Chapter 6

INFORMATION AND COMMUNICATION TECHNOLOGY IN THE ARAB REGION

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Introduction

In recent years, major advances in information and communication technologies (ICT) combined with the rapid growth of global networks such as the Internet, have transformed businesses and markets, revolutionized learning and knowledge-sharing, generated global information flows, empowered citizens and communities in new ways that redefine governance, and created significant wealth and economic growth in many countries.[1] This trend, labeled as the digital revolution has been made possible by the potent combination of dramatic increases in the power and versatility of technologies, at significantly lower costs with enormous creativity in the applications of these tools and networks in all aspects of the economy and society. The ICT sector is one of the highest growing sectors in the world economy. It is one of the chief contributors to world economic growth, to job creation, and to productivity enhancement.

Recent developments in the ICT sector have been especially revolutionary. Information and knowledge are expanding in quantity and accessibility. In many fields, future decision-makers will be presented with unprecedented new tools for development. In such fields as agriculture, health, education, human resources and environmental management, or transport and business development, the consequences could be revolutionary. ICT has enormous potential, especially for developing countries, in furthering sustainable development. The whole world is now focusing on the role of ICT as an essential tool for socio-economic development. It can potentially be a powerful enabler

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[1] In this chapter, information and communications technologies (ICT) refer to electronic means of capturing, processing, storing, and communicating information. It is based mainly on digital information and comprises computer hardware, software, network infrastructures, and related services.

of development goals because its unique characteristics dramatically improve communication and the exchange of information in order to strengthen and create new economic and social networks (Aboge, 2001).

Building a knowledge society today is very important for economic and social development of developing and poor countries. ICT is the main driver or the tool for building that knowledge society. Knowledge resides in people rather than in the information infrastructure. The knowledge economy relies on the diffusion and use of information and knowledge, as well as its creation. That is why its success depends on the ICT infrastructure. Today, we live in a very competitive and dynamic global economy and holding on to the status quo is not an option anymore (Mansell and When, 1998; Information Society Commission, 2002). No region or country can afford to ignore its ICT sector.

This chapter reviews the role of ICT for a country in a realm of global competitiveness, highlights the role of ICT in Arabic countries, and identifies some of the key features impeding the full development of ICT in the Arab countries. Finally, some strategies and recommendations are put forth for building competitive economies based on ICT infrastructure supporting knowledge creation and dissemination.

6.1   ICT in a Global Context

The concept of a *digital divide* gained headway in the early nineties with the explosion of Internet and dot-com companies. Developed countries capitalized on this new economy by constructing modern ICT infrastructure and by creating innovative environments for the private sector to grow. Developing countries were not able to follow suit because of old and badly damaged ICT infrastructure, not to mention political and economic corruption (Warschauer, 2003). If we consider the Gross Domestic Product (GDP), a leading indicator of economic prosperity, we see that economic disparity between countries is increasing. In 1995, the GDP in the twenty richest countries was 37 times that of the poorest twenty countries. In 1960, the gap was only 18 times (WDR, 2001). Another study by the United Nations Development Program (1999) shows that GDP ratio between the same two groups increased from 30 to 1 in 1960, to 60 to 1 in 1990, and 70 to 1 in 1997. Figure 6.1 shows this gap (UNDP, 1999).

A related view is obtained in Table 6.1, which shows 2005 statistics on the world Internet usage as compared to population in different parts of the world (IWS, 2005). Note that the Middle East and Africa have the *lowest*
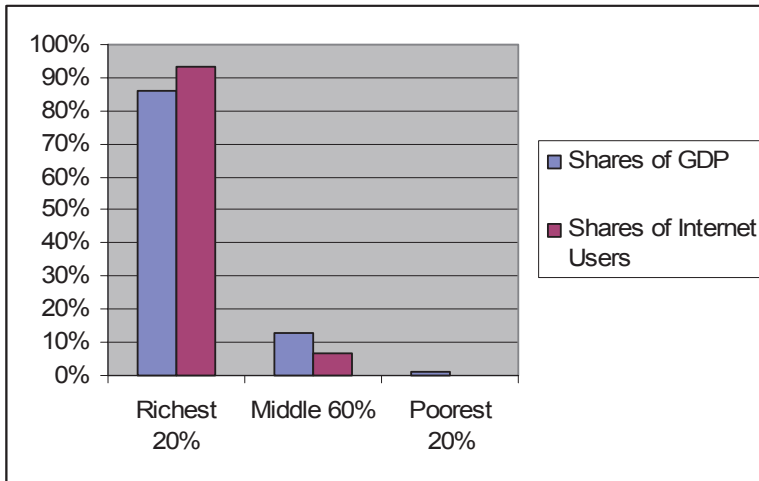
Figure 6.1 **Shares of global GDP and Internet users among world population. Based on data from UNDP, 1999.**

Internet penetration in the world even though they have the largest usage growth compared to others. While the data show that many developing and poor countries are realizing the importance of ICT, the road ahead is still very long. It is clear that the Middle East region (made mostly of Arab states) is lagging in significant ways.

