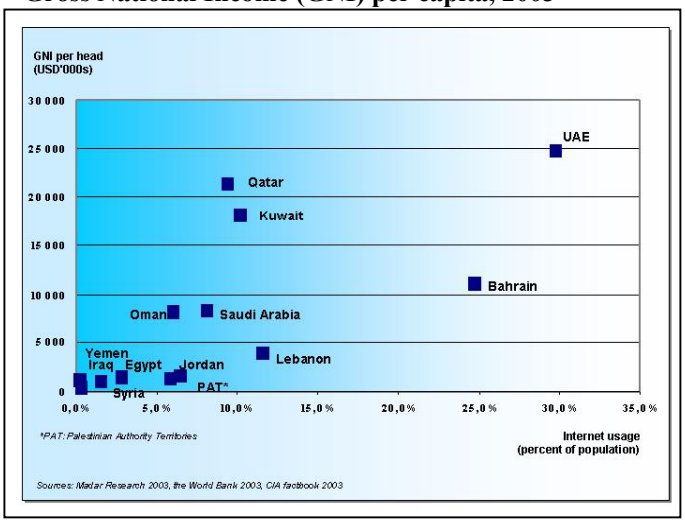
Telephony density and market conditions	
World class	UAE
Above average	Bahrain Kuwait Qatar
Average	Egypt Jordan Lebanon Oman Saudi Arabia Syria
Poor	Iraq Palestinian Authority Yemen

International telephony and internet backbone links	
Highly developed	UAE
Developed	Bahrain Kuwait Qatar
Developing	Egypt Jordan Lebanon Saudi Arabia Syria Oman
Scarce	Iraq Palestinian Authority Yemen

Internet dissemination, national backbone and players	
World class	UAE (Dubai)
Above average	Egypt Jordan
Average	Bahrain Kuwait Lebanon Oman Qatar Saudi Arabia Syria
Poor	Iraq Palestinian Authority Yemen

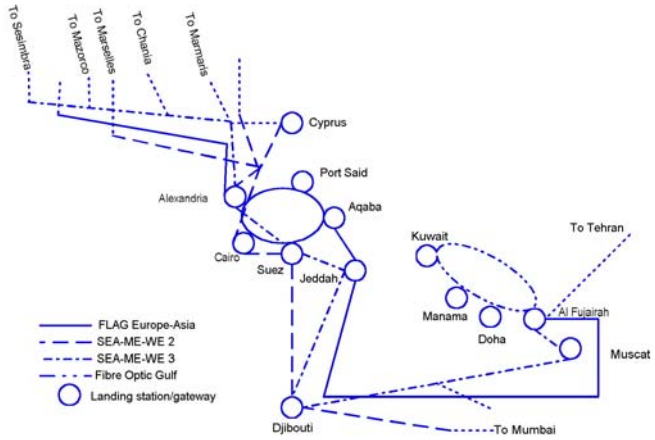
Internet dissemination, national	
World class	UAE (Dubai)
Above average	Egypt Jordan
Average	Bahrain Kuwait Lebanon Oman Qatar Saudi Arabia
Poor	Syria Iraq Palestinian Authority Yemen

Figure 5. EMC Internet use patterns, according to Gross National Income (GNI) per capita, 2003



Sources: Madar Research 2003, World Bank 2003, The World Factbook 2003.

Figure 6. EMC fixed fibre optic international connectivity 2003



Source: France Cable Radio, FLAG Telecom, FOG.

2. ICT infrastructure: an uneven commitment to deregulation

Commitment to deregulation is also uneven, with the majority of EMCs not fully realising the potential and benefits of private sector participation in taking the lead to alleviate some infrastructure challenges. Deregulation of certain components of ICT infrastructure could allow for increasing momentum of infrastructure deployment. Only a few ESCWA member countries have decided to partner with the private sector in the national or local Internet backbone. The most significant Private Public Partnership (PPP) in this respect is the example of Egypt where the national incumbent operator Telecom Egypt partnered with licensed ISPs in order to harmoniously build several Public Data Networks (PDNs), and to realise the free Internet solution.

3. ICT infrastructure: free Internet, a new business model

Some ESCWA member countries are increasingly considering emulating the example of Egypt in offering free Internet access to the masses through the above-mentioned PPP model. This model is perceived as a solid booster to Internet dissemination, and is considered a pioneering model that originated from the region.

D. RECOMMENDATIONS

Recommendations for improving the status of ICT infrastructure across the 13 member countries are:

1. **For countries at maturity level 1**: Although the plans being devised are expected to improve ICT infrastructure, it could be very beneficial for these countries to consider alternative and more rapidly deployable technical solutions such as Wireless Local Loops (WLL). In addition, subsidising PC equipment to certain segments of the society, such as students, may be a good solution to focus efforts and increase dissemination. It would also be advisable to review the deregulation programme, ensuring the private sector is more closely engaged in the development strategies of ICT infrastructure.

2. **For countries at maturity level 2**: These countries need to focus on means for achieving critical mass in PC dissemination and ICT backbones. They may consider setting up some consumer finance solutions to further increase PC dissemination, in parallel with the teledensity improvement efforts underway. Also, as ICT infrastructure is costly, rigorous planning could help in certain cases improve speed and efficiency of deployment to those user segments that most require ICT infrastructure.

3. **For countries at maturity level 3 and 4**: These countries should move forward to ensure that ICT infrastructure becomes a central component of their economy. In the case of the Emirate of Dubai, diversification from the oil sector has led to this move. This is yet to be efficiently implemented in other countries at this level, with world class ICT infrastructure.

4. **For all 13 EMCs:** Creation of a regional Internet backbone to:

   - Rreduce the expenditure of hard currency disbursed to attain multiple connectivity to the Internet cloud from several countries;
   - Foster the establishment of data centres within the region to act as content reservoirs and magnets towards which regional traffic would be shaped;
   - Improve efficiency of inter-Arab electronic commerce;
   - Reduce the cost burden by sharing same common technological development and deployment costs;

   A good example to follow is the GCC's FOG network, the Arabsat and Althuraya.

IV. ICT CAPACITY BUILDING

INTRODUCTION

ICT capacity building covers all aspects related to the process of developing human and institutional capabilities in ICT. These aspects include planning, delivery, and the process related partnerships. The development of skilled human resources lies at the core of any ICT strategy. It is important to address this issue in a comprehensive manner, and to map ICT capacity building objectives into the programmes and content being delivered in education. The criteria for measuring ICT capacity building are:

- **Awareness and dissemination**: Identification of national ICT delivery strategies, and the attained levels of awareness;
- **Computers in Schools:** Quantifying of the use of computers in performing administrative tasks, in aiding teachers in the classroom, and in the student education process both as tool and subject;
- **Vocational Training**: Capacity of institutions to deliver ICT vocational training through the regular educational process, or through private/public training centres;
- **University Education**: Variety and quality of ICT programmes, across multi-disciplinary departments and faculties, the number of students, graduates and ICT professors;
- **Research, Development and Innovation (RDI):** RDI institutions, private/public initiatives and programmes, and centres of excellence in ICT.

A. COMPARATIVE ANALYSIS OF EMCS ON ICT CAPACITY BUILDING

ICT capacity building starts with raising awareness regarding the capabilities and benefits of having the knowledge and using the technology. It requires educating and training human resources to increase and improve the quality and extent of involvement in the field. Most EMCs have outsourced ICT awareness raising functions to national ICT related NGOs, in an effort to conduct rapid training campaigns in ICT. In terms of PC dissemination, some EMCs have produced positive results by allocating budgets aided by NGOs and regional commissions, aimed at increasing PC penetration.

EMCs are becoming increasingly aware that ICT in education starts at the primary and secondary school levels. Educational systems at large are starting to address market sector development needs by graduating medium skill engineers, programmers, and technicians. This is achieved through partnerships with large multinational vendors. There is, nonetheless, some confusion with regard to the objective of ICT education. Education is focused on developing an understanding of information systems, computers, and the computational process. Whereas, the objectives of vocational training is to deliver a specific set of skills related to performing a

predefined job description. The weakness in many of the educational systems of the EMC is in their inability to deliver the critical mass of ICT professionals needed to fuel growth and development. Many of these countries are striving to include ICT education within the general educational agenda.

The absence of good RDI output is prevalent, manifested in the absence of good ICT localization efforts, and the scarcity of research publication.

1. Awareness and dissemination

Few countries have put in place a clear strategy for raising awareness and improving dissemination. Syrian Arab Republic and Jordan have adopted programmes of national scale aimed at underlining the importance of ICT availablity to the public. These programmes aim not only to promote the use of ICT tools, but also to build the skills needed by a true information society. Box 2 gives an example of such a programme, namely the International Driver Licence (ICDL) proramme. Governments formulated programmes and out-sourced their implementation to national computer and technology associations. Programme strategies include the covering of remote areas, and addressing a heterogeneous public. These programmes are not linked to ICT promotion, but rather aim to highlight the benefits of a networked society. Subsidy of the outsourcing process is a measure of bridging the income gap separating PC owners and literates from the rest of the population. Some countries with higher penetration rates, such as the United Arab Emirates, have moved to e-learning Web portals, and multimedia as vehicles of awareness campaigns.

2. Computers in schools

All EMCs acknowledge the importance of access to PCs in schools, for their by faculty and students in daily interaction. Two comparative metrics do exist: PC-to-Student, and PC-to-Teacher ratios. These figures show large variations, sometime within the same country, based on whether the school is public (governmental) or private, in urban or rural areas, within concentrations of wealth or poverty. Some of the more advanced countries are using Internet technology to publish examination results, and promote e-learning initiatives and pilot programmes. The readiness of the national network is proving to be a key component of these initiatives. In other countries like Syrian Arab Republic and Egypt, governments subsidize PC equipment to schools, successfully increasing computer laboratory availability. Budget constraints remain the most prevalent reason for reduced dissemination rates.

While ICT inclusive curricula are under development, some countries are hesitant to engage in PC dissemination efforts before a fully developed and tested educational program is in place.

3. Vocational training

Vocational training is generally geared towards the development of specific skill sets directed towards market needs. A variety of institutions types and programmes provide such training in the region. To address the need for skilled technicians in the area of ICT many EMCs established partnerships with global vendors; and in so doing failed to establish vendor-independent ICT progrmmes.

4. University education

Most EMCs have set their objectives for ICT skilled graduates. While most programmes had been developed in the mid nineties, they have seen substantial growth in the number of graduates since the year 2000. As an example, the Egyptian government has set a target Compound Annual Growth Rate (CAGR) of 30 per cent in ICT related educational sector. The effort is focused on knowledge in areas like computer programming and networking, and has been accompanied by the deployment of local area networks (LANs) and the establishment of Internet connectivity on a priority basis. ICT undergraduate programmes are expected to follow market demand both at the professional and teaching levels. It is through partnerships with vendors that universities hope to achieve their competitive advantages, building towards more advanced graduate studies.

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

There is very little substance to account for in terms of RDI accomplishments. Relying on foreign technology, and the allocation of 0.5 per cent of the Arab GDP to RDI, EMCs are net importers of technology.[3] While technology exports represented between 50 per cent and 80 per cent of total exports of world leaders like Finland, the United States of America and Japan (1st, 2nd, and 4th respectively), technology exports of most Arab states are below the 5 per cent mark..

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURITY LEVEL

The ranking of EMCs on ICT capacity building takes into account qualitative factors like awareness raising campaigns, and quantitative measures like the actual number of graduates entering the work market. Four maturity levels can be identified:

(3) There are some exceptions. For example in 1999, Tunisia, the only exporter of "recent" innovations in high and medium technology ranked 51st (out of 72 countries) on the UNDP's global technology achievement index, with exports reaching 19.7 per cent of total exports.

Box 2. The International Computer Driving Licence (ICDL) programme

The ICDL global programme certifies essential IT skills for life-long e-learning. It provides a certification that is vendor neutral, with a broad scope of IT knowledge and skills. Awarded upon completion of seven modules covering essential IT concepts, it provides a flexible learning approach to an international standard, regardless of the candidate's prior computer knowledge. ICDL benefits include its administration by NGOs, its coverage of a broad range of skills and a single, agreed, and generic hardware or software product independent syllabus. The ICDL is promoted in the Arab region by UNESCO, and is available in most countries. By 2002, the number of registrants reached 25,000, the majority of whom were in Jordan, with courses delivered through a network of 90 centres. Approximately 7,000 people have completed the programme across the area.

ICDL REGISTRANTS, 2001-2002

Country	Number of Registrants		
	2001	2002	Total
Egypt	803	2,349	3,152
Jordan	4,280	11,621	15,901
Kuwait	-	1,720	1,720
Lebanon	140	261	401
Palestinian Authority	-	960	960
Kingdom of Saudi Arabia	-	80	80
Syrian Arab Republic	140	201	341
United Arab Emirates	200	2,697	2,897
TOTAL	5,563	19,889	25,452

Source: UNESCO Cairo, 2003

- **Maturity level 1**: Absence of awareness and dissemination programmes scarcity of computers in schools. It also underlines the lack of adequate vocational training, and insufficient university level involvement in terms of curricula and outputs. This level also indicates the absence of RDI in ICT.
- **Maturity level 2**: Awareness and dissemination campaigns have been introduced, and where computers are present in the schooling system. Vocational training is available, and universities have established some form of ICT oriented curricula and its related output. RDI in ICT is still in the early stages.
- **Maturity level 3**: Denotes development in the awareness and dissemination efforts, and increased adoption of computers in schools. It also denotes consistent vocational training output in terms of quantity and quality, with suitability to the job

market. This level also signals increased output from universities in both outcomes and curricula.

- **Maturity level 4**: Refers to a strong awareness and dissemination strategy, with good benchmark ratios for computers in schools. An efficient vocational training output, catering to market demand, and developed university programmes corresponding to higher education needs. This level is accompanied by an effective, high level output of RDI in ICT.

TABLE 6. THE MATURITY LEVELS AND RANKINGS OF EMCS

Country	Level 1	Level 2	Level 3	Level 4
Bahrain		✓		
Egypt			✓	
Iraq	✓			
Jordan			✓	
Kuwait		✓		
Lebanon		✓		
Oman		✓		
Palestinian Authority		✓		
Qatar		✓		
Kingdom of Saudi Arabia		✓		
Syrian Arab Republic		✓		
United Arab Emirates			✓	
Yemen		✓		

1. Maturity level 1: Iraq

There are few campaigns to raise awareness on ICT. Because of the political situation, and the recent war, there are no effective policies or plans in ICT capacity building.

2. Maturity level 2: Bahrain, Kuwait, Lebanon, Oman, Palestinian Authority Territories, Qatar, Saudi Arabia, Syrian Arab Republic, and Yemen

These countries are conducting awareness raising campaigns. While their dedication to the matter is not to be questioned, the degree with which they have achieved their target varies. They share the following characteristics:

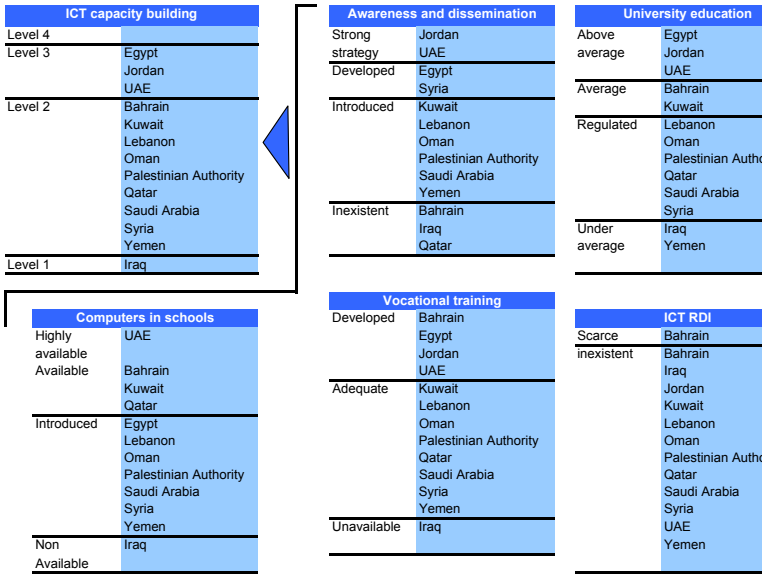
- Awareness campaigns are underway;
- University education and vocational training is available, with most choosing to partner with global IT vendors;
- RDI output is rudimentary.

3. Maturity level 3: Egypt, Jordan And The United Arab Emirates

Countries in this level are achieving significant output in terms of ICT educated graduates. They differ from members of the second level in the magnitude of their awareness campaigns, and their degree of proliferation into the fabric of society. The level of RDI in ICT remains very close to that observed in preceding level.

Figure 7 provides a summary of EMCs ranking regarding ICT capacity building.

Figure 7. EMC ranking for ICT capacity building



C. CONCLUSION

ICT capacity building is based on an awareness and dissemination component, especially with regard to schools. It is also a function of education, be that through vocational training or university level education. Finally, it is measured in terms of RDI output determined primarily through the number of inventions and publications. Following are detailed remarks in every one of these components.

Awareness campaigns are launched in most EMCs: Some serious results have been achieved, primarily through outsourcing such campaigns, regarded as a necessary first step towards ICT dissemination, to national information technology associations. However, most of these campaigns remain superficial in nature. PC dissemination campaigns are taking place,

with increased recognition throughout the region of the importance of starting computer-based education at the earliest stages of schooling.

Vocational training is on the rise: It is through partnerships with global ICT vendors that EMCs are looking to train employees in the private and public sectors. EMCs should differentiate between ICT education and vendor certified training. The latter addresses immediate market demand, with little regard to the long-term objectives of the former. This model fails to constitute thorough ICT education, does not foster innovation, and aggravates reliance on foreign corporations.

University education and RDI are weak: ICT education at the university level, though available, does not deliver sufficient output in terms of number of graduates, and suffers from copying ICT education models from advanced countries, indirectly fostering the emigration of local talent. Specialised courses in computer science and related technologies are still limited. Consequently, the region does not effectively perform in RDI, and remains dependent on foreign sources. Thus, the region only marginally creates wealth from its ICT capacity.

D. RECOMMENDATIONS

Recommendations for improving the status of ICT capacity building across the 13 regional countries are:

1. **For countries at maturity level 1 (Iraq)**: It may be the perfect opportunity to rebuild a proper ICT enabled public sector, by selecting "best in class" practices, and learning from the weaknesses of similar programmes in other countries.

2. **For countries at maturity level 2**: Proper balance between conducting awareness campaigns and their effective results in bringing about a sustainable change in ICT capacity is recommended. Governments, IT associations, and the public education system must take the benefit of awareness campaigns to a deeper level, and focus on educating students in ICT-specific courses including computer science, hardware and software design and production. Partnering with global IT vendors, though useful, may render some countries over-dependant on these vendors, and should not be construed as effective delivery of ICT-related education. Care should be given to set up local research and development to foster the growth of national ICT firms, and promote exports.

3. **For countries at maturity level 3:** It may be beneficial to use the present growth opportunity to increasingly focus on building local world-class ICT educational facilities, and transform the education into an effective RDI source, thus enhancing growth and exports. These countries should look at expanding their partnerships to include other universities and research institutes around the world.

V. BUILDING THE ICT SECTOR

INTRODUCTION

Building and developing the ICT sector is a function of strategic and operational planning and choices. The ICT sector has an immense number of markets, nuances, and niches. Thus, building an ICT sector and being a center for ICT can mean a variety of things. Most countries in the world want to become an ICT hub or to build an ICT sector which is competitive in selected niches. From hardware to software to services, telecommunications, mobile data networks, computer training, Web design, content provision and development, e-commerce and online banking, the ICT sector indeed has far too many facets and niches for a single country take the region's leadership role in every respect. Furthermore, any review of the sector must carefully examine performance in each of these facets.

Many issues contribute to shaping and building an ICT sector: investments and finance facilities, industry structure, employment structure, innovation, research and development capacities, market structure, competition, and ownership structures, to mention a few. The involvement of the private sector, as well as cooperation between private and public sector institutions in terms of investment and employment, also play a key role.

The criteria for determining the effectiveness of building the ICT sector in the EMCs have been narrowed down to include the following issues:

- **Categories of ICT companies:** Private and/or public companies, such as telecom operators, software developers, service companies, and their respective size and structure;
- **Investment in ICT:** National and foreign direct investment, policies, volumes and trends;
- **Government facilitation:** Tax incentives, and import/export facilitation and promotion schemes;
- **Export of ICT products:** Export types, markets, volumes, and obstacles.

A. COMPARATIVE ANALYSIS OF EMCS FOR BUILDING THE ICT SECTOR

1. Categories of ICT companies

Telecommunication operators constitute the dominant category of companies in the ICT sector in all EMCs in terms of employment, output, capitalization and investment. In all EMCs fixed-line telephony operators are still government owned and managed monopolies. Some of the operators in monopolized markets have extended their service offering to other ICT related fields like Internet hosting, application service provision (ASP), and data clearing solutions. Telecommunications operators were the priority focus of some EMC governments in the

second half of the 1990s, as mobile telephony was introduced and positioned as a massive recipient of FDI. This means that some non-Gulf states have started liberalization processes and opened up for competition and foreign investment in selected services, most notably in mobile telephony (often duopoly) and Internet service provision were there is more open competition. In these liberalized markets, telecommunication operators continue to focus mainly on telephony and to a lesser extent on Internet Protocol (IP) networks, but have done little effort to extend their offering beyond the traditional business lines and models. In the Gulf states, where telephony and data transfer infrastructures and services are dominated by monopolistic telecommunication models, operators generally offer cheaper and better services than operators in some of the countries going through liberalization processes. The ICT sector in the Gulf states seems generally to be more innovative and responsive to market demands. Therefore, there is no evidence in EMCs that liberalization is leading to a faster and more comprehensive building and development of the ICT sector, particularly in view of the dominant position and performance of telecommunication monopolies in the Gulf countries. However, comparison among non-Gulf states indicates that countries going through liberalization processes of telecommunication operators, such as Jordan, seem to experience more rapid development and service improvement in the telecommunications and related ICT sectors than those not opening up for liberalization.

Other ICT companies are mainly focused on the software and services segments, with very little effort going into the hardware manufacturing industry. Most of these firms are local agents for international vendors and work to provide after sales services based on their product offering. Software development firms have focused on network related applications, and Internet based software technology. Some of these companies provide outsourcing service to larger corporations locally or internationally. It is worth noting that software development firms have identified a niche segment in localization services, also known as “Arabization”. Most SMEs remain to be local agents.

Capitalization of other ICT companies is low in comparison to telecom operators. According to the records of the Amman Chamber of Commerce of June 2000, the 385 Jordanian IT equipment importers had a combined capitalization of USD 43 million. In Egypt 950 IT firms had a combined capitalization of USD 340 million. These and other figures yield an average unit capitalization of USD 110,000 to USD 300,000. In the absence of a market of substantial size, few ICT affiliated services like business consulting and system integration companies find reason for being present in these local markets. EMC ICT markets are expected to grow at a CAGR of 30 per cent to 50 per cent over the next three years, driven largely by procurement in imported software and hardware to meet increased demand.

2. Investment in ICT

With the gradual implementation of WTO standards, EMCs are amending their investment laws to adapt to global standards. In countries like Jordan, Egypt and the UAE

where ICT is a national priority, investment laws have been adapted, to varying degrees, to effectively impact investment. In the case of Egypt, ICT is still under the realm of general investment laws. Jordan and the Emirate of Dubai took steps favouring investment in ICT. These steps include tax breaks, facilitated land grants, protection of investment, intellectual property rights, simplified registration procedures, freedom of personnel movement, and full facilities in investment-proceed-repatriation. In developing markets like those of Syrian Arab Republic and Yemen, as well as some oil-rich states like Kuwait and Bahrain, no ICT specific investment model is present. Lebanon, on the other hand, relies largely on the contribution of the private sector.

3. Governmental facilitation

Most EMC governments used tax incentives as the main mode of government facilitation to promote ICT. While these incentives play a role in fostering the creation and growth of national export bases, their effect remains limited if not coupled with other incentives. Some EMC governments integrated tax incentives with plans to promote ICT imports of growth inducing technologies and technology transfer practices. Property and land connections, mostly in the form of dedicated technology zones, are also a common government incentive across the region.

4. Export of ICT products

EMCs are net importers of technology products and services. As RDI is neglected, the region is absent from the export league despite the existing framework to encourage investment in, and growth of, the ICT industry.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURUTY LEVEL

The ranking of EMCs with regard to building the ICT sector takes into account the number of firms in the sector and their size. The process also includes more qualitative factors such as the effectiveness of governments in promoting investment and in regulating ICT equipment imports and exports. Four maturity levels have been identified:

- **Maturity level 1:** Indicates scarce presence of local ICT firms with a low level of investment, and a limited or inefficient facilitation role from the government, and the scarcity or absence of ICT products.
- **Maturity level 2:** Indicates the presence of nascent local ICT firms with limited investment volumes, an improved government facilitation role, and the existence of some export of ICT products.

- **Maturity level 3:** Indicates a growing mass of local ICT firms with an increasing investment level, an increasingly efficient governmental facilitation role, and a developing export of ICT products;
- **Maturity level 4:** Is marked by a strong, well recognized and highly capitalized mass of ICT firms. This is accompanied by an efficient governmental facilitation role and a solid base of ICT product exports.

Table 7 summarizes the maturity levels and ranking of the countries covered. The table is followed by a discussion of the main feature of the maturity groups.

TABLE 7. RANKING OF EMCS ACCORDING TO THEIR MATURITY IN BUILDING THE ICT SECTOR

Country	Level 1	Level 2	Level 3	Level 4
Bahrain	✓			
Egypt		✓		
Iraq	✓			
Jordan		✓		
Kuwait	✓			
Lebanon		✓		
Oman	✓			
Palestinian Authority	✓			
Qatar	✓			
Kingdom of Saudi Arabia		✓		
Syrian Arab Republic	✓			
United Arab Emirates			✓	
Yemen	✓			

1. Maturity level 1: Bahrain, Iraq, Kuwait, Oman, Palestinian Authority, Qatar, Syrian Arab Republic, and Yemen.

These countries are still at the stage where they have not built an ICT sector and share the following characteristics:

- There are few ICT firms;
- Most ICT firms in the these new countries are importers of equipment and software;
- ICT investment is low, except eventually in telecommunications;
- Government facilitation is weak, and does not offer full frameworks for investment and local ICT development.

2. Maturity level 2: Egypt, Jordan, Lebanon, and Saudi Arabia.

The private sector and the national governments of these countries have established local ICT firms that, if properly developed, can constitute an ICT sector capable of competing in selected regional and international niche markets. Investments in, and exports by, these ICT firms are on the rise, fuelled by strong capabilities and solid government incentives. They all share the following characteristics:

- The private sector is vibrant and is creating some local ICT firms;
- Government facilitation is efficient, and measures like tax breaks are successful;
- Import and export of ICT products is fairly liberal.

3. Maturity level 3: UAE

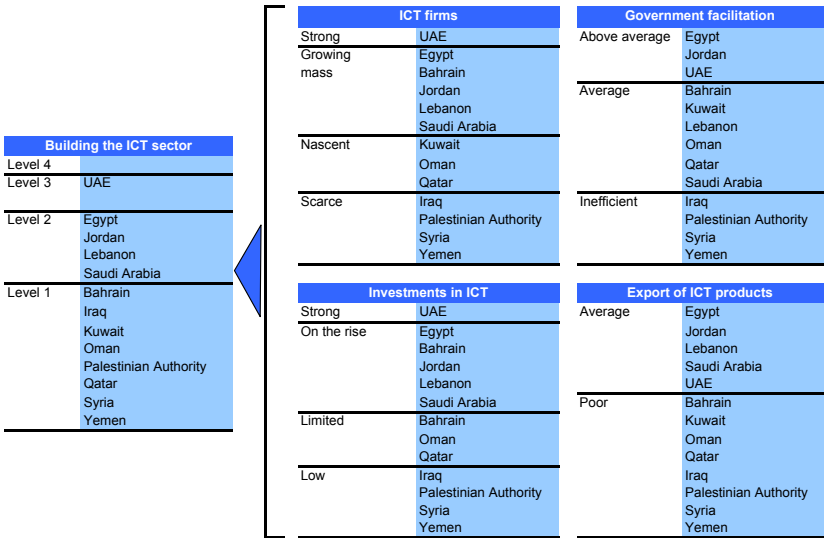
The Emirate of Dubai, is considered to be the out-performer in the region. Several ICT firms have grown thanks to effective policies and strong infrastructure. The government is committed to positioning the country as a regional leader in ICT.

4. Maturity level 4

No countries.

Figure 8 provides a summary of EMCs ranking regarding building the ICT sector.

Figure 8. EMC ranking for building the ICT sector



C. CONCLUSIONS

ICT sector build-up is measured by the number of firms created, ICT investment, government facilitation, and ICT product export. The main characteristics of the region with respect to the ICT sector are summarized in the following.

A limited critical mass of ICT firms is present, with limited access to debt financing and low capitalization: With the exception of Egypt, Jordan, Lebanon, and the Emirate of Dubai, EMCs host no significant number of firms, and those remain small, and under-capitalized. Weak funding and the lack of specialization may be amongst the root causes for this situation. Most firms in the region have no or limited access to debt financing markets. The only examples of homegrown large ICT-related achievements are the telecommunications operators, both fixed and mobile. The majority of the remaining firms are mere importers, re-sellers and agents of foreign vendors in hardware and software alike. As such, they do not yet constitute a viable growth sector for the countries' economies.

Equity investments are still relatively low: Despite governmental facilitation and incentives, mostly in the form of tax breaks and land grants, no effective results have yet materialized. Most EMCs receive little investment in terms of equity partners or investment funds, a problem which may be related to the lack of investment targets in the region.

ICT product export: The region remains absent from the export arena, as illustrated in Figure 9, with Jordan, the first EMC in ranking, numbered 54 globally, and Egypt the second EMC in ranking, numbered 73 globally.

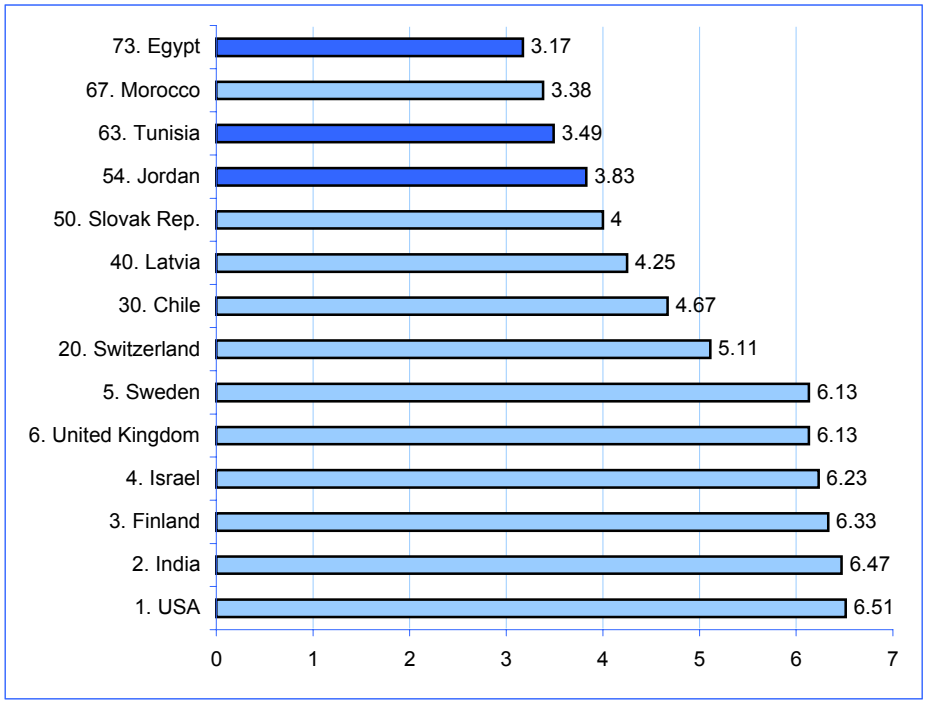
D. RECOMMENDATIONS

It is recommended that all EMCs provide better funding, in the form of debt and equity, for local ICT firms. By taking the lead, governments and public agencies can help the area move from an ICT buyer to an ICT producer framework. Moreover, governmental incentives, such as the tax lever, should be part of an overall sector programme to develop local ICT firms. Finally, spreading corporate and research best practices across the area would allow for the emergence of credible regional ICT players.

Recommendations for improving the status of ICT sector building across the different maturity levels are:

1. **For countries at maturity level 1:** Technology transfer between universities and ICT firms should be encouraged, in order to increase local firms' ability to attract investment. It may also be beneficial to invite foreign IT vendors to invest in local production as a means of addressing local market demand.

Figure 9. Domestic software companies in international markets, (7 is high, 1 is low)



Source: World Economic Forum, INSEAD and *info*Dev, "Global IT Report", 2003

2. **For countries at maturity level 2:** Local ICT firms should be fostered with the help of governments and banks in collaboration with the investment community. This adoption would be in the form of grants, and subsidized loans against good results in production, sales and increased employment. Similar systems have proven successful as they were implemented in Western Europe to stimulate ICT small to medium size enterprises. It is important to accompany this provision with a transparent monitoring system through a PPP between government agencies and financers.

3. **For countries at maturity level 3:** The challenge for governments is to maintain a distant attitude from the private sector, whilst ensuring that public administered programmes such as technology parks and incubators are implemented fully to fruition. It is also important to spread best practices within the country as well as to other EMCs.

VI. ICT APPLICATIONS IN GOVERNMENT

INTRODUCTION

E-government aims at improving government services to citizens, enhancing interaction with business and industry, empowering citizens through access to information, and increasing efficiency of government management. In this respect, e-government has become the modern tool for government to reduce corruption, increase transparency, provide greater convenience to citizen, increase revenue, and reduce costs of administrative operations.

The following selected key indicators are utilized for measuring the use and effectiveness of ICT applications in government establishments:

- **Computerisation of public administrations:** This indicator measures the volume, coverage, availability and update of online and offline services;
- **Digitisation of information:** This indicator measures the degree of transformation of government information to digital format, and the use of digital archives;
- **E-government plans:** This indicator checks for e-government policies, strategies, and action plans.
- **E-procurement plans:** This indicator checks for e-procurment policies, strategies, and action plans.

A. COMPARATIVE ANALYSIS OF EMCS ON ICT APPLICATIONS IN GOVERNMENT

1. Computerisation of public administration

Computerisation of public administration is expanding in the region. UAE and Egypt are the two leading countries that are introducing ICTs in their organizations and implementing business process re-engineering and workflow solutions in order to increase efficiency and effectiveness of government processes.

Several EMCs including Bahrain, Jordan, Kuwait, Lebanon, Saudi Arabia, are providing their public administration with needed ICT equipment and classical management applications. Basic automation services such as e-mail and Web sites presence are functional in most of these countries. Some governments were even successful in implementing an e-government portal.

2. Digitisation of information

Overall trends are indicative of a positive move toward digitisation in Egypt and UAE.

3. E-government

Most EMCs have e-government plans. Jordan and UAE have adopted clear strategies and have started implementation. Bahrain, Egypt, Kuwait, Lebanon and Saudi Arabia have recently developed e-government plans although some of them initiated e-government projects since 1998.

4. E-procurement

E-procurement is not fully operational in most EMCs, with the exception of UAE.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURITY LEVEL

The following ranking reflects a measure of the overall proficiency and success in adopting ICT in government establishments. The maturity level of individual countries reflects their capability in developing and deploying e-government applications. Due to the nature of the data provided in the country profiles, the ranking process is subjective and qualitative rather than quantitative. Table 8 summarizes the maturity levels and ranking of EMCs.

This section groups EMCs by maturity stage and presents the main features characterizing each stage.

1. Maturity level 1: Iraq, Palestinian Territories, and Yemen.

Countries in this group are at the stage of building or preparing the basic supporting ICT infrastructure for e-government. They are either at the stage of building their ICT infrastructure in preparation for developing and deploying ICT applications in government establishments, as is the case with Iraq and the Palestinian Authority, or at the stage of having a strategy which is not supported by implementation plans due to lack of resources, as is the case with Yemen.

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

Countries in this group have strategies and partial implementation plans in place, but the results for wide spread implementation are limited in scale. Most e-government sites are non-interactive, passively presenting information.

3. Maturity level 3: Bahrain, Jordan, Lebanon and UAE

Countries in this group have established strategies and implementation plans. Successful achievements in a number of areas, with limited benefits at national evel exist. However, full benefits for the whole society has not been achieved yet. Most e-government Web sites provide forms that can be filled electronically or printed and then sent by mail.

