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ICT Opportunities and Challenges for Development in the Arab World

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Abstract

This paper examines the status of ICT in the Arab world and the potential opportunities and challenges that ICT is expected to create for development in the region. The analysis shows that, despite the recent growth in the demand for ICT, it has a very limited market in the Arab region, as indicated by the lukewarm demand, limited supply and low investments in comparison to the world total. The diffusion of ICT is characterized by a market concentration in the richer Gulf countries and the wide difference between these and other Arab countries in terms of demand, supply, price and the intensity of the services. The analysis also shows that the diffusion of ICT in the Arab world significantly increases in relation to economic growth (as measured by GDP per capita). However, the influence of human capital development (as measured by average years of schooling) is somewhat doubtful. As highlighted by the study, ICT has the potential to impose the so-called 'creative destruction' process in the Arab world. On the one hand, ICT has the potential to induce productivity growth, employment, human resources, skills and capabilities, knowledge-based economy and hence economic development. On the other hand, ICT may introduce challenges with regard to intensified competition, inequality as well as the elimination of some unskilled jobs, thus negatively influencing the region's development.

Keywords: ICT diffusion, ICT market, ICT implications, Arab world

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1 Introduction

The rapid progress in ICT and its impacts on the global economy have intensified in recent years, leading to a new economic system that has attracted a great deal of interest. It has also raised debate on the extent of ICT and the economic opportunities and the challenges that the information and communications technology imposes on the world economy, particularly for the developing countries.

More recently, the continuous move towards globalization has made information and communication technologies one of the most important factors in achieving success as well as in seeking new markets, improving quality, providing better and faster customer service and bringing the flexibility needed to make changes quickly.

The role and impact of technical changes in economic growth and economic development have received particular interest in the recent literature focusing on economic growth. In particular, many of the recent studies have shed some light on the impact of IT on economic growth, productivity, employment, work organization, competitiveness and human capital development.

Some recent studies have highlighted both the opportunities and the challenges that ICT has imposed on the world economy. For instance, Hitt and Brynjolfsson (1996) and Brynjolfsson and Yang (1996) have analysed the implications of IT on productivity while studies by Jorgenson and Stiroh (1995), Mansell and Wehn (1998), Pohjola (2000) and Pohjola (2001) have looked at growth and development. Bresnahan, Brynjolfsson and Hitt (1999) have focused on work place organization, and Acemoglu (1998) and Hwang (2000) on human capital development and skill upgrading.

On the other hand, several studies discuss the hazards ICT creates for economic development. Most of this literature is based on the idea that technical change is a creative destruction process that creates opportunities for development, while also imposing certain restrictions to development. For instance, several studies have highlighted the negative implications of ICT on employment and labour market (cf. Aghion and Howitt 1998; Freeman and Soete 1985; Freeman and Soete 1994 and Freeman and Soete 1997). Some of these studies raised the issue that, as with most other technical change, ICT or IT has the so-called labour saving or skilled biased effect through the displacement of unskilled labour that results from either the reduction or elimination of some basic non-skilled jobs.

It has also been hypothesized that ICT could impose adverse effects in the developing world because greater advantages will accrue to the industrialized world from global competitiveness than to the developing world, thus making it hard for the less developed countries to compete on the international market. Furthermore, the rapid evolution in ICT will make it harder for the developing countries to bridge the already widening gap between the developed and developing world. ICT, by increasing inequality in income distribution and thus adding to the poverty of the poor, will have adverse results on the status of the poor.

The aim of this paper is two fold; first, to analyse the status and the determinants of ICT diffusion in the Arab countries¹ and to review the potential opportunities and challenges that ICT is expected to create for development in the Arab world. The paper will use the descriptive approach, utilizing secondary data and information.

Section two of the paper reviews the status and properties of ICT diffusion in the Arab world. Section three examines the determinants of ICT diffusion in the region, while section four reviews the potential opportunities and challenges that ICT is expected to create for economic development in the Arab world. The summary and conclusion are given in section five.

2 The status and properties of ICT in the Arab world

This section discusses the status and properties of ICT diffusion in the limited market of the Arab countries, and regional disparities characterizing the diffusion of ICT in the region.

2.1 Growing but limited market for ICT in the Arab countries

In recent years, the diffusion of ICT in the Arab region has increased significantly. As Table 1 illustrates, the recent growth rate of the total online population in the Middle East² region during the last two years has been significant. In addition, a forecast by Ajeeb Research Unit (2001a) estimates that the Arab world will experience a rapid increase in ICT demand, accelerating from about 6 million users in 2002 to about 25 million by the end of 2005. Moreover, more recent study by the Arab Advisors Group (2002) reports that the available Internet bandwidth in the Middle East grew by 154 per cent between August 2001 and January 2002.