Table 6.1 **World Internet usage and population statistics.**

World Regions	Population (2005 Est.)	% of World	Internet Usage, Latest Data	% Internet Pene- tration	Usage % of World	Usage Growth 2000–2005
North America	331,473,276	5.10	225,801,428	68.10	22.20	108.90
Oceania/ Australia	33,956,977	0.50	17,690,762	52.90	1.80	132.20
Europe	807,289,020	12.40	290,121,957	35.90	28.50	176.10
Latin America	553,908,632	8.5	79,033,597	14.30	7.80	337.40
Asia	3,667,774,066	56.40	364,270,713	9.90	35.70	218.70
Middle East	190,084,161	2.90	18,203,500	9.60	1.80	454.20
Africa	915,210,928	14.10	22,737,500	2.50	2.20	403.70
World Total	**6,499,697,060**	**100.00**	**1,018,057,389**	**15.70**	**100.00**	**182.00**

Based on data from World Internet Stats (www.internetworldstats.com).

As noted in earlier chapters of this book, English remains the dominant language on the Internet, even though many studies have shown a drop from 81% to 68% from 1997 to 2000. This dominance is due to the fact the early designers and users of the Internet were the Americans. Table 6.2 shows the ratio of speakers of a language to web pages in that language (Warschauer, 2003).

Table 6.2 **Ratio of speakers of a language to web pages in that language.**

Rank	Language	Number of Web Pages	Number of Speakers (000)	Speakers/ Web Page
1	English	214,250,996	322,000	1.5
10	Japanese	18,335,739	125,000	6.8
26	Hebrew	198,030	12,000	60.6
31	**Arabic**	**127,565**	**202,000**	**1,583.50**

Based on data from Warschauer, 2003.

Since citizens of many countries around the globe do not speak English, especially in developing and poor countries, it is important to build websites in native languages in order to disseminate information and knowledge. In this connection, the Arabic language is ranked lowest in Internet usage, which also means that there is significant lack of information and knowledge available online in that language. It also signals the poor condition of ICT infrastructure throughout the Arab world.

6.2   ICT in the Arab Region

The implications of the above can best be understood by viewing the Arab states within a broader context. The Arab countries as a whole account for 5% of the world's population and 2% of the world GDP. Despite its relatively high average GDP per capita by international standards, the Arab world still accounts for less than 2% of the world's Internet users. This simple fact suggests that the traditional source of the digital divide – namely poverty reflected in lower income per capita – does not appear to be the major impediment of ICT deployment in that region (ITU, 2002).

In the context of the digital divide itself, it is important to note the prevailing gaps between countries within the Arab world, as shown in Table 6.3. There are marked variances between countries in their efforts to adopt ICT tools and grow their networked economies. For instance, the United Arab

Emirates (UAE) and Bahrain have a well-established Internet presence given their status as an ICT hub in the Middle East (created by massive foreign ICT investments). Also important is the case of Lebanon. Despite poor government support and mediocre capital injected in the ICT market, it has an enormous potential for development and adoption of key technologies. This is due to its skilled workforce and the openness of its market. By contrast, the trends in, and the limited ICT-related performance, of Egypt are shaped by its huge population, the concentration of development around the main cities, and the wide gap between rural and urban areas. At the other end of the region's spectrum is Israel, the most advanced country in the region. Israel has a penetration rate of almost 50% of the total population. The contrast is Yemen that has the lowest penetration among all the countries in the region. Finally, what is startling in the Middle East as a whole is that only four countries have more than 5 ISPs. Such simple statistics reflects the prevailing monopoly in many countries, and the essential features associated with market closure (IWS, 2005; ITU, 2002).

Table 6.3 **Selected ICT indicators in the Arab world, 2001.**

Country	Population	Internet Users	% Population Penetration	ISPs
Algeria	32,530,000	180,000	0.55	2
Bahrain	688,345	140,200	20.37	1
Chad	9,833,000	4,000	0.04	1
Egypt	77,510,000	2,420,000	3.12	50
Iran	68,020,000	420,000	0.62	8
Iraq	26,070,000	12,500	0.05	1
Israel	6,280,000	3,130,000	49.84	21
Jordan	5,760,000	212,000	3.68	5
Kuwait	2,340,000	200,000	8.55	3
Lebanon	3,830,000	300,000	7.83	22
Libya	5,770,000	20,000	0.35	1
Morocco	32,720,000	400,000	1.22	8
Oman	3,000,000	120,000	4.00	1
Qatar	863,051	75,000	8.69	1
Saudi Arabia	26,420,000	2,540,000	9.61	42
Somalia	8,590,000	200	0.00	3
Sudan	40,190,000	56,000	0.14	2
Syria	18,450,000	60,000	0.33	1
Tunisia	10,070,000	400,000	3.97	1
UAE	2,560,000	900,000	35.16	1
Yemen	20,730,000	17,000	0.08	1

Based on data from World Internet Stats (www.internetworldstats.com).