TABLE 8. RANKING OF EMCS ACCORDING TO THEIR LEVEL OF MATURITY IN ICT APPLICATIONS IN GOVERNMENT

Country	Level 1	Level 2	Level 3	Level 4
Bahrain			✓	
Egypt		✓		
Iraq	✓			
Jordan			✓	
Kuwait		✓		
Lebanon			✓	
Oman		✓		
Palestinian Authority	✓			
Qatar		✓		
Kingdom of Saudi Arabia		✓		
Syrian Arab Republic		✓		
United Arab Emirates			✓	
Yemen	✓			

4. Maturity level 4: UAE (Emirate of Dubai)

This group implies national implementation with full benefits of deploying ICT applications in government establishments across the whole country. Most e-government sites automate government functions and have more streamline capabilities. At this stage, only the Emirate of Dubai could be positioned in this level.

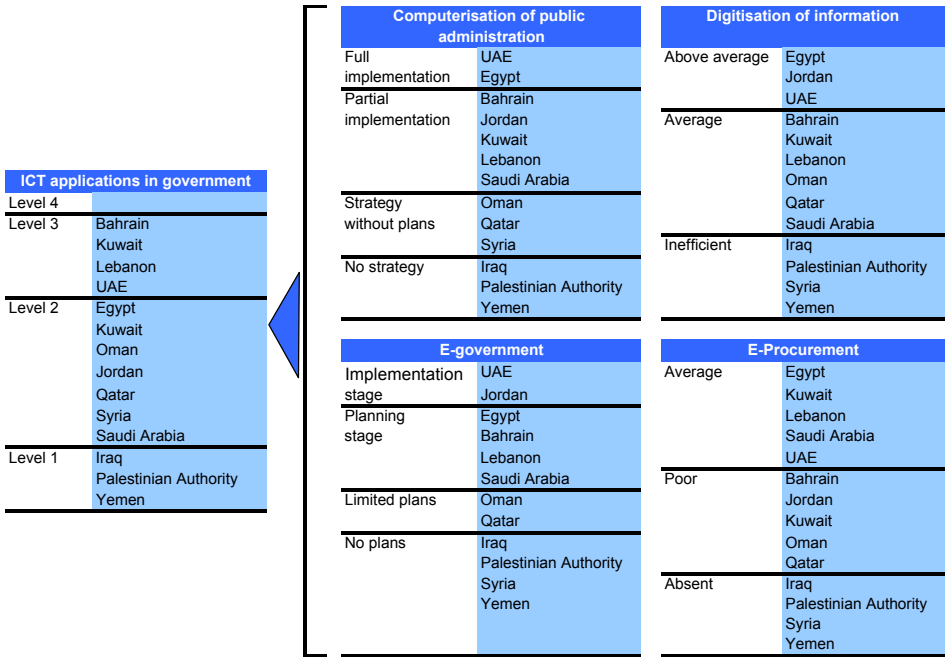
Figure 10 provides a summary of EMCs ranking regarding ICT applications in government.

C. CONCLUSIONS

In general, EMCs have embarked on a path to automate government services. However, most countries in the region are still a long way from using ICT effectively to transform government establishments. Streamlining government procedures, introducing administrative reform, and standardizing forms and data must be a prelude to effective e-government initiatives. The following is a summary of the main indicators utilized for measuring the use and effectiveness of e-government in the ESCWA region:

1. **Computerisation of public administration**: This is not always used as an opportunity for re-engineering government processes. A common practice is still to develop applications isolated from each other, rather than exploiting the advantages offered by integration applications, and workflow streamlining solutions.

Figure 10. EMC ranking for ICT applications in government



2. **Digitisation of information:** Efforts in this regard are still not fully integrated in action plans, and are missing from the priority list of most EMCs.

3. **E-government plans:** Plans are mostly present; however, they need to be supported by realistic objectives along with implementation measures. In order for the latter to be enforceable, EMCs need to revise their execution procedures and dedicate more financial and human resources to their e-government initiatives;

4. **E-procurement:** This important e-government component except in UAE, is underdeveloped in EMCs.

D. RECOMMENDATIONS

Following are the main recommendations[3] for improving the status of ICT applications in government establishments across the Western Asia.

1. **Exchange of expertise among ESCWA countries:** National e-government programmes remain unsynchronised and experiences are hardly shared. Several times, similar projects were redone from scratch all over again;

2. **Introduce administrative reform:** Governments need to consider redesigning existing business processes, maintaining quality, introducing audit control mechanism, implementing an e-procurement system, acquiring technical and project management skills, and increasing government transparency and accountability.

3. **Adopting an enabling fiscal and monetary regime:** Governments need to provide an enabling environment to encourage Foreign Direct Investment (FDI) and thus provide an incentive for private investors to establish ICT firms in the region and participate in e-government projects.

4. **Launching pilot projects:** These projects could tackle selected key priority areas and adopt proper testing and monitoring mechanisms.

(3) ESCWA, "Promoting e-government applications towards an Information Society in ESCWA member countries", Western Asia Regional Preparatory Conference for WSIS, February 2003, Beirut, E/ESCWA/ICTD/2003/WG.1/8.

VII. ICT APPLICATIONS IN EDUCATION

INTRODUCTION

Knowledge-based Economies are the driving engines in today's global market where innovation, in particular technological innovation, plays a central role. Countries with extensive knowledge assets are able to rapidly achieve technological progress and reap the benefits in economic growth and levering living standards

Education, life-long learning and continuous upgrading of skills and knowledge are now recognized as the foundations of the knowledge based economy. Developing countries should deploy serious effort to provide their citizens with the educational levels and advanced skills needed to create and apply new knowledge. As a tool, ICT offers tremendous opportunities in this regard enabling developing countries to rapidly upgrade the skills and knowledge of their citizens at affordable costs.

Recent studies show a clear shift in labour demand towards average and advanced skills in almost all countries. In fact, the unemployment figures displayed in some ESCWA member countries show that 80 per cent of the unemployed are illiterate. Illiteracy is still a main problem in EMCs hindering their economic and social development. About 40 per cent of their population is illiterate, the majority of them being women.

ICT offers a unique opportunity to change the classical teacher-centric model into the learner-centric model, where instructors become supervisors-facilitators, and learners become more self-dependent, capable of finding needed information and accessing suitable knowledge. This is a primary step towards true life-long education.

Key criteria used for measuring the use and effectiveness of ICT applications in education are:

- **Computer-based education:** Introduction of ICT tools, ICT-based courses, and ICT skills at student and teacher levels in educational institutes;
- **Educational institutes connectivity:** Access to the Internet, and availability of Web sites;
- **Online services:** Online courses, information, registration and other services;
- **Distance learning:** Availability and effectiveness of on-line education systems.

A. Comparative Analysis of EMCs for ICT Applications in Education

1. E-education strategy

With the exception of Jordan, UAE, and Egypt, all EMCs have yet to design dedicated strategies for the introduction and use of ICT in education. Fragmented initiatives will not necessarily lead to tangible result, especially when they are implemented without a clear and comprehensive vision. It is often the case that, when these strategies exist, they are national rather than regional or sub-regional in scale. This is an area where regional strategy can be applicable and fruitful.

2. Computer-based education

The use of ICT in education is still far from the optimal levels of utilization as a third component, alongside the subject and the instructor, in the educational process in EMCs. Most EMCs are in the phase of skill building at student level without paying adequate attention to the training of the educational staff. Such training should be at the technical and conceptual levels. Delay in this aspect will translate into various weaknesses in the quality of educational outcome.

3. Online services

ICT enables students, teachers, decision makers, and families to obtain valuable information and to conduct time saving transactional operations related to the educational activities. This type of services is completely absent in EMC educational institutes, rendering them critically lacking. Gulf states display more progress in this regard with the other EMCs still far behind.

4. Educational institutes connectivity

Gulf states and Jordan are already implementing plans to connect all schools to the Internet. The Syrian Arab Republic is undertaking a national project to connect all secondary schools during a three year period. If adequately utilized, this will bring a number of positive changes to learners and teachers alike.

5. Distance learning

Life-long learning is an essential feature of modern society where knowledge is seamlessly and continuously developed. Distance learning is an essential element in this regrad. The Syrian Virtual University, the Arab Open University, and Jordan's Regional Distance Learning Center are the first initiatives in the region. The number of registered students in these universities is still very low. The number of companies and organizations

using this technique in the training of their staff is small as well. This seems to suggest that the region is reluctant to adopt the concept of distance learning. Different technical solutions are being experimented with, yielding varying degrees of success in different countries. The experience of China TV University and the University of South Africa (UNISA) effectively demonstrate the impact of ICT in life-long learning.

The UAE Knowledge Village initiative is a good model to follow for the creation of a knowledge community that utilizes ICT and its application in all domains including education. Its diverse organisation, which include a Media Academy, an Innovation Centre, e-learning institutions which provide graduate and post-graduate education, research and technology institutes, certification and testing organisations and incubators, could provide an excellent example to follow by other EMCs.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURITY LEVEL

The ranking reflects a measure of the overall proficiency and success in adopting ICT technologies to develop and use ICT applications in education. The maturity level of individual countries reflects their respective capabilities in developing and deploying ICT applications-in-education. Due to the nature of the data provided in the country profiles, the ranking process is subjective and qualitative rather than quantitative. Table 10 summarizes the maturity levels and ranking of the EMCs covered. This is followed by a discussion of the main features of the maturity groups.

1. Maturity level 1: Iraq, Palestinian Authority, Yemen, and Qatar[4]

Countries at this maturity level are at the stage of building the basic supporting ICT infrastructure at schools and universities in preparation for the exploitation of ICT potential in education. The EMCs ranked at this level are in one of the following two stages:

- Building their ICT infrastructure in preparation for developing and deploying ICT applications in education, as is the case with Iraq and Palestinian Authority Territories; or
- Having a vision which is not supported by implementation initiatives due to lack of resources or other reasons, as is the case of Yemen.

(4) Due to lack of information in the country report it is not possible to judge the real status of ICT applications in education, as is the case with Qatar.

TABLE 9. RANKING OF EMCS ACCORDING TO THEIR LEVEL OF MATURITY IN ICT APPLICATIONS IN EDUCATION

Country	Level 1	Level 2	Level 3	Level 4
Bahrain			✓	
Egypt		✓		
Iraq	✓			
Jordan			✓	
Kuwait			✓	
Lebanon		✓		
Oman		✓		
Palestinian Authority	✓			
Qatar	✓			
Kingdom of Saudi Arabia		✓		
Syrian Arab Republic		✓		
United Arab Emirates			✓	
Yemen	✓			

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

Countries at this level have a vision, but no articulated strategies or implementation plans. The undertaken projects and initiatives are promising.

3. Maturity level 3: Bahrain, Jordan, Kuwait, and UAE

Countries at the Partial Performance Stage have visions, initiatives and evidence of implementation in place. However, full benefits for the society as a whole have not been achieved yet.

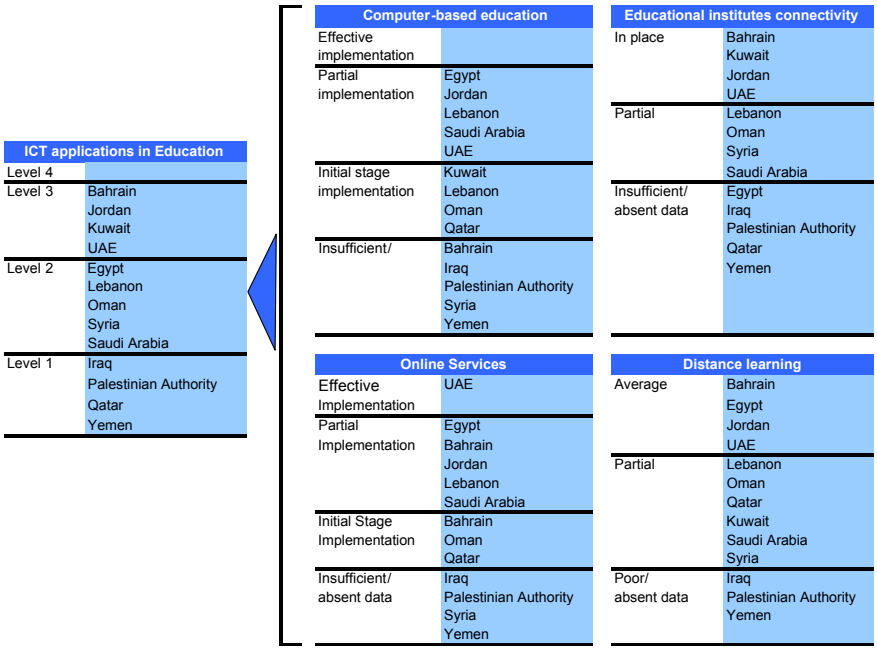
4. Maturity Level 4: No EMCs ranked in this maturity level.

Which implies national implementation and gains of the full benefits of deploying ICT application in education across the whole country.

Compared with other regions of the world, Europe is a good example of best practice in applying ICT in education. The e-learning programmes running in Europe provide a good example to follow. EMC's can learn from the European successes and create regional and national programme to promote ICT in education across the region.

Figure 11 provides a summary of EMCs ranking regarding ICT applications in education.

Figure 11. EMC ranking for ICT applications in education



C. CONCLUSIONS

Knowledge is a cornerstone of development. ICT provides huge opportunities for revolutionising education through:

- Extending educational opportunities;
- Accelerating change through educational innovation and dissemination of best practice;
- Providing education to sectors of the society that may have been cut-off from the education system;
- Encouraging life-long learning across all sections of the society.

Although ICT education is critical for making future generations fully conversant in ICT, progress in this area has been very slow in a number of EMCs. The focus of many countries is still on supplying schools with PC capabilities and linking them to the Internet. Although these are important steps, they do not constitute proper and effective conversion to computer-based learning; a term widely misunderstood in many EMCs.

Life-long learning is not a widely adopted concept yet. As such, there is need for massive awareness campaigns across the EMCs to explain and promote the concept, and illustrate its benefits particularly as it provides the opportunity to bridge the huge illiteracy gap since ICT can bring education to homes and villages. According to the 2002 UNDP Arab Human Development report, about 65 million adult Arabs are illiterate, two thirds of them women.

In general, e-learning initiatives in EMCs face a number of challenges and obstacles including insufficient training of teachers, severe shortage of educational software in Arabic, rigid curricula unable to adapt to new e-learning methods and inadequate ICT infrastructure in schools to support e-learning.

D. RECOMMENDATIONS

Recommendations for improving the status of applications in education across the 13 member countries include the following:

1. **Adopt a clear vision, elaborate an adequate strategy and its implementation plans:** ICT offers the opportunity to revolutionize education and help eradicate illiteracy. To reap the benefits of ICT in education, a clear and focused vision is a must. All stakeholders, private and public, should share this vision. Strategies and their implementation plans should be designed adequately taking into consideration the rapid pace of change in technology. Cooperation should be encouraged on both the regional and international levels.

Practical steps toward this goal could be:

- The creation of national committees mandated with the mission of elaborating strategies and execution plans for ICT-based education;
- Establishing pilot projects in the field of e-learning;
- Training teachers on the use of ICT, and authoring computer-based courses with all associated concepts of learner-centric education;
- Creating a suitable environment for a sustainable e-learning industry;
- Launching regional initiatives, mainly in the area of distance education.

2. **Build a regional e-learning portal:** Such a portal could be used for exchanging experiences and views on e-learning and success stories of applying ICT applications to education. It could encourage joint programmes across EMCs and increase the level of cross-country co-operation. Also, a regional portal could act as a marketplace where private businesses could register their services.

3. **Establish links with international e-learning standards committees to represent the regional point of view:** There are a number of international standards committees who are actively working to define standards for e-learning technologies. One area that needs to be considered in such standards is the area of Arabic content for online courses[5].

(5) An example of these committees is the IEEE Learning Technology Standards Committee (LTSC), chartered by the IEEE Computer Society Standards Activity Board to develop accredited technical standards, recommended practices and guidelines for e-learning technology, www.computer.org/standard.

VIII. ICT APPLICATIONS IN BUSINESS AND COMMERCE

INTRODUCTION

E-commerce and e-business aim at increasing revenue by reaching existing as well as new markets at lower cost, and by reducing inventory and expenses associated with order management and logistics. E-commerce applications contribute to the development of micro-enterprises and small and medium enterprises (SMEs), which have a very important social function in job creation, especially in developing countries; whereas e-business solutions are more geared towards the automation of the business processes.

The following key indicators are used for measuring the use and effectiveness of e-commerce and e-business applications:

- **Extent and maturity of e-commerce and e-business:** This indicator measures the volume, coverage, availability and update of online services;
- **Availability and quality of e-banking:** This indicators reflects the extent of automation in the banking sector by measuring the use of back and front office ICT solutions including automatic teller machine dissemination.

A. COMPARATIVE ANALYSIS OF EMCS FOR ICT APPLICATIONS IN BUSINESS AND COMMERCE

1. Extent and maturity of e-commerce and e-business

Since the collapse of the Internet bubble, EMCs have been struggling to maintain the achieved levels in e-commerce and e-business applications. Two countries have accomplished successful e-commerce B2B solutions in the region; namely UAE and Saudi Arabia. Kuwait and Oman are catching up with promising forecasted growth in e-commerce and e-business.

Other countries, such as Jordan, Lebanon and Egypt, have realized a number of successful e-business and e-commerce solutions. Most of these implementations were mainly driven by the private sector, but the obtained results are still mediocre in comparison with the potential resources available in these markets.

2. Availability and quality of e-banking

The banking sector is witnessing a major transformation as far as ICT is concerned. First, most institutions have implemented a back office system and automatic teller machines are mushrooming almost everywhere in the region, with the exception of post conflict economies. The communication infrastructure among these institutions, which is mostly based on X25, has helped in paving the way to adopt Internet technology.

Among the leaders in implementing e-banking solutions are Kuwait, UAE and Bahrain. Others, including Jordan, Lebanon, Oman, and Qatar are undertaking major initiatives to disseminate e-banking services.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURITY LEVEL

The ranking reflects a measure of the overall proficiency and success in adopting ICT in the commerce and business sectors. The maturity level of every country reflects its capability in developing and deploying e-commerce, e-business, and e-banking applications. Due to the nature of the data provided in the country profiles, the ranking process is subjective and qualitative rather than quantitative. Table 11 summarises the maturity levels and ranking of the EMCs.

This section groups EMCs by maturity stage and presents the main features characterizing each stage.

1. Maturity level 1: Iraq, Palestinian Authority and Yemen

Both Iraq and Palestinian Territories suffer from military conflict and difficult political and social situation, which hinder any serious effort to develop any national plans in this area. They do not have adequate technical and financial infrastructure to support efforts for developing and deploying ICT applications in commerce and business at a national scale. Yemen is at a stage of building its ICT infrastructure to support ICT applications in commerce and business. However, Yemen suffers form lack of funds and high illiteracy rate.

2. Maturity level 2: Bahrain, Egypt, Jordan, Lebanon and Syrian Arab Republic

Countries on this level of maturity have adequate infrastructure to support developing and deploying ICT application in commerce and business. They have set up strategies and plans at a national level. However, they are at different stages of implementation and the full benefits have not been realized yet. The majority of the EMCs are at this stage of development.

3. Maturity level 3: Kuwait, Oman, Saudi Arabia,and United Arab Emirates

Countries on this level have strategies, plans and evidence of implementation in place. However, full benefits for the whole society have not been achieved yet. Successful achievements in a number of areas can be found.

4. Maturity level 4: No countries at this level

This group implies national implementation with full benefits of deploying ICT application in government establishments across the whole country.

TABLE 10. RANKING OF EMCS ACCORDING TO THEIR LEVEL OF MATURITY IN ICT APPLICATIONS IN BUSINESS AND COMMERCE

Country	Level 1	Level 2	Level 3	Level 4
Bahrain		✓		
Egypt		✓		
Iraq	✓			
Jordan		✓		
Kuwait			✓	
Lebanon		✓		
Oman			✓	
Palestinian Authority	✓			
Qatar	Data not available			
Kingdom of Saudi Arabia			✓	
Syria Arab Republic		✓		
United Arab Emirates			✓	
Yemen	✓			

Figure 12 provides a summary of EMCs ranking regarding ICT applications in business and commerce.

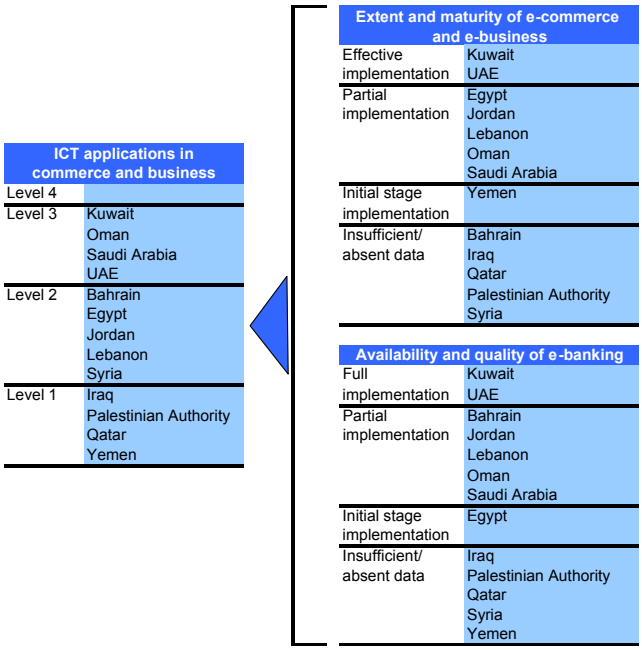
C. CONCLUSIONS

In a time of accelerating globalisation and increasing economic challenges, success in meeting these challenges depends on the ability to adapt to the new economy. ICT provides the opportunity for achieving this through e-commerce and e-business applications and models. However, Most EMCs' applications in commerce and business tackle isolated areas and fail to integrate into a regional or even national strategy for economic growth. In 2002, the global e-commerce market was valued at around $2,293 billion. In 2000/2001, the Arab world e-commerce market was estimated at $3 billion and is expected to reach $5 billion by 2005[6]. It is important to note that e-business development is contingent upon the adoption of ICT solutions by the private in automating their day-to-day operations. The following is a summary of the main issues characterizing ICT applications in commerce and business in the region:

Businesses in EMCs are far behind in deploying ICT effectively in their business operations. In many EMCs, foreign, mainly Western, companies and banks are leading the way in e-commerce and e-business, with the local businesses lagging behind.

(6) ESCWA, "Capacity building in selected ICT applications in ESCWA member countries", Volume 1: E-government and e-commerce, E/ESCWA/ICTD/2003/6

Figure 12. EMC ranking for ICT applications in business and commerce



Most implementations miss the opportunities offered by ICT for reengineering the business processes. Unfortunately, this area is underdeveloped in nearly all countries of the region. For business-to-business (B2B) and business-to-consumer (B2C) e-commerce application to succeed they need the right supportive technological infrastructure, change of behaviour by business and consumers, as well as trust to use the Internet.

The majority of e-banking initiatives are realised through partnerships with foreign countries or corporations. There are very few national success stories.

In the majority of EMCs, there are several factors that are slowing the take-up of e-business and e-commerce by national companies. These factors include absence of the right legislation, weak ICT infrastructure, and low awareness levels on e-commerce and e-business applications.

The gap between oil-rich states and others in the region is evident in the case of ICT applications in commerce and business. There is no regional cooperation to narrow this gap, reduce costs and improve productivity.

D. RECOMMENDATIONS

Developed nations are moving towards an e-economy which consists of a dynamic system of interactions between citizens, businesses, and governments, utilizing ICT to achieve social and economic progress. The successful adoption of ICT in commerce and business requires significant changes in various directions and at a number of levels of intervention, in policies, legislative frameworks, and regulatory instruments. Main recommendations for improving the status of ICT applications in commerce and business enterprises across the ESCWA region are the following:

1. **On the national level**: There is a need to encourage users to trade on-line. The most commonly traded products or services are food, art, clothes, flowers, travel/leisure services, technology, and entertainment products[7].

2. **On the regional level:** Launching regional initiatives aimed at the formation of clusters of countries with common goals and synergy of operations. Regional initiatives aim at establishing B2B solutions among EMCs. The formation of these clusters will pave the way for future regional trade agreements. Suggested initiatives are:

- Clustering of Egypt, Jordan, Lebanon and the Syrian Arab Republic to develop an e-tourism solution. Also the clustering of Syrian Arab Republic and Egypt to develop a B2B agricultural and textile e-commerce initiative[8].
- Developing a regional mechanism to identify best practices in EMCs and encourage their dissemination across the region. The successes must to be well publicised across the region. EMCs need to actively seek to learn from these successes and consider cooperation with the achievers.
- Increasing regional participation at international e-commerce, e-business, and e-banking standards committees to represent the regional and local points of view. There are a number of committees and consortia that are actively developing standards and protocols that will enable e-payment, e-signature, privacy issues, and secure payments architectures. EMCs should participate in these fora to learn, to contribute, and to ensure the region's special characteristics and demands are taken into consideration in any future set of standards.
- Promoting public private partnership in order to foster innovation and realise gains in productivity and competitiveness.

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(7) ESCWA, " Capacity building in selected ICT applications in ESCWA member countries", Volume 1: E-government and e-commerce, ESCWA publication (2003), E/ESCWA/ICTD/2003/6.

(8) Ibid

IX. ICT APPLICATIONS IN HEALTHCARE

INTRODUCTION

Access to healthcare information and services is a basic right for all citizens. ICT plays an increasingly important role in the healthcare system by providing citizens with needed healthcare information and giving them access to basic and vital data required to improve their living standards. In addition, e-health is making specialized clinical expertise available in rural areas as well as providing second opinions for patient and doctors. The next section provides a ranking of e-health applications in EMCs. The following key indicators are used for measuring the use and effectiveness of these applications:

- **Databases for national healthcare:** This indicator measures the interconnection among health institutions and the development of national healthcare databases.
- **Telemedicine and medical use of teleconferencing:** This indicator measures the dissemination of telemedicine applications and the use of teleconferencing services.

A. COMPARATIVE ANALYSIS OF EMCS FOR ICT APPLICATIONS IN HEALTHCARE

1. Databases for national healthcare

Jordan, Kuwait, Oman, Qatar and UAE took strategic decisions to implement databases for national healthcare. Some of them have successfully connected a number of their hospitals with their Ministry of Health.

On another level, and in most countries of the region, health institutions are automating their back office operations. Healthcare applications are either being developed internally or purchased from international or local sources.

2. Telemedicine and medical use of teleconferencing

Teleconferencing is catching up between local hospitals and other healthcare institutions from outside the region. This is mainly observed among private hospitals that have established strong links with foreign hospitals. An important telemedicine project, based on a satellite connection, was carried out by Jordanian and American hospitals. Similar projects are being implemented in Kuwait, Lebanon, Saudi Arabia and UAE.

Telemedicine, which encompasses a broader range of services and is in direct contact with patients, is not fully utilized in Western Asia. Some countries such as UAE has implemented an e-health portal allowing citizens to have ion-line access to medical expertise.

B. RANKING AND CLASSIFICATION OF EMCS ACCORDING TO THEIR MATURITY LEVEL

The ranking reflects a measure of the overall proficiency and success in adopting ICT in the healthcare sector. The maturity level of individual countries reflects their capability in developing and deploying e-health applications. Table 11 summarizes the maturity levels and ranking of the EMCs.

This section groups EMCs by maturity stage and presents the main features characterizing each stage.

1. Maturity level 1 : Iraq, Palestinian Authority, and Yemen

The EMCs ranked in this group are either at a stage of building their ICT infrastructure in preparation for developing and deploying ICT applications in healthcare establishments, or at the stage of having a strategy which is not supported by implementation plans.

2. Maturity level 2: Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, and Syrian Arab Republic

Countries in this group have strategies and implementation plans in place, but implementation results are limited in scale.

TABLE 11. RANKING OF EMCS ACCORDING TO THEIR LEVEL OF MATURITY IN ICT APPLICATIONS IN HEALTHCARE

Country	Level 1	Level 2	Level 3	Level 4
Bahrain		✓		
Egypt		✓		
Iraq	✓			
Jordan		✓		
Kuwait		✓		
Lebanon		✓		
Oman		✓		
Palestinian Territories	✓			
Qatar		✓		
Saudi Arabia		✓		
Syrian Arab Republic		✓		
U.A.E			✓	
Yemen	✓			

3. Maturity level 3: United Arab Emirates

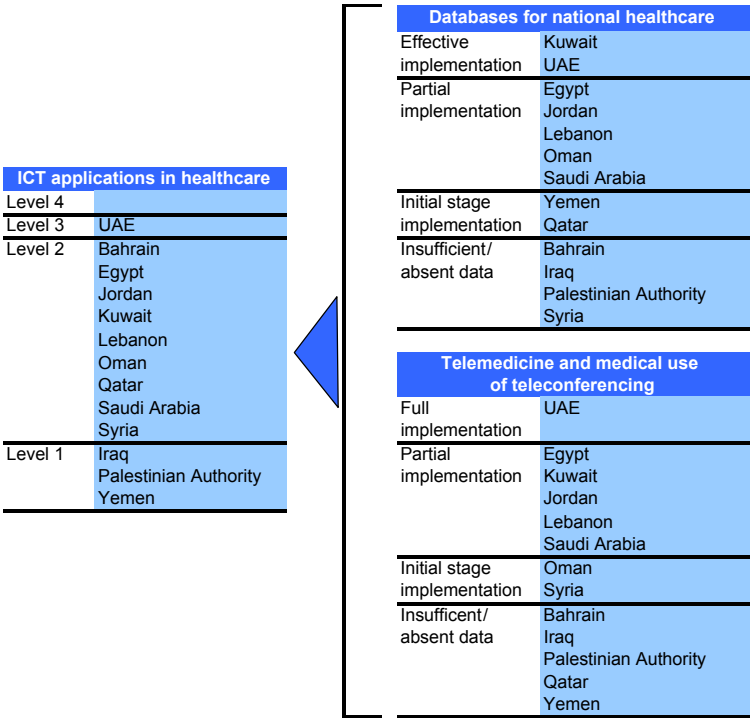
The United Arab Emirates is the only country at this level, with a vision and strategy, and implementation plans. Successful achievements in a number of areas exist, but have not yet realized the benefits at a national scale.

4. Maturity level 4: There are no countries at this level.

This group implies national implementation with full benefits of deploying ICT applications in government establishments across the whole country.

Figure 13 provides a summary of EMCs ranking regarding ICT applications in healthcare.

Figure 13. EMC ranking for ICT applications in healthcare



ICT applications in healthcare	
Level 4	
Level 3	UAE
Level 2	Bahrain Egypt Jordan Kuwait Lebanon Oman Qatar Saudi Arabia Syria
Level 1	Iraq Palestinian Authority Yemen

Databases for national healthcare	
Effective implementation	Kuwait UAE
Partial implementation	Egypt Jordan Lebanon Oman Saudi Arabia
Initial stage implementation	Yemen Qatar
Insufficient/ absent data	Bahrain Iraq Palestinian Authority Syria

Telemedicine and medical use of teleconferencing	
Full implementation	UAE
Partial implementation	Egypt Kuwait Jordan Lebanon Saudi Arabia
Initial stage implementation	Oman Syria
Insufficent/ absent data	Bahrain Iraq Palestinian Authority Qatar Yemen

C. CONCLUSIONS

ESCWA member countries are still a long way from using ICT effectively to transform healthcare. Many EMCs are still at the early stages in which basic ICT applications for management of hospitals and ministries of health are used. The following is a summary of the main indicators utilized for measuring the use and effectiveness of e-health in the ESCWA region:

Databases for national healthcare. The majority have strategies and plans with a variety of approaches ranging from a bottom-up approach, which aims at networking available separate databases together to ultimately reach a national database as in the case of Oman, and a top-down approach, which aims at developing a central national database as part of a strategic initiative such as in the case of Bahrain.

Telemedicine. There is still a segment of the population who are reluctant to use ICT when it comes to health issues.

D. RECOMMENDATIONS

Initiatives in this area should be planned and implemented at the levels of individual countries as well as country clusters, such as the Gulf states, always keeping in mind the benefits expected at the regional level. Recommended initiatives[9] for improving the status of ICT applications in healthcare across Western Asia include:

1. **Establishment and development of partnerships in selected area of ICT that are capital intensive**: This initiative could lead to co-ordinated national healthcare initiatives across EMCs. It would develop regional models and closely cooperate with similar multinational and local healthcare institutions from both the public and private sectors.

2. **Standardization in e-health**: Standardizing Arabic terminology and data convention used in healthcare systems as well as standardizing electronic medical records.

3. **Development of an e-health backbone network**: Such a network should connect several healthcare institutions and medical educational universities in different ESCWA countries. This regional e-health backbone network would provide the mechanism to identify best practices in the EMCs and encourage their dissemination across the region.

4. **Building awareness about the benefits of e-health.** Clearing common misconceptions about privacy and security related to ICT tools.

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(9) ESCWA, "Promoting e-health applications towards an Information Society in ESCWA member countries", World Summit on Information Society Western Asia Regional Preparatory Conference, E/ESCWA/ICTD/2003/WG.1/7.

X. DIGITAL ARABIC CONTENT

INTRODUCTION

Given the importance of content in a knowledge society, local content creation must become a major asset. Hence, there is strong and urgent need to develop and promote original Web content in Arabic.

Content reflects a wide and diversified range of human activities, such as economic, cultural, social, educational, healthcare, and others. The size and quality of content is an issue of supply and demand. So it may be argued that the size of content is proportional to the number of users.

The main trends in contemporary economy are: globalization, information and knowledge dependency, and unlimited connectivity. These trends have been strengthened and integrated over the past decade. Since economic activities seem to dominate over all other activities, it is safe to assume that the number of Internet users in a given society should correlate with the share of this society in global economic activities. In fact, data depicted in figure 14 confirms this argument.

It should be obvious that other activities, such as cultural and social play a major role as enablers to economic activities and should, therefore, not be neglected. This is the case with Korea which is transforming into a knowledge society, as is illustrated in figure 14.

The criteria for determining the level of Arabization and Arabic digital content in this review are the following:

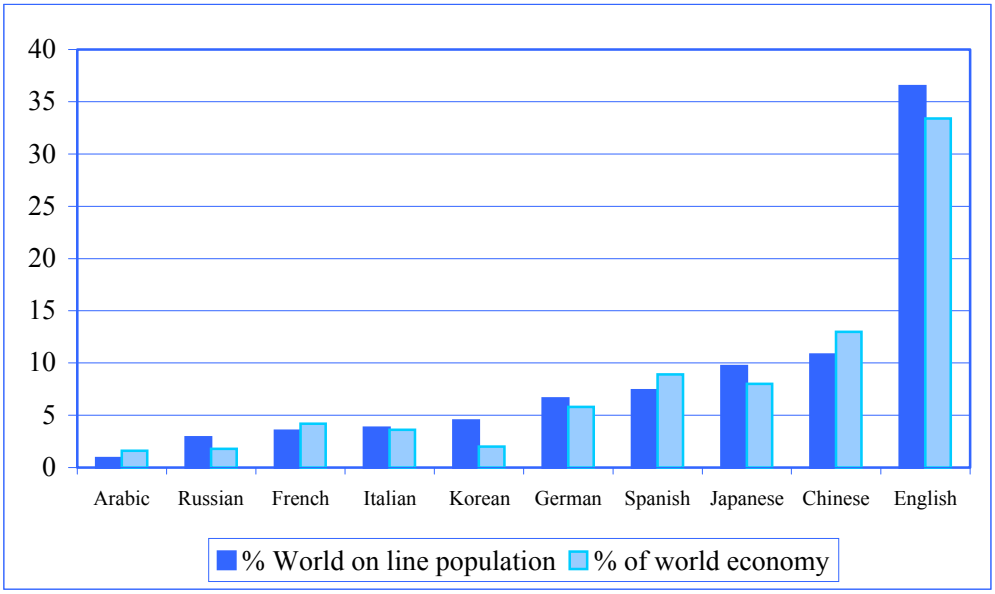
- Internet penetration;
- Types of actual Arabic digital content;
- Level of Arabic Web hosting.

A. COMPARATIVE ANALYSIS OF EMCS FOR DIGITAL ARABIC CONTENT

1. Internet penetration

The number of Internet users has grown drastically since 1992 reaching more than 650 million users across the world in September 2002. This number is expected to reach one billion by the year 2004. Arab Internet users were estimated at 0.9 per cent of worldwide Internet users in September 2002, while people speaking the Arabic language represent about 5 per cent of world population. In addition, Internet applications deployed in the Arab world do not reflect, quantitatively and qualitatively, a clear belief that the use of ICT could have radical impact on development.

Figure 14. Internet users and percentages of global economical shares in correlation to languages in September 2002

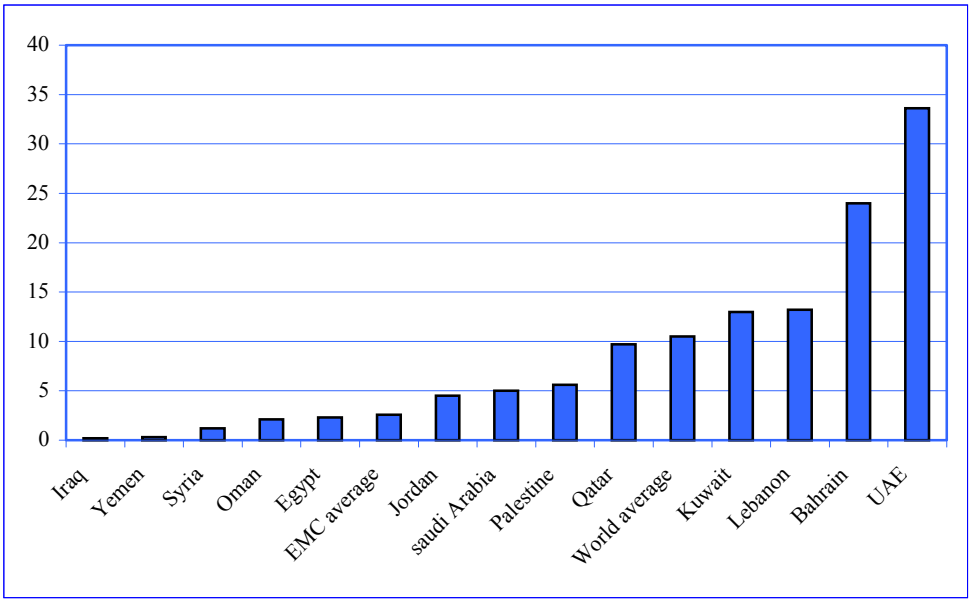


Source: http://www.glreach.com/globstats/

Intensity of Internet use varies between ESCWA member countries. Some countries, such as UAE, could be ranked among the top world countries, but other more densely populated countries are among the last, such as Yemen, as figure 15 illustrates. However the average of Internet penetration in the ESCWA region (2.6 per cent) is still very low compared to the world average (10.5 per cent).

Previous chapters of this report showed low use of e-applications in EMC, which can explain the weakness of Arabic content. This is a major issue that must be tackled seriously. Being absent from the field of digital content is a risky situation which could lead to serious negative effects.

Figure 15. Internet penetration in ESCWA region



Source: EMC profiles.

1. Types of Arabic digital content present

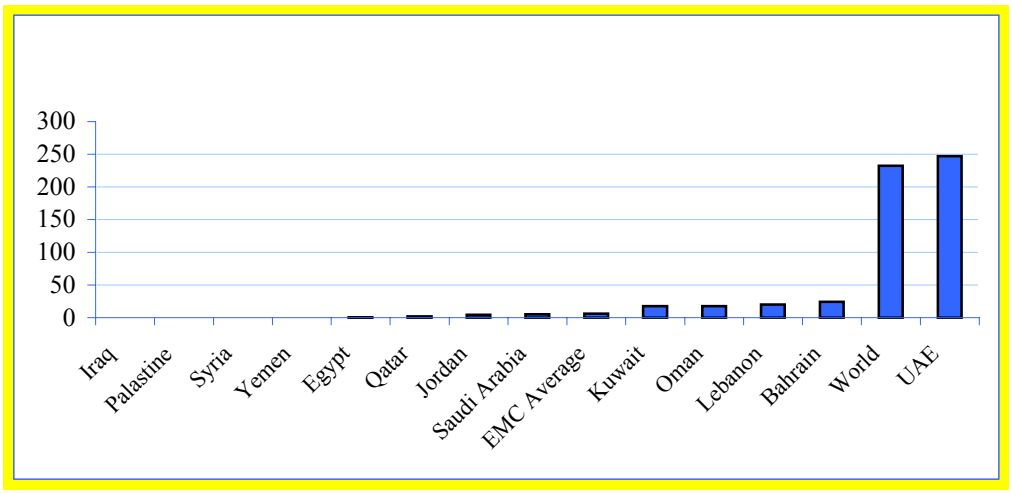
Country reports classify Arabic content in the following main areas:

- Local information and Arab newspapers,
- Cultural and social Web sites,
- Encyclopaedias and translated works into Arabic,
- Music and mobile tones,
- E-mailing and chatting.

2. Low level of Arab Web hosting

Many EMC country reports admit that most of their countries websites are hosted outside the country. This could have very negative implications on the security of websites and their contents. In fact, the number of hosts having country code in the top level domain (ccTLD) per 10,000 inhabitants in 2001, as shown in figure 16, reflects the very low hosting percentage of EMCs compared to the world average, except for the UAE.

Figure 16. Number of hosts with ccTDL per 10,000 inhabitants in 2001



Source: ITU 2002.

B. CONCLUSIONS

Access and use of ICT in Arabic countries is still limited. According to the UNDP Arab Human Development Report 2002, only 0.6 per cent of the Arab population uses the Internet, and personal computer penetration rate is only 1.2 per cent. Collectively, the country profiles state a number of obstacles that hinder the development of Arabic content on the Web. Following is a consolidated list of the main obstacles:

- Low level of ICT infrastructure and use in the Arab countries and low Internet penetration;
- Lack of adequate regulation: Absence of legislation for data privacy and security of information, and lack of enforcement of Intellectual Property Right laws;
- Lack of research addressing the particularities of the Arabic language;
- Lack of appropriate tools for Arabic Web publishing;
- Low level of ICT awareness;
- Limited income levels, and low purchasing power;
- Lack of pan Arab ICT strategy;
- Technical difficulties and weak tools for Arabic language processing;
- Lack of unified standard for Arabic;
- Need for Arabic versions of popular software products such as Arabic browser and search engines.

C. RECOMMENDATIONS

It should be stated at the outset that due to the shared nature of the issue under consideration, any efforts towards supporting Arabic digital content should be coordinated across the region. Main recommendations for improving Arabic Digital Content across the ESCWA region are:

1. **Creation of Arabic content industry:** As it was stated repeatedly in this report, ICT could be a very strong enabler towards real and sustainable development, which places content on top of the issues to be developed. For this to be achieved, EMC governments should create a healthy environment to promote the establishment of an Arab content industry.

2. **Strengthen scientific research and development:** Mainly in Natural Language processing, which should be supported by national governments through a framework of regional cooperation. Processing Arabic language needs to be seriously addressed by universities in the Arab countries. With the emerging of the semantic Web language-processing tools will be a necessity to reap full advantage of the Internet. Cooperation with international research centers will be certainly valuable in this regard.

3. **Increase the number of Arabic Internet users:** By making ICT tools affordable to all income levels of the population, and encouraging tele-centers and Internet cafés.

4. **Quality of data published:** More focus should be placed on gathering and publishing economic and social information on the Web. More emphasis on developing Web applications to serve the public, such as e-Health, e-Learning and Distance Learning.

5. **Facilitate access to everyone:** Facilitate Internet access to all citizens of both Arabic and English sites by using techniques such as Arabized domain names.

6. **Encourage online learning in Arabic:** This can be achieved by encouraging both students and teachers in the primary, secondary and higher education levels to use ICT and Internet technology in teaching and learning,

7. **Legislation:** Formulation and issuing of legislation and laws for all relevant areas including: IPR protection, data privacy and security, and digital signature regulations.

8. **Develop applications for automatic translation:** Developing free of charge and downloadable applications (free-ware) for translating into Arabic, and encouraging national initiatives that aim to electronically document the national heritage in Arabic.

9. **Develop Arabic standards:** To further increase Arabic content and therefore motivate more Arabic language users to go online, standards should be developed for the Arabic language use in areas such as transfer of information over networks, display and print character sets, page formatting, software and the various ICT applications (e-commerce, e-publish, etc.).

XI. REGIONAL AND GLOBAL COMPARATIVE ANALYSIS

This chapter provides a synopsis of the findings presented in an analytical and comparative manner. It is composed of four main sections. The first provides classification of EMCs into homogenous grouping based on analytical assessment of their capacities and profiles. The second section presents a comparative analysis of EMC performance worldwide. The third section provides a brief description of the ICT indicators database for the EMCs, and the fourth is a summary of country performance and area maturity.

A. CLASSIFICATION OF EMCS INTO HOMOGENEOUS GROUPS

This section will classify EMCs into homogeneous groups, within the region, It will set forth conclusions on these groups and their relative performance with peer groupings worldwide.

1. ICT policies and strategies: Regional models emerging

The analysis of EMCs' policies and strategies towards ICT based on empirical evidence with regard to articulation of strategic plan, existence of sectoral policies, and emergence of ICT firms, suggests that the emergence of three models in the region, comprising three groups of countries. Figure 17 highlights the three groups. The first, where ICT is being industrially deployed, is composed of the UAE and especially the Emirate of Dubai. ICT shows signs of development, where local ICT firms are acquiring regional or global status, government is being re-thought and re-organised to better leverage ICT efficiencies, with alignment to global standards.

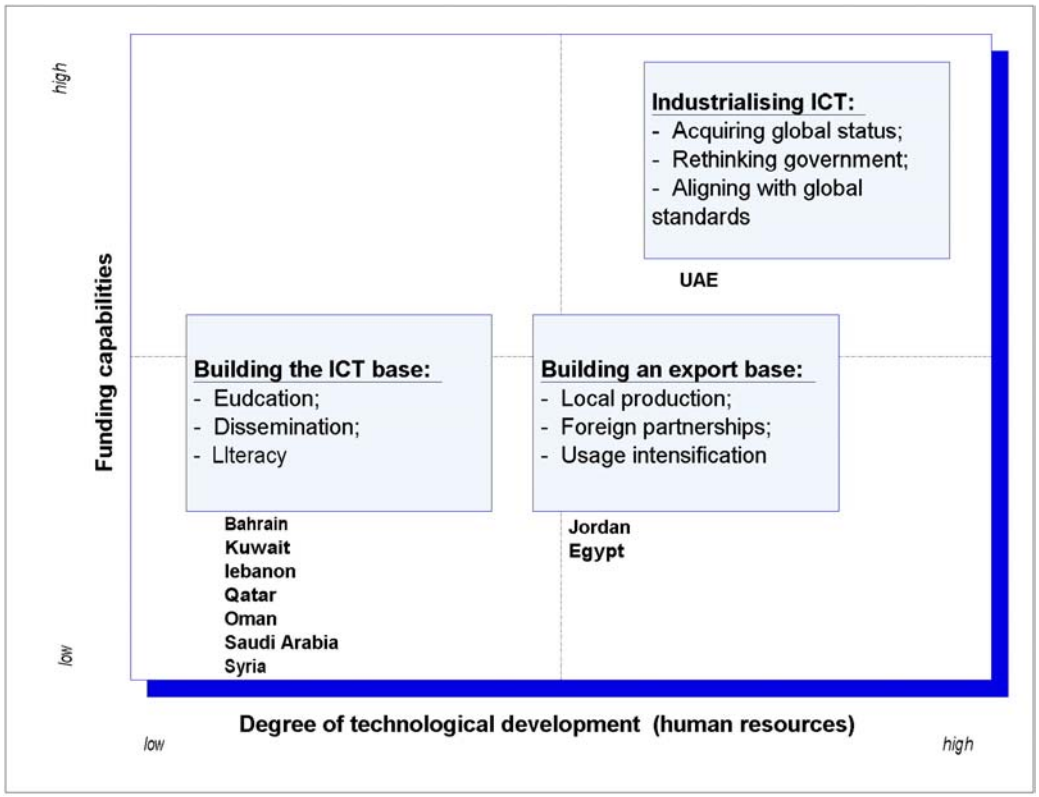
The second group, made up of Jordan and Egypt, is advancing to build an export base for ICT. Unlike the first model, ICT is not yet pervasive in terms of scale, but decisive strategies and policies allow and encourage the emergence of local ICT production, effective foreign partnerships, and use intensification patterns. The last group is at the stage where policy makers are helping in building the ICT base, with varying results. Few have devoted large budgets for ICT development, but education, improving ICT literacy and dissemination and awareness campaigns are helping some actors, firms and users alike, emerge. Iraq, Palestinian Authority, and Yemen, are not accounted for in this grouping exercise, as there is no evidence of decisive action of any sort in building an ICT base at this stage.

2. Legal and regulatory environment

On the legal and regulatory fronts, the EMC ICT regional profile distinguishes between EMCs based on: IPR frameworks, the degree to which their legal frameworks are geared to ICT, and whether they have ongoing World Trade Organisation (WTO) and Trade Related

Aspects of IPRs (TRIPS) commitments. As figure 18 suggests, only four EMCs have national IPR laws covering ICT, and are simultaneously part of WTO and TRIPS arrangements. The remaining nine have, with varying degrees, fragmented alignment on the comprehensive frameworks for proper ICT development.

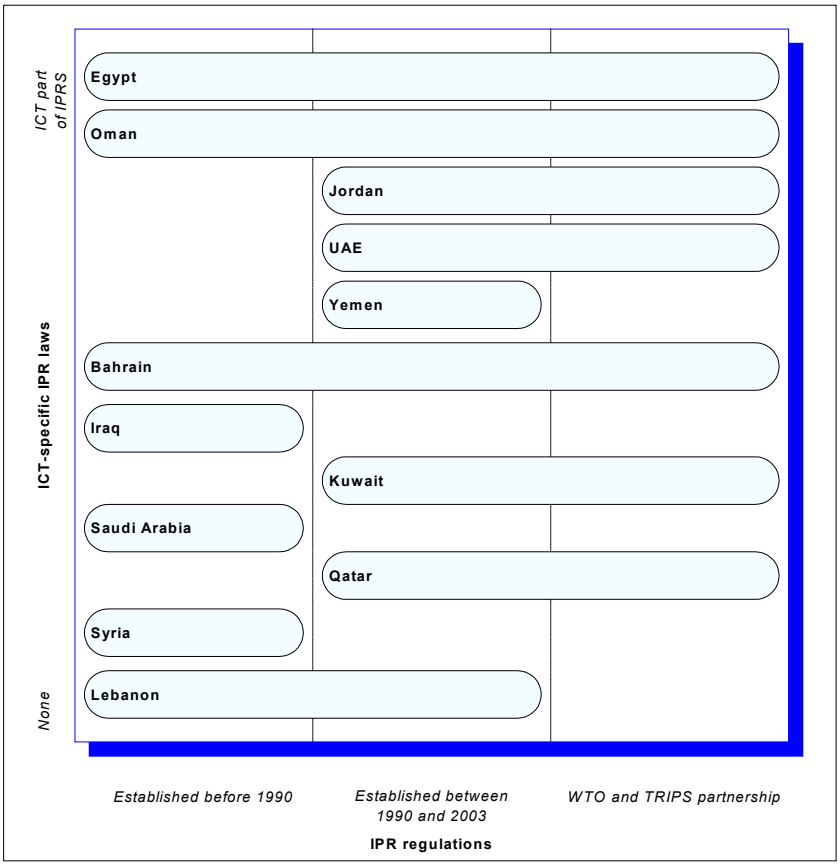
Figure 17. Regional ICT strategic models in EMCs



Source: ESCWA research.

From the point of view of technologists and investors alike, be they inside or outside the region, the partial performance of the region as a whole has negative implications. By failing to take a firm stance on protecting and allowing the emergence of proper ICT investments, be they intellectual or financial, and by displaying tardiness in drafting their laws, and in view of low levels of commitment to international trade agreement implications on ICT, EMCs fail to offer a sufficient confidence-building environment for ICT players.

Figure 18. Patterns of legal and regulatory frameworks within EMCs

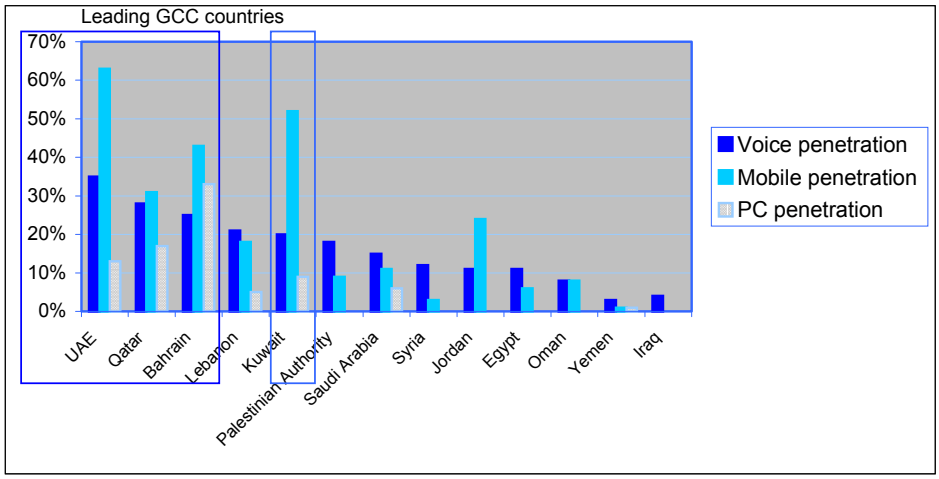


Source: ESCWA research

3. ICT infrastructure

Comparing EMCs on ICT infrastructure yields several density groupings. Fixed telephony, mobile services and PC equipment are some of the enablers for end-user ICT infrastructure. As indicated in Figure 19, it appears that three homogeneous groups emerge: leading Gulf Cooperation Council (GCC) member states, a middle-income group, and others.

Figure 19. EMC density rate groups on voice, mobile and PC penetration, 2001-2003



Source: ESCWA research.
2003 figures for Qatar.
2002 figures for UAE, Qatar, Kuwait, Palestinian Authority, Syria, Egypt, Yemen and Iraq.
2001 figures for Bahrain, Lebanon, Saudi Arabia and Jordan.

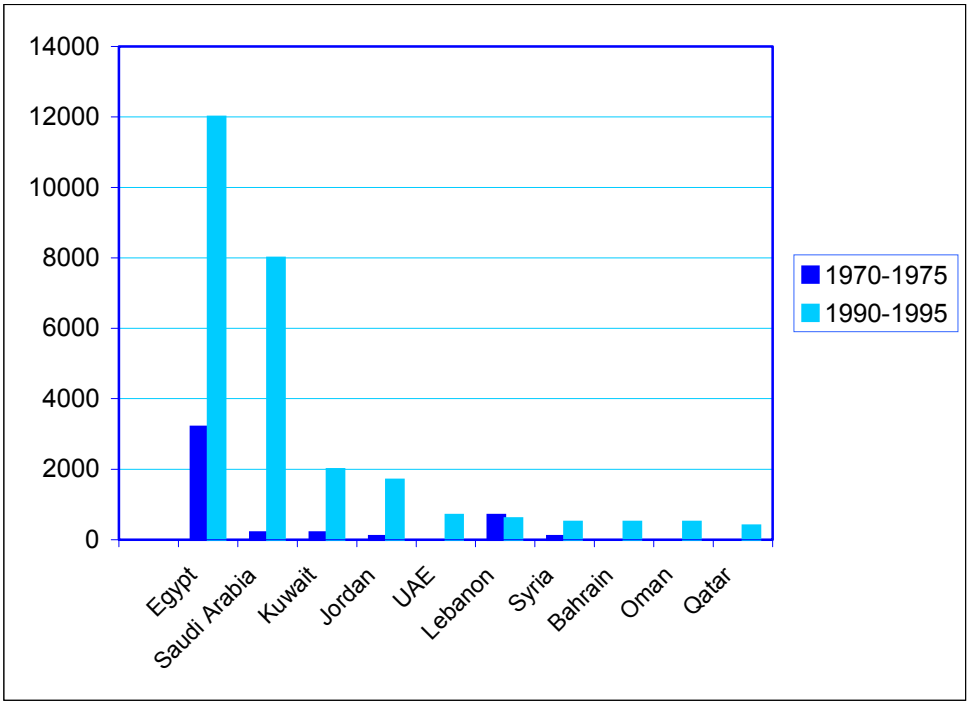
On fixed voice, mobile telephony, and PC penetration, leading GCC states offer their residential constituency some of the best rates in the world. This may be explained by high purchasing power, extensiveness of national operator networks, and market maturity traditions. The second group, homogeneous in its equipment rates, is heterogeneous in its economic and social realities. It includes diverse countries such as Lebanon, Saudi Arabia, Jordan, Egypt, and Syrian Arab Republic. Depending on the country, density rates have been on the one side a function of the evolution of telecommunications networks, and on the other a function of national deregulation to allow for new telecommunications devices. Lebanon serves as an example of the first condition where mobile services came to substitute a derelict post-war fixed network. A last group, made of Yemen and Iraq, suffers from some of the lowest ICT infrastructure equipment standards in the world.

4. ICT capacity building

The regional profile highlighted weaknesses in ICT capacity building. Looking beyond awareness campaigns, an efficient measurement of how EMCs build their ICT capacity, especially in transferring education and innovation into the private sector, can be established through technology output. A group of two EMCs namely, Egypt and Saudi Arabia leads the

region in terms of contributions to innovation. Figure 20 shows that in 1999, these countries distinguished themselves from other EMCs in terms of science and technology innovation, not necessarily inventions, but development.

Figure 20. Arab science and technology output, papers published in refereed international journals (number of publications), comparative table, 1970-1995



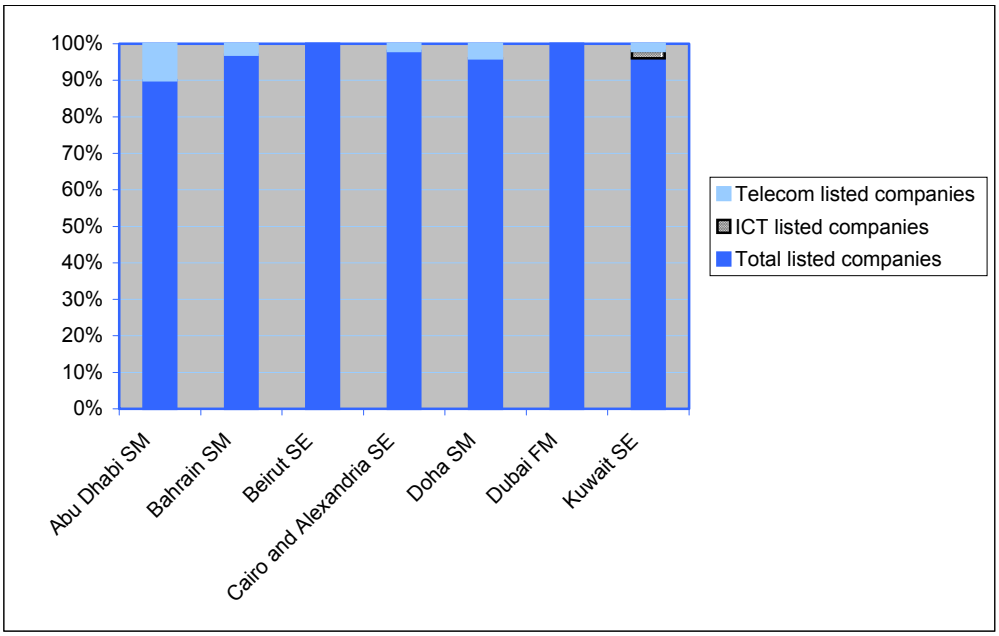
Source: A. Zahlan, "Arabs and the challenges of science and technology: progress without change", 1999.

Another group of EMCs include: Kuwait, Jordan, the UAE, Lebanon, Syrian Arab Republic, Bahrain, Oman and Qatar. In these countries, innovation in science and technology is marginal, in terms of output, but nevertheless does exist. A last group, for which no statistics are available, includes Iraq, Palestinian Authority, and Yemen, where innovation is absent or unaccounted for.

5. Building the ICT sector

The regional profile suggests that the area is not efficient in creating a sufficiently vibrant ICT sector. This common trait displays strong homogeneity in the region. As illustrated in Figure 21, ICT-related firms and telecommunications firms make up a very small segment of listed securities in EMC stock exchanges. The inability to bring to fruition investment programmes in ICT firms displays the weaknesses of the region in both creating ICT investment targets and providing proper financing to ICT endeavours.

Figure 21. Share of ICT and telecommunications companies in listed companies on EMC stock exchanges, September 15th, 2003



Sources: Abu Dhabi Securities Market, Bahrain Stock Exchange, Beirut Stock Exchange, Cairo and Alexandria Stock Exchanges, Doha Securities Market, Dubai Financial Market and Kuwait Stock Exchange.

6. ICT applications in government: regional models emerging

Analysis of the country reports with a focus on the issue of applying ICT in government reveals further grouping of EMCs based on the degree of progress and achievement in building the Web front-end of e-government, and in automating the back-end of public administration applications. EMCs may be organised in three groups. The first includes

countries that have adequate Web presence for their government information and services. Countries in this group have made the government information and some government services available on the Web. That is to say they built the front-end of the e-government and most of the back-end computerised applications. This group includes: Egypt, Lebanon, Kuwait, and UAE. The second group includes countries which are still focusing on the automation of public administration applications; i.e. the back-end of the government applications. They are late in building the Web front-end to offer public services to citizens, although some have the intentions of building that Web front-end as part of their strategy. This group includes Bahrain, Qatar, Saudi Arabia, Syrian Arab Republic, Bahrain, and Jordan. The third group comprises those countries that are still struggling in using ICT to computerise their public administration (although some may have the intention, but lack the capability). This group includes Iraq, the Palestinian Authority, and Yemen.

7. ICT applications in education

Detailed analysis of the country reports with a focus on the area of applying ICT in education reveals further grouping of EMCs classified on the basis of the degree of developing ICT applications. The first group includes countries which managed to realise effective e-learning models using ICT. This group comprises Jordan, Kuwait, Lebanon, and UAE. The second group comprises countries which focus on the computerisation of the applications of Ministries of Education, the provision of ICT capabilities to schools and universities, but are still to develop effective e-learning and distance learning communities. This group comprise Bahrain, Egypt, Oman, Qatar, Saudi Arabia, and Syrian Arab Republic. The third group comprise those countries, which are still struggling to provide basic computer facilities to schools and universities. This group comprises Iraq, the Palestinian Authority, and Yemen. Another mode of classification could be conducted around the progress of countries in developing or participating in virtual universities. Countries such as Kuwait, Lebanon, and Egypt could collaborate to establish a regional virtual university.

8. ICT applications in business and commerce

Analysis of the country reports with a focus on the area of applying ICT in business and commerce measured by the degree of readiness and uptake of the businesses and citizens of e-business and e-commerce reveals further distribution of EMCs into three groups. The first group comprise countries which have created adequate ICT infrastructure as well as legal and security framework that enable businesses. They have also launched awareness campaigns to encourage citizens to change their purchasing habits and adopt online transactions. This group includes Kuwait and UAE only. The second group comprises countries, at varying degrees of readiness, which are still behind in creating adequate ICT infrastructure and have obstacles in creating the legal and security framework necessary to encourage businesses and citizens to adopt e-business and e-commerce. These are: Bahrain, Egypt, Jordan, Lebanon, Oman, and

Qatar. The third group comprises countries that have obstacles (technical, political, or legal) which must be overcome for real activities towards e-business or e-commerce to materialise. This group comprises Syrian Arab Republic, Saudi Arabia, Iraq, Palestinian Authority, and Yemen.

9. ICT applications in healthcare

Although there is general lack of progress in this area across the region, countries can still be distributed into three groups. The first comprises countries which are venturing into e-health applications such as UAE, Jordan, and Kuwait. The second group comprises countries that are using ICT to computerise ministries of health and hospital applications mainly, without effective utilisation of the Internet. This group comprises Bahrain, Egypt, Lebanon, Oman, Saudi Arabia, Syrian Arab Republic, and Qatar. The third group comprises countries which are still struggling to introduce basic ICT infrastructure and applications in their Ministries of Health and hospitals. This group comprises Iraq, the Palestinian Authority, and Yemen.

10. Arabic digital content

Further analysis of the EMC country reports in this area reveals further classification of the EMC countries in this area as follows:

- Countries that have developed Arabic Web hosting capability which is still weak across the region;
- Countries that re developing Arabic Web sites, although these are often hosted outside the country;
- Countries that do not have Arabic Web sites at all.

B. EMC PERFORMANCE ON A GLOBAL SCALE

1. EMC performance on ICT policies and strategies

There is no standard approach to building ICT strategies. It appears that while emerging economies focus on building such strategies, nations with developed ICT industries did not necessarily build those strategies. Seven of the thirteen EMCs did, to varying degrees, plan ICT strategies, while others with developed ICT performance such as Bahrain and Kuwait did not formulate strategies, but actually took action on an operational basis.

ICT strategies are built to respond to challenges and opportunities posed by the emergence of technology and its integration in new social and business models. These are highlighted in table 12. Clearly, EMCs are not equally equipped in responding to these challenges and opportunities. Other more advanced nations have embedded these issues into

their social and economic fabric, as ICT grew more and more integrated in the manner with which they conduct business, social interaction, and learning.

TABLE 12. SUMMARY OF OPPORTUNITIES AND THREATS POSED BY ICT

ICT development opportunities	ICT development challenges
- Promotion of economic growth by facilitating the increase of other sources and investments	- Increased competition affecting productivity and stemming from investment rates
- Enhancement of employment opportunities	- Growing unemployment due to gains in work efficiency
- Improvement of the knowledge economy through increased education efficiency, development of the communication system, and the upgrade of human skills	- Widening regional disparities, increasing gaps within and between regions
- Promotion of work efficiency	- Definition of priorities in allocating public funds to ICT, versus other industrial sectors
- Acceleration of gap bridging between developing and advanced countries	- Challenges to established working modes and funding solutions, especially in the fields of e-commerce and e-transactions
- Poverty minimisation	
- Research and development advancement	
- E-commerce promotion	

Source: S. Satti and O.M Nour, "ICT opportunities and challenges for development in the Arab world", United Nations University, pp. 9 and 10.

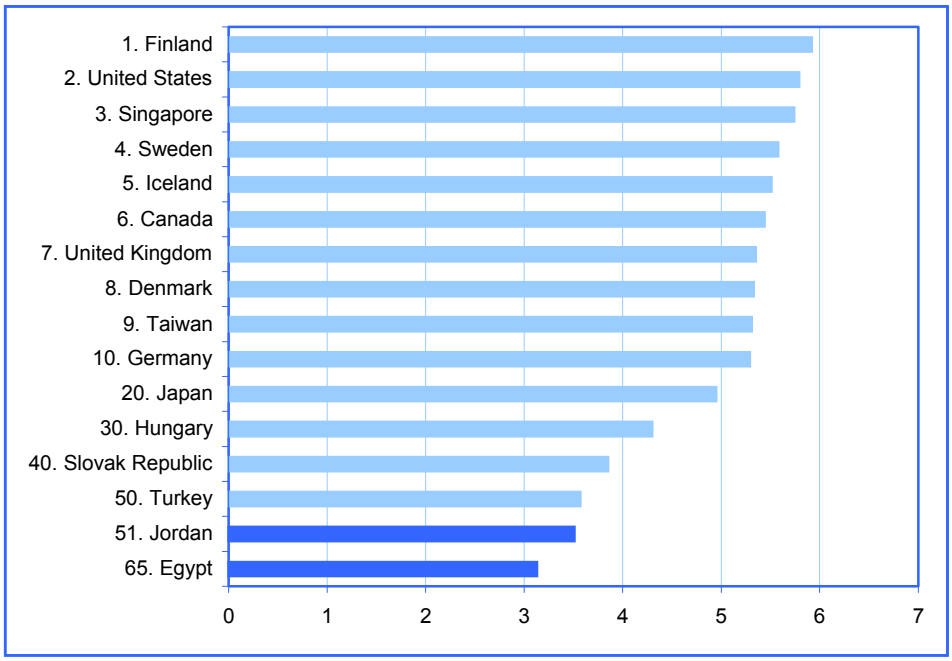
EMC ICT policies and strategies presented in this report, though potentially efficient for some of the countries analysed, fail to make an impact on the global scene. The region's economic weight does not enter into consideration as a determining factor, as even the best performing EMCs are small in relative global economic weight. Analysis shows that the region ranks at the lower end globally, if and when accounted for. Figure 22 illustrates that benchmarked on a global "networked readiness" index, the first EMCs to appear on the list are Jordan and Egypt, ranking 51st and 65th respectively.

2. EMC performance on the global legal and regulatory front

EMCs faced strong media and business challenges in the past decade. They were accused, sometimes rightly so, of complacency in law enforcement, lack of legal IPR and copyrights protection. The Business Software Alliance (BSA) ranks EMCs as having the highest rates of technology and software piracy occurrences in the world (figure 23). It

specifically points out Lebanon (79 per cent), Qatar (78 per cent), Bahrain (77 per cent), Oman (77 per cent) and Kuwait (76 per cent) on its list of top 25 offenders. Although these rates dropped in 2001, the BSA and others question the commitment and efficiency of EMCs to crack down on software piracy. Despite the fact that the Middle East and Africa represented only 3 per cent of financial losses accounted for by this institution (figure 24), the area remains a high profile target for the BSA's activities, presenting serious implication for EMCs in the process of join the WTO.

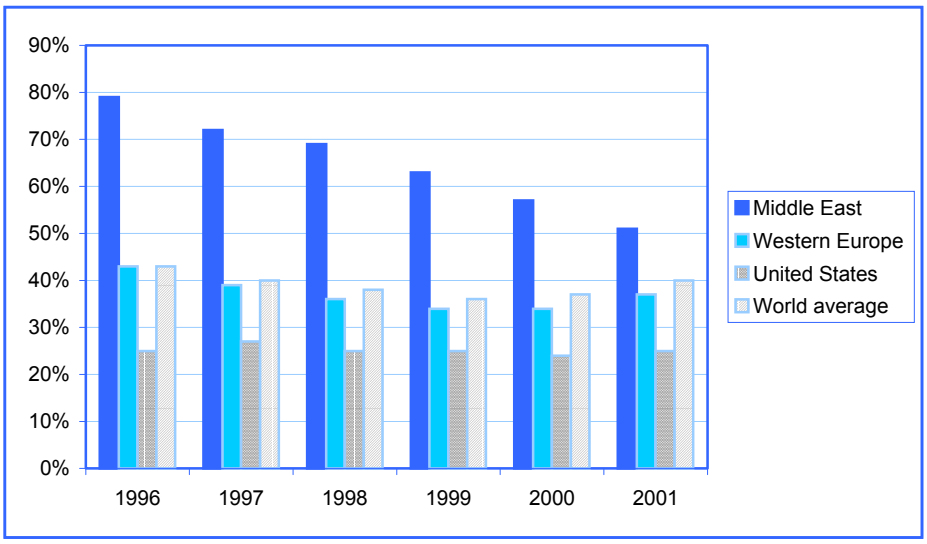
Figure 22. Networked readiness index 2002



Sources: Global IT Report 2002, World Economic Forum, *info*Dev, and INSEAD (2003).

Reasons put forward to explain this situation include: (1) structural technological disadvantage of the region; (2) cost of software and (3) rampant computer and business illiteracy. Cooperation between EMC judicial systems and BSA interests is increasing. High profile crackdowns are occurring in some Gulf states, and are commended by the stakeholders of the global software industry.

Figure 23. World software piracy rates for 2001



Source: Business Software Alliance, Piracy (study 2002).

On the front of issues of personal liberties, and the protection of citizen and consumer rights, press and human rights advocates reports indicate that the regions does not perform adequately in protecting and guaranteeing freedom of expression and personal rights.

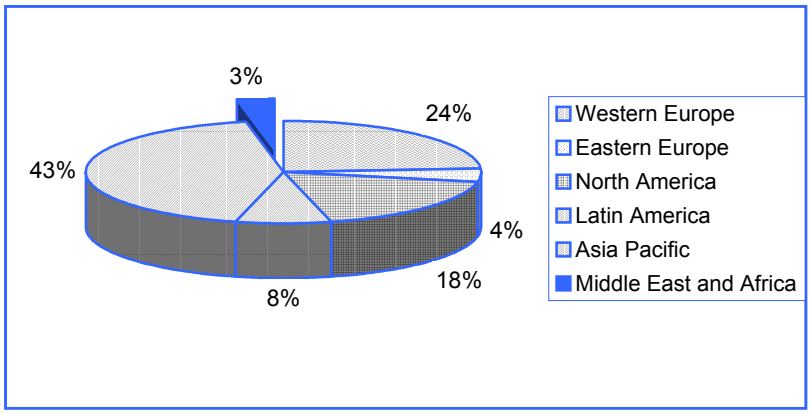
3. EMC performance in ICT infrastructure, compared with the rest of the world

Measured in relation to teledensity, the EMC region ranks in the lower levels globally. In its target teledensity measures for 2002, the International Telecommunications Union (ITU)[10] ranks EMCs in the lower level groups, namely B, C, D and E.[11] This is highlighted in figures 25 and 26.