Against this background, we can now evaluate ICT in the Arab region. This coverage includes a review of the *environment*, the degree of *readiness,* and the current *usage* of ICT. We turn to each of these factors in turn.

6.2.1   ICT Environment

The concept of ICT Environment refers to the conduciveness of the overall socio-economic and political context for ICT development, and the extent of its articulation or 'maturity' in the Arab region. ESCWA has undertaken two studies, one in 2003 and one in 2005 (ESCWA, 2003, 2005), comparing ICT maturity levels of different countries, and placing these at one of four levels: Level 1, indicates the absence of a clearly articulated vision and national ICT strategy, and limited implementation plans and initiatives; Level 2, which indicates the existence of a clearly articulated vision and national strategy, albeit with limited implementation plans; Level 3, which indicates the existence of a clearly articulated vision and advanced national strategy, in addition to moderately effective implementation plans; and Level 4, which indicates a clearly-articulated vision and advanced national strategy, and effective implementation plans.

Table 6.4 shows the distribution of 'maturity levels' for ESCWA countries. Many countries are moving forward and have reached Level 4 like Bahrain and Jordan. Others are doing an excellent job and have moved forward since

Table 6.4 **Ranking of ESCWA members according to ICT strategy and policy maturity levels.**

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

Based on data from ESCWA, 2005.

2003 and today they can be classified as Level 3. Such countries are Egypt, Kuwait, Saudi Arabia, and the UAE.[2] The remaining countries are still at Level 1or Level 2. These are countries that have to undertake radical changes in their ICT policies and strategies in order to develop the next two levels of ICT maturity.

One note about Lebanon is of special relevance here. Following the termination of civil strife in 1990, the country had an excellent vision of building the ICT sector, through the leadership of the late Prime Minister Rafic Hariri. It did invest in ICT infrastructure and was the leader in the region in Internet and Global System for Mobile (GSM) Communications Services. The country did acquire the technology and built its human ICT infrastructure since the mid-nineties. But by the late nineties, Lebanon lost its competitive edge. This has resulted in brain drain of Lebanese ICT experts to neighboring and international countries. Today, the two GSM companies are owned by the Lebanese government but operated by two non-Lebanese regional companies. Thus, while development toward greater ICT maturity may be policy, the reality can reflect marked deterioration instead.

6.2.2 ICT Readiness

ICT Readiness describes maturity level as well as infrastructure conditions. This includes consumers' access to telephone fixed lines, mobile services, Internet access, and personal computers penetration. The MADAR Research Group, a leading ICT research group in Dubai, created an ICT Index – consisting of four parameters, namely of the number of personal computers (PCs) installed, the number of Internet users, the number of mobile phones, and the number of fixed lines in the country. The Index is calculated by summing the values of these four parameters and dividing the sum by the country's population figure. A higher Index score indicates more aggressive ICT adoption in the country under question (MRG, 2006). Table 6.5 shows the ranking of ESCWA countries according to the ICT index (ESCWA, 2005; MRG, 2006).

The ranking is consistent with maturity levels discussed earlier and provides a confirmation of the inferences we have drawn. More specifically, Bahrain, the UAE, and Kuwait remain the most advanced countries in the region because of their ICT investment as shown in Table 6.6 (ESCWA, 2005). Only Bahrain is spending 6% of its GDP on ICT, which is equal to the world average. Many countries are investing more nowadays on ICT but this is still not enough for their economic and social development.

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[2] The city of Dubai is at Level 4.

***Table 6.5* Ranking of ESCWA members according to the ICT Index.**

Rank	Country or Territory	Popu-lation (000)	PCs (000)	Internet Users (000)	Fixed Line Subscribers (000)	Mobile Phone Subscribers (000)	ICT Index
1	Bahrain	708	145	202	192	650	1.68
2	UAE	4,320	850	1,437	1,200	3,700	1.66
3	Kuwait	2,750	450	590	490	2,109	1.32
4	Qatar	790	142	125	200	490	1.21
5	Saudi Arabia	22,866	2,250	3,400	3,695	9,176	0.81
6	Jordan	5,470	400	550	638	1,624	0.59
7	Lebanon	4,500	420	600	704	900	0.58
8	Oman	2,410	130	201	243	806	0.57
9	Palestine	3,670	170	380	332	854	0.47
10	Syria	17,980	430	700	2,657	2,480	0.35
11	Egypt	73,500	1,900	3,900	9,600	7,557	0.31
12	Iraq	25,400	480	450	960	1,598	0.14
13	Yemen	20,350	190	210	750	1,100	0.11
	Total	**184,714**	**7,957**	**12,745**	**21,661**	**33,044**	**0.41**

Based on data from ESCWA, 2005.