(10) ITU, "2002 target rates for teledensity groups", 2002, http://www.itu.int/itudoc/itu-t/com3/focus/80500.pdf

(11) Teledensity rates are A: below 1 per cent, B: between 1 per cent and 5 per cent, C, between 5 per cent and 10 per cent, D, between 10 per cent and 20 per cent, E, between 20 per cent and 35 per cent, F, between 35 per cent and 50 per cent, G, above 50 per cent).

Figure 24. World software piracy rates losses per region in 2001 percentage of global losses



Source: Business Software Alliance, Piracy study 2002

Figure 25. 2002 teledensity groupings

Group B	
EMC's	Iraq
	Yemen
Selected peers	Albania
	Ivory Coast
	Gabon
	Ghana
	Morocco
	Pakistan
	Philippines
	Sri Lanka
	Sudan
	Togo
	Zimbabwe

Group C	
EMC's	Oman
	Palestinian Authority
Selected peers	Algeria
	Cuba
	El Salvador
	Namibia
	Paraguay
	Peru
	Thailand
	Turkmenistan
	Tonga
	Uzbekistan

Group D	
EMC's	Egypt
	Jordan
	Lebanon
	Saudi Arabia
	Syria
Selected peers	Armenia
	China
	Colombia
	Iran
	Jamaica
	Malaysia
	Mexico
	Tunisia
	Venezuela

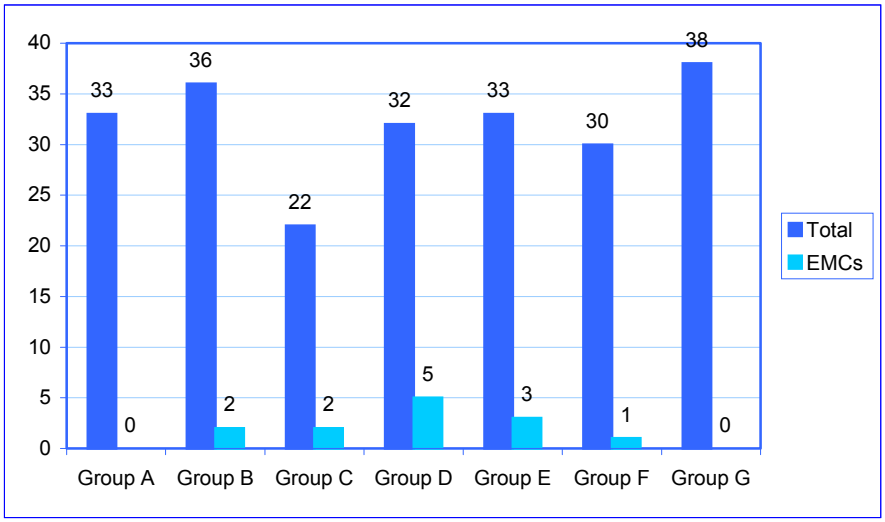
Group E	
EMC's	Bahrain
	Kuwait
	Qatar
Selected peers	Argentina
	Brazil
	Lithuania
	Poland
	Puerto Rico
	Russia
	Ukraine
	Uruguay
	Yugoslavia FR

Group F	
EMC's	UAE
Selected peers	Belgium
	Czech Republic
	Hungary
	Israel
	Italy
	Korea (Rep).
	New Zealand
	Portugal
	Reunion
	Singapore
	Spain

Source: ITU, 2002 target rates for different teledensity groups.

Another measurement for ICT infrastructure is found in ICT spending including hardware, software and telecommunications. The World Information Technology and Services Alliance (WITSA) measured ICT spending in the region, as compared with the rest of the world. EMCs, from the wealthiest per capita to some of the poorest, substantially under performed global standards in ICT spending, be it in hardware, software, associated services and telecommunications. The aggregate Egyptian spending on ICT reached only 2.5 per cent of GDP, whilst Saudi Arabia and the Gulf states spent 3.6 per cent of GDP (table 13). The world average ratio was 7.6 per cent. The World Economic Forum global ranking of countries based on ICT expenditure as a percentage of GDP (figure 27) shows that the best performing EMCs, Jordan and Egypt, ranked 63rd and 79th respectively.

Figure 26. 2002 teledensity groupings according to peer groups



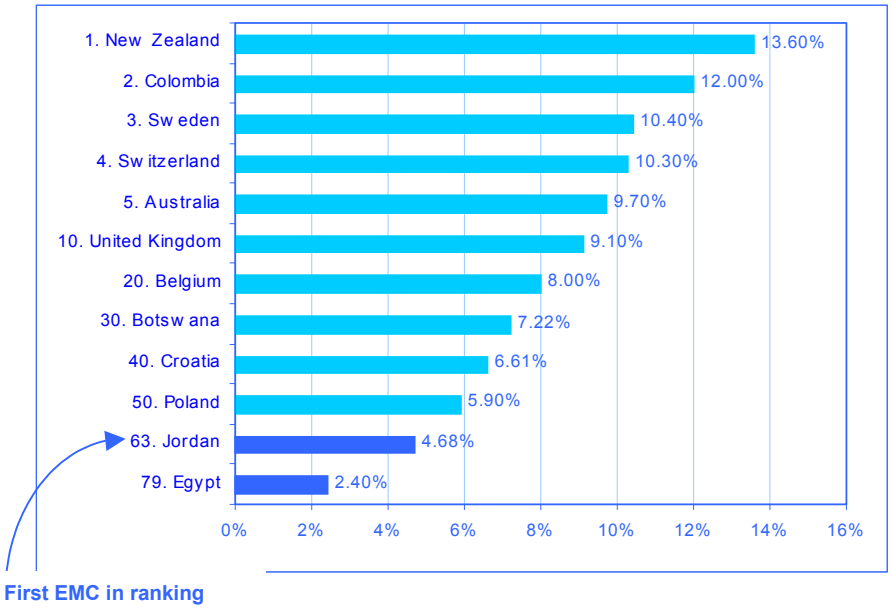
Source: ITU, 2002 target rates for different teledensity groups.

TABLE 13. ICT SPENDING, IN USD MILLIONS, 2001

Items	World	Saudi Arabia and Gulf countries	Egypt
Hardware	376,119	1,043	417
Software	196,237	302	124
Services	425,660	922	245
Internal	345,500	557	223
Other	33,705	94	38
Total IT spend	**1,377,221**	**2,918**	**1,046**
Telecommunications	1,037,877	3,276	1,337
Total ICT spend	**2,415,098**	**6,194**	**2,383**

Source: World Information Technology and Services Alliance (WITSA), 2002.

Figure 27. 2003 ICT expenditure, as percentage of GDP



Source: World Economic Forum, INSEAD and *info*Dev, "Global IT Report", 2003.

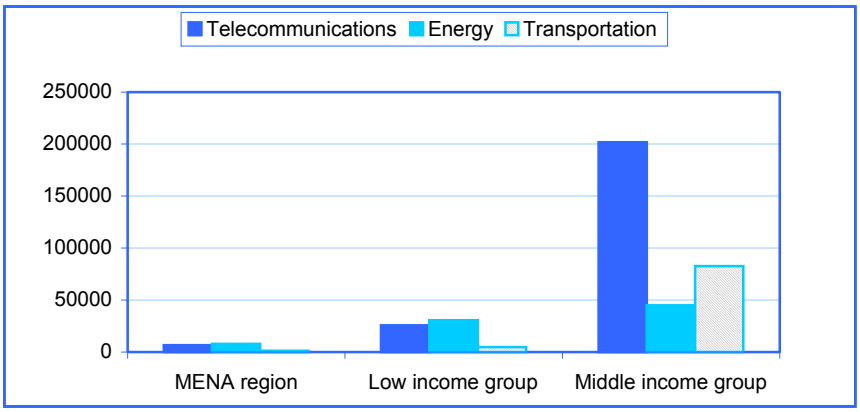
As suggested in figure 28, the absence of private sector participation in ICT infrastructure investment in region is noticeable. Combined Middle East and North Africa

(MENA) ICT infrastructure investments between 1995 and 2000 under performed that of the World Bank's Low Income group, and remained way below those accomplished in the Middle Income Group. This is despite the fact that only one EMC (Yemen) is classified in the World Bank report as Low Income, and five EMCs are classified as Lower Middle Income (Egypt, Iraq, Jordan, Syrian Arab Republic and Palestinian Authority), three as Upper Middle Income (Lebanon, Oman and Saudi Arabia), and four as High Income (Bahrain, Kuwait, Qatar and the UAE).

4. ICT capacity building in EMCs compared with the rest of the world

ICT capacity-building has three phases of development. The first phase involves awareness raising activities and associated measures, such as PC dissemination. The second phase focuses on training and assessing further developments required to obtain proper capacity. The last phase initiatives are carried out on a national scale.

Figure 28. Investment in infrastructure projects with private sector participation (1995-2000), million USD



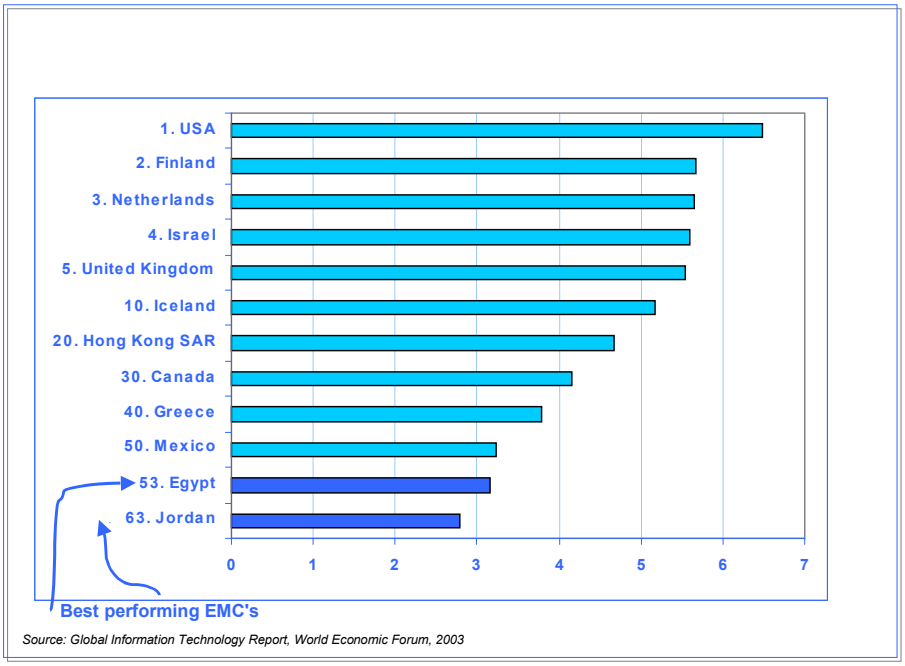
Source: World Bank 2002.

As benchmarked with international practices, it appears that: (1) most capacity building efforts in EMCs rank at the first two stages of ICT capacity programmes, with the notable exceptions of Jordan, Syria and the UAE; (2) leading foreign countries are now present at the third stage and beyond, especially in the ASEAN region (cases of Singapore, Malaysia, and Hong Kong) and are established as key players in a sector where EMCs are largely absent; (3) that countries that have been successful in ICT capacity building are also successful in building an ICT sector of relevance, although the link between ICT capacity

building and the emergence of an ICT sector is not established. Consequently, EMCs attempts at building capacities in ICT, compared to their inability on the other criteria discussed in this paper, does not establish a promising future technological uptake in the area.

Of particular importance is the "brain drain" factor, which affects the ICT sector. Well researched in several publications, including the UNDP's Arab Human Development Report 2002, the "brain drain" is attributed to the lack of recognition of scientists and technologists in the area, poor salary levels, and to the absence of exciting entrepreneurial endeavours in the ICT arena in the region. Figure 29 shows that Egypt and Jordan, the two best regional performers on "brain retention", ranked 53rd and 63rd respectively on the global scale, in 2003 according to the World Economic Forum. Poor regional performance in this regard deprives the region of valuable talent and hampers further development awareness campaigns, and high profile promotion and communication, are not sufficient solutions in themselves, for this problem.

Figure 29. Global brain drain ranking (7 is low, 1 is high)

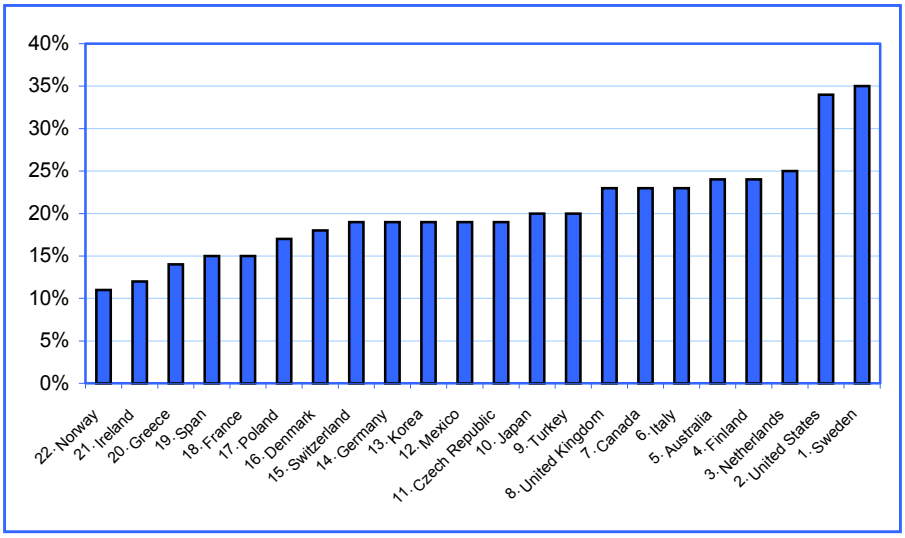


Source: World Economic Forum, INSEAD and *info*Dev, "Global IT Report", 2003.

5. EMC performance in building the ICT sector, compared with the rest of the world

At the end of 2002, 12 EMC stock markets had a total capitalisation of around USD 200 billion, representing less than 1 per cent of the global stock market capitalisation. Highly illiquid, these markets had very low trading volumes. For instance, 80 per cent of Egypt's listed companies (Cairo and Alexandria exchanges), are not publicly traded at all. EMC stock markets are dominated by the financial sector, which constitutes up to 60 per cent of all listed companies, with little diversification. The ICT sector is almost totally absent, except for telecommunications operators. Characterised by poor regulations in terms of reporting and transparency, EMC equity markets do not attract investors in ICT, and do not represent ICT gain realisation opportunities for entrepreneurs as in other markets. Despite action taken by EMCs and incentives extended to support building an ICT sector, performance remains marginal when compared with the rest of the world. By way of providing a measure of evaluation, Figure 30 shows that in the year 2000, ICT accounted for over 35 per cent of non-residential gross fixed capital formation, in some OECD member countries.

Figure 30. ICT investments as percentage of non-residential gross fixed capital formation, total economy, 2000



source: OECD, "ICT statistics 2000," www.oecd.org/EN/document

6. ICT applications in government within Western Asia, compared with the rest of the world

The e-government index has been computed for fourteen Arab countries including nine from EMCs. The objective of the e-government index is to establish a benchmark for positioning the relative status of e-government in the various regions of the world. With a score of 1.76, the Middle East ranked above the e-government global index mean of 1.62; details about each country are illustrated in table 14, while a comparison of e-government indexes on a regional basis is illustrated in figure 31. However, while interpreting the data presented in figure 31, the following considerations should be addressed:

(a) The 1.76 average overestimates EMCs' e-government readiness index for two main reasons: First, Syrian Arab Republic, Iraq, and Palestine are not included in this assessment thus distorting the actual average; second Israel is included in the benchmark of Middle East countries and its index increases the average of the Arab countries[12].

(b) The indices presented in figure 31 are relative values and should not be considered in the absolute[13]. If one considers the highest e-government index, which is 3.11 attributed to the United States, it does not mean at all that the few Middle East countries that scored above 2 are doing well. There are several options to the process in which a country choose to realize its e-government project. The progress of the latter is highly correlated to social, political, and economic factors that add to the complexity of implementing e-government projects.

Within a global perspective, the most advanced in e-governments applications are the USA, Canada, Sweden, Australia and the UK. All were early adopters of ICT applications. It is interesting to note that some early adopters ran into implementation hurdles. According to a study titled "International e-Economy Benchmarking" by Booz, Allen and Hamilton (November 2002), some of the nations who started later, such as Germany, Italy and Japan, have made rapid progress as a result of energetic programmes which build on the lessons learned by the early adopters. This gives hope for EMCs who may be late in adopting e-government. Based on the experience of world leaders in e-government, the conditions for success in e-government are:

- strong government leadership;
- clear, specific, comprehensive and achievable strategy, focusing on getting citizens online, closing the digital divide and encouraging greater levels of sophisticated use on the Internet;

(12) By excluding Israel, the new average would be 1.72 for the Arab countries included in this indexing exercise.

(13) For more information on how these indices are derived refer to UNDPEPA and ASPA, "Benchmarking E-government: A global perspective", May 2002.

- supporting ICT infrastructure and a secure interface between the government, businesses and citizens;
- dual focus on back-office integration (the automation of the internal processes of government establishments) and front office services (providing services to citizens and businesses).

TABLE 14. MENA E-GOVERNMENT INDEX

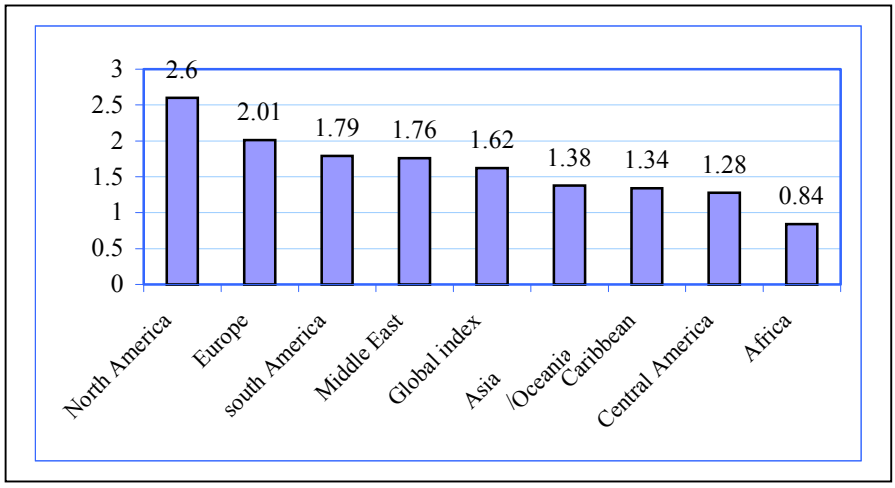
Country	E-government Index
Algeria	1.27
Bahrain	2.04
Egypt	1.73
Jordan	1.75
Kuwait	2.12
Lebanon	2.00
Libya	1.57
Morocco	1.47
Oman	1.64
Qatar	1.81
Saudi Arabia	1.86
Tunisia	1.36
UAE	2.17
Yemen	1.30

Source: UNDPEPA and ASPA, "Benchmarking E-government: A global perspective", May 2002

The US e-government strategy, the UK's Government Gateway and the German e-government policy BundOnline are all successful examples to be studied. These are characterised by:

- High levels of basic use of e-government applications as evident in the large number of staff and services online.
- A high level of interaction between governments, citizens and businesses.

Figure 31. Regional comparison of e-government index



Source: UNDPEPA and ASPA, "Benchmarking E-government: A global perspective", May 2002.

7. International best practice cases applying ICT in education

Compared with other regions of the world, Europe is a good example of best practice in applying ICT in education. The e-learning programmes running in Europe provide a good example to be followed for successful e-learning. The European Union runs regional programmes for e-learning, organised European summit for setting a European e-learning strategy, and published a set of ten e-learning recommendations. Examples of the regional projects sponsored by the European Commission include:

- Projects for creating Regional Virtual University;
- Projects for creating a model for a European University for e-Learning; and
- Projects for developing e-Learning environment

Such projects are run by multi-country teams, which encourage cross-country co-ordination and co-operation across the region. An important role for the European Commission is to promote collaboration and exchange of experiences in the area of e-Learning and pedagogical development, especially with a view towards:

- Supporting trans-national virtual meeting places,
- Stimulating European networking at all levels, and in this context establish and provide networks for the benefit of teacher training.

The European e-Learning Initiative was announced by the European Commission in Brussels in 2001, and has led to a regional e-Learning Action Plan, and the allocation of funding. The action plan aims to boost change from traditional education to systematic applications of ICT for the provision of flexible learning and competence building.

8. ICT applications in business and commerce in Western Asia

In 2002, the global e-commerce market is valued at around $2,293 billion[14]. In 2000/2001, the Arab world e-commerce market was estimated at 3 billion USD and is expected to reach 5 billion USD by 2005[15]. Even though the forecasted growth of e-commerce is promising as shown in table 15, EMCs and Arab countries are still lagging behind all the other regions.

TABLE 15. FORECAST B2B AND B2C IN 2006, BY REGION
(BILLIONS OF US DOLLARS)

Region	B2B	%	B2C	%	B2B/B2C
North America	7,127	58.1	211	37.5	34
Asia Pacific	2,460	20	185	33	13
Western Europe	2,320	18.9	138	24.6	17
Latin America	216	1.8	16	2.9	14
Eastern Europe	84	0.7	6	1.1	14
Africa and Middle East	69	0.6	5	0.9	14
Total	**12,276**	**100**	**561**	**100**	**22**

Source: Adapted from Forrester (2001), decimals have been rounded

Successful adoption of ICT in commerce and business is dependent on a number of critical factors such as: infrastructure, the political environment, and the regulatory environment. Business readiness in Europe is strongest in Sweden followed by Germany and the UK. Business uptake is reflected in the level of small and medium enterprises (SMEs) establishing presence on the Internet, and online trading., as they represent the engine for economic growth. Barriers to business uptake are: concerns about security, cost, and insufficient numbers of online customers. World leaders in the uptake of business and commerce of ICT and online technologies are: Japan, Sweden, the USA, the UK, and Canada. This is established on the basis of the high level of business readiness, level of adoption and

(14) UN conference on Trade and Development, "Ecommerce and Development report 2002", executive summary ref:UNCTAD/SDTE/ECB/2 (SUM), page 1.

(15) http://www.tradepartners.gov.uk/it_saudi_arabia/ecommerce/overview/growth.shtml.

use, level of interaction, and level of transaction activity. Benefits appear in the form of changes in consumer spending behaviour, and in business processes such as ordering and logistics. Online spending in the USA is the highest in the world.

Examples of successful initiatives to promote e-business are: the "MINinfo centers" cross-departmental initiative in France, created to provide local information and support to businesses; the Business Services Centers established in Canada to provide support to businesses by making government resources available online; and the ECOM "Electronic Commerce Promotion Council" of Japan, through which government provides training to businesses.

9. ICT applications in healthcare at the international level

The most successful adoption of ICT in healthcare is in the US and Europe. A large number of programmes in Europe take advantage of ICT to provide higher quality of healthcare through: enhanced communication between health care professionals, better access to information, higher efficiency in handling forms, and better control of expenditure. The target beneficiaries of applying ICT to healthcare are: patients, doctors and healthcare professionals, hospital staff, and health insurance companies. Effectiveness of automated health care systems are measured in terms of a number of indicators including:

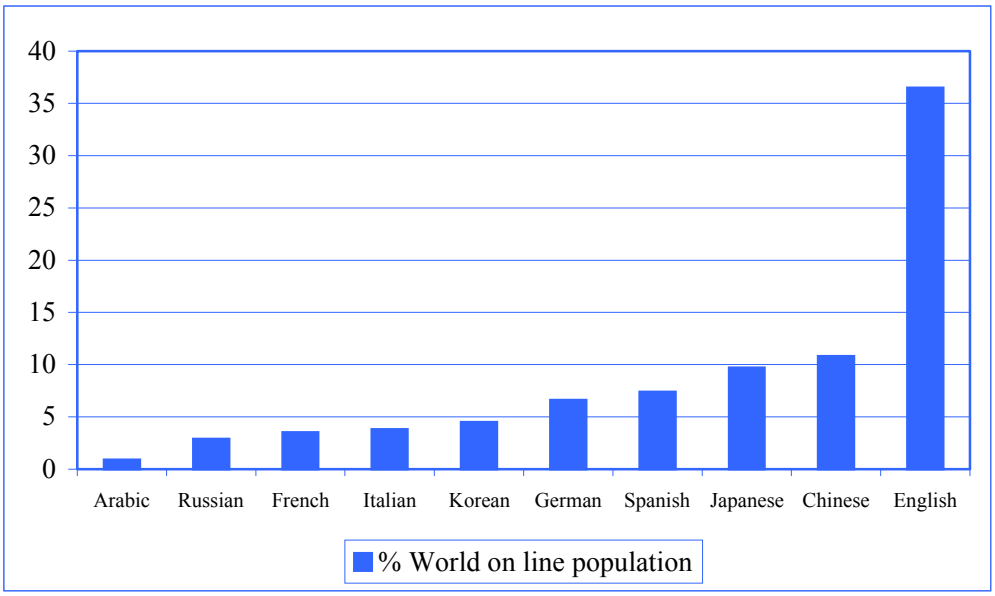
- penetration rate of PCs amongst doctors,
- percentage of forms transmitted electronically,
- electronic and automatic handling of patient information.

EMCs are far behind other regions in applying ICT to healthcare in a holistic manner.

10. Digital Arabic content, compared with the rest of the world

The number of Internet users has grown drastically since 1992 reaching more than 650 million users across the world in September 2002. Figure 32 shows the distribution of these users according to their mother tongue. This number is expected to reach one billion in the year 2004. While native speakers of Arabic language represent about 5 per cent of world population, Arab Internet users were estimated at 0.9 per cent only of worldwide Internet users in September 2002. In addition, Internet applications deployed in the Arab world do not reflect, both quantitatively and qualitatively, a firm belief that the use of ICT could strongly impact development. Intensity of Internet use, as reflected by the Internet penetration, varies between ESCWA member countries. Some countries could be ranked among the first world countries such as UAE, but other more densely populated countries such as Yemen, rank among the last worldwide. The average Internet penetration in Western Asia is 2.6 per cent which is very low compared to the world average of 10.5 per cent.

Figure 32. Internet users according to mother tongue (September 2002)



Source: http://www.glreach.com/globstats/

C. ICT INDICATORS DATABASE FOR WESTERN ASIA

A generic database software for the purpose of collecting and processing ICT indicators for the region was developed by a group within ICT Division in ESCWA. The database allows the organization of indicators into meaningful groups for ease of comparison and analysis. A three dimensional model for data structuring was adopted enabling the user to define as many indicators as he/she wishes for as many countries as desired and for several years. The system can automatically calculate aggregates and has an option to use previous year data when the year under consideration has missing data. Each cell in the database is individually referenced using the meta data concept, thus enabling analysts and decision makers to authenticate the figures used.

At present there are many gaps in the data tables, which ESCWA hopes to fill over time with the help of official organizations in member countries and consultants who will be commissioned by ESCWA to update country profiles on ICT activities.

Once launched, the system will be hosted on the ESCWA Web site and can be accessed for reporting and charting purposes in 2004.

As an example of the output that could be produced from the database, a number of "hard" and "soft" indicators were selected for the year 2002. These included:

1. Fixed lines teledensity;
2. Mobile cellular lines per 100;
3. Personal computers per 100;
4. Internet users per 10000;
5. Internet hosts per 10000;
6. The human development index (HDI);
7. The Gender Development Index (GDI) value;
8. Adult literacy rate.

Figure 33 represents the combined values of the eight indicators for the ESCWA region compared with the values of the same indicators for all the Arab States and the world for 2000. Figure 34 shows the e-government index for several countries in the region in descending order of performance, together with the ESCWA region, the Arab states, and world average values. Annex 10 contains figures 1 to 13 showing these indicators for every country in Western Asia in comparison with regional, Arab and world averages for 2002.

Figure 33. Western Asia compared to Arab States and the world

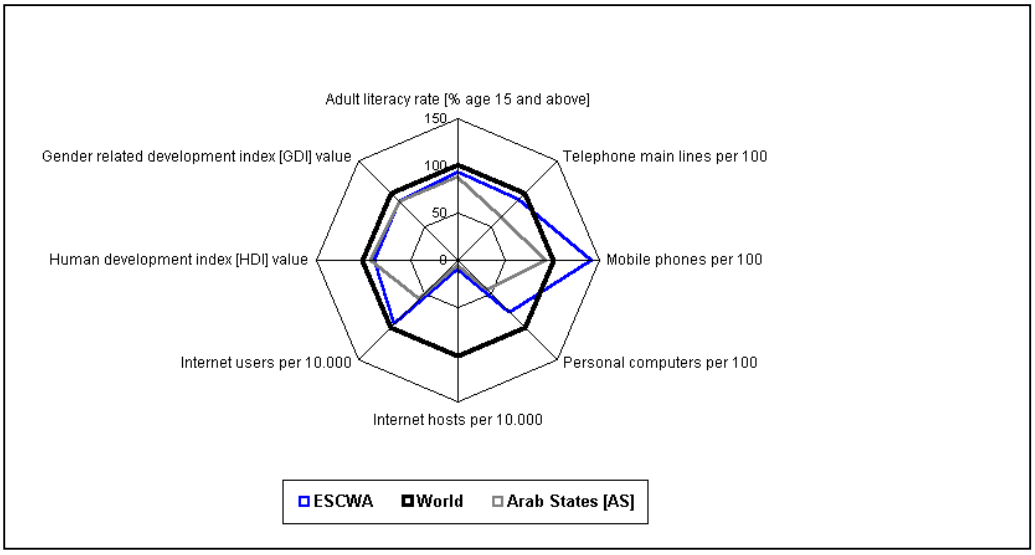
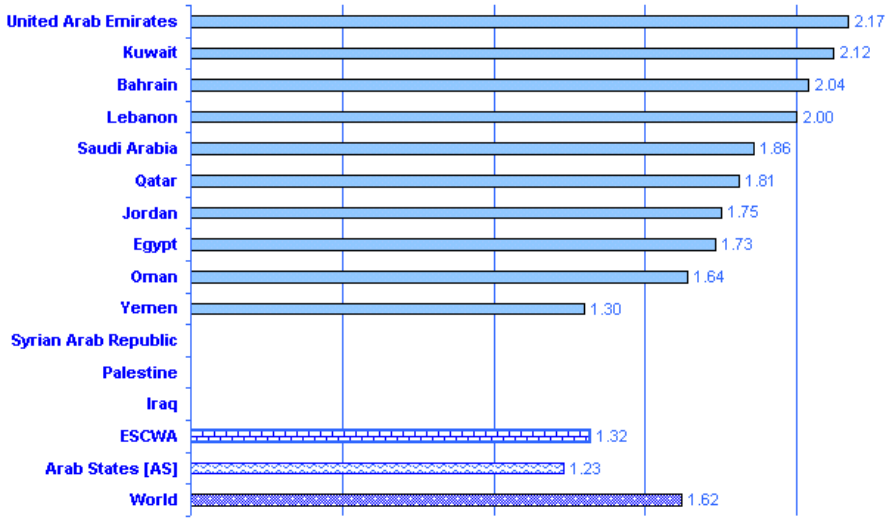


Figure 34. E-Government index



D. SUMMARY OF COUNTRY PERFORMANCE AND AREA MATURITY

Based on the qualitative analysis and ranking presented in the previous sections, a quantitative scheme of evaluation was devised to help present a summary of the region's performance. The scheme uses the maturity level rating discussed in the previous sections as numerical measure.

Using the above described measuring scheme, a table was built displaying country performance and ICT area maturity. The area of digital Arabic content was excluded from the table due to lack of individual country performance evaluation.

It is important to note that this measuring scheme is indicative and not accurate, since measuring is based on qualitative ranking evaluations. As such, table 16 is only intended to give an approximate, and to some extent subjective, overview of the performance, and not an accurate evaluation.

The table illustrates that UAE has the best overall performance (28/36), while Iraq, Palestinian Authority and Yemen have the poorest overall performance (9/36, 10/36 and 10/36 respectively). It also indicates that the area of capacity building has the highest maturity (28/52), while the area of sector development has the lowest maturity level (19/52).

TABLE 16. COUNTRY PERFORMANCE AND AREA MATURITY

Activity / Country	Policies and Strategies	Legal and Regulatory	Infrastructure	Capacity Building	Sector Development	E-Government	E-Learning	E-Commerce	E-Health	Country performance (out of 36)
Bahrain	2	2	3	2	1	3	3	2	2	20
Egypt	2	2	2	3	2	2	2	2	2	19
Iraq	1	1	1	1	1	1	1	1	1	9
Jordan	3	3	2	3	2	3	3	2	2	23
Kuwait	2	2	2	2	1	2	3	3	2	19
Lebanon	1	2	2	2	2	3	2	2	2	18
Oman	2	2	2	2	1	2	2	3	2	18
Palestine	1	1	1	2	1	1	1	1	1	10
Qatar	2	2	3	2	1	2	1	2*	2	17
Saudi Arabia	1	1	2	2	2	2	2	3	2	17
Syrian Arabic Republic	1	1	1	2	1	2	2	2	2	14
United Arab Emirates	3	3	4	3	3	3	3	3	3	28
Yemen	1	1	1	2	1	1	1	1	1	10
ICT area maturity (out of 52)	22	23	26	28	19	27	26	27	25	

* Value derived from country average performance.

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   (d) Profile of the Information Society in the Hashemite Kingdom of Jordan
   (e) Profile of the Information Society in the State of Kuwait
   (f) Profile of the Information Society in the Republic of Lebanon
   (g) Profile of the Information Society in the Sultanate of Oman
   (h) Profile of the Information Society in the Palestinian Authority
   (i) Profile of the Information Society in the State of Qatar
   (j) Profile of the Information Society in the Kingdom of Saudi Arabia
   (k) Profile of the Information Society in the Syrian Arab Republic
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Annex 1

Main features of ICT policies and strategies

Country	Criteria	Features
Bahrain	National information society policies and strategies	Vision: Bahrain's vision is to position itself as a centre of excellence in e-business. Specifically, the country aims to establish Bahrain as the "centre of choice" for e-business in the Middle East by nurturing successful partnership and fostering infrastructure to serve the citizens and business community"[1]. National strategy: Under the above vision, no articulated national ICT strategy has been written out. However, Bahrain has taken operational steps towards positioning itself in the ICT field.
	Sectoral plans for building the information society	Implementation plans: The ICT strategic vision is being implemented at the ministerial level by initiatives described below, and is complemented by an incubator initiative, the "Bahrain Incubator", to develop ICT firms. Initiatives: The Bahraini Government is aligning its 22 ministries along several fronts including: - Strategic Health Information System / Ministry of Health: a project estimated at USD 53 million, approved in September 2001, allowing clinics and physicians to share healthcare related information. - Ministry of Commerce and Industry: with a two-way communication infrastructure and online payment facilities, the ministry's website offers online delivery of government services. - Ministry of Interior: the Directorate of Traffic and the General Directorate of Immigration and Passports are developing applications with online services for traffic and visa services. - Other programmes include the Ministry of Education's ICT training programme, the plans of the Ministry of Electricity and Water for Web enabled systems as well as the General Directorate of Customs and Ports' Web-enabled system to streamline business processes and increase quality of services.
Egypt	National information society policies and strategies	Vision: The vision is to stimulate national demand for ICT use and applications, and to position Egypt as a player on the ICT export market, by developing its national ICT human resources capabilities. National strategy: Egypt's priority to build a local ICT base. Alliances with foreign global ICT players are sought. Underpinning that effort is a review of the legal and regulatory environment to stimulate industry uptake.
		- Egypt aims at stimulating national demand by increasing governmental role in the development and use of ICT applications. Egypt expects to "cascade" this national effort down onto the lower administrative echelons: this covers ICT applications, underlying infrastructure, education and training projects. To position Egypt as a technology export base, government and administration will promote the establishment of a national organization of software exporters, develop technology parks, promote e-commerce and build the human skills base.

(1) Ministry of Commerce, Kingdom of Bahrain, "The ministry of commerce and industry launches its second generation Web site", March 10, 2003, http://www.commerce.gov.bh/News_DisplayNews.asp?NewsID=474

Country	Criteria	Features
	Sectoral plans for building the information society	Implementation plans: - Human resources: the objective is to deliver over 5,000 specialized management and personnel yearly, and to increase productivity from USD 10,000 yearly to USD 40,000 yearly for each such qualified ICT individual. - ICT industry: the government encourages the national ICT industry to grow. Alliances with global corporations are perceived as key enablers for this growth. Government expectations set the value of the national ICT industry at USD 500 million in 2002 - ICT infrastructure: Egypt is to revamp its ICT infrastructure by renewing its national communication network, and expanding connectivity. Measures include deregulation, enforcement of quality of national services and tariffs reduction to encourage growth. - ICT legal and regulatory framework: Egypt is undergoing review of its legal environment to promote confidence in its ICT sector, especially in the area of software. Initiatives: Execution of national projects is split between the Ministry of Communications and Information Technology (MCIT), and other ministries. The Ministry of CIT is taking over projects of national scope, including (1) digitising national accounting and land registry, (2) promoting e-commerce, (3) improving the communications network, (4) creating a coordination unit for the follow-up of national projects, (5), developing the national post office, and (6) digitising national heritage. - Human resources: Egypt launched a training initiative aiming at upgrading its average skilled and highly qualified ICT labour. - Egyptian ICT infrastructure plan: an integrated approach with the development of infrastructure, performance of ICT regulation body and a review of services and tariffs provided to the public.
Iraq	National information society policies and strategies	- Although Iraq has built an advanced scientific culture and tradition of scientific RDI, under the previous regime, the Iran-Iraq war, the 1991 Gulf War and the 2003 Gulf War have shut Iraq out of recent ICT developments. - With little room left in the United Nations (UN) "Oil for Food" programme to sponsor technology, Iraq now ranks at the lowest levels of ICT development, with no ICT development strategy. The International Telecommunications Union ITU ICT for e-readiness Index for Iraq is 206 in a sample of 208 nations.
	Sectoral plans for building the information society	- There is no national ICT sectoral plan proper for Iraq, although some ICT-related development, especially in the field of telecommunications and mobile connectivity exist.
Jordan	National information society policies and strategies	Vision: building Jordan as an ICT exporting economy is a key point of the country's Jordan 2020 Vision[2]. National strategy: The "Regulatory framework, Enabling environment, Advancement Programmes, Capital and Human resource development" initiative (REACH), the national ICT strategy, professes to efficiently bring about change in ICT employment, exports and Foreign Direct Investment (FDI). It has a clear milestone plan with effective steer and follow-up by national authorities. The strategy covers (1) legal and regulatory, (2) infrastructure development, (3) IT industry development, (4) capital and finance, (5) human resources, (6) government support. The following results are expected in 2004: - Creating 30,000 ICT related jobs (20,000 direct and 10,000 indirect); - Achieving USD 550 million in annual exports; - Collecting USD 150 million in cumulative FDI.

(2) Jordan 2020 Vision, http://www.jv2020.com

Country	Criteria	Features
	Sectoral plans for building the information society	Implementation plans: Jordan has chosen several implementation programmes in the form of technology incubators, technology parks, education and framework environment improvements. Initiatives: Jordan has several initiatives underway; including: - "Connecting Jordanians Initiative (CJI)": In 1999, Jordan launched a strategy to become a knowledge-based economy. The Ministry of Information and Communications Technology (MoICT) introduced CJI for an integrated national strategy to get Jordanians online, broadening ICT access. - Amman Chamber of Industry (ACI) initiative: ACI, in cooperation with MoICT concluded training programs specialised in e-government and e-commerce, graduating staff of different ministries and government agencies. Other projects include E-Health, education by connecting schools, and creating virtual universities, multiplying e-banking and e-business portals, and implementing e-government plans.
Kuwait	National information society policies and strategies	Vision: Kuwait has not articulated a specific vision for ICT but is positioning itself, through some of its initiatives, as a strong user of ICT in delivering national programmes. National strategy: Kuwait has no explicit ICT strategy and lacks a comprehensive national IT plan. Although some projects like the electronic government initiative define goals out-reaching the prerogatives of an online administration, it has not decided as yet to articulate an ICT programme. The Kuwait Information Technology Society (KITS), the national technology association, was created in 1981 and was instrumental in lobbying for changes such as the passing of Kuwait's copyright bill.
	Sectoral plans for building the information society	Implementation plans: N/A Initiatives: Kuwaiti ICT-driven programmes cover (1) education, (2) government, and (3) health, include: - Upgrade of the educational system: In 2002, Kuwait launched the "Education Net" programme, to connect all 620 Kuwaiti schools and increase PC usage in schools. Budgeted initially at USD 24.6 million, the project will be further expanded to reaching a total cost of USD 100 million, in 2007, and to cover all components of the education system. - Planning for e-government: A dedicated committee was formed in 2002 to examine practical steps in launching e-government. A tendering process is underway, but progress is slow, due to the political situation. The process is expected to increase transparency and efficiency, with tendering processes coming online. - Ministry of Health programme: In 2001 Kuwait launched an electronic files project for its healthcare system, to replace traditional paper patient records system. The programme, which started in 2002, will be subsequently expanded to cover the entire medical system.
Lebanon	National information society policies and strategies	Vision: Lebanon has not articulated a specific vision for ICT. National strategy: The Office of the Minister of State for Administrative Reform (OMSAR) developed a national ICT policy and strategy in 1999, identifying three main roles for government: (1) facilitation, (2) regulation and (3) leadership through ICT applications use.

Country	Criteria	Features
	Sectoral plans for building the information society	□ Implementation plans: OMSAR recently initiated the development of a national e-strategy for Lebanon, to be released in summer 2003 with a roadmap for implementation. □ Initiatives: Lebanese ICT initiatives focus on technology parks and incubators. They include: - Planning for a technology zone in Beirut: the Investment and Development Authority of Lebanon (IDAL) launched a feasibility study in 2000 for the creation of the Beirut Emerging Technology Zone (BETZ). The zone will provide premises for local and international companies as well as for universities to set up RDI facilities. - Private initiative and the Berytech technopole: driven by the University of Saint Joseph, Lebanon's first technopole was launched in 2002, with French (Agence Française de Développement) funding support, offering the services and the environment necessary for the uptake of an ICT industrial cluster. - Other projects in plan include a media zone project and an industrial park.
Oman	National information society policies and strategies	□ Vision: Oman's vision is to leverage ICT to provide services to the public and private sectors as well as citizens through electronic means. ICT has a special role to play in Oman's Sixth Five Year Development Plan (2001-2005)[3], by helping diversify the country away from the oil sector.
		□ National strategy: Oman's strategy is to set policies to promote ICT use, upgrade infrastructure and revamp the legal and regulatory frameworks, in line with global standards, to allow for increased liberalisation and competition. Policies will also focus on e-government services and human resources build-up. Telecom-specific goals (Oman Sixth Development Plan, 2001-2005) have been set-up and include: - Increasing teledensity to 13.0% by 2005; - Increasing mobile penetration to 10.7% in 2005; - Increasing Internet penetration to 5.2% by 2005; - Modernising telephony capabilities.
	Sectoral plans for building the information society	□ Implementation plans: Oman's ICT vision is substantiated by several programmes including: (1) creating a national database linking local and global information resources and centres, (2) making ICT accessible to a majority of the population, (3) endowing the private sector with a leading role and (4) making telecommunication affordable to all sectors of society. □ Initiatives: The Omani plan aims at: (1) opening telecoms for privatisation (Royal Decree No. 46/99, issued on 18 July 1999) and competition, (2) endowing the newly created National Committee for Information Technology (NCIT) with the responsibility of formulating an ICT policy and the strategy of its implementation, and (3) adopting international best practices in ICT for development implementation. This programme should help connect the country with an electronic information network, promote an e-transactions environment, develop human resources, raise awareness, set-up the proper databases and standards, ensuring that the proper economic system set-up effectively reduces the digital divide.
Palestinian Authority	National information society policies and strategies	- The Palestinian Authority has not defined a plan for ICT.
	Sectoral plans for building the information society	- There are no operational plans underway. The only major commitment to ICT has been a joint education programme funded by the World Bank.

(3) Oman Sixth Five-Year Plan (2001-2005), http://www.moneoman.gov.om

Country	Criteria	Features
Qatar	National information society policies and strategies	Vision: Qatar considers ICT as a means for development. Through a 2002 governmental decision (Amiri Decree No 25 of 2002.), Qatar proclaimed ICT a national priority, and set-up a committee for the establishment of e-government. National strategy: Government decision (Qatari Amiri Decree No 26 of 2002.) established a National ICT Committee, to coordinate ICT strategy deployment, for infrastructure, digitisation of government records and processes, and awareness. Building on the premise that ICT can contribute to economic and social advancement, Qatar embarked on an ICT strategy extending until 2010. The Government decided on six ICT projects, with guidelines and deliverables in: (1) infrastructure (2) ICT literacy, (3) ICT dissemination, (4) e-government, (5) e-business and (6) centres of excellence.
	Sectoral plans for building the information society	Implementation plans: - Infrastructure project: creation of a national communications infrastructure due to start in 2003, and establishment of a dedicated organisation regulating telecoms. The project is due to materialise in the period between 2007 and 2010. - ICT literacy: The project is set-up of the following: (1) an e-learning project, (2) providing e-mail to all citizens, and (3) supporting ICT in education. This project is due for completion by 2007. - ICT dissemination campaign, with a first stage due for completion by 2004, and the last stage for 2010. - Online government: set-up of a national government network, due to last four to ten years. - Electronic business: by encouraging e-commerce, adapting the legal system, participation in international network security and encryption arrangements, due to be completed within four years. - Setting-up a centre of excellence, where ICT participates in future growth, innovation is protected, funds are set-up promoting research and development (R and D). This is due for completion within four years.
Saudi Arabia	National information society policies and strategies	Vision: the advent of an ICT-based society is clearly spelled out in Saudi Arabia's Seventh Development Plan[4], 2000-2004. It covers one of the 15 basic strategic principles of the country's development plan, "establishing a national science and technology base capable of innovating and inventing as well as adapting technology" National strategy: Saudi Arabia defined a two-pronged national ICT strategy in light of its growing population (3% per year) and the need to diversify the national economy away from oil. The first approach is a national policy, the second focuses on sectoral issues. The national policy, defined by King Abdulaziz City for Science and Technology (KACST) and approved by the Cabinet in July 2002, aims at:(1) building a comprehensive national ICT plan, (2) supporting a national ICT base, (3) encouraging adoption, publication and facilitation of technology transfers, (4) implementing the necessary mechanisms for IPR protection, (5) supporting the use and consolidation of the Arabic language and (6) using ICT as a tool for administration and services efficiency.

(4) Saudi Arabia's Seventh Development Plan, 2000-2004, http://www.planning.gov.sa/PLANNING/INTROe.HTM

Country	Criteria	Features
	Sectoral plans for building the information society	Implementation plans: KACST and the Ministry of Planning are in charge of the preparation of the national ICT plan[5] whilst the Saudi Computer Society (SCS) is in charge, since March 2001, of implementation, including: (1) dealing with urgent initiatives, determining critical and urgent and dealing with them in a speedy and cost efficient manner, (2) building the long-term strategic plan, with issues subject to studies and planning, and (3) developing a detailed plan, executing the general strategy. Initiatives: initiatives still need to be developed as part of the plan.
Syria	National information society policies and strategies	Vision: Syria sees in ICT a valuable tool to overcome many obstacles facing the Syrian society. It has implicitly admitted the necessity to move towards the Information society. Syrian officials target the achievement of this goal by the year 2025. National strategy: the Syrian national ICT strategy is being developed in coordination with the United Nations Development Programme (UNDP). It focuses on four themes: (1) ICT education and culture, (2) the economy, (3) services, and (4) infrastructure and networks.
	Sectoral plans for building the information society	Implementation plans: Syria's implementation plans focus on promoting ICT use, for the transition towards an information society by the end of 2025. This includes using ICT: (1) in the economy to improve competitiveness, (2) in education to create a human capital base, (3) to increase literacy and encourage continuous education and (4) to improve administration efficiency. This programme still requires specifying the operational levers to be used and the measurements and benchmarks to test results. Initiatives: Several ICT-led initiatives are underway. These include: - Education initiative: this programme aims at the dissemination of ICT in all primary and secondary education stages. The initiative is based on the gradual generalisation of ICT as a topic of study by the year of 2005. In coordination between the Ministry of Education and the Syrian Computer Society, a major ICT literacy programme was launched in 1998 offering the opportunity for all citizens to develop their ICT skills. The number of Syrians who followed this programme reached more than 300 thousands by the end of 2002. The Ministry is planning to offer support for the ICDL programme. - Initiative for corporations: based on the results of a study published by the Syrian Ministry of Industry, it aims at spreading ICT use in businesses and improving efficiency. This plan will be open for investment by 2004; - Digitisation of automobile registration: the Ministry of Transportation established a plan applying a "one-spot-stop" principle for automobile registration. - Digitisation of the fixed telephone administration: a programme of the Ministry of Communications to reduce the wait in the acquisition of fixed telephone lines by 2004.
		- Digitisation of services in the Ministry of Interior: a plan to improve information systems and services to citizens, and reduce administrative decision-making time. It focuses on: (1) automation of the civil register, (2) automation of ID card issuance and passport delivery, (3) migration control and (4) digital management of judicial records.
UAE	National information society policies and strategies	Vision: The UAE's strategy is to improve its position as a conception and programming centre for software, and as an export base to the Middle East and the Indian sub-continent for local, regional, and global players. National strategy: The status of ICT in the UAE is uneven, as the different Emirates often compete on the basis of different economic advantages. The Emirates of Dubai, and Abu Dhabi play the most visible roles in industrialising ICT, whilst the other Emirates focus on other priorities.

(5) Saudi ICT plan, http://www.nitp.org.sa

Country	Criteria	Features
	Sectoral plans for building the information society	Implementation plans: The government of the UAE is increasing its efficiency by leveraging IT. The Government of Dubai moved its 22 agencies online and, in March 2003, the UAE's Ministry of Finance and IBM Middle East signed a contract for the implementation of the first phase of the federal e-government project. This project is integral to a number of transformation initiatives launched by the UAE Federal Government to achieve rapid and significant transformation in the provision and efficiency of federal government services within the UAE Initiatives: The UAE has taken operational steps in launching ICT initiatives including: (1) technology parks (2) ICT industrial clusters and joint venture with foreign companies, (3) learning facilities and (4) investment facilitation initiatives.
Yemen	National information society policies and strategies	Vision: Yemen's national ICT objective is to use technology as an efficient way to solve several economic issues, and to increase income for citizens. National strategy: Yemen's strategy is to develop human capital and knowledge in order to access information society status. The National Information Centre (NIC) founded in the mid 1990's under direct steering of the Presidency, aims at: (1) establishing and improving ICT infrastructure, (2) taking an integrated approach to the creation of a national ICT sector, and (3) articulating national ICT strategies in line with globalisation requirements.
	Sectoral plans for building the information society	Implementation plans: In 2002, the Ministry of Communications established a strategy to achieve national ICT goals, including: (1) raising awareness of the importance of ICT, (2) integrating ICT in various economic fields, (3) improving governmental and administrative efficiency and performance, (4) improving connectivity, (5) encouraging the building of the proper infrastructure through investments, (6) digitising government records and processes, and (7) ensuring adequate transparency of ICT programmes and strategies.

Annex 2

Main features of the legal and regulatory ICT environment

Country	Criteria	Features
Bahrain	National legal and regulatory IPR status	- Patents and trademarks are protected under the Law of July 1955, decree No 22 of 1977 and decree No 10 of June 1991, respectively. - Copyrights are protected under decree No 10 of June 1993.
	Telecom regulatory framework	- Although Bahrain has been a WTO member since 1995, it has not delivered on deregulation commitments. - Bahrain is considering deregulation, but no decision has been taken yet[6].
	Regulating the Internet	- Internet content of political nature is regulated in Bahrain[7].
	Consumer privacy and security laws and regulations	- The Government approved a draft e-commerce Law in 2003. The Law follows world standards, with adaptation to the Bahraini context. It covers digital signature and other means of electronic verification and identity authentication. It will also cover contractual rights and obligations over the Internet.
	Multilateral Agreements	- Bahrain is a WTO member. Bahrain signed the WIPO's Paris convention in 1997 and Trade Related Aspects of IPRs.
Egypt	National legal and regulatory IPR status	- The Egyptian copyright Law No 354 of 1954, amended in 1968 and 1975, was further amended for the third time in 1992 (Law No 38) to explicitly cover ICT protection. - An additional amendment signed in 1994 protects copyrights for a period of 50 years from either the author's date of death, or the date of publishing.
	Telecom regulatory framework	- The Government and the People's Assembly adopted in February 2003, a new Law deregulating telecoms, with additional transparency. - The law legislates the creation of a National Board of Telecommunications namely "The Telecom Regulatory Authority", reporting to the Minister of Communications & Information Technologies. (MCIT) - Responsible for organising the industry, the Board oversees the following: (1) tariff liberalisation, (2) national telecom independence, (3) optimal use of telecom resources and (4) granting licenses to operators, ensuring their compliance to quality and assuring reasonable tariffs.
	Regulating the Internet	- Internet Service providers have to obtain a license through the Telecommunication Regulatory Authority. - Voice Over IP is strictly forbidden
	Consumer privacy and security laws and regulations	- An electronic signature Law is needed. Consequently, the MCIT has set up a dedicated committee, with representatives from the Central Bank, Ministries of Justice and Finance, in addition to experts from universities and the private sector. The first draft of the electronic signature Law is undergoing review.
	Multilateral Agreements	- Egypt is a WTO member. Egypt signed the WIPO's Paris Convention in 1951 and Trade Related Aspects of IPRs (TRIPS) It is also a party to several interim treaties.
Iraq	National legal and regulatory IPR status	- Iraq enacted trademark and copyright protection Laws in 1957 and 1971, with little track record in enforcement.

(6) Gulf News, January 2002, "*Bahrain studying telecom deregulation*", Dubai, available online on http://www.gulf-news.com/Articles/news.asp?ArticleID=38547

(7) Human Rights Watch, available online on http://marketing.byu.edu/htmlpages/ccrs/proceedings99/peart.htm and http://216.239.51.104/search?q=cache:UqJNydnugJYJ:www.hrw.org/advocacy/internet/mena/intro

Country	Criteria	Features
	Telecom regulatory framework	- In the absence of Telecom regulatory authority, Iraqi telecoms operated under the Iraqi Telecommunications and Post Company's (ITPC) monopoly, reporting to the Ministry of Transport & Communications. - No specific laws pertaining to telecom and Internet have been drafted yet.
	Regulating the Internet	- The Internet was heavily controlled under the former regime.
	Consumer privacy and security laws and regulations	- No such laws and regulations have been drafted or implemented.
	Multilateral Agreements	- Iraq signed the WIPO's Paris Convention in 1976. However, Iraq is not a WTO member.
Jordan	National legal and regulatory IPR status	- To foster investor confidence, Jordan amended its copyright and patent Laws in 2002. - The original copyright Law was passed in 1992 and amended in 1998 to include enforcement mechanisms and registration obligations.
	Telecom regulatory framework	- According to the 2002 amended telecommunications Law, the Telecommunications Regulatory Committee (TRC) is currently separated from the Ministry of Communication and Information (MoCIT) as an independent body with 5 full-time board members. - TRC, an independent regulatory body, will promote increased competition in the telecom sector, resulting in lower prices for consumers. - TRC new programs will focus on developing skills and expertise in the fields of law, finance and consumer protection.
	Regulating the Internet	- The Information Technology Association of Jordan (int@j) lobbied against attempts to impose regulations on Internet Café that blocks specific content and requires user identification. - While regulations remain in effect; however, they are not implemented yet.
	Consumer privacy and security laws and regulations	- The TRC commissioned int@j, Internet Service Providers (ISPs) and Jordan Telecom to develop a position paper and guidelines for minimum requirements to ensure Internet security. - An e-transaction Law was passed in 2002, covering e-commerce and e-banking, based on the United Nations Commission on International Trade (UNCITRAL) model. - The Law recognises electronic signatures, documents, data, and transactions, as having same legal status as originals. However, it needs to be put in effect, as currently e-signatures have no evidentiary power.
	Multilateral Agreements	- Jordan is a WTO member. Jordan signed the WIPO's Paris Convention in 1972 and TRIPS. It is also a party to one interim treaty.
Kuwait	National legal and regulatory IPR status	- Kuwait passed its Copyright Law in 1999 to protect Products covered by World Intellectual Property Organisation (WIPO) frameworks, following accession. Kuwait amended its Trademark and Patent Law in 2001 to transfer responsibility for patents to the Trade and Industry Ministry, extending filing time with new penalties.
	Telecom regulatory framework	- The Ministry of Communications (MoC) controls fixed PTT whilst serving as the telecom regulator.
	Regulating the Internet	- Kuwait's government strictly monitors Internet use. Ministerial Decision No. 70 of 2002 censors Internet content on the grounds of moral and religious convictions and requires of "Duly Authorised Internet Representatives" to survey and control content.
	Consumer privacy and security laws and regulations	- Government is drafting an e-signature Law, to be approved by end of 2003, based on the UNCITRAL model.

Country	Criteria	Features
	Multilateral Agreements	- Kuwait is a WTO member. It did not sign the WIPO's Paris Convention but is a member of TRIPS. It is also a party to one interim treaty.
Lebanon	National legal and regulatory IPR status	- In 1999, the government passed the Literary and Artistic Property Rights Law, which is similar to an IPR Law. However, the law is not enforced. - Clause 25 of the Law allows teachers and students to make copies of software. Ministerial decision 16/2002 explains this clause in clear terms limiting permitted copying to educational and cultural software, as well as stipulating the exact number of permitted copies, and the conditions of their use.
	Telecom regulatory framework	- The Ministry of Telecommunications (MoT) is the sole fixed network operator, and the country's regulatory body. Converting MoT into a regulatory entity is considered, and The operational structure is currently being drafted.
	Regulating the Internet	- There are no national regulations governing the Internet sector to date.
	Consumer privacy and security laws and regulations	- There are no privacy and security laws in Lebanon. OMSAR is currently developing guidelines for public sector ICT projects, to be completed by June 2003.
	Multilateral Agreements	- Lebanon is not a WTO member. Lebanon signed the WIPO's Paris Convention in 1924, but is not a member of TRIPS. It is also a party to several interim treaties.
Oman	National legal and regulatory IPR status	- The trademark regime in Oman is based on Royal Decree No 68/87, Decree No 635/1991, and Royal Decree No 33/91, covering marks and 41 classes of the International Classification. - Royal Decree No 47/96 enacted a new copyright regime in 1996. - No ICT IPR specific law has been enacted since.
	Telecom regulatory framework	- The Omani government issued a communications Law in early 2002, setting up the Telecommunications Regulatory Authority (TRA) as an autonomous regulatory body, to issue new licenses to mobile and ISP providers. Additionally, the government envisages deregulating fixed telephony, and data communications.
	Regulating the Internet	- There is no specific regulation for the Internet and electronic transactions in Oman. - In June 2003, the Oman Ministry of National Economy announced it will draft laws for: (1) authentication, (2) open records, (3) e-procurement, (4) privacy, (5), e-payment, and (6) liability.
	Consumer privacy and security laws and regulations	- Personal privacy on the Internet is not guaranteed.
	Multilateral Agreements	- Oman is a WTO member. Oman signed the WIPO's Paris Convention in 1999, and is a member of TRIPS. It is also a party to one interim treaty.
Palestinian Authority	National legal and regulatory IPR status	- The occupying authority does not allow the "Palestinian Authority" to take part in international conventions. The "Palestinian Authority" being a non-sovereign entity, does not engage in international treaties.
	Telecom regulatory framework	- The monopoly telecommunications operator, Palestinian Telecommunications (Pal-Tel), is the sole regulatory body in these areas.
	Regulating the Internet	- N/A
	Consumer privacy and security laws and regulations	- N/A
	Multilateral Agreements	- N/A

Country	Criteria	Features
Qatar	National legal and regulatory IPR status	- Qatar issued laws protecting innovation and copyrights: IPR Law No 7 of 2002 and Law No 9 of 2002 protect commercial data, trade marks, copyrights, with penalties for infringement, copies and computer crime.
	Telecom regulatory framework	- The national telecommunications operator, Qatar Telecom (Q-Tel), is the sole regulatory body in the country.
	Regulating the Internet	- Not existing
	Consumer privacy and security laws and regulations	- Personal privacy on the Internet is not guaranteed.
	Multilateral Agreements	- Qatar is a WTO member. It signed the WIPO's Paris Convention in 2000, but is not a member of TRIPS. It is also a party to one interim treaty.
Saudi Arabia	National legal and regulatory IPR status	- Saudi Arabia's legal system is based on Islamic principles (Sharia). The Saudi IPR Law came into force in 1989, extending protection to authors and innovations in sciences, literature, and arts. - There is no specific law for software protection; however, this protection may be assumed as an extension of the above mentioned Law.
	Telecom regulatory framework	- A body of laws was issued in 2000 pertaining to: (1) issuing of ISP licenses, (2) ISP operating rules, and (3) censorship of content in contradiction with religious beliefs and traditions.
	Regulating the Internet	- Personal privacy on the Internet is not guaranteed.
	Consumer privacy and security laws and regulations	- A 2001 Law covers Internet banking transaction regulations in Saudi Arabia. New laws are being drafted dealing with: (1) electronic signatures, (2) Public Key Infrastructure (PKI), and (3) protection of privacy.
	Multilateral Agreements	- Saudi Arabia is not a WTO member. - Saudi Arabia did not sign the WIPO's Paris Convention, and is not a member of TRIPS. It is party to one interim treaty.
Syria	National legal and regulatory IPR status	- Protection of IPR is stated in Article 24 of the Syrian Constitution[8]. More recently, IPR protection Law No 12 was issued in 2001, extending protection to printed and musical and artistic works, and software. - The Law is not applied to ICT.
	Telecom regulatory framework	- Syria's telecom industry is a monopoly. - The Syrian Telecommunication Establishment (STE) reports to the Ministry of Communications. - The Global System for Mobile Communications (GSM) sector has opened up to deregulation as two companies have been granted licenses under a Build-Operate-Transfer (BOT) contract for 1.7 million lines, for a 15-year period.
	Regulating the Internet	- Internet related legislation is underway, especially for ISP licensing, under the authority of the Ministry of Communications.
	Consumer privacy and security laws and regulations	- Personal privacy on the Internet is not guaranteed.
	Multilateral Agreements	- Syria is not a WTO member. Syria signed the WIPO's Paris Convention in 1924, but is not a member of TRIPS. It is party to one interim treaty.

(8) Constitution of the Syrian Arab Republic, http://www.oefre.unibe.ch/law/icl/sy00000_.html

Country	Criteria	Features
UAE	National legal and regulatory IPR status	- The UAE copyright Law No. 7 of 2002 protects "any original work in the areas of literature, arts or science, whatever its description, form of expression and conveyance, significance or purpose". The enforcement of the Law caused UAE piracy rates to drop to 41% in 2001.
	Telecom regulatory framework	- Public telecom services are monopolised by Emirates Telecommunications Corporation (Etisalat), with no plans for deregulation.
	Regulating the Internet	- The Emirate of Dubai issued Law No. 2 of 2002 for e-transactions and e-commerce. It combines UN and local guidelines for: (1) e-correspondence, (2) e-commerce (3) certification and security standardisation, and (4) e-signatures - The proposed UAE federal laws for e-transactions and e-commerce are in their second draft. A committee under the Ministry of Justice and Islamic Affairs and General Information Authority is responsible for reviewing the plan.
	Consumer privacy and security laws and regulations	- Dubai electronic signature Law No 5 of 2001was issued in order to deal with the use of PCs in criminal procedures. It acknowledges signatures of individuals acquired through the use of computers and other IT means as proof in criminal cases. The UAE "cyber-crime" Law, currently under review at the Federal level, makes direct reference to the Singapore Electronic Transactions Act.
	Multilateral Agreements	- The UAE is a WTO member and has signed the WIPO's Paris Convention in 1996. It is not a member of TRIPS. It is party to several interim treaties.
Yemen	National legal and regulatory IPR status	- The Yemeni government enacted Presidential Decree No. 19 in 1994 for IPR protection, covering authors' rights, protecting inventions, trademarks and industrial designs.
	Telecom regulatory framework	- N/A
	Regulating the Internet	- The National Information Centre (NIC) co-ordinates the planning of regulations of electronic services and applications (such as the electronic government and e-commerce), between ministries and governmental corporations.
	Consumer privacy and security laws and regulations	- Personal privacy on the Internet is not guaranteed.
	Multilateral Agreements	- Yemen is not a WTO member but has signed the WIPO's Paris Convention in 1979. It is not a member of TRIPS. It is not a party to any interim treaty.

Annex 3

Main features of ICT infrastructure

Country	Criteria	Features
Bahrain	Voice services penetration	- More than 50% of households and 100% of businesses have fixed phones, with fixed lines estimated at 200,000. Fixed teledensity stood at 24.8% in 2001, while mobile teledensity reached 42.5% in the same year. Current mobile phone penetration is roughly estimated at 50%.
	Telephony market structure and major players	- Bahrain Telecommunications Company (Batelco) is the monopoly operator of fixed and mobile voice services.
	Network highlights and other telephony services	- With its totally digitised network, Batelco offers: (1) digital international circuits, (2) Integrated Services Digital Network (ISDN), Asynchronous Transfer Mode, Local Area Networks (LAN), Frame Relay and Very Small Aperture Terminal (VSAT), and (3) GSM and Internet services. - Batelco is also planning to offer Internet via cable, as Bahrain has a 96.8% penetration rate for cable.
	International links	- Bahrain is connected to ArabSat, IntelSat and InmarSat. - While Bahrain has no direct international fibre optic link it has a connection to the regional Fibre Optic Gulf (FOG).
	Internet and PC dissemination	- Internet users were estimated at 150,000 in 2001. According to the Bahrain Directorate of Statistics, 18% of households are connected to the Internet. - According to national statistics, PC penetration in Bahrain reached 33.3% of households in 2001.
	Internet backbone and major supporting networks	- N/A
	Internet players	- There are three ISPs in Bahrain: Batelco -dominating the market-, Computec and GCC Online. -
Egypt	Voice services penetration	- Voice teledensity multiplied 11 times in the period between 1981 and 2002: it now stands at 11% of population, with more than 7.4 million subscribers, of which 157,000 phones with international capability, according to Telecom Egypt; - With full national coverage achieved in 2002, Egyptian mobile subscribers are above the 4 million mark (2.2 million for MobiNil and 1.8 million for Vodafone).
	Telephony market structure and major players	- Telecom Egypt operates as a monopoly for fixed line communications. - Mobile telecommunication was deregulated in 1998: two private actors, MobiNil and MisrFone -now Vodafone- emerged.
	Network highlights and other telephony services	- Besides fixed voice, Telecom Egypt expanded the number of public payphones to 45,000. - In addition to voice services, mobile services in Egypt cover: (1) fax, (2) Internet, (3) e-mail and (4) International Dialling Service (IDS) calling, and Multimedia Message Service (MMS) services. - The national data communications system used X25 transmission protocols until 1990. It has lately been upgraded to frame relay, with the national system now offering 44 points of presence and speeds up to 2Mb/s.
	International links	- International telephony is facilitated through the co-establishment of several cables though Egypt linking South East Asia with West Europe. - In addition, international service is available through Intelsat and Arabsat satellite systems, covering communications over the Atlantic Ocean and the Indian subcontinent. - 300 microwave links were set-up for telecommunications with Jordan, initially 300. These have been increased to 960. - Fibre Link Around the Globe (FLAG) now connects South West Asia, Pakistan, India, the Gulf, and Saudi Arabia to Egypt (Suez and Alexandria landing stations, Cairo point of presence), Italy and France. - In April 1998, an initiative to organise the telecom gateway was successfully launched.

Country	Criteria	Features
	Internet and PC dissemination	- 2002 Internet users were estimated at 2 million by Madar Research[9] - In 2002, there were 9,776 ISDN subscribers and 447 Digital Subscriber Line (DSL) users, and an estimate of more than 1.5 Million PCs (2.3% per capita).
	Internet backbone and major supporting networks	- The Internet was introduced in Egypt in 1993 through university networks at speeds of 64Kb/s: national capacity was increased to 850Mb/s covering over 1.6 million users in Egypt.
	Internet players	- There were few ISPs operating in Egypt (less than 50). After the Free Internet services were introduced in 2002, the number of ISPs (Categorized into Class A, B & C) reached around 158 by October 2002, with seven dominant players only.
Iraq	Voice services penetration	- Iraqi fixed telephony penetration was estimated in 1988 at 4.0%. In 2002, the rate dropped to 2.8%, with most of the equipment becoming obsolete and manually operated; the decline is mainly attributed to the war. - Phases V to XII of the "Oil for food" UN programme allowed for minimal telephony infrastructure: a system of pre-paid cards and a national phone cabin dissemination programme provided limited improvements in Iraqi telecom. - Small-scale mobile telephony projects were allowed by the previous regime, mostly geared to the needs of regime members and affiliates. - Wealthy Iraqis use satellite telephony through the UAE's Thuraya.
	Telephony market structure and major players	- Prior to the 2003 war, Iraq Telecommunications and Post Company (ITPC) was the sole operator of fixed and mobile telephony.
	Network highlights and other telephony services	- N/A
	International links	- Iraq is linked to ArabSat. - Iraq has no regional and no direct international fibre optic link.
	Internet and PC dissemination	- Prior to the 2003 war, the PC installed base stood at ca. 200,000 with somewhat obsolete units, yielding a 0.8% penetration rate. This is attributed to UN sanctions and the absence of local productive capabilities. - Internet penetration stood at 45,000 users, accessing through approximately 60 Internet cafés, representing a penetration rate of 0.2%. This does not account for access of Kurdish controlled zones.
	Internet backbone and major supporting networks	- N/A
	Internet players	- Most content and access was provided via Uruklink, the national Internet Protocol (IP) provider.
Jordan	Voice services penetration	- In 2000, 78% of households had access to fixed telephony. In 2001, there were 660,000 fixed lines in service. - Mobile penetration stands at around 24%, with high Short Messaging System (SMS) usage. .
	Telephony market structure and major players	- There is one fixed line operator, namely Jordan Telecom. - Jordan has two mobile operators, Fastlink and MobileCom.
	Network highlights and other telephony services	- Jordan Telecom was the first to launch MMS in the region, and the second to launch General Packet Radio Services (GPRS) after the UAE.
	International links	- Jordan is linked to the ArabSat satellite system. - Jordan has a direct international fibre optic link through FLAG's landing station in Aqaba.

(9) Madar Research, "Madar Research Journal", Fenruary 2003

Country	Criteria	Features
	Internet and PC dissemination	- Internet penetration in Jordan suffers from high connectivity rates and high costs of PCs. Because financing schemes for PCs are not available, Internet Cafés and public access points are multiplying. - int@j, the national IT association, launched the "Connecting Jordanians" initiative providing the student community with high bandwidth. Public access points of this initiative will play a critical role in the next decade, as PC costs remain high. - The "Jordan Information Technology Community Centres" (JITCC) initiative offers full-service computer labs: 41 of the 67 centres are already operational and offer access, ICT support access, English language learning software, pilot social development services and training in basic computer literacy.
	Internet backbone and major supporting networks	- ISPs connect through fibre optic submarine cables from FLAG and through satellites. - By 2003, total bandwidth is approximately 200 Mb/s: ISPs have bandwidth channels of 20 Mb/s to 155 Mb/s. - The MoICT and the Ministries of Education, Higher Education and Planning are considering a broadband learning network to link more than 3,000 public schools, eight public universities, 23 community colleges, and 67 community access centres by 2005, reaching 1.5 million citizens.
	Internet players	- There are at least six ISPs operating in Jordan.
Kuwait	Voice services penetration	- Fixed line teledensity in Kuwait is high, with a 20% rate in 2002, and more than 480,000 fixed lines, expected to grow at a 5% CAGR by 2005, fuelled largely by ISP demand for dial-up lines. - Mobile penetration was estimated at 52% in 2002, with an expected growth of 12% CAGR by 2005, yielding more than 1.75 million mobile lines.
	Telephony market structure and major players	- The national incumbent, Kuwait Telecom, provides fixed telephony services. - The semi-competitive industry has contributed to reducing tariffs (one state-owned mobile operator, Watanyia, and one private MTC-Vodafone).
	Network highlights and other telephony services	- MTC-Vodafone started the first General Packet Radio Service (GPRS) network in Kuwait in September 2002.
	International links	- Kuwait is connected to the Internet backbone through a submarine cable, fibre optics, microwave links and satellite networks. Kuwait is part of Fibre Optic Gulf (FOG), inaugurated in 1998, providing gateway access into FLAG's Fujeirah landing station. - Kuwait links with Arabsat, Intelsat and Inmarsat, carrying voice and data traffic.
	Internet and PC dissemination	- In 2002, Internet penetration stood at 9.51%, with 230,000 users. 12,000 subscribers access the Internet through DSL and ADSL lines, while 1,200 use leased lines. Additionally, there are 150 ISDN subscriptions. Competition has led to price reduction, both for dial-up and broadband. Monthly dial-up subscriptions cost USD 33 whilst ADSL costs USD 60. - The 2002 PC installed base stood at 300,000, yielding a 12.4% penetration rate. Kuwait's spending on PCs amounts to 40% of total IT spending, with 2002 PC sales estimated at 94,200 units. Demand will increase as the country implements e-government.
	Internet backbone and major supporting networks	- There is no Internet exchange within Kuwait.
	Internet players	- There are 3 major ISPs and 13 sub-ISPs operating in Kuwait.
Lebanon	Voice services penetration	- Lebanon's fixed line teledensity is 21%. The network offers 1.4 million telephone lines, of which 740,000 were subscribed to in 2000. - 2002-2007 fixed telephony CAGR is estimated at 1.9%. - 700,000 mobile lines were in use in 2000, with expansion limitations due to the numbering scheme in use. GSM will grow at a CAGR of 17% over 2002-2007 to reach a penetration level of 42%.