***Table 6.6* ICT spending in the ESCWA region.**

Rank	Country or Territory	GDP (*Billions of $*)	ICT Spending (*Billions of $*)	ICT Spending (*% of GDP*)
1	Bahrain	10.00	0.60	6.00
2	Palestine	4.46	0.21	4.71
3	Jordan	11.20	0.52	4.64
4	Iraq	21.10	0.85	4.03
5	United Arab Emirates	91.00	2.80	3.08
6	Lebanon	21.77	0.58	2.66
7	Saudi Arabia	251.00	6.20	2.47
8	Egypt	75.15	1.78	2.37
9	Syrian Arab Republic	23.13	0.53	2.29
10	Kuwait	50.00	1.10	2.20
11	Oman	24.50	0.50	2.04
12	Qatar	28.46	0.52	1.83
13	Yemen	12.83	0.20	1.56
	Total	**625**	**6.39**	**2.62**

Based on data from ESCWA, 2005.

6.2.3 Fixed Lines

Governments in the region control and operate most of the fixed lines services. Figure 6.2 shows growth rate in fixed lines services. Egypt, Syria, Yemen, and Qatar have the highest growth because these governments only invested recently in fixed lines in order to reach remote areas. Figure 6.2 shows that the UAE (28%), Bahrain (27%), and Qatar (25%) have the highest fixed lines penetration in the region where the regional average is about 12%. Iraq has one of the lowest penetration rates of 4% but the annual growth was 25%. Iraq still has not reached maturity in terms of fixed lines service whereas most countries in the region already have (ESCWA, 2005).
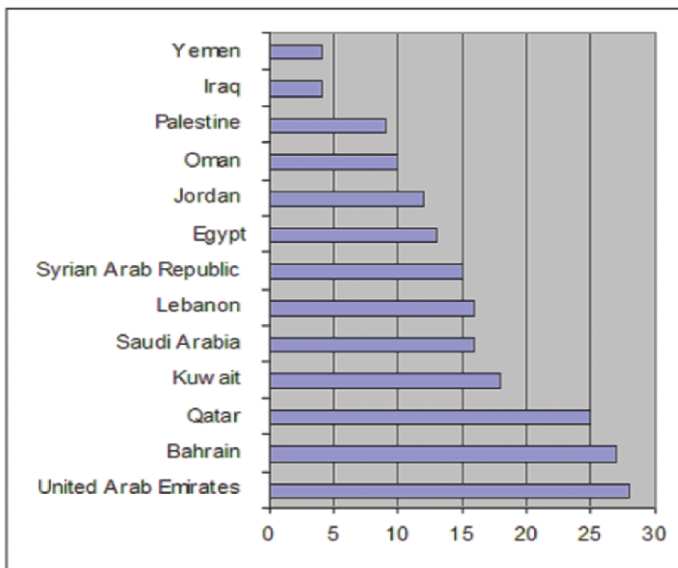
Figure 6.2 **Fixed lines penetration rates in ESCWA countries. Based on data from ESCWA, 2005.**

6.2.4 Mobile Service

The last two years have witnessed an explosion in mobile service subscribers across the region. Many consumers are opting for mobile serving over the fixed lines because of the increased competition in this sector. Many mobile service providers are affiliated with well-known international service providers such as Orange, France Telecom, and many others. This competitive environment has benefited consumers with cheaper fees over the fixed lines services.

   Table 6.7 shows the growth rate of mobile service in ESCWA countries and many countries who have introduced mobile services very recently are

showing higher annual growth rate than others. Iraq mobile services grew 1,353% between 2004 and 2005. This reflects the need for consumers to have a communication device to use in their daily lives. Mobile services infrastructure is easier to install and operate than poorly damaged existing fixed lines services. Lebanon only shows a 7% growth rate. There are two reasons for this relatively slow mobile service growth rate. First, mobile services in Lebanon started in 1994.

By now, a market saturation has occurred, where many sellers compete for consumers who already have service. Second, the cost of owning and using a GSM phone line is Lebanon is one of the most expensive in the world. The Lebanese national debt is about 200% of the GDP, and to the government, GSM services are a major source of income that will help in paying its debt.