Country	Criteria	Features
	Telephony market structure and major players	- Two private companies (LibanCell and Cellis) operated mobile telephony services through BOT contracts. Contracts were cancelled 2 years before BOT expiry, and gave rise to dispute. A third GSM operator license is being considered.
	Network highlights and other telephony services	- The Ministry of Telecommunications now offers end-to-end data services, cancelling previous requirements for data connectivity users to set-up and maintain network equipment at national gateway premises. - Mobile operators provide GPRS and Wireless Application Protocol (WAP) services.
	International links	- Lebanon is connected via the ArabSat gateway, two marine line connections to Cyprus, and one to Syria (Berytar).
	Internet and PC dissemination	- There were 65,000 Internet subscribers in 2002, with a 3.5 users to subscriber ratio. - 2002 average monthly costs stood at USD 18 to USD 20. In 2000, Internet phone dial-up fees were of USD1.6 per hour, regardless of area code. Internet access for 30 hours per month cost USD 53 and, when cost of including telephony is added, amounts to a USD63 to USD 73 per month, a high figure relative to local wages. The Ministry of Telecom introduced a fixed tariff, lowering average monthly costs to USD 13, to help increase access density in rural areas. - In 2002, there were 225,000 PCs in Lebanon, representing a 6% penetration rate. PC penetration in government and administration stands at 23%. Most PCs acquired are locally assembled, and make up to 85% of the market.
	Internet backbone and major supporting networks	- The Lebanese Internet backbone is linked by high-speed fibre connections: plans are underway to establish an Internet hub of a total bandwidth of 90 Mb/s catering to all ISPs and interconnecting them locally. In addition, a 20 Mb/s node via satellite is planned. - OMSAR is considering "Multipurpose Community Tele-Centres" to serve as gateways providing access to the Internet, and learning possibilities and access to government services.
	Internet players	- Lebanese ISPs have consolidated to 16 in 2000, with five dominant ISPs emerging. - There is one ASP in Lebanon, Trinec, who has now expanded to other markets in the region. -
Oman	Voice services penetration	- 2003 fixed line capacity stood at 235,000 yielding a 9.2% teledensity rate. - 2003 mobile penetration stood at 9.0%, with over 228,000 lines, with a majority of prepaid customers.
	Telephony market structure and major players	- Oman Telecommunications (OmanTel), the incumbent operator, is the monopoly operator of fixed and mobile services.
	Network highlights and other telephony services	- OmanTel offers a fully digital network including switches and inter-exchange fibre optics transmission links, a digital data network, GSM services, mobile fax and data, SMS, Value Added Services (VAS), Internet connectivity and data communications including ISDN, Asynchronous Transfer Mode, Wireless Local Loop (WLL) and Very Small Aperture Terminals (VSAT). - OmanTel will offer GPRS and Third Generation (3G) networks. In addition, it operates over 9,000 public phones in the country.
	International links	- Available capacity of Oman's backbone is over 310 Mb/s, including 2 STM1 links via the SEA-ME-WE3 and FLAG networks.
	Internet and PC dissemination	- The Internet customer base was estimated at above 50,000 in 2002, growing at a 50% CAGR. - PC dissemination statistics are unavailable in Oman, and will be published in December 2003.
	Internet backbone and major supporting networks	- N/A

Country	Criteria	Features
	Internet players	- OmanTel is the sole ISP: it offers more than 100 leased lines to corporations and services customers via 150 Internet Cafés. - It provides IP telephony and e-business solutions, and will launch e-government and e-commerce services. - Over 80% of OmanTel's ISP revenues are generated through dial-up services. - Increased focus on the corporate sector is planned.
Palestinian Authority	Voice services penetration	- Fixed telephony penetration stood at 3.5% in 1994. Since then, the Palestinian Telecommunications Company (PalTel) upgraded the network, with over 270,000 subscribers in 2000, yielding a growth of over 225% over 1994. PalTel claims it now offers access to fixed telephony to over 19% of households. Since the start of the recent Intifada, teledensity suffered, but there are no recent statistics. - Mobile telephony expanded from 25,000 subscribers in 1996 to over 285,000 in 2000, mostly prepaid customers, with penetration estimated at 9%.
	Telephony market structure and major players	- PalTel is the sole operator of fixed and mobile services within the Palestinian Authority Territories.
	Network highlights and other telephony services	- N/A
	International links	- The areas are not connected directly to satellite, regional or international fibre optic links. Israeli operators indirectly provide the international links.
	Internet and PC dissemination	- There are 25,000 subscribers, and total use yields a 7.5% penetration rate. Connections cost between USD 10 and USD 20 per month, provided for by Israeli and Palestinian operators.
	Internet backbone and major supporting networks	- The available bandwidth is 60Mb/s.
	Internet players	- There are over 20 ISPs, 80% of which in Ram Allah and Jerusalem, using leased circuits for provisioning.
Qatar	Voice services penetration	- 2002 fixed line subscribers were above 176,000, a 5.4% increase, yielding a 29% penetration rate. - 2002 GSM subscribers reached more than 260,000, representing an increase of 67% over 2001.
	Telephony market structure and major players	- Qatar Telecommunications (Q-Tel) is the fixed and mobile line monopoly of Qatar. - Q-Tel reduced International communication tariffs in 2001 by 25%, which led to an increase in traffic by 20%.
	Network highlights and other telephony services	- Besides fixed telephony, Q-Tel offers a variety of mobile services including GSM, satellite and Thuraya mobile telephony, mobile Internet, SMS, e-mail and ADSL services. Q-Tel also offers ADSL access to individuals and corporations.
	International links	- Qatar engaged in regional and international initiatives to improve connectivity. It is a contributing party to Inmarsat satellite system, and Thuraya satellite telephony. .
	Internet and PC dissemination	- Qatar's Internet users were estimated at 60,000 in 2002, according to Madar Research. - DSL subscription has grown in 2002 to over 19,000 subscribers, at an increase rate of 70% over 2001, and is accessible to 73% of homes. - PC dissemination is estimated at 107,000, yielding an average of 17% per inhabitant, one of the highest rates in the area, due to high-income levels. - Of the monthly average spent on telecommunications in Qatar; estimated at QAR 2.2 million (USD 5 million), only 3.4% are spent on the Internet.

Country	Criteria	Features
	Internet backbone and major supporting networks	- Most Qatari Internet connections are dial-up. In 2002, Qatar completed its first phase of establishing a unified Multi-Protocol Label Switching (MPLS) IP network, connecting Q-Tel with individuals, the private sector, and government agencies, offering convergent voice, video and data communications. - A governmental agency and university network provides connectivity within Qatar, known as GISNet, built on a Fibre Distributed Data Interface (FDDI) ring.
	Internet players	- Q-Tel operates the ISP Internet Qatar, while Arab Web Networks is another ISP operating in Qatar.
Saudi Arabia	Voice services penetration	- Saudi teledensity stood at 14.5% in 2001, a development over the 12.9% rate of 1999. According to the Higher Authority for the Development of Riyadh, this is expected to reach 29.8% by 2010. In 2001, there were more than 3.2 million fixed lines. - Mobile telephony subscription rates were at 11.3% in 2001 versus 4% in 1999. This figure should reach 58.8% by 2010.
	Telephony market structure and major players	- The Saudi Telecommunications Company (STC) represents a monopoly fixed and mobile telecom operator. - Fixed telephony connections cost SAR 500, (USD 133), whilst monthly subscription rates stood at SAR 60, (USD 16). - In 1999, the cost of obtaining a mobile line was SAR 3,500 (USD 933). In 2001, this rate dropped to SAR 800 (USD 213).
	Network highlights and other telephony services	- N/A
	International links	- Saudi Arabia has international satellite links via ArabSat, InetlSat and Inmarsat. - It is linked directly to the international Internet backbone via FLAG's landing station in Jeddah, and via the SE-ME-WE 2 and SE-ME-WE 3 cables.
	Internet and PC dissemination	- In 2002, there were 1.1 million users, with a rate of 2.5 users per Internet subscription on average, representing a 40% growth over 2001. There were 130,000 dedicated lines for Internet connections. The subscription base grew tremendously since the launch of the Internet in 1998. Internet usage is expected to reach 2 million in 2005. - There were 1.7 million PCs installed in 2001.
	Internet backbone and major supporting networks	- The Saudi backbone is based on an Asynchronous Transfer Mode network, with gateways provided by KACST's Riyadh and Jeddah premises. Connectivity is cascaded through to end-users via KACST, STC and ISPs. - Connectivity is available via dial-up, ADSL, Defence Data Networks (DDN) leased lines or via Frame Relay. KACST is in charge of monitoring and controlling access to Internet content. - Total bandwidth stood at 640Mb/s in 2002. Given the number of Internet users (estimated at above 1.1 million), this yields 0.6Kb/s per user average bandwidth availability. - In 2000, STC started a programme linking 178 commercial building sites to the Internet. An ADSL deployment programme was launched in 2001, allowing for more than 18,000 lines, and an MPLS project was launched in 2002, allowing for Asynchronous Transfer Mode deployment to more than 480 sites.
	Internet players	- ISP services are provided through KACST only.

Country	Criteria	Features
Syria	Voice services penetration	- In 2000, there were 1.6 million fixed lines with a 10.2% penetration. That grew to 12.2% in 2002, with 2 million lines. - Waiting time to acquire a new landline is long. - Teledensity is improving as the installation of 1.6 million new lines is being undertaken in partnership with the foreign vendors Ericsson, Samsung and Siemens. The expanded digitised network will accommodate 3 million fixed lines. - There were only 30,000 subscribers to mobile services in 2000. This grew to 400,000 in 2002, a 2.3% penetration rate. Access costs to mobile services are high, running at SYP 9,000 for subscription, and SYP 6.0 per minute for mobile-fixed connections.
	Telephony market structure and major players	- Syrian Telecommunications Establishment (STE) is the monopoly fixed telephony operator. - Local communications costs are low (SYP 0.2 per minute for inter-city, SYP 2.0 per minute for regional), subsidised by IDS rates. Installation costs run high at SYP 4,000 and monthly subscription costs at SYP 300. - There are two GSM carriers in Syria: Spacetel and Syriatel.
	Network highlights and other telephony services	- N/A
	International links	- Syria is linked to the ArabSat and Inmarsat satellite systems. - It has sub-marine cable links with Lebanon (Berytar) and Egypt (Aletar).
	Internet and PC dissemination	- There were 8,000 Internet subscribers in 2000. This grew to 73,000 in 2002, a 0.4% penetration. In 2003, subscribers are expected to reach 100,000. ISPs offer e-mail and access but do not accommodate File Transfer Protocols (FTP). - Dial-up costs run from SYP 300 for 10hr/month packages for members, to SYP 650 for 20hr/ month packages for non-members. - Figures about PC equipment rates are unavailable, but they are low, as Internet Café PCs are used not only for Internet, but also for studies and research.
	Internet backbone and major supporting networks	- Syria currently uses the STE's and the Ministry of Communications' networks to deliver Internet. There is no dedicated Internet backbone. A series of leased lines and routers connect this network to end-users. Only recently have leased lines, ISDN and ADSL been envisaged. - Internet services are provided by the Syrian Telecommunication Establishment (STE), and the Syrian Computer Society (SCS) using international links with bandwidth of 128 MB and 40 MB respectively. - Latest developments include a plan for a national network covering 250,000 subscribers to be expanded to 800,000 users, delivering high speed Internet access. As the project unfolds, ISPs will be liberalised and licenses will be granted.
	Internet players	- Internet Cafés are allowed, with 100 outlets in Damascus alone - STE will start granting licenses for ISPs.
UAE	Voice services penetration	- In 2002, the UAE fixed line capacity was 1.4 million digital lines, around 50,000 of which are ISDN in addition to the leased circuits. - The number of telephone connections increased to 1.1 million in 2001, a penetration of 34%. This is expected to grow to 1.4 million in 2006. - The 2002 mobile subscriber base was 2.3 million, a 63% penetration. This should grow to 3.8 million in 2006. GPRS was launched in 2002, attracting over 7,000 subscribers so far.
	Telephony market structure and major players	- The Emirates Telecommunications Corporation (Etisalat) provides telecom services under monopoly conditions. - Etisalat operates payphones but their number declined to 28,623 units in 2001 because of mobile prevalence.
	Network highlights and other telephony services	- Etisalat offers: (1) GSM roaming, (2) value-added services, (3) fax and data, (4) prepaid cards, (5) messaging services (6) SMS mail and (7) WAP. - WAP and GPRS will lead to migration to 3G broadband mobile networks. - Additionally, Etisalat launched the Thuraya Satellite system, with increasing uptake.

Country	Criteria	Features
	International links	- The UAE is linked with the ArabSat, Intelsat and Inmarsat satellite systems. - It is also linked through regional fibre optics cable FOG, and to the SE-ME-WE 3 international fibre optic cable.
	Internet and PC dissemination	- Over the 1997-2000 period, Internet users grew by 170% on average, due to: (1) proliferation of Internet Cafés, (2) lower subscription and connection fees, and (3) introduction of Internet to universities and schools. - There are over 316,000 Internet subscribers, expected to grow to 345,000 by 2005. Actual users are estimated at 900,000, a 29% penetration rate. - At the end of 2001, the total number of ADSL subscribers was 946. In 2002, ADSL users represented 3,260 subscribers; this number is expected to amount to 10,700 subscribers by 2005. - In 2002, other access devices included leased lines for 427 customers, LAN for 600 subscribers and 7,511 "Al Shamil" high-speed subscribers. DSL was introduced for SMEs, with high-speed at low cost. - In December 2002, the installed PC base reached 490,000 units, a 13.2% penetration. According to IDC forecasts, PCs installed in 2003 should exceed 200,000.
	Internet backbone and major supporting networks	- Etisalat's high-speed Internet is delivered via Etisalat's Hybrid Fibre Coaxial (HFC) cable infrastructure, which is presently used to deliver digital cable television services and will complement the existing DSL infrastructure. - The only networks independent of Etisalat are those operated by government departments (Ministry of Interior, Armed Forces/General HQ). - Oil companies such as Abu Dhabi National Oil Company (ADNOC) use Etisalat facilities but retain their own independent telecom facilities as back up.
	Internet players	- Etisalat is the only ISP in the UAE providing Internet services since 1995.
Yemen	Voice services penetration	- In 2002, Yemen had 600,000 fixed lines, a teledensity of 2% to 3%. Government and the national telecom company launched a programme to: (1) increase teledensity, (2) equip rural areas, (3) stimulate demand (tariff reduction) and (4) multiply ubiquitous public access: they launched a programme to cover rural areas with 500,000 additional fixed lines and 70,000 lines for expansion and densification of covered areas. They also set-up 2,000 communication centres offering voice, fax services and phone cards. - There are 200,000 mobile lines in operation in Yemen.
	Telephony market structure and major players	- Yemen has a monopolistic fixed line operator. - Installation fees were reduced from YER 220,000 to YER 170,000, offering local calls for the equivalent of 30 cents a minute. - Monthly subscription was reduced by 40% from YER 1,300 to YER 800. - Mobile telephony is deregulated: Tele-Yemen operates analogue lines since 1995 and GSM newcomers are SabaFon and Spacetel. - Mobile satellite costs are high (USD 1,400 per subscription) and have not attracted a critical mass market.
	Network highlights and other telephony services	- N/A
	International links	- Yemen is linked to the ArabSat satellite system.
	Internet and PC dissemination	- 2002 Internet penetration stands at 0.089%. The Internet was introduced in the mid 1990's by Tele-Yemen. In 2000, there were 50 Internet cafés and 70,000 subscribers, according to the Ministry of Planning and Development's 2001-2005 National Plan. - Private sector and public sector participation in the Internet is low, with 214 corporations online in 2002. - Government launched Yemen Net, a public corporation with a mission to work on improving service level and guaranteeing delivery to citizens. It is expected to contribute to lower tariffs, ultimately moving to the free Internet model. Yemen Net is in charge of raising awareness and conducting training programmes for Internet uptake. - There were 14,000 PCs in 2002, a 0.72% penetration, with ICT literacy estimated at 1.6% of population.

Country	Criteria	Features
	Internet backbone and major supporting networks	- The Internet gateway was completed after the national incumbent was mandated by the Yemeni council of Ministers decree No 16/2000, to help develop the Internet and promote the issuing of ISP licences. - It will offer connectivity to five cities through 12 points of presence for approximately 30,000 users.
	Internet players	- Tele Yemen is the only ISP in operation. - Services include dial-up and leased lines, with speeds between 64Kb/s and 2Mb/s. The incumbent also offers DSL services, available with speeds up to 2Mb/s, and ISDN services with speeds between 64kb/s and 128Kb/s.

Annex 4

Main features of ICT capacity building

Country	Criteria	Features
Bahrain	Awareness and dissemination	- Bahrain has yet to develop an ICT education plan and formulate a related strategy.
	Computers in schools	- The Ministry of Education has arranged for all public intermediate and secondary schools to be connected to the Internet, and there is an ongoing process of upgrading PC labs and improving on Internet use.
	Vocational training	- Several institutes offer vendor certified training in Bahrain. Bahrain Training institute, Bahrain Institute of Technology, Aptech, NIIT, and New Horizon are examples of these institutes.
	University education	- ICT development programs are offered in two higher education institutes: The University of Bahrain and the Arab Open University. - The Arab Open University, a factor in Bahrain's "digital migration" in education, is funded by the Arab Gulf program for the support of United Nations Developmental Organisations (AGFUND). This institution uses electronic delivery methods for its courses.
	RDI in ICT	- N/A
Egypt	Awareness and dissemination	- PC dissemination in schools started as early as 1985 to promote: education on the essentials of computing and ICT, use of computers as training tools, and use of PCs in school administration.
	Computers in schools	- An "intelligent school" programme is underway. This program aims to equip each student with a PC over a four-year period under the auspices of the Ministry of Education.
	Vocational training	- The Egyptian National Communications Board devised training programmes in telecom and networks, four to eight weeks in duration, in partnership with Cisco, Lucent and Ericsson. In 2002, 755 individuals graduated from these programmes. - A national ICT training programme was set-up in 2002, through cooperation between the Ministry of Communications and the Board, to graduate 5,000 individuals per year in the fields of: (1) software programming and electronic commerce applications, (2) systems design, (3) decision support data tools and (4) geographical information system design (5) computer network development, construction and support. In June 2002, approximately 3,000 had graduated, with an additional 2,000 students in the program.
	University education	- The Egyptian education system offers four programmes: (1) computer education in universities, (2) specialisation programmes in engineering and computer science, (3) specialisation programmes in ICT and (4) IT related curricula in private education. They are available in major public universities in the country.
		- Computer and Information Faculties were introduced in 1996 in the main universities. Two additional faculties followed in 2001 and 2003. - Egypt plans to grow its annual output of ICT trained graduates to 22,000 in the year 2010, whereas the actual need is estimated at 80,000. In 2003, some 9,000 graduates are expected, but demand is almost double, at 16,000.
	RDI in ICT	- Egyptian RDI in ICT originates in the university segment, at the masters and doctoral studies levels. This output is mainly seen in applied research, and through research centres such as the Ministry of Research affiliated Centre for Electronics Research, the National Communications Board and the Atomic Research Agency.
Iraq	Awareness and dissemination	- N/A

Country	Criteria	Features
	Computers in schools	- Prior to the 1991 Gulf war, Iraq's education system and budget allocation allowed for some of the highest literacy rates in the region, and a 100% school enrolment ratio. Earlier programmes for PC dissemination in schools were never implemented.
	Vocational training	- N/A
	University education	- Eight to ten faculties specialising in computer science are recognised within the Iraqi educational system, graduating on average 2,500 to 3,000 students annually. Iraq has been heavily hit by the "brain drain" phenomenon, as a consequence to the 1991 Gulf war, translating into poor PC equipment availability, and to the quasi-absence of university output in ICT-related skills.
	RDI in ICT	- N/A
Jordan	Awareness and dissemination	- MoICT launched the first phase of the International Computer Driving Licence (IDCL), as part of the e-government ICT literacy-training programme. Budgeted at JOD 2.5 million (USD 3.5 million), it aims to train 20,000 government employees by 2005, covering basic IT literacy. The programme will also be taught in Arabic. - Int@j is upgrading the online database for ICT professionals, gathering information about available IT skills. To revive the site's functions, int@j mapped out IT skill gaps and identified 2001 targets.
	Computers in schools	- N/A
	Vocational training	- To strengthen ties between the local ICT industry and universities, int@j will undertake: (1) the creation of a working group to define specific goals for IT education and, (2) the coordination of training and education goals. - The national certification "Tawjihi" will ensure students qualify for ICT studies. - Int@j will coordinate with donor communities to fill gaps left by the private sector and institutes of higher education. It will initiate industry-based partnerships between companies and universities to develop ICT education whilst improving quality and relevance of research and teaching. - Certification from large software and IT vendors runs high (approx. 10%) in specialised training centres. - Int@j will offer subsidised ICT training programmes for the underprivileged, in a drive to improve talent availability. It is promoting internships with the private sector, offering students a practical work experience. - Int@j and the American Near East Refugee Aid (ANERA) established "Centres of Excellence" to train university graduates in IT, aimed at developing world-class professionals, to help these graduates find or create jobs.
	University education	- Up to 2,000 Jordanians are trained yearly in IT related skills. In 1998, there were 1,125 graduating students[10] in computer science and engineering, with a total student count of 7,723. - Government forced radical reforms to introduce computer-based education in public and private universities, national development priorities: the University of Jordan, Jordan University for Science and Technology (JUST), and the Hashemite University. These universities established IT colleges and run software development and programming courses. - The Royal Scientific Society runs an IT "upgrading centre", funded by Japan International Cooperation Agency (JICA) that graduates about 120 post computer science B.Sc. graduates annually.
	RDI in ICT	- N/A

(10) int@j, "Distribution of students at Jordanian universities in computer science and engineering related field", int@j, 1997,1998.

Country	Criteria	Features
Kuwait	Awareness and dissemination	- The Kuwaiti Ministry of Education issued a decree (Kuwaiti Decree of May 2002) making ICDL mandatory for all teachers, granting them a 6-year period before disqualification from the educational system. - Kuwait is also collaborating with UNESCO's Team educational framework to conduct strategic studies, network infrastructure deployment, training and human resources development, and application initiatives in education.
	Computers in schools	- The official number of PCs currently used in classrooms or in computer laboratories in Kuwaiti schools is not available, but is estimated (source: Madar Research) at fewer than 25,000 units. - The Kuwaiti government subsidised projects to achieve a ratio of one PC per eight students in public schools. At this stage, the ratio of computer use for teaching to computer use for administrative functions is about 4 to 1. The majority of PCs used in schools are housed in a PC laboratory rather than in regular classrooms. Some schools use a system from Arabic software firm Sakhr to manage administrative tasks. Religious, historical and cultural software from both Sakhr and Harf are also used as complementary instructional tools. - Private institutions have PCs fully available in foreign curricula, achieving a ratio of one PC-per-student. - A private organisation, the Kuwait Fund for the Advancement of Science (KFAS) accelerated efforts to equip schools and colleges and awarded the Ministry of Education a USD 233,000 grant in 2001 for upgrades and another USD 16 million for the provision of PCs to 170 intermediate schools.
	Vocational training	- Al-Khawarizmi Centre of Kuwait University, and other private entities offer vocational training, including technology assistance to universities, government and the private sector, with classes ranging from basic courses offered for children to high-level consulting and training for corporate users. - Private institutions offer certifications in various Operating System (OS) environments. - The Kuwait Institute for Scientific Research's (KISR) continuing education programme offers short-term IT courses at low nominal fees, with introduction to basic ICT education.
	University education	- Kuwait's two higher learning institutes, Kuwait University and the Public Authority for Applied Education and Training, teach pure and applied mathematics and computer science, with 70 faculty members. - Sources indicate that 100 graduates, 5% of Kuwait's annual graduates since 1997, earned an ICT-related degree.
	RDI in ICT	- According to UNESCO 0.24% of Kuwait's GDP is spent on RDI, representing USD 67 million of 1996 state expenditure. This is below the world average of 1.8%. 97.2% of this expenditure came from the government in petrochemical industry related research. More recent figures are not available.
Lebanon	Awareness and dissemination	- The government and the private sector provide awareness on ICT development through seminars, conferences and tradeshows. Government is working on eliminating computer illiteracy.
	Computers in schools	- SchoolNet, Schools Online and the Ministry of Education's PC programme for schools have contributed to the introduction of PCs in schools. Curricula were modified in 1998 to include ICT subject matters. PC use in administrative tasks at schools is also on the rise. The country report does not provide any accurate data in this regard.

Country	Criteria	Features
	Vocational training	- Educational centres provide vocational training that starts after completion of primary level, requiring four years after the technical baccalaureate level. Training on secretarial skills using office tools, electronics, and IT is also offered. - The availability of certified training centres and institutes is an indicator of efforts to raise ICT skills.
	University education	- Estimates indicate that universities graduate 400 ICT trained individuals annually. - Established universities provide computer science degrees and other ICT related majors such as computer engineering, telecom engineering and information systems management. No data is available on the number of ICT professors.
	RDI in ICT	- ICT RDI is within graduate school thesis research in addition to the innovative work at Berytech techno pole. - The Syndicate of Industrialists in association with the Centre for National Scientific Research and national universities hold an annual innovators exhibition whereby university RDI projects are evaluated. The Entrepreneurship Network of Lebanon collaborates with the MIT Entrepreneurship Centre and holds annual business plan competitions. The country profile does not show any statistics in this regard.
Oman	Awareness and dissemination	- Government is fostering ICT awareness, through operational programmes and initiatives, including the Knowledge Oasis Muscat (KOM) awareness campaign, trade associations, seminar conferences, and the establishment of a computer society and an ICT trade association. Vendor-independent certifications such as the ICDL are under consideration.
	Computers in schools	- Government is working on a scheme to provide PCs to all secondary level schools, along with necessary software and Internet facilities, ultimately covering over 1,100 schools.
	Vocational training	- The national vocational training trend is dubbed “Omanisation”, to ensure ownership by Omani nationals. The programmes rely on vendor accreditation and certification, private sponsorship and entrepreneurship initiatives. Vendor support stems from global brands. Special arrangements have been drafted between the government and these organisations to provide for training of government employees. - Government supports the education of young ICT professionals for the benefit of the private sector. The idea is to train eligible ICT certified personnel under a subsidised education incentive scheme. - Government is considering a programme to train IT personnel to support enterprises, over a 6-month period.
	University education	- Sultan Qaboos University (SQU) delivers bachelors degrees in IT, along with a network of private schools. - KOM is expected to provide IT education through its private colleges: they include the Middle East College of Information Technology (MECIT) and Waljat College for the Birla Institute of Technology. - An incubator programme known as the “Knowledge Mine” is being drafted.

Country	Criteria	Features
	RDI in ICT	- Oman's Five-Year Plan gives high importance to RDI by building a national skill base in relevant areas, funding RDI activities from public and private sources, promoting coordination and cooperation with regional and international RDI centres. In 2002, some 50 secondary students were sent to study ICT in Malaysia, Singapore and Australia. Others were sent on scholarship to India. SQU now intends to introduce a Ph.D. programme in IT. - Funding includes contributions from the Sultan's funds for RDI. KOM will play the role of a conduit for ICT RDI and technology transfers, creating the environment for subsequent transfers to the entrepreneurship world.
Palestinian Authority	Awareness and dissemination	- There are several forms of ICT awareness and promotion campaigns provided for by public and private entities, covering all ages and levels of society: "Future Kids" is an example of such programmes aimed at children.
	Computers in schools	- Education is provided by public schools, the United Nations Relief and Works Agency for Palestinian Refugees in the Near East (UNRWA) and the private sector. The Ministry of Education announced participation at 97% in primary and 57% in secondary. It is planning to increase overall attendance to 68%. - ICT is increasingly included in programmes as there were 400 school PC labs available in 2002.
	Vocational training	- Several institutes offer vocational training. Vocational training is not in high esteem in Palestinian society, as the higher educational system does not take into account this education, and poses barriers to entry.
	University education	- Higher ICT education is considered with extreme importance and priority in development plans but there is no operational plan for the execution of this vision. Several faculties dedicated to ICT are found in universities, who target the preparation of managers with conceptual and operational skills, with one to four year programs of study. - In the year 2002 computer science students amounted to only 887 students out of a total of 6,200 in technical education. - Most universities have included ICT literacy as part of their programme. - Palestinian universities benefited from an infrastructure upgrade allowing for Internet provision to students and workers. There is approximately 1 PC for 25 students, and 1 PC per teacher. Internet use is high for science and computer students and faculty, with a 100% penetration rate for teachers and 80% of students. - Nine Palestinian universities deliver bachelor degrees in ICT, of which are the Jerusalem Open University and the Jerusalem ICT University -started in 2003- are two examples. New programmes are being created in Al-Azhar University, in Gaza, and Birzeit University, but have not yet received acceptance from the Ministry of Higher Education.
		- Universities and faculties suffered from a sharp decrease in the number of specialists from master degree graduates and doctoral students in sciences and engineering. Furthermore, Classes are overcrowded (50 students to 1 teacher).
	RDI in ICT	- N/A
Qatar	Awareness and dissemination	- N/A
	Computers in schools	- Education priorities in Qatar include the development of curricula for qualified education, increased computer use in education and the generalisation of teaching of the English language. - The Ministry of Education introduced computers in schools in 1995 and plans on leveraging this base to offer computer use starting from primary school, and build incentives for teachers to execute the programme.

Country	Criteria	Features
	Vocational training	- The Qatari Institute of Administrative Development, founded in 1996, is in charge of dispensing ICT vocational training government employees: it has delivered over 119 programmes since inception to 1,942 trainees, with a view to develop skills in ICT, site development, IT systems management.
	University education	- Qatar University graduated over 330 students specialised in ICT. Topics in 2000-2001 included computer science, information systems, and IT. Qatar University has 22 professors in computer science and 17 in informatics and applications
	RDI in ICT	- N/A
Saudi Arabia	Awareness and dissemination	- The "Taaheel" education programme aims at building the human capital base for IT, fostering skills acquisition, preparing students for the job market and raising the overall level of ICT awareness.
	Computers in schools	- Computer education initially developed in boys' public schools. In 2003, it was extended to all secondary schools, with courses taught twice a week. For girls, computer education is limited to the higher levels of secondary schools. There is no formal computer programme for classes under the secondary level. The Ministry of Culture and Education introduced a new programme in 2003; (1) extending computer education and use to the primary level, (2) allowing students to familiarise themselves with IT for job creation purposes, (3) increased public-private collaboration, and (4) coaching teachers into basic computer skills and education. Saudi Arabia devised a programme for teachers to deal with this challenge, observing separation between men and women in education. - The private education system introduces computer as of primary classes.
	Vocational training	- Saudi Arabia introduced a programme educating students in: (1) IT tools for business applications, (2) OS, (3) Internet applications, (4) networking and, (5) computer science. The programme operates with vendor support in 20 pilot schools across urban centres. - The ICT vocational training system suffers from weaknesses in quality, shortage of qualified professors, and shortage of funding.
	University education	- Four faculties for science and computer education have been established in Saudi Arabia in Mecca, Medina, and Riyadh. These specialised faculties add to the existing university system across urban centres. - Although computer programmes are now prevalent, the country report observes a mismatch between what is taught and what the market requires, as well as an uneven level of quality in education.
	RDI in ICT	- N/A
Syria	Awareness and dissemination	- The Ministry of Education, in cooperation with the Syrian Computer Society (SCS) is conducting awareness campaigns on ICT in Syria, with 218 LAN-connected training centres for over 300,000 citizens. 80% of the programme focuses on basic training in ICT literacy. These programmes are dispensed in rural areas too. - Syria is collaborating with UNESCO in introducing ICDL, establishing 15 centres and labs. Coordinated by the SCS, it will cost around SYP 3,000 per trainee, expected to drop to SYP 2,000 as critical mass is attained. - SCS offers training since 1997 and trains 1,000 individuals annually, with costs between USD 30 and 120 per unit. - Private initiative is contributing to ICT awareness and literacy: these non-qualifying sessions sometimes include groups of 800 individuals per session, with cost estimated between USD 20 and USD 120 per head. - In 2001,The Syrian Rural Development Fund inaugurated a programme for ICT training in rural areas. By July 2002, it had dispensed over 34 training courses to 680 trainees, with estimated costs between USD 1 and USD 2.
	Computers in schools	- PC dissemination in schools started in 1997, and by 2002, 2,900 schools received funding for equipment. 75% of preparatory and secondary schools own a PC lab, most still not connected to the Internet.

Country	Criteria	Features
	Vocational training	- The National Centre for ICT was created by decree No 1 of January 6, 2001 to foster basic ICT education, development of programming, advanced ICT training, and Web sites. Certified by vendors, its offers attracted over 651 participants in 2001-2002. Other private training centres offer training on widespread topics, relying on foreign professors, with an approximate cost of USD 1,500 per trainee.
	University education	- The Syrian Higher Education and Research Network (SHERN) infrastructure connects universities to the Internet at a speed of 7Mb/s. This joint programme between the UNDP and the Ministry of Education cost USD 850,000. The first stage was completed in 2001. - Damascus University offers Internet access to faculty and students, with ICT topics placed high on the agenda. The computer science department is now equipped with 400 dial-up Internet-connected computers.
		- Specialised institutions include: (1) a secondary informatics engineering school, created in 1990, graduating 200 individuals a year, and (2) specialised computer engineering faculties created by presidential decree in 2000, within four Syrian universities, to graduate 200 engineers by 2003, and 800 by 2007. In 1984, Syria established the Higher Institute for Applied Science and Technology (HIAST), an elite institution offering complete training and education in computer engineering. A telecom curriculum was recently added to the programme.
	RDI in ICT	- The major axis for RDI in Syria is in the technology localisation field, Arabization.
UAE	Awareness and dissemination	- The UAE Internet Association was established in 2000 to raise awareness and conduct ICT promotion. - National ISP initiatives include the creation of: (1) “Al Bahhar”, a bilingual portal, (2) “Al Mawrood” Internet Surfing centres (currently 100), and (3) the 2002 interactive Web learning channel for children and parents.
	Computers in schools	- Education is provided for free to all nationals. IT is taught as a subject in all schools through committees established by the UAE Ministry of Education and Youth developing a computer-based integrated curriculum.
	Vocational training	- Several ICT education programmes are conducted by the private sector, such as the ADNOC programme, geared at the oil industry, the Emirates Institute for Banking and Financial Studies for the financial sector. - The Higher Colleges of Technology (HCT) provide vocational education, with a special orientation towards government services. Established in 1988, they offer complimentary technical courses of study. HCT graduated their first group in 1992. A one-year basic course of prerequisites, introduced in 1996, trains those lacking preparation to enter HCT. - Etisalat trains local students in ICT fields to encourage reliance on local human resources. Etisalat College of Engineering graduated more than 200 students and serves as an important source of national engineers.
	University education	- In 2001, there were 139 computer science graduates from the UAE University, and in 2002-2003, some 80 graduates had enrolled in HCT and in Sharjah University computer science and computer engineering programs.
	RDI in ICT	- N/A
Yemen	Awareness and dissemination	- Government launched Yemen Net, a public corporation in charge of raising awareness and conducting training programmes for Internet uptake. “Internet clubs”, considered instrumental in raising awareness in the country, are multiplying in Yemeni cities offering Internet access at a rate of USD 1 per hour.