Table 6.7 **ICT growth rates in ESCWA countries between 2004 and 2005.**

Country or Territory	Fixed Lines (%)	Mobile Lines (%)	Internet (%)	Personal Computers (%)
Bahrain	3	48	12	17
Egypt	9	30	44	19
Iraq	25	1,353	80	60
Jordan	2	23	28	21
Kuwait	0.2	30	47	32
Lebanon	0.57	7	14	31
Oman	3	37	15	17
Palestine	5	29	27	21
Qatar	8	30	39	14
Saudi Arabia	6	31	31	12
Syrian Arab Republic	10	109	30	10
United Arab Emirates	5	25	15	26
Yemen	9	38	50	15

Based on data from ESCWA, 2005.

Figure 6.3 shows that Bahrain (92%), the UAE (86%), Kuwait (77%), and Qatar (62%) have the highest penetration rate in the region and they have similar rates compared to North American and European countries. The average penetration rate in ESCWA countries is 18% and the world average is 26%. Yemen, Iraq, Syria, and Egypt have the lowest penetration rate but this is expected to increase in the next coming years, this is reflected in their growth rates, because mobile service were recently introduced and more investments are forecasted (ESCWA, 2005).

6.2.5 Internet Services

The Gulf Region countries have one of the most advanced Internet infrastructures in the ESCWA region. They have a Fibre Optic Gulf (FOG) backbone, which links Bahrain, Kuwait, Qatar, and the UAE, with a capacity of 5 billion bits of data per second (Gbps) per fiber pair. There are two other major links, namely: the Fibre Optic Link Around the Globe (FLAG), which connects Europe to Southeast Asia via the UAE, and the Europe 3 Cable System, which connects Southeast Asia, the Middle East, and Western Europe with a capacity of 40 Gbps.

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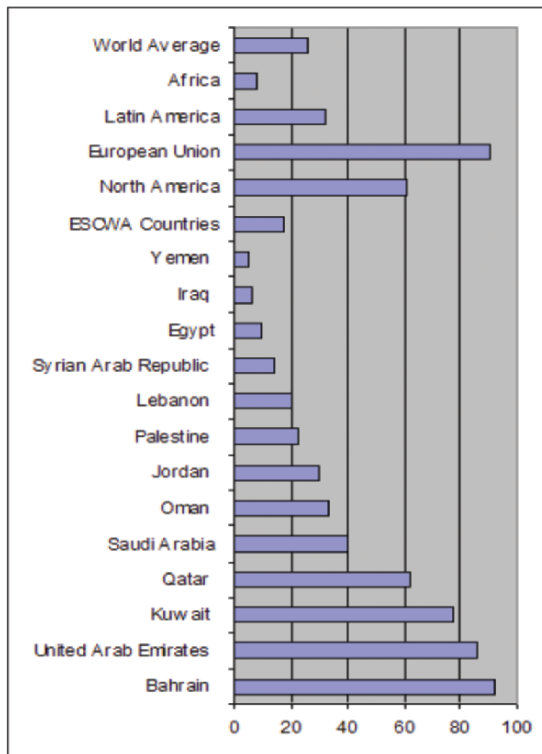

Figure 6.3 **Penetration rates of mobile lines in ESCWA and other countries. Based on data from ESCWA, 2005.**

In Egypt, the Internet bandwidth increased from 850 Mbps in 2003 to reach 2,060 Mbps in 2004. Meanwhile, in Jordan, the Internet bandwidth provided through submarine cables reached 465 Mbps. Other important developments in Internet backbone links are the Public Data Network (PDN) project in the Syrian Arab Republic, which increased Internet capacity to 500 Mbps by mid 2005 and is expected to reach 2.1 Gbps by year end 2005. Finally, Yemen Telecom's agreement with Alcatel, which will provide the first digital subscriber line (DSL) network of 3,000 lines in the first phase of installation (ESCWA, 2005).

Earlier, in Table 6.3, we showed that many countries have few ISP providers and only some of them have multiple providers. Egypt, for example, has more than 50 ISPs while the UAE has only one provider. Figure 6.4 shows that the UAE, Bahrain, and Kuwait have over 20% penetration rates where the average penetration rate of ESCWA countries is around 7%. The average world penetration rate is 13%. Internet penetration rates in the region are still way below North American and European countries. More initiatives are needed to increase Internet users. Some countries have low
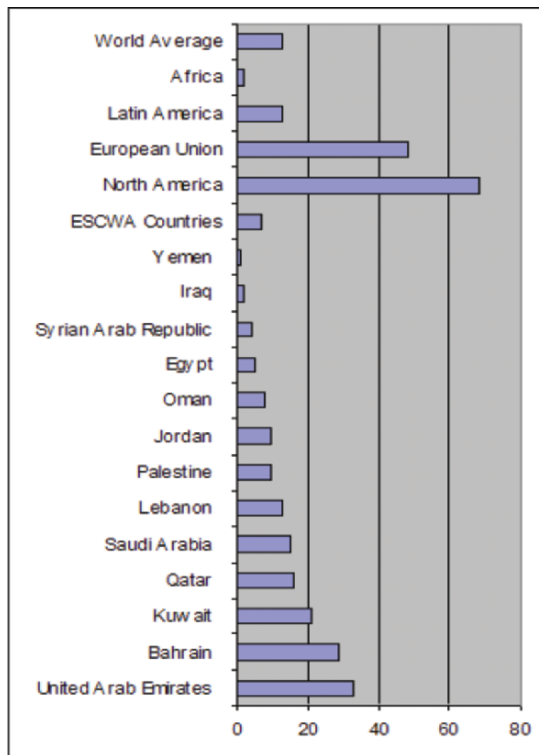

Figure 6.4 **Penetration rates of Internet users in ESCWA and other countries. Based on data from ESCWA, 2005.**

penetration rates but have high annual growth. For example, Iraq, Egypt, and Yemen have annual growths of 80%, 50%, and 44%, respectively. Internet services were recently introduced in these countries (ESCWA, 2005). The low penetration rate is mostly due to the high cost of Internet services in the region. In order to increase Internet penetration, the government of Egypt, for example, is offering consumers free Internet connection via a telephone line, but the consumer must pay for the telephone line.

6.2.6 ICT Usage

ICT usage includes identifying the level to which ICTs are used in the public sector (e-government), in the private sector (e-commerce), and in the educational sector (e-learning). Here we consider ICT applications in government agencies, health care, business, and education. But before going into each in detail, it is important to note how Arabic users are accessing the Internet. According to the ITU, 72% are accessing Internet from home and 22% from work. Internet in the region is mostly used for chatting, for e-mail, and for downloading information from the web (ITU, 2002).

6.2.7 ICT Applications in Government Agencies

To measure the effectiveness of e-government, the following criteria have been chosen to determine the level of integration of ICT applications in government: (a) computerizing public administration; (b) digitizing information; (c) e-government plans; (d) e-procurement applications; (e) computerizing customs processing; and (f) computerizing taxation and revenue management systems. Many regional countries only recently started posting information on the web. Only a few countries have started some form of e-government applications. But all countries are planning to improve and develop their e-government applications because of their importance to ICT development. Some countries are slower than others. Table 6.8 presents a ranking of e-government readiness of ESCWA countries from a global perspective. The ESCWA organization developed a ranking procedure for the different countries in order to reflect the overall success and commitment of each country in terms of creating and implementing adequate e-government strategies and services (roughly similar to the ESCWA ranking noted earlier). These consist of: Level 1, the absence of a coherent strategy and the lack of implementation efforts with very weak digitization and automation processes; Level 2, the existence of a clear strategy but no clear implementation or plan of action, and some digitization and automation of processes and information; Level 3, a clear e-government strategy with advanced levels of implementation, and a variety of services and information available over the Internet

with high level of digitization and automation of governmental processes; and Level 4, a clearly implemented e-government strategy at all levels with full automation and digitization of information and services, and high quality of services provided over the Internet (ESCWA, 2005). Table 6.9 shows the maturity levels of ESCWA countries between 2003 and 2005. It is noticeable that no country has yet reached Level 4.

Table 6.8 **Ranking of e-Government Readiness of ESCWA countries.**

Regional Rank	Country or Territory	Global Ranking
1	Bahrain	46
2	United Arab Emirates	60
3	Jordan	68
4	Lebanon	74
5	Qatar	80
6	Saudi Arabia	90
7	Kuwait	100
8	Iraq	103
9	Oman	128
10	Egypt	136
11	Syrian Arab Republic	137
12	Yemen	154
13	Palestine	−

Based on data from UNPAN, 2004.

Table 6.9 **Maturity levels of e-government in ESCWA countries.**

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

Based on data from ESCWA, 2005.

6.2.8 ICT Applications in Education

ICT in education is a basic component in building future generations and a knowledge-based society. In the Arab world, the percentage of young people (<20 years old) is greater than the percentage of older people (>55 years old). These younger generations are the future users of ICT and it is essential to start their ICT education in schools. Integrating ICT applications in the process of education can help accelerate preparedness and transformation to a knowledge-based economy. Such integration can be measured through the following criteria: (a) e-learning; (b) e-schools; and (c) virtual universities (ESCWA, 2005).

e-Learning is defined broadly as the delivery of training content through a computer network infrastructure. Many countries have developed a plan of action to introduce or develop e-learning. For example, in Egypt, the Ministry of Communication and Information Technology, in collaboration with various governmental and private sector entities, introduced an e-learning ICT skills development programs for small- and medium-sized commercial establishments. In Jordan, the Education Reform for the Knowledge Economy Initiative that was launched in 2002 was aimed at providing e-learning for both basic and university education. In Kuwait, the Education Net Initiative is considered one of the most important priorities for developing education and represents a cornerstone of the long-term plan of the Ministry of Education to revamp the education sector. The Initiative aims to connect all schools and libraries over one network and to provide all public schools with computers by 2006. Among ESCWA members, only Yemen has no clear plan of action to introduce ICT and e-learning to its educational sector.