Country	Criteria	Features
	Computers in schools	- Starting 2003-2004, computer studies will be included in governmental schools, on a pilot basis, with results disseminated across to other schools. Government is studying how to equip participating schools with PC infrastructure. - Private schools have a 92% PC equipment rate as opposed to 26% in government schools due to budget constrains. E-learning and virtual universities will be promoted once PC equipment rates increase.
	Vocational training	- There are several Yemeni companies offering "on the job" training in ICT for personnel.
	University education	- There are 15 universities in Yemen, of which 7 are governmental but few specialise in ICT. Sources indicate that the two technical faculties of Sanna'a did not adequately respond to 2001 market demands. A proposed program to equip Yemeni universities with 1,000 PCs exists, but has not yet been implemented. - As 90% of Yemeni students graduate from programs in humanities, social training centres were inaugurated in 1998 in Sanna'a and Aden, to offset weaknesses in ICT educational output and provide proper orientation.
	RDI in ICT	- N/A

Annex 5

Main features of EMC profiles in building the ICT sector

Country	Criteria	Features
Bahrain	ICT firms	- There are approximately 282 ICT-related companies operating in Bahrain, 36% dealing with the Internet, 38% in hardware (retail mostly), 9% in training, 9% in consultancy and 8% in software. -
	Investment in ICT	- N/A
	Government facilitation	- To attract ICT players, the government signed agreements with all major software and hardware companies especially in e-Government applications and IT training.
	ICT Exports	- N/A
Egypt	ICT firms	- There are approximately 950 Egyptian ICT firms, mostly SMEs, of which 807 are in software and programming. - There are 124 ISPs, four ASPs and three large telecommunication groups.
	Investment in ICT	- The combined capital of software companies is approximately USD 340 million, and their combined investments is USD 600 million, whilst the three large telecommunications company represent investments in the range of USD 8.4 billion. - 58% of the investments of telecom firm over the period 2000-2001 were directed to capital expenditures such as telephony and switches. 23% of funds were dedicated to investments in software, whilst 12% and 7% were respectively spent on managerial ICT tools and network infrastructure. - The National Communications Board set yearly investment targets at USD 2.8 billion in 2004, with a target of USD 10 billion in 2010.
	Government facilitation	- The Egyptian government introduced a set of incentives including: (1) tax exemptions for newly established companies, (2) encouraging exports via an ICT development association, and (3) extension of material and organisational support to exporting companies.
	ICT Exports	- N/A
Iraq	ICT firms	- Mostly SMEs, Iraqi firms involved with ICT suffer from one of the highest piracy rates with little incentives for local innovation, and lack of enforcement of the rule of law over the last decade. Most of these firms acquire ICT equipment from the UAE or South East Asia, in a market estimated at less than USD 200 million in 2002.
	Investment in ICT	- N/A
	Government facilitation	- N/A
	ICT Exports	- N/A
Jordan	ICT firms	- In 2000, the ACI accounted for 385 IT equipment importers in Jordan. - The country has several projects underway, to encourage the creation of ICT firms, and tools include the National IT Association, and the Young Entrepreneurs Association.
	Investment in ICT	- The Ministry of Planning launched Enhanced Productivity Programmes (EPP), a development project for rural areas, endowed with a JOD 25 million (USD 32 million) to provide seed money for new initiatives. - ICT investment priorities are covered under the Investment and Promotion Law of 1995 which promises equal treatment to all investors, and offering favourable tax and customs duty treatment for investments above USD 70,000. - The Jordan Investment Board (JIB) assists local and foreign investors in applications and procedures. In 2000, the JIC identified only 12 IT projects invested under the investment promotion Law, representing a total value of JOD 13 million (USD 18.3 million).

Country	Criteria	Features
	Government facilitation	- Jordan's Customs Department exempted key ICT products from all import tariffs as of 1999. Also, a free trade agreement (United States -Jordan Free Trade Area Implementation Act, passed in September, 2001) eliminated duties and commercial barriers to bilateral trade in goods and services.
	ICT Exports	- The 385 Jordanian IT equipment importers had combined capital of JOD 31 million in 2000 (USD 43 million). - The Jordanian IT market, estimated at USD 60 million, of which 27% is in software and IT services, and 73% is in PCs and hardware, is expected to grow at CAGR 15% - 30%. Jordanian IT exports, currently above USD 7 million, are poised to double yearly.
Kuwait	ICT firms	- Most ICT companies operating in Kuwait are hardware retail businesses and service centres. There is no major Kuwaiti ICT industry identified. Valued at USD 410 million in 2002, this market is expected to rise to USD 544 million in 2005. The computer equipment and software markets represent, respectively, 39% and 20% of 2002 spending. IT services were valued at USD 100 million in 2002, are expected to grow to USD 136 million by 2005. - There are several local systems integrators operating in Kuwait, providing integration solutions, consultancy and support. Kuwait is also home to Sakhr, the Arabic language software and technology localisation leader.
	Investment in ICT	- The new investment law, passed by the National Assembly on March 11, 2001, authorises 100% foreign-ownership in certain industries, exempts foreign-majority owned companies from requiring a local agent, authorises 10-year tax holidays for new foreign investors, and facilitates other business requirements. - The licensing authority of the Ministry of Commerce and Industry encourages high-tech industries and the Foreign Capital Investment Committee (FIC) will work on new investment incentives.
	Government facilitation	- Multinational vendors and importers of ICT goods now benefit from the implementation of the GCC Customs Union (in effect since 2003), unifying common customs tariffs at 5%.
	ICT Exports	- World Bank's World Development Indicators 2003 confirm Kuwait had no high-technology exports in 2000-2001.
Lebanon	ICT firms	- There are about 500 IT-related companies in Lebanon, mostly SMEs, the majority of which focuses on retailing and Internet services. Some software companies are developing systems for the national and international markets. - Several of the 200 software companies have turned to exporting their products and knowledge.
	Investment in ICT	- Investment houses and the Central Bank have taken interest in ICT investments since 1999. The Central Bank started to encourage banks to provide loans to technology SMEs, and incubators were launched in 2000. - A dedicated law (Lebanese Investment Law No 360) sets a series of incentives for investments. Developments underway could include building the Initial Public Offering (IPO) framework in the local market. According to the Professional Computer Association (PCA), most Lebanese ICT investment (54.5%) come from individuals, the balance (36.4%) from bank loans and joint venture funding (27.3%).
	Government facilitation	- To encourage technology zones and parks, the government introduced tax incentives. In 2000, the government eliminated customs tariffs on all ICT products. In 2002, the 10% VAT offset tariffs reduction.
	ICT Exports	- According to the PCA, 2002 hardware sales were low. 19 ICT firms reported annual sales of USD 126.5 million with 9.3% for export. Companies reported an annual growth rate over the last 5 years of 32.5%. - Development of Arabic software and software packages Arabization could be an opportunity for growth.

Country	Criteria	Features
Oman	ICT firms	- N/A
	Investment in ICT	- N/A
	Government facilitation	- To build a local ICT industrial base and to proceed into the "Omanisation programme", the government is acting to encourage Private Public Partnerships (PPP), inviting global ICT players to set up "Centres of Excellence" in the country, and taking steps to foster entrepreneurship. KOM plays a critical part in this programme, with focus on local PC assembly, establishment of contact centres and software Arabization.
	ICT Exports	- N/A
Palestinian Authority	ICT firms	- The first ISP opened in 1994: there are now over 60 SMEs operating in programming, 70 in training, and several players involved in equipment sales. - Foreign companies such as Hewlett Packard, IDS, Timex, Siemens and Microsoft have opened representative offices in Ramallah, Jerusalem, Nablus and Gaza.
	Investment in ICT	- The Palestinian IT association groups 73 companies, most of which private, which represent 70% to 80% of the sector. It collaborates with the Palestinian Authority in building the proper framework, legal and financial, for investments in the sector.
	Government facilitation	- The PNA set up a preferential programme favouring local alternatives over foreign equipment acquisition, through a system of grants.
	ICT Exports	- NA/
Qatar	ICT firms	- There were over 41 firms accounted for in Qatar in 2002, specialised in ICT. They include companies offering IT services, as well as those in the domain of programming and software development.
	Investment in ICT	- N/A
	Government facilitation	- N/A
	ICT Exports	- N/A
Saudi Arabia	ICT firms	- STC, Saudi Arabia's largest ICT-related company and the third largest in the country, has a turnover of SAR 39 billion (USD 10.4 billion) in 2002. There are other players such as the Arab Computer Company, with a turnover of SAR 694 million (being USD 185 million), the "World Electronics Company", with a turnover of SAR 510 million (USD 135 million), to mention the largest players. - The Saudi chamber of commerce estimates that there are few SMEs and large size firms specialising in ICT. Most companies focus on contracting services for telecom networks, cabling trade, consulting services, and repair and maintenance services. The majority of the other players are importers of hardware and software, distributors, and maintenance related businesses. In addition, there are 25 ISPs in the country.
	Investment in ICT	- According to the STC's 2001 "Perspectives on the Saudi Economy", the Saudi market represented demand of over SAR 10.2 billion in 2000, (USD 2.7 billion), representing 5% of GDP. It is expected to grow to SAR 20 billion (USD 5.3 billion) in 2010. - The market is structurally an import market with little local assembly. There are few examples, such as 2000 opening of the "Alfaislia" PC assembly plant, where daily output is 200 units, and yearly sales are at SAR 16 million.
	Government facilitation	- N/A
	ICT Exports	- N/A
Syria	ICT firms	- The SCS accounts for 130 member companies representing players in the Syrian ICT industry. The majority of these firms engage in retailing of foreign ICT products in the country, with local programming under 25%.

Country	Criteria	Features
	Investment in ICT	- Governmental or government-affiliated investments in Syrian ICT are some of the lowest in the world. Private investment is extremely weak, as a proper investment framework is not in place, and is not planned at this stage. - The Syrian investment Law (Law No 10) organises investments and defines government facilities. However, it is not adapted to the ICT field.
	Government facilitation	- N/A
	ICT Exports	- The Syrian ICT industry is not geared for exports. Exports could be envisaged in the software segment.
UAE	ICT firms	- Several ICT players operate, with web-based companies, IT support and software development representing the bulk, at respectively 34%, 22%, and 17%. Others include ASPs, back-office and consultancy businesses. - Some leaders have emerged, under the auspices of Etisalat, the national telecom incumbent, including Ebtikar, a specialist card manufacturing unit, Emirates Internet Exchange (EMIX), the region's first Network Access Point (NAP), Emirates Data Clearing House (EDCH), providing billing exchanging and accounting data between GSM operators, Thuraya, a satellite mobile service, EIDC, a hosting business, E-Vision, a cable television (CTV) multimedia business, and E-Marine, working in submarine cable installation, repair and maintenance projects.
	Investment in ICT	- UAE ICT investments, amounting to USD 1.2 billion in 2002, representing 1.8% of GDP. - Government-led initiatives to foster ICT investment have been implemented and include Dubai Internet City (DIC), a free-trade area for technology, Sheikh Mohammad Technology Park, a technology park announced in 2002 and Dubai Silicon Oasis (DSO), a park focussing on the semiconductor industry.
	Government facilitation	- Government incentives for ICT investments in the UAE are materialised in projects launched, including the DIC, where companies are exempt from income tax. Special adaptations to ICT investment requirements include: (1) allowing 100% foreign ownership, (2) tax holidays and (3) 50-year renewable land leases. - The Dubai Development Investment Authority is attracting investments to the UAE and encouraging the development of local SMEs, acting as an incubator for ICT SMEs. Recently, a ministerial decree (December 2002 Decree of Sheikh Abdallah Bin Zayed AL Nahyan, UAE Minister of Information and Culture) cancelled fees on computer programmes to help the spread of software especially in the field of education.
	ICT Exports	- N/A
Yemen	ICT firms	- The 95 Yemeni ICT-related companies are mostly importers of equipment and integrators. Few local firms engage in programming and local development. The local market does not cover Yemeni ICT application needs. The difficulty is in the fact that the local market demands such tools in the Arabic language, which are largely unavailable. There are few local Yemeni providers. The same applies to Yemeni hardware needs.
	Investment in ICT	- N/A
	Government facilitation	- There is no reported government incentive scheme or facilitation for ICT equipment procurement. To promote the creation of local ICT firms, the Ministry of Telecommunications is planning a programme whereby local players would be granted direct access to equip government and administration with their output.
	ICT Exports	- N/A

Annex 6

Main features of ICT applications for government

Country	Criteria	Features
Bahrain	Computerisation of public administrations	- Bahrain developed a strategic plan that aims at developing the country into an information technology hub. - Government computerisation and modernisation are part of this strategy. - Bahrain has the financial strength to implement this strategy.
	Digitisation of information	- Bahrain has implemented a pilot project, namely the automation of its commercial register services, and a number of other services and laws.
	E-government plans	- Bahrain has set a high level schedule and an e-government strategy model. - The e-government strategy undertakes to implement a series of related projects to improve the effectiveness of systems and technology within the government of Bahrain. - The projects follow a phased approach according to a schedule over 2003 & 2004.
	E-procurement	- N/A.
Egypt	Computerisation of public administrations	- Egypt has a number of government ministries and agencies leading the way in computerising public administration. - Computerisation of government departments includes business process re-engineering and workflow implementation in order to increase efficiency and effectiveness of government processes, as well as developing decision support systems. This is the right approach to benefiting from gains in efficiency and performance through re-engineering the procedures while computerising public administration.
	Digitisation of information	- There are a number of projects aiming at digitising national economic data, legislative data, manpower data, and services data. The allocated budget for these projects is USD30 million.
	E-government plans	- Egypt is advanced in its e-government plans which revolve around 5 major programmes: infrastructure (technical, legal, organisational), network services, governmental communication network, new models for government procurement (including e-procurement).
	E-procurement	- e-procurement is one of the e-government five basic plans.
Iraq	Computerisation of public administrations; Digitisation of information; E-government plans & E-procurement	- Prior to 1991, mainframe computers were available in a few government establishments. - The few computers that were installed in the "Oil-for-Food" program are not networked. - The recent war has destroyed what is left of the administration's infrastructure; hence there is no data available on any of the indicators for e-government applications.

Country	Criteria	Features
Jordan	Computerisation of public administrations	- Jordan launched its government computerisation initiative (REACH) back in 1999. - Almost all ministries and government institutes are launching their new and modified Web sites, linking them to their database when applicable. - Many public entities are implementing basic automation services such as electronic mail and archiving systems.
	Digitisation of information	- N/A.
	E-government plans	- The e-government strategy described in the country report has five building blocks: Management and organisation framework, legislation, education and awareness, infrastructure, and e-services.
	E-procurement	- N/A
Kuwait	Computerisation of public administrations	- An Internet-accessible database of Kuwait's 170,000 government employees, or civil servants, went live in 2002 at the Civil Service Commission. - The Ministry of Interior, embarked on a USD45 million IT modernisation program in 2001. This project involves upgrading the ministry's backbone network, centralising applications and offering secure payments and exchange of information through multiple devices such as public kiosks. - The Ministry of Information and Computer Systems Center has designed, developed and rolled out 13 applications relating to key areas such as immigration, residency and visa processing, driving license application and renewal, vehicle registration, border control and criminal records management, as well as an automated fingerprint identification system.
	Digitisation of information	- The Ministry of Interior IT modernisation plan involve the consolidation of a common data model, where all the ministry's databases – and eventually all government databases – are digitised, shared and centralised.
	E-government plans	- On April 29th 2002, a national project was launched, to issue e-mails address to every citizen in Kuwait based on the unique national identification card number of each citizen. - The service, which will be free of charge for users, is an integral part of the Web-based service that will enable residents to use government e-services and authenticate their correspondence with public departments, banks and other organisations. - Government departments and utility services such as the traffic department and water, electricity and telephone companies can also use the e-mail address to deliver traffic fines and utility bills.
	E-procurement	- Requests for proposals (RFP's) are published on the Web, but full e-procurement is not in place yet.

Country	Criteria	Features
Lebanon	Computerisation of public administrations	- Lebanon launched its ICT initiative in the mid 1990's. Since then, a wide array of ICT projects has been implemented in the public administration. - Infrastructure has been put in place in many government ministries and agencies. Most government ministries have deployed local area networks and some have implemented wide area networks. - The full benefits of the connectivity and integration offered by modern ICT and Internet technologies are still to be exploited. - Supporting the day-to-day operations of the public administration, a large number of ministries and agencies have received productivity tools such as word processing, spreadsheet, presentation and project management software. - Beyond infrastructure work, numerous information system applications have been developed in the public administration.
	Digitisation of information	- All ministries and most agencies in the Government of Lebanon have Web sites that contain pertinent government information. Some sites also have digital forms that can be downloaded and submitted manually. - In 2002, and for the first time in any Arab country, all Government application forms and relevant information were digitised into one central portal called INFORMS (http://www.informs.gov.lb)
	E-government plans	- In 2002, the Government of Lebanon prepared an e-government strategy for the Lebanese Administration with strategic objectives serving the citizen and the business sector.
	E-procurement	- A new draft law for legalising e-procurement services by the government, for Public Tenders is suggested to include new articles confirming explicitly the principle of making purchases electronically by the Lebanese government, and organising the conditions of performing public transactions electronically with the business sector. This will pave the way towards full adoption of e-procurement.
Oman	Computerisation of public administrations	- Many computerisation projects have already started and others are in the pipeline. Some of these projects have been chosen as quick wins to create an immediate impact, these cover: Government portal, government tendering site, government suppliers online, statistics online, government forms online, and one-stop-shop for company registration. - Additionally, Muscat Municipality and Oman Police Force have initiated significant automation projects. For example, Muscat Municipality is planning to establish kiosks for e-payment all over the capital area to pay government bills. - The Ministry of Commerce and Industry is implementing a one-stop shop Web Portal project to automate all services related to commercial registration, industrial registration, tourism permits/registrations and the minerals permits/registration.
	Digitisation of information	- This is being done gradually as more and more applications are put online.
	E-government plans	- One of the first steps has been the commissioning of the National IT and e-government strategy. - Oman has an approved IT strategy for e-Government.

Country	Criteria	Features
Palestinian Authority	Computerisation of public administrations; Digitisation of information; E-government plans & E-procurement	- In view of the challenges faced by the Palestinian Authority, there is no mention of these topics in the country report.
Qatar	Computerisation of public administrations,	- Qatar developed a strategy for the computerisation of government applications recently (The Emiri decree 25 for the Year 2002). - Qatar has identified 1350 e-government services and has implemented 130 so far. The plan is to move all services by 2005. - Qatar has the advantage of financial strength and capability to implement its recent government computerisation strategy.
	Digitisation of information	- N/A.
	E-government plans	- Qatar has established a central committee to develop e-government plan. The latter has four strategic areas: Management, Technology, Policies and Business.
	E-procurement	- N/A.
Saudi Arabia	Computerisation of public administrations	- Computerisation started successfully with a number of projects in government ministries including the Ministry of Foreign Affairs, The Ministry of Hajj, and the Ministry on Interior. - The above is an addition to the legacy applications, which has been computerised using mainframes and PC's across a number of government departments.
	Digitisation of information	- N/A.
	E-government plans	- Saudi Arabia issued a strategy and action plan for a high-level e-government vision in 2003. - The E-government initiative is still at the beginning in Saudi Arabia, however there are many computerisation projects across ministries, which pave the way towards an integrated e-government approach in the future.
	E-procurement	- N/A.
Syrian Arab Republic	Computerisation of public administrations	- Although ICT in Syria is not at top performance, Syria is in the middle of developing a number of significant projects aiming at the adoption of ICT to improve public services. Some of these projects are: (a) A national programme for Citizens Registration and Identification (ID Cards), which started in 2001 and will continue until 2006. (b) A number of computerisation efforts scattered across some other ministries and government agencies such as the Ministry of Health, Ministry of Finance, the Syrian Commercial Bank, and the Municipality of Damascus.
	Digitisation of information	- This will be part of the large computerisation projects mentioned above, such as the Citizens Registration and the Ministry of Finance. - The Geographic Information System (GIS) project run by the Department of National Survey has digitised maps of Syria.

Country	Criteria	Features
	E-government plans	- There is no integrated e-government initiative in Syria yet. However, many Ministries have Web sites.
	E-procurement	- The current legislation presents an obstacle for implementing e-procurement.
UAE	Computerisation of public administrations	- The UAE is well advanced in computerisation of government applications. - In a recent UNDESA[1] report "Benchmarking in E-government", the UAE ranked first in the Arab world and 21st globally. - Some Emirates such as Dubai and Abu Dhabi are visibly ahead of the others in terms of ICT applications to their public administration. - Computerisation in public administration has been going hand in hand with e-government and e-procurement plans in the UAE.
	Digitisation of information	- There is no concrete information available concerning the extent of digitisation of information in the UAE; however, some macro trends are indicative of a positive move toward digitisation in the country.
	E-government plans	- In the past 12 months, the UAE made major advances in bringing its government services online, for both the business sector and the individual users.
	E-procurement	- The Ministry of Finance and Industry started to offer online services to its customers and the public through the new electronic services (e-procurement and e-sinaee). Through these services, the customer can register, select the service and apply, fill the forms, upload the documents and pay online using the e-Dirham card and finally receive the services.
Yemen	Computerisation of public administrations; Digitisation of information; e-government plans & e-procurement	- The slow uptake of ICT in Yemen is attributed to the absence of a national strategy for exploiting information and communication technologies. - A large percentage of government departments did not apply automation to their working processes yet. However, some ministries and government departments started to apply automation independently. Examples of these ministries are: the Ministry of Finance, the Ministry of Higher Education, and the Ministry of Social Services.

(1) UNDESA: The UN's Department of Economic and Social Affairs.

Annex 7

Main features of ICT Applications in education

Country	Criteria	Features
Bahrain	Computer-based education	- N/A
	Connectivity	- The Ministry of Education has arranged for all public intermediate and secondary schools in Bahrain to be connected to the Internet, and the process of improving on Internet is ongoing.
	Online services	- The University of Bahrain has boosted its use of the Internet from mere dissemination of information to a two-way communication. - Students can select their courses and apply for admission and registration using online forms. - The university is planning further ICT development and Internet integration to bring more of the learning and administrative processes online, such as e-Courses which the university is currently developing.
	Distance learning	- The Arab Open University, with headquarters in Kuwait, and a planned campus in Bahrain, is based on the concept of distance learning. This university is designed to initially handle about 4,000 students from around the Middle East. - Students use the Internet as the main channel for accessing teaching material and assignments.
Egypt	Computer-based education	- The Ministry of Education established a center for technology development, with the task of setting up ICT in schools and introducing e-Learning into these schools. - The Ministry of Education has set up a joint project, entitled Smart Schools, with the Ministry of Information and Communications. The project aims at introducing ICT technology to 7,500 schools in its first stage, and is expected to be accomplished by 2008. These schools will play the role of community center to offer ICT facilities for use by Citizens. - About 600,000 PCs are installed in Egyptian schools, i.e. one PC for every 15 students.
	Connectivity	- N/A
	Online services	- N/A
	Distance learning	- The Egyptian National Council for Higher Education has established a national center for e-learning to serve other universities, and higher institutes. The mission of this center is to qualify teachers in setting and teaching e-Learning courses, developing online courses and creating an e-Learning portal on a national level. - Egypt participates in the Open Arab University, based in Kuwait, whereby students use the Internet as the main channel for accessing teaching material and assignments. So far 70 students joined this university.
Iraq		- There are no education-specific applications being used in Iraq's educational sector.

Country	Criteria	Features
Jordan	Computer-based education	- The Ministry of Education developed a comprehensive e-Learning strategy. - The Ministry also established an e-Learning Co-ordination Unit to co-ordinate implementation of this strategy. - The implementation plan covers: - Infrastructure: goal to equip all schools with computers with a ratio of 1 computer to every 10 students, and connect the school with Internet via Broadband connectivity. The actual situation is 2,100 schools out of 3,200 schools are equipped with computers (40 computers in each). The total Number of computers will be 45,000 out of the proposed 100,000 by the end of April 2003. - Curricula: the goal is to enhance the teaching and learning process by using ICT as a tool in different subjects, - Teacher training: the goal is to provide teachers with skills (technical and pedagogical) needed to enhance teaching & learning in the classroom and to be the facilitator, guide and negotiator of learning rather than main source of knowledge. More than 3,500 teachers got training from international companies in the year 2002. Some 2,500 teachers already obtained the ICDL, and more than 5,000 teachers are following the ICDL courses. - Management information system: the goal is to provide decision-makers with accurate and up-to-date information at the exact time when they need it. - Other initiatives were launched for Higher Education development through introducing ICT technology in higher education institutions.
	Online services	- N/A.
	Connectivity	- The actual situation: 1,000 schools are connected to the Internet by ADSL technology. By the end of February this will increase each month by 200 schools. - Future projections: Broadband connectivity will be established by the year 2005 for all schools
	Distance learning	- The closest example to the virtual university concept is the Regional Distance Learning Center. - The University of Jordan was chosen by the World Bank to be one of the centers of the Regional Distance Learning Network. This project establishes a distance-learning network for IT and facilitates information technology education for World Bank member countries in the Middle East and North Africa.
Kuwait	Computer-based education	- Kuwaiti Schools are equipped with about 22,500 PC, with a ratio of 1 PC for every 20 students. The Ministry of education plans to achieve a ratio of 1 PC for every 8 students by 2006-2007. - Twenty-four public intermediate and secondary schools in Kuwait will serve as the pilot sites for an e-learning module starting year 2003-2004. .

Country	Criteria	Features
	Online services	- Kuwait University students are now able to use the university portal to register for academic courses and receive information through the Internet. The service is available to university staff and faculty, with parent-focused services planned for a later phase of the project, in addition to online interaction with students. - The library component of the online project is expected to be available by mid 2003. - Soon, students using the portal will be able to access all of their daily applications through the site, and customize their Web interface to get university news and calendar of events that interests them.
	Connectivity	- In addition to the multiple gigabit Ethernet network deployed around Kuwait University campuses, wireless LANs are now located in various meeting areas and restaurants within the university. IP telephony is also available within the campuses, as the network platform supports all forms of data transmission: voice, video, and text. - The new classrooms at Kuwait University are also equipped with a jack for a camera so that classes can be recorded and stored in a digital library. The digital library provides students with a video on-demand facility where all the live lectures are recorded and backed up to an online library, which students can access whenever they need to.
	Distance learning	- Kuwait University installed a converged network, which allows the university to utilize distance learning whereby a class can be held in different locations at the same time with the instructor at one campus and the students at their own home campus.
Lebanon	Computer-based education	- Computer literacy courses are introduced in the new K-12 curriculum. - The ICT share in the curricula of 1994 reform stipulates 1 hour per week. - Many schools, mainly private, are using multimedia authoring tools.
	Online services	- One of Lebanon's e-learning proposals is an Internet-based system available to all schools which provides online education facilities, low cost access to reference material, guides to national and international educational sources that enables students and teachers to communicate nationally and internationally. - Numerous universities have engaged in technology-supported learning through the use of learning management systems, which allow students to access course material and their own class progress through a Web interface.
	Connectivity	- Lebanon's SchoolNet pilot project, launched in June 2000 connecting some chosen public school, aims to enhance co-operation among sectors of the education system as well as among schools, teachers and students. - CARTAGE is launched by the Catholic Schools aiming at linking 3000 private and public schools with a bandwidth of 8 Mbits.
	Distance learning	- The Open Arab University has recently opened a branch in Beirut. Other than that, there are no other forms of virtual universities.

Country	Criteria	Features
Oman	Computer-based learning	- Some positive initiative have been taken by Oman government, including an Educational Portal to facilitate communication between the Ministry of Education, schools, students, parents and members of the society who are concerned with education. - The portal will make it possible to apply distance learning, self-paced learning visual classrooms and group learning. Implementation is planned through launching pilot projects in the following areas: - e-school project; - e-region project: which involves redesigning and rehabilitation of local area network, provision of Internet communication using e-mail among region's elements and establishing regional portal, - e-curricula project: to transform books and guides into electronic texts and promulgate into the Ministry of Education Web site.
	Online services	- There is a proposal for a pilot e-school project in Oman which will be accomplished through: - use of the school administrative system, - rehabilitation and redesigning of the local network, - provision of communication services through the Internet, - establishing school portals and the use of e–mail between school segments.
	Connectivity	- See data given above.
	Distance learning	- There is no mention of virtual universities in the country report.
Palestinian Authority	Computer-based education	- ICT is commonly used in the school administration systems in Palestinian private schools, and is modestly used in public schools. There is no mention of PC use in educational institutes.
	Online services	- Palestinian Universities publish the curricula and educational material on their Web sites so they can be accessible by students who are prevented from attending their universities because of closures by the occupying forces.
	Connectivity	- There is no mention of school connectivity to the Internet, but Palestinian universities have their own Web sites.
	Distance learning	- There is no mention of virtual universities in the country report.
Qatar	Computer-based education, Online services, Connectivity, Distance learning	- Qatar's effort in this area is limited to teaching ICT in schools and universities. - There is no mention of how many schools have PC's or have access to the Internet. - There is no mention of whether online courses have been developed, and - There is no mention of a national strategy to exploit the potential opportunities of ICT technologies for transforming education.

Country	Criteria	Features
Saudi Arabia	Computer-based education	- e-Curricula is not common in Saudi Arabia. There is only limited experiments, for example in King Fahd University for Petroleum and Minerals, for teaching a curriculum on data structures via the communication network, - An experimental Laboratory for e-University has been established in King Abdul Aziz in Jeddah., - An e-learning network established by Al-Dwalej (www.dwalej.com). - Al Andalus private schools in Jeddah follow a five stage plan to convert into computer-based education during the next two years.
	Online Services	- Some universities offer some limited services such as online registration.
	Connectivity	- There is no mention of schools connectivity to the Internet. - The Ministry of Education plans to develop the libraries of all schools to be used as learning centers containing all printed sources and ICT tools to be incorporated in the teaching and learning operations.
	Distance learning	- There are no plans for distance learning in the Saudi educational establishments, except in very restricted cases, and for very specific purpose such as medical reasons. - The Open Arab University has a branch in Saudi Arabia.
Syria	Computer-based education	- ICT courses are offered in the secondary and preparatory stages, with a frequency of 2 hours per week. There are 4 PCs for every secondary school. - No clear use of ICT as a tool in learning. - The idea of smart schools is being discussed with a Malaysian company.
	Online services	- There are no clear online services except the possibility of downloading some course content and browsing some general information from the Ministry of Education Web site.
	Connectivity	- The Syrian Ministry of Education is in the last stage of building its own Intranet. The first phase of this project is to link 1000 schools through the Ministry. The Ministry plans to connect 2000 additional schools in the next two phases.
	Distance learning	- The Syrian Virtual University (SVU) has been established as a national initiative. SVU has links with a number of international universities, and co-operates with universities in Canada, USA, Britain, and France. SVU is in the process of partnering with forty internationally recognised educational institutions.
UAE	Computer-based education	- Each secondary school is equipped with 35 workstations and cameras that help in monitoring and follow-up processes, in addition to servers and colour printers. This project demonstrated that the connection to the Internet has been of great service to students, teachers, schools and parents. - e-School Projects: The primary mission of these projects is to offer IT education for all possible courses through the Internet. These projects are aimed at providing a collection of high school credit courses offered entirely over the Internet to students in UAE.

Country	Criteria	Features
	Online services	- The UAE National Computing Center in Abu Dhabi, has been, for sometime, running a programme for the computerisation of schools across the UAE.
	Connectivity	- All public schools in the UAE are connected to the Internet and equipped with IT laboratories. The programme will allow interaction among students in the emirates with every one of them having an email address and password that allows him/her to log into the system from his/her terminal in the school or at home. The benefits of such projects are still very hard to estimate since they are still at a very limited stage of implementation.
	Distance learning	- The UAE has established a "Knowledge Village" (www.kv.ae) aimed at building a vibrant connected learning community. One of the key objectives of the Knowledge Village is to raise the abilities of the region's knowledge workforce to compete and innovate in the global economy. - Knowledge Village will house a diverse community of knowledge-focused organisations including: a Media Academy, an Innovation Center, e-learning institutions which provide graduate and post-graduate education, research and development organisations, a multi-media library, corporate training institutions, scientific and technology institutes, certification and testing organisations and incubators. The learning community at Knowledge Village will facilitate increased access to world-class learning opportunities in a variety of disciplines for student and corporate communities. - The UAE through Dubai Internet City (www.dubaiinternetcity.com) has a joint venture with e-College from the United States to form "Knowledge Access", a company that will make education more accessible to the Gulf region and surrounding areas. It will provide technology and support services for academic institutions and corporate training organisations to build full online programs.
Yemen	Computer-based education	- Teaching ICT subjects is just starting on a very limited scale. There is sever shortage of funding that can be allocated to any project aiming to promote and develop ICT applications in education. - While about 92% of private schools in Yemen have PC's, only 27% of the public schools have PC's.
	Online services	- N/A
	Connectivity	- N/A
	Distance learning	- A presidential decree was issued this year to develop a Virtual University to provide distance learning to expatriate Yemeni citizens living outside Yemen, and those living in remote areas. The Ministries of Higher Education and Scientific Research are coordinating the effort to create this virtual university.

Annex 8

Main features of ICT applications in business and commerce

Country	Criteria	Features
Bahrain	Extent and maturity of e-commerce and e-business	- N/A.
	Availability and quality of e-banking	- Internet Banking has made real headway in Bahrain, with adoption rate standing at around 20% of all Internet users, an average adoption rate that is comparable with advanced countries. - Several Bahraini or partly Bahraini banks are now offering e-banking.
Egypt	Extent and maturity of e-commerce and e-business	- E-commerce and e-business applications are limited in scope and scale. And there are no accurate data on the real spread of e-commerce and e-business in Egypt at this point of time. - The Egyptian government is in the process of issuing the legislation necessary to encourage and support e-commerce and e-business. - A study by the US Department of Trade titled "Developments in electronic Commerce in Egypt" published in December 2002 has highlighted the potential of e-commerce and e-business in Egypt.
	Availability and quality of e-banking	- E-banking in Egypt is restricted by the fact that there is only around 10% of the Egyptians who have bank accounts. - The government is trying to promote e-banking through initiatives such as electronic transfer of salaries and pensions to bank accounts, and it is encouraging the use of credit cards. - This is an under-utilised area in Egypt with potential for growth.
Iraq	Extent and maturity of e-commerce and e-business	- E-commerce and e-business applications are not available in Iraq. - Iraq's infrastructure is totally destroyed and business activities are paralyzed.
	Availability and quality of e-banking	- Banks in Iraq are unprepared for any form of e-banking at the present time. - The infrastructure necessary for e-banking, such as reliable telecommunication network and a secure and high speed Internet network, and the availability of payment cards, is lacking.
Jordan	Extent and maturity of e-commerce and e-business	- Business-to-Business (B2B) e-commerce is present and its use is spreading. Commerce One and TEJARI are success stories. - Business-to-Customer (B2C) is still not widely spread, as tools and software are still somewhat expensive. - Problems that are facing e-commerce and e-business are the lack of both a payment gateway and an Internet security for shopping cards.
	Availability and quality of e-banking	- There are 22 banks in Jordan, three of which have Internet banking, namely Arab Bank, Housing Bank and Jordan-Kuwait Bank. The provided e-banking services do not cover the whole spectrum of e-banking services. - Most banks have already implemented Automated Teller Machine (ATM) networks, 8 of the 22 banks share a common network for ATM's called JONET. - Quality of e-banking in Jordan is high with secure networks in place. Over 600,000 credit cards deployed of which more than 500,000 are Visa electron Cards, around 50,000 – 60,000 charged cards and 20,000 – 30,000 credit cards.