The main characteristics of e-schools include the availability of Internet connectivity and computers in classrooms, and the integration of ICT technology in the education process. Classroom connectivity is still the exception in the ESCWA region. Even with several ambitious plans for introducing ICTs in curricula, Internet connectivity remains limited with all ESCWA members, with the exception of Bahrain and Jordan. Bahrain has achieved a relatively good connectivity rate of three Internet connections per school and plans to increase that rate to 12 connections. Furthermore, the Jordan Broadband Learning Network, which aims to connect all public schools, universities and knowledge stations to one network, is expected to be implemented by 2006. Virtual universities provide e-learning channels for university and higher education. They are portals for various types of educational programs including remote education and continuous education. There are few universities in the region that can be considered virtual. These are the Syrian Virtual University (SVU); Avicenna Knowledge Centre in Egypt, and the Arab Open University.

The ESCWA organization developed a ranking procedure for the different countries in order to reflect the overall success and commitment of each

country in terms of education. The ranking approach used is similar to the ones noted earlier in related contexts, however the specific factors taken into account differ as needed. These levels are: Level 1, where no clear policy of integrating e-learning systems in the educational system exists, with a lack of connectivity and Internet availability in schools, no organized or accredited distance learning activities and overall deficiency in e-educational services; Level 2, efforts forward e-learning policy, sporadic Internet connectivity with no plan for expansion, existence of pilot e-school projects but without a clear plan of action to generalize the experiment, limited accessibility to Internet services through universities, and no clear national e-education plans; Level 3, active e-learning and e-school projects with implementation and plans of action, well-developed ICT infrastructure in educational facilities, well-developed distance learning programs and active services by virtual universities, existence of a national e-education plan; and Level 4, already implemented e-school and e-learning systems, existence of well-developed and integrated virtual and distance learning programs, existence of a national e-education plan. Table 6.10 shows the maturity levels of ESCWA countries between 2003 and 2005. Like e-government, no country has reached Level 4.

Table 6.10 **Maturity levels of ICT applications in education in ESCWA countries.**

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

Based on data from ESCWA, 2005.

6.2.9 ICT Applications in Commerce and Business

The use of ICT in commerce and business in the ESCWA region is growing at a relatively fast pace especially in countries in the Gulf region. Interestingly, e-commerce is growing at a sluggish pace between regional companies

and those in ESCWA member countries; it is growing at a much faster rate between international companies and those in the ESCWA region. An example of this effect can be seen in that international companies require their regional distributors and agents to communicate with them through electronic means. The banking sector is taking the leadership role in adopting advanced ICT technologies to cover e-commerce and e-business applications, and to give customers quality e-banking and ATM systems. Quality e-banking is available in most ESCWA countries except in Yemen, Syria, and Iraq. The biggest e-commerce market in the region is in Saudi Arabia followed by UAE. Most of the e-commerce transactions in the ESCWA region are directed outwards, between international companies and their local distributors. e-Commerce laws have been enacted only in Jordan and Bahrain (ESCWA, 2005).

The ESCWA organization developed a ranking procedure for the different countries in order to reflect the overall ICT implementation in commerce and business. Once more, we refer to ESCWA's ranking system, adapted to these sets of issues. These are: Level 1, a lack of adequate technological and financial infrastructures to support national efforts for the development and dissemination of ICT applications in business and commerce; Level 2, a suitable framework for developing and disseminating ICT applications in business and commerce, and for formulating relevant national strategies and plans, however, it has yet to benefit fully from these initiatives; Level 3, the existence of strategies, plans and evidence of their implementation, however, societies in these countries have yet to reap the full benefits of such strategies; Level 4, benefiting fully from the deployment of ICT applications in the government and private sectors nationwide.

Displayed in Table 6.11 are the maturity levels of ESCWA countries between 2003 and 2005. Unlike e-government and e-learning, two countries in this category achieved Level 4 status, Bahrain and the UAE. Given its fully liberalized banking sector, Bahrain is considered one of the leading financial centers in the world and a key destination for the international banking industry. It was one of the first countries to legislate an e-commerce law, and enjoys one of the most advanced banking technology infrastructures in the world. And the UAE, and particularly Dubai, is at the forefront of the region in terms of adopting the latest technologies to support the development of its economy. Furthermore, the UAE is home to branches of most international banks and financial institutions, in addition to featuring a number of preeminent local banks. Moreover, e-commerce in the UAE is comparatively mature and widely prevalent, both locally and regionally (ESCWA, 2005).

Table 6.11 **Maturity levels of ICT applications in commerce and business in ESCWA countries.**

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

Based on data from ESCWA, 2005.

6.3   Conclusion

6.3.1 ICT Moves Supporting the Knowledge Economy

While the majority of ESCWA member countries have established ICT policies and strategies, most of them suffer from: (i) a lack of a methodical analysis with regard to the state of the respective societies; (ii) failure to deliver deeply into the real needs of these societies; (iii) absence of detailed plans aimed at executing such policies and strategies; (iv) insufficient funds for the implementation and execution of such strategies; and (v) failure to establish necessary mechanisms aimed at monitoring progress and at seeking remedies. The data in this chapter clearly indicate that the ESCWA member countries need to exert further efforts in establishing their knowledge societies. With the sharp rise in oil revenues in 2006, countries of the GCC currently have a real opportunity to achieve this objective. It is obvious that more serious work is needed in order to build a knowledge economy in the Arab world.

In parallel, however, countries in the region should embark on another important path, namely that of engaging in political, economic, and social reform. This includes allowing the key freedoms of opinion, speech, and assembly through good governance. Moves such as these will ensure the sustainability of building knowledge societies in the region.

6.3.2 Policy Formulation and Reforms

Based on the evidence in this chapter – and a general understanding of the politics and economics of the ESCWA countries, we propose here a set of actions that can serve as a remedial strategy to improve the overall ICT-related situation.

Accordingly, among the salient policy interventions required at this time, we highlight the following: first, we should examine present and future needs of the societies, and establish new policies, or correct existing policies, in line with the results of such studies. Second, we should increase the role of the private sector and civil society establishments in terms of planning, remedying and monitoring policies and strategies. Third, we need to allocate the necessary financial resources to realize ICT-focused policies and strategies. Fourth, we should promote and prioritize the formulation of laws and regulations that protect personal data and information privacy, including copyrights and intellectual property rights. Fifth, we should complete the privatization of the telecommunications sector, especially in relation to new services such as mobile phones and the Internet. Sixth we should promote and accelerate legislation in e-business and e-commerce. Seventh, we should shift rapidly toward knowledge-based production. The final policy intervention proposed here is to establish mechanisms for monitoring, measuring reporting on the pace and progress of policies and strategies.

6.3.3 ICT Use and Local Content

Also with the understanding that evidence in the chapter calls for identifying ways of improving current conditions, we note here some priority steps. First is building an up-to-date and advanced ICT infrastructure while increasing ICT access to low income families is vital. Inequalities can be the source of tension in a society, and inequality spawned by an inability to accessing the knowledge network is no different. Second, we must promote the use of e-government services across the region. This can be achieved by increasing local Arabic content through greater ICT access in all sectors, especially in education. Third, we must support Arabic cultural centers aimed at establishing content-rich websites. Fourth, we must provide knowledge content in local language and translate foreign knowledge to local language. Fifth, we must establish strategies to build an Arab software industry in the region. Sixth, we must create domestic partnerships between those that are e-literate and those that are not, and to the extent possible consider ways of using ICT for promoting social inclusion. Seventh, we must render ICT strategies compatible, and not competitive, with knowledge strategies.

6.3.4   Education and Awareness

Specific moves in this domain consist of the following types of actions: Increase ICT awareness in all sectors using all existing media channels, with added attention to rural areas. Link ICT awareness to literacy programs in order to eradicate illiteracy as well. Increase investments and incentives in human resource training and in the purchasing ICT hardware and software for public, private, and education uses. Promote and develop e-learning programs and curricula across all levels of education and in all sectors. And, disseminate high quality education with tied to achievement and to and lifelong learning.

In addition, it is important to indigenize the generation and diffusion of science. Telecenters projects should make a difference in people's lives. ICT training should include uses of techniques as well as applications to improve people's lives. Telecenter projects should reach "people" as individual human beings, and not as "numbers," or anonymous aggregates thereof. Experiments with Computer Clubhouses in poor communities and rural areas suggest that such projects help youth build on their own interests, and create an environment of respect and trust (Schon et al., 2001).

Each one of these moves is significant in its own right. Jointly, they can be powerful indeed. However, none can be successful without cooperation and collaboration among the public, private, and educational sectors, nor can any be successful without the support of the non-governmental organizations in each country (ESCWA, 2005). Clearly, it is now essential to understand and exploit possible catalytic effects of ICT development. Finally, "champions" and other agents of change must now involve community leaders, educators, managers, and organizers rather than only computer experts, technologists, or technocrats.

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