Country	Criteria	Features
Kuwait	Extent and maturity of e-commerce and e-business	- The Kuwaiti B2B and B2C e-commerce sector is growing, registering a total of US$170 million in 2002. - The bulk of the transactions were B2B, valued at US$150 million, taking place between multi-national companies and their local distributors. - There are e-commerce and e-business activities led by the KOC (Kuwait Oil Company). All these activities are likely to flourish when the Digital Signature Law is passed. - The projection for growth of the B2B segment is likely to be worth between US$342 million and US$496, while the B2C segment is likely to be worth between US$54 million and US$55 million.
	Availability and quality of e-banking	- Kuwait claims to have the highest e-banking adoption rate among all Arab states. - Four of Kuwait's seven commercial banks offer retail banking services through the Internet, while the other three banks offer phone and ATM banking services. - Kuwait's largest bank, National Bank of Kuwait (NBK), leads the way by offering most of its services online. In terms of security, NBK employs the latest encryption and authentication techniques like public key infrastructure (PKI) and secured socket layer (SSL). - Bank of Kuwait and Middle East provides SMS and WAP enabled services to execute utility bills payment, transfer funds or send a statement of account to the concerned customer.
Lebanon	Extent and maturity of e-commerce and e-business	- The skills and entrepreneurship of the Lebanese may enable the country to reach great heights in e-commerce and e-business. - E-commerce projects in Lebanon face numerous barriers to progress, namely: lack of efficient infrastructure, lack of venture capital and funding, and lack of laws and regulations that create an attractive environment for e-commerce in the country. - In 2003, 30 e-commerce sites are hosted outside the country. E-commerce projects focus on exporting goods and services from Lebanon rather than becoming pure consumer projects catering for local markets. - Some companies have established themselves as infrastructure providers for electronic ordering and electronic transaction processing in the business-to-business domain.
	Availability and quality of e-banking	- The ATM network of the commercial banks currently comprises more than 740 ATMs and growing with 700,000 average monthly transactions. - There are currently 52 commercial banks operating in Lebanon: 10 banks offer transactional internet banking while 4 have a similar service under trial and expect to release it in few months. 11 banks are still developing this service. - In addition, one bank offers SMS banking, 3 providing a WAP banking service and 1 bank provids TV banking. - The Central Bank of Lebanon is undertaking an initiative named Secure Electronic Banking and Information for Lebanon (SeBIL), in order to provide a secure platform for electronic banking and e-services for Lebanon's financial sector.

Country	Criteria	Features
Oman	Extent and maturity of e-commerce and e-business	- Many corporate sector companies conduct B2B transactions using electronic means. - B2C is also being introduced. - The Muscat Bank initiative to implement a comprehensive business continuity plan is likely to assure businesses and individuals of the robustness on the infrastructure supporting e-commerce and e-business. This is likely to attract citizens and business to trust transacting over the Internet.
	Availability and quality of e-banking	- Many banks in Oman are on the move to promote e-banking and e-payments. - There are agreements between the Ministry of Commerce and Industry and Oman Arab Bank to establish electronic payment system supported by smart cards that can be used by all companies in the private sector. As such the Muscat Bank initiatives targets to launch e-Bank. - Muscat Municipality aims at launching an e-payment gateway, and the Central Bank of Oman is considering the introduction of an Electronic Fund Transfer system.
Palestinian Authority	Extent and maturity of e-commerce and e-business	- E-commerce and e-business are potential areas for growth in Palestinian Authority inspite of the country being under occupation. - Currently there are no credible e-commerce and e-business activities in Occupied Palestinian Territories, except on a very limited scale in some banks, such as the Arab Bank.
	Availability and quality of e-banking	- Use of e-banking in Palestinian Authority Territories is very restricted at the moment. E-banking is not likely to take off before a certain degree of political stability is achieved.
Qatar	Extent and maturity of e-commerce and e-business	- N/A.
	Availability and quality of e-banking	- N/A.
Saudi Arabia	Extent and maturity of e-commerce and e-business	- It is estimated that Saudi Arabia was responsible for generating approximately USD1 billion of e-commerce activity in 2001. - The Ministry of Finance, the Ministry of Commerce, and Saudi Arabian Monetary Authority (SAMA) are in the process of developing a regulatory e-commerce framework more focused on online financial services. - King Abdulaziz City for Science and Technology (KACST) has initiated a public key infrastructure system that will enable a secure e-commerce environment in the Kingdom - Two of Saudi Arabia's largest firms are pioneering B2B e-commerce initiatives. The first, Saudi Aramco, is encouraging its 1,200 partners to use its B2B platform. The second, Saudi Basic Industries Company, is enhancing its supply chain processes by adopting a B2B exchange solution involving some of the largest banks in Saudi Arabia.

Country	Criteria	Features
	Availability and quality of e-banking	- E-banking is the main form of transacting between the Saudi Ministry of Finance and the Saudi Arab Monetary Agency in terms of government revenue and official cheques. - Most of the local banks offer services to their customers enabling them to make payments across the Internet or by mobile phones.
Syrian Arab Republic	Extent and maturity of e-commerce and e-business	- There is no real activity in the areas of e-commerce and e-business. - A number of factors block progress in this area, such as absence of the laws and regulations, lack of adequate communication network, and lack of e-payment facilities. - However there are some companies which offer e-commerce and e-business services using Web site hosted outside Syria.
	Availability and quality of e-banking	- Lack of secure means for e-payment is a major blocking factor that prevents the spread to e-banking. - There are some pilot projects undertaken by the Ministry of Economy and Foreign Trade and leading banks to implement a credit card system and ATMs to improve the level of services offered to the customers. - A new law that allowed three private banks to open in Syrian Arab Republic might introduce e-banking through these banks.
UAE	Extent and maturity of e-commerce and e-business	- The UAE has a flagship for e-commerce and e-business in the form of its Tejari.com operation in Dubai. - The UAE has strategic advantages such as a very efficient ICT infrastructure through initiatives like the Dubai Internet City and Dubai Silicon Oasis. - The UAE Etisalat has established a separate business unit; Comtrust, dedicated to the development of e-commerce in the UAE. The Central Bank has decided to link Comtrust's e-commerce systems with its UAE exchange network to facilitate online payments. - The above initiatives together with other initiatives such as the e-Dirham and the automation of the Ministry of Finance puts the UAE ahead of many countries in terms of its support to e-commerce and e-business. - Currently two emirates, Abu Dhabi and Dubai, graduated the first group of police specialized in cyber crimes.
	Availability and quality of e-banking	- Around 20% of local banks already have full transactional e-banking services and many more are developing them. - Several initiatives such as e-Dirham, electronic transactions by the Ministry of Finance and Industry, and the initiative by Tejari.com are indicators that e-payment and e-banking have a presence in the UAE.
Yemen	Extent and maturity of e-commerce and e-business	- There is lack of take up of e-commerce and e-business in Yemen. - Yemen has started the e-Rial project, which is a step in the right direction. The e-Rial enables the Yemeni citizens to pay their utilities' invoices: such as electricity, water and Internet subscriptions. - The degree of success of this initiative is dependent on the availability of the supporting legal system.
	Availability and quality of e-banking	- In spite of the difficulties which faces Yemen in spreading the use of ICT applications, the e-Rial initiative is leading the way towards more serious effort to adopt e-banking in the future.

Annex 9

Main features of ICT applications in healthcare

Country	Indicators	Features
Bahrain	Databases for national healthcare	- The Ministry of Health has developed a plan for a Strategic Health Information System. The plan was approved in September 2001 and launched in April 2002. The expected duration for the implementation is six years. - The system will allow clinics, physicians and health officials to share healthcare related information and have instant access to updated medical records over the Intranet. - The Ministry of Health already has a Web site (www.moh.gov.bh) where forms can be completed and submitted online, in addition to online directories.
	Telemedicine and medical use of teleconferencing	- N/A.
Egypt	Databases for national healthcare	- The Ministry of Health and the Ministry of Communication drive a number of joint projects, which aim at covering the improvement of emergency service, establishing an insurance services centre, and establishing a Web site for the Ministry of Health. - The Ministry of Health established a database of family record for use in insurance claims. - The Ministry of Health has developed a database for managing the medical records of 30 million citizens. The next phase aims at tying the National Identity Number with the citizens' health data, and provide this information to main hospitals.
	Telemedicine and medical use of teleconferencing	- The Ministry of Health in co-operation with the Ministry of Communication and Information are establishing the Egyptian telemedicine network. - Five locations have already been equipped with such services and two more locations will be added shortly.
Iraq	Databases for national healthcare	- According to the ITU delegation that visited Iraq in 1998, many of Iraq's 132 hospitals, 1500 primary healthcare centres, 52 private hospitals and numerous pharmacies were equipped with computers but lacked the network required to transfer the data between the various health sector establishments and the ministry. - Several orders for computers and other equipment were placed as part of the "Oil for Food" programme before the latest war. Now the situation is uncertain until stability returns to the country.
	Telemedicine and medical use of teleconferencing	There are no applications for telemedicine or teleconferencing in the Iraqi healthcare sector.

Country	Indicators	Features
Jordan	Databases for national healthcare	- There are government attempts to develop national database for all healthcare services, drugs and physicians. According to Jordan's country report, the government is currently attempting to develop national database of medical services and directories. - There are also attempts by private sector companies to develop online portal for healthcare services mainly for managing health insurance. - There is a growing trend to use smart cards for members of health insurance plans, and to promote electronic claim.
	Telemedicine and medical use of teleconferencing	- In 1996, the Mayo Clinic, Rochester, Minnesotta, USA, established an ongoing satellite-based, live and interacting continuing medical education (CME) program. - A full-motion, interactive video satellite system was also installed and a plan for evolving program of clinical consultations was also implemented.
Kuwait	Databases for national healthcare	The current state-wide electronic filing system is considered the forerunner for Kuwait's clinics and hospitals to link up in a single network and to a central database for more efficient patient record management system.
	Telemedicine and medical use of teleconferencing	- In 2000, Kuwait's Al Bader Group became the primary provider of Apollo Telemedicine to implement the first tele-diagnostic network in the Middle East and the Indian subcontinent. - There are no published documents regarding the number of hospitals or physicians using Telemedicine applications in Kuwait.
Lebanon	Databases for national healthcare	- Lebanon has a vision for its healthcare which links together medical professionals, hospitals, medical staff, drug companies and patient medical records being captured electronically.
	Telemedicine and medical use of teleconferencing	- A number of technology initiatives in Lebanon use Telemedicine and teleconferencing, such as the Medical Center of the American University of Beirut, and the portal toubibonline.com which brings together professionals from the healthcare industry to offer customised healthcare solutions to individuals at home.
Oman	Databases for national healthcare	- The Ministry of Health took a strategic decision to use ICT as the main tool to improve healthcare and to re-engineer the healthcare processes. - Currently there are only 9 out of 56 hospitals that are connected to the headquarters. The Ministry of Health plans to connect all sites by 2005. It is hoped that networking and linking of hospitals will help in the gradual establishment of a national health database. - Healthcare applications will be built internally. Its first priority is to computerise all health institutions by 2005, of which almost 60% are completed. The applications cover administration and financial, clinical, and maintenance systems.
	Telemedicine and medical use of teleconferencing	- Telemedicine will be introduced in the long-term. The current structure of the healthcare delivery system in Oman is built in such a way that, at the moment, it does not require the conventional Telemedicine set up.
Palestinian Authority	Databases for national healthcare	- Efforts to develop health databases are led by the civil and social institutions and in universities outside the government.
	Telemedicine and medical use of teleconferencing	- There are no telemedicine applications yet for the Palestinian Authority.

Country	Indicators	Features
Qatar	Databases for national healthcare	- The Ministry plans to integrate a health information system in three phases; the third phase includes the establishment of a national health database.
	Telemedicine and medical use of teleconferencing	- N/A.
Saudi Arabia	Databases for national healthcare	- Applications for healthcare in Saudi Arabia are present with varying degrees in various sectors; namely public hospitals, King Faisal Specialised Hospital, private hospitals and pharmacies, military and security forces hospitals. - The lowest level is in government hospitals, which generally lack any ICT facilities. Only 13 out of 186 hospitals have health information systems in place. On the other hand hospitals in other sectors such as the military, defense, and national guards enjoy a much better level of automation and healthcare systems. - The Sultan Ibn-Abdul Aziz programme for Medical and educational communications is implementing a HealthNet system.
	Telemedicine and medical use of teleconferencing	- Telemedicine is one of the areas covered by the Sultan Ibn Abdul Aziz programme for educational and medical communications. - The programme uses the latest ICT technologies in telemedicine and teleconferencing to enable doctors to hold tele-meetings with consultants to discuss medical cases, to exchange the results of medical tests and diagnosis and perform remote diagnosis via television cameras connected to the network.
Syrian Arab Republic	Databases for national healthcare	- Some hospitals started projects for partial automation. These projects are not fully developed yet. - None of the Web sites that currently exist can be considered to offer a national health database. However, the Ministry of Health is currently developing an informational infrastructure to support the health service, namely; Participative Approach to Disease Global Management (PARADIGMA), within EUMEDIS Programme.
	Telemedicine and medical use of teleconferencing	- Telemedicine applications are not yet available in Syria. However, the Ministry of Health plans to enable doctors to exchange consultation and medical information across it Web sites.
UAE	databases for national healthcare	- The Ministry of Health is engaged in a project to develop a central database at its premises in Abu Dhabi linking all hospitals, health centers and medical zones in the country. - Several healthcare initiatives are taking place as joint effort between the UAE Ministry of Health and the UAE Offset Group (UOG). - Dubai Municipality has implemented an “e-medical certification system” for those working in the Dubai Emirate civil services. The purpose of this system is to help processing applications for occupational health cards and medical certificates for staff working in the Dubai Municipality.

Country	Indicators	Features
	Telemedicine and medical use of teleconferencing	- Telemedicine is alive and kicking in the UAE. Al Mafraq hospital has established a Telemedicine system to enable physicians at the hospital to consult 1,600 physicians at the Mayo Clinic and its associates in Minnesota, Arizona and Florida. - The Mayo Clinic will also establish similar links with Al Jazeirah Hospital in Abu Dhabi and Tawam Hospital in Al Ain. - The Ministry of Health plans to establish similar links at other hospitals including Al Qasimi Hospital in Sharjah, Al Bahara Hospital in Dubai and Al Ain Hospital.
Yemen	Databases for national healthcare	- Applying ICT technologies to health applications (e-health) has not been fully realised in Yemen, yet.
	Telemedicine and medical use of teleconferencing	- There are no telemedicine applications in Yemen, yet.

Annex 10

ICT indicators for EMCs in comparison with regional, Arab and world averages for 2002

Figure 1. Bahrain

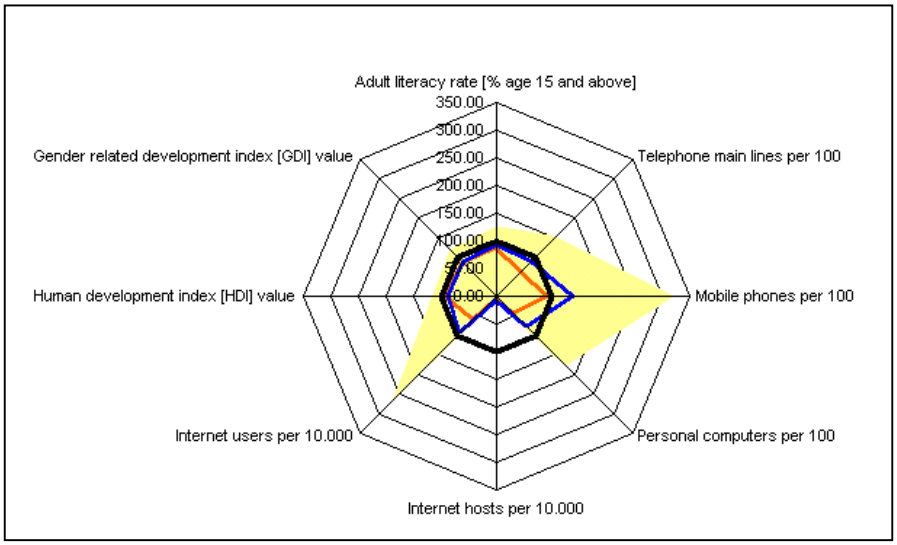


Figure 2. Egypt

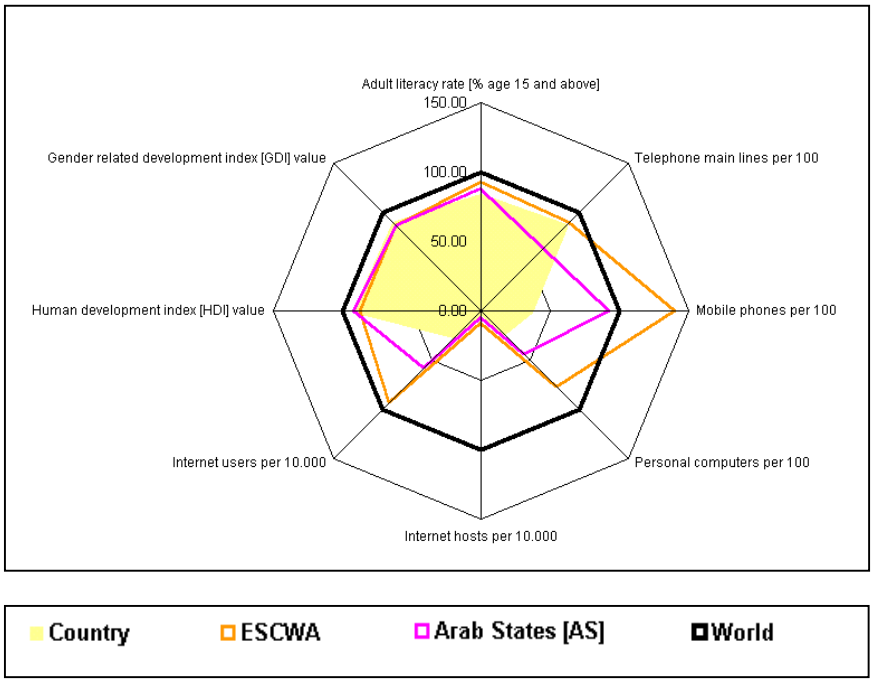


Figure 3. Iraq

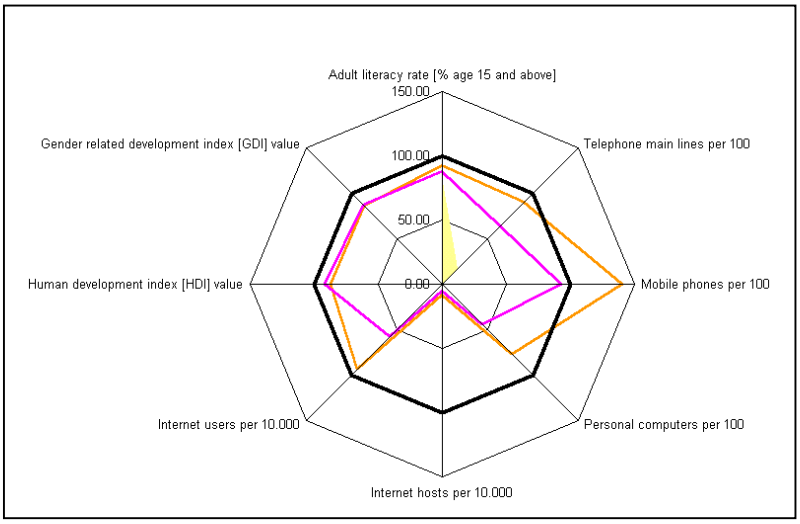


Figure 4. Jordan

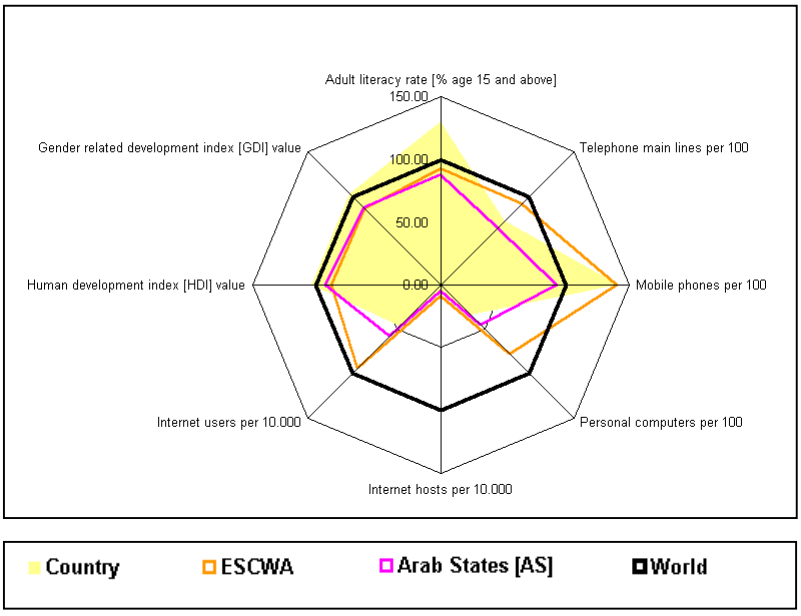


Figure 5. Kuwait

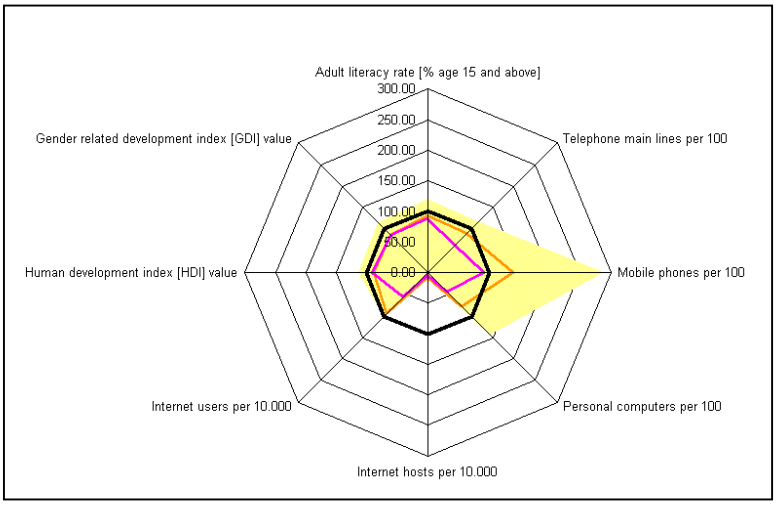


Figure 6. Lebanon

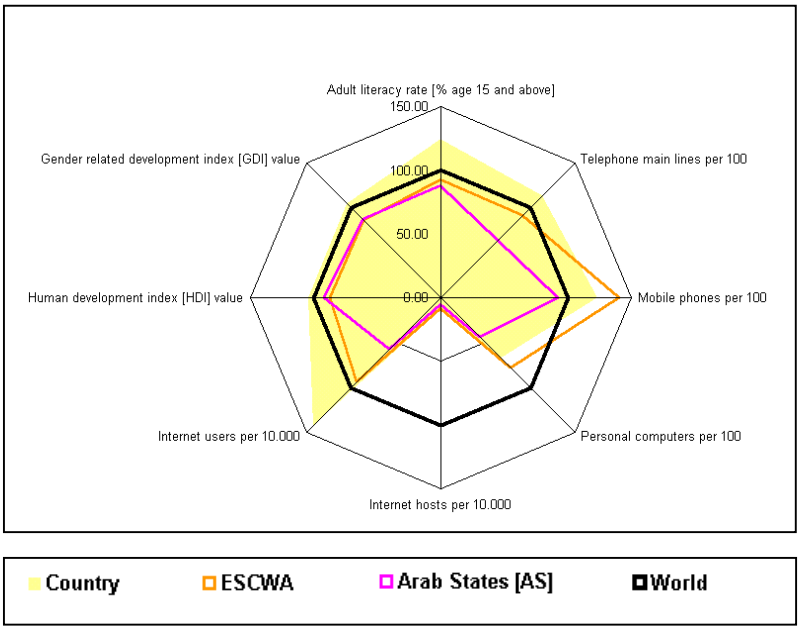


Figure 7. Oman

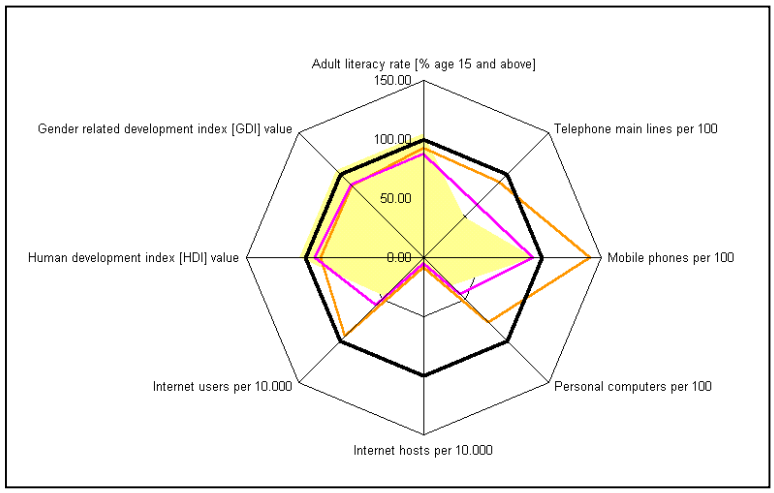


Figure 8. Palestine

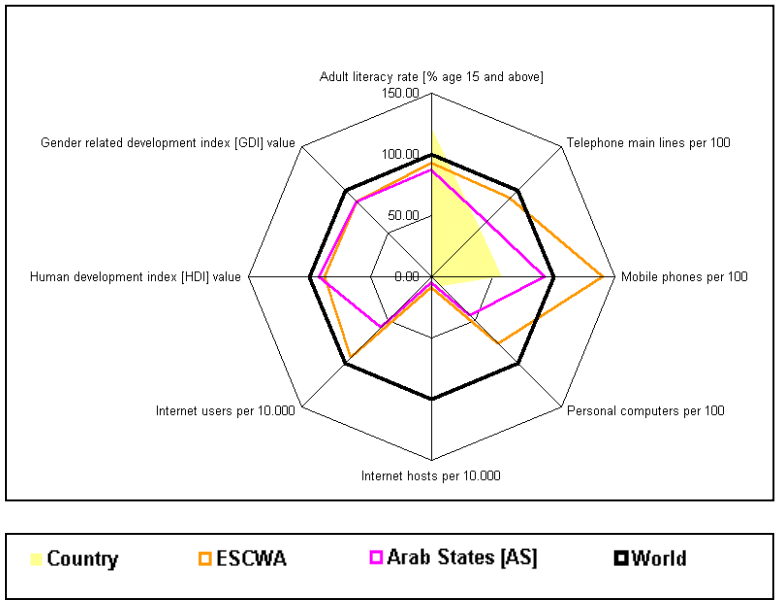


Figure 9. Qatar

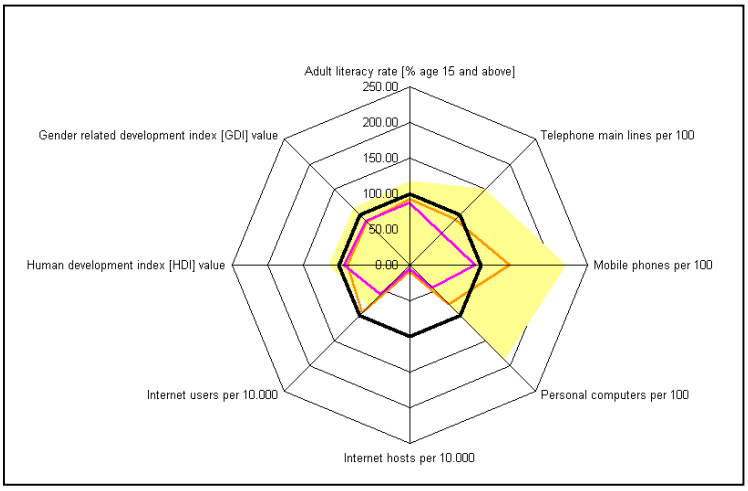


Figure 10. Saudi Arabia

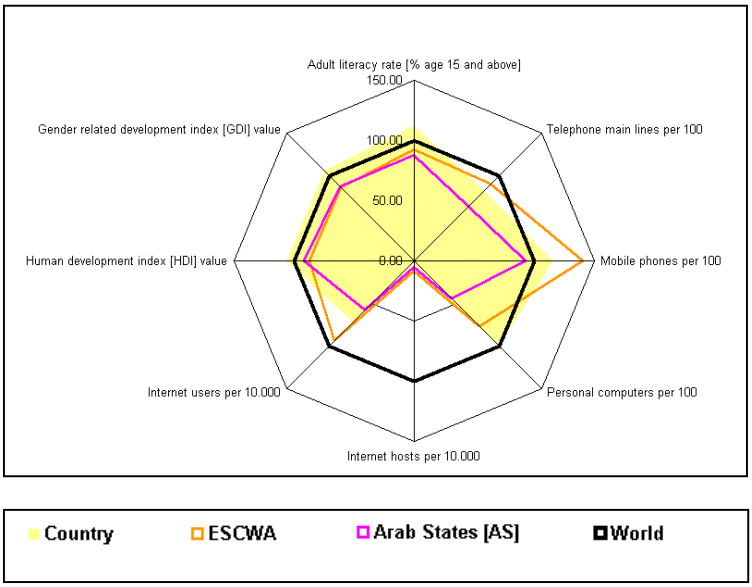


Figure 11. Syrian Arab Republic

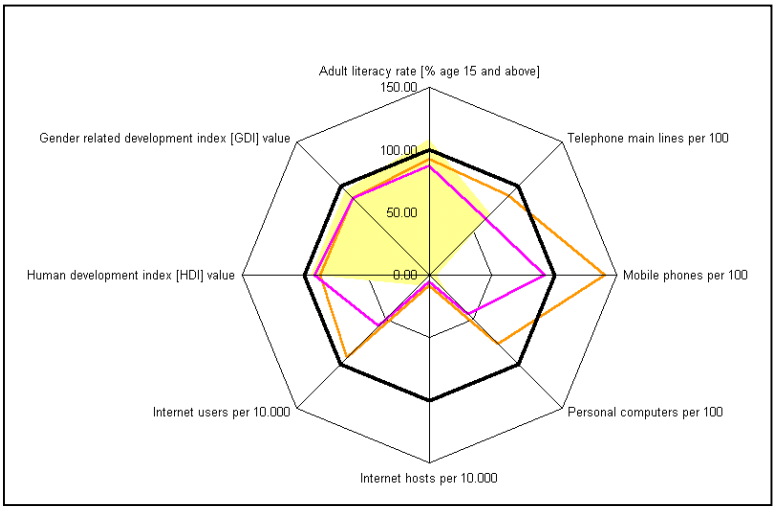


Figure 12. United Arab Emirates

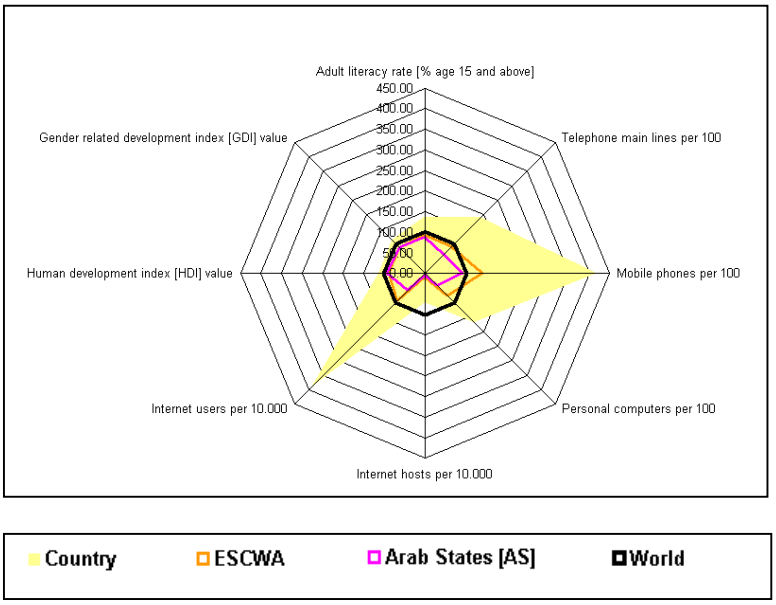
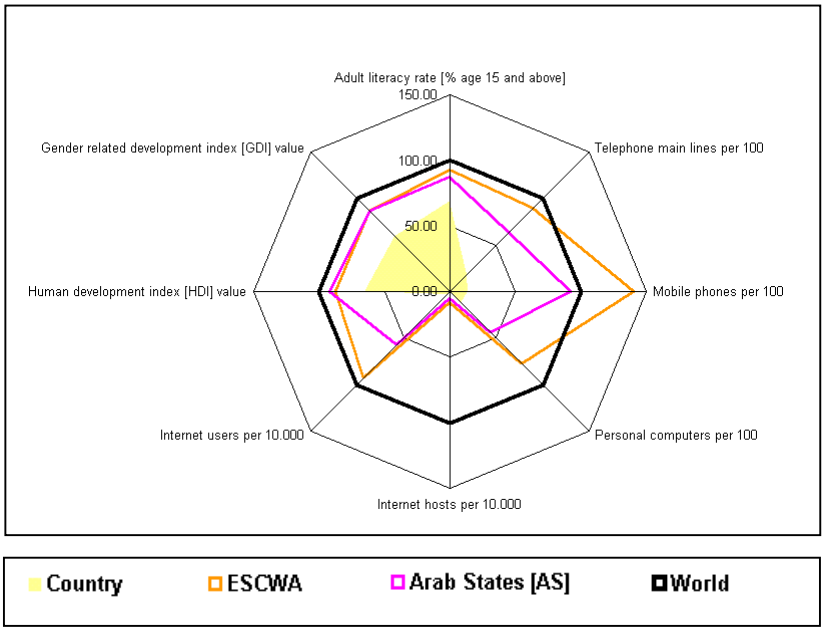
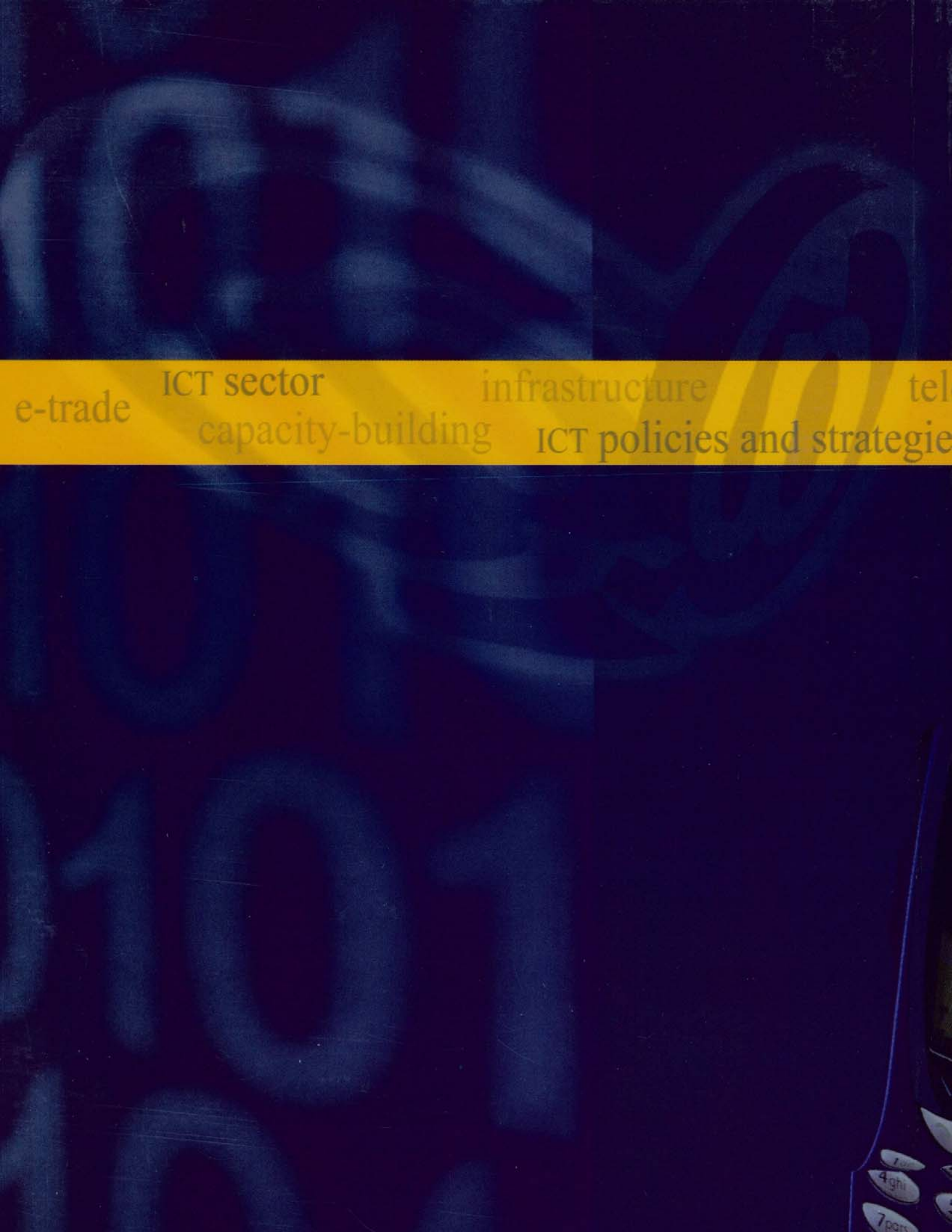


Figure 13. Yemen

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