Table 1
Growth of the 'online' population worldwide, 2000-02

	World total	Africa	Asia/Pacific	Europe	Middle East	Canada & USA	Latin America
Year 2000							
Number online, millions	359.8	3.11	89.43	94.22	2.4	157.24	13.4
% of total	100	1	25	26	1	44	4
Year 2002							
Number online, millions	544.2	4.15	157.49	171.35	4.65	181.23	25.33
% of total	100	1	29	31	1	33	5
Growth rate, % (2000-02)	51.25	33.44	76.10	81.86	93.75	15.26	89.03

Source: Nua Internet Surveys (2000 and 2002).

¹ The Arab countries include Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia and the United Arab Emirates.

² The Middle East region includes all the Arab countries in addition to Iran, Turkey and Israel.

Table 2
Total population with access to main telephone lines, mobile telephones, Internet and ISP
1996-2000

Country	% of population with access to main telephone lines	% of total population:		Internet service providers (ISP)
		With mobile telephones	Using the Internet	
United States	69.77	24.89	53.23	7,800
Japan	47.63	50.39	21.35	73
United Kingdom	58.47	21.79	32.64	245
The Netherlands	57.14	25.54	42.55	52
Average Arab countries	11.81	6.99	3.10	8.31

Source: CIA (2001).³

However, despite the recent positive growth trend, the market for ICT is limited in the Arab countries and this is apparent in the low demand, limited supply and restricted ICT spending. The Arab world embraces more than 281 million people,⁴ but as Table 2 indicates, the average shares of the population having access to main telephone lines, mobile phones, or the Internet are 11.81 per cent, 6.99 per cent and 3.10 per cent, respectively, which are low in comparison to the USA, Japan and Europe. Moreover, the average Arab countries' supply as indicated by the average number of Internet services providers (ISP) is very low versus the USA, Japan and Europe. This limited supply is attributed to inadequate investment and infrastructure. In addition, Table 3 indicates that during the year 2001, ICT spending, IT variables, ICT per GDP and ICT per capita in Saudi Arabia/Gulf states⁵ and Egypt were minimal in comparison to United States, Japan, UK, Germany and the world total. Moreover, software-to-hardware spending ratios in Saudi Arabia/Gulf states and Egypt are lagging far behind the major industrialized countries and the world total. The market is discouraged by high prices, as is indicated in Table 4 on the costs of Internet services in the Arab countries versus the USA and Canada over the period 1999-2000.

Moreover, the limited market and the low diffusion rate of ICT in the Arab world are exacerbated by many problems. These include: (i) inadequate investment and lack of infrastructure; (ii) inadequate awareness of the importance of ICT in the new economy, particularly of the value/importance of Internet and intranet in daily operations; (iii) insufficient R&D in ICT-related issues; (iv) deficient services resulting either from low speed rate or disconnection; (v) the lack of a network system minimizes the efficiency benefit of the services; (vi) low demand by consumers, as a result of either the limited capacity/availability and efficiency of the services, or the high costs; (vii) uncertainty/risk aversion on the supply side because deficient and limited demand

³ The CIA World Factbook 2001 contains data collected during different time periods (i.e., 1996, 2000). As a result, even though the countries are examined under the same data category, the data for the different countries may correspond to different years. This inconsistency can render the country comparison less reliable. However, this source is used here because it covers most of the Arab countries.

⁴ See Table 5.

⁵ The Arab Gulf states include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE).

discourage investments and expansion of the services; (viii) poverty in some countries in the region restricts demand; (ix) higher costs of the services discourage both demand and supply (for instance, Table 4 shows that the prices and costs in some Arab countries are far higher than in the USA and Canada) and (x) language problems caused by the preference for Arabic, or unfamiliarity with other languages, which reduces the maximum benefit to be gained from the Internet, especially with regard to websites offered in other languages. According to Ajeeb Research Unit (2001b), the percentage of Internet users in the Arab world unable to fully benefit from non-Arabic web content is increasing rapidly from the 1 per cent observed in 1995 to 45 per cent in 2001. This is expected to jump to 67 per cent by the end of 2005.

Table 3
ICT spending and IT variables in selected Arab countries
compared to USA, Japan, UK, Germany and world total, 2001

	USA	Japan	UK	Germany	World total	Saudi Arabia/Gulf states	Egypt
(1) ICT spending (in millions US\$)							
Hardware	136,051	49,686	21,287	24,488	376,119	1,043	417
Software	96,556	13,729	13,798	14,697	196,237	302	124
Services	199,203	52,320	27,354	27,018	425,660	922	245
Internal	107,428	67,786	26,723	29,075	345,500	557	223
Other office equipment	7,442	4,491	2,194	2,982	33,705	94	38
Total IT spending	546,681	188,012	91,356	98,260	1,377,221	2,918	1,046
Telecommunications	265,954	225,761	46,370	56,385	1,037,877	3,276	1,337
Total ICT spending	812,635	413,772	137,726	154,645	2,415,098	6,194	2,383
(2) Economic ratios							
ICT/GDP, %	7.9	9.6	9.7	7.9	7.6	3.6	2.5
ICT/capita, \$	2,923.8	3,256.2	2,318.6	1,880.4	395.3	309.4	36.8
Software/hardware spending, %	71.0	27.6	64.8	60.0	52.2	28.9	29.8
(3) IT variables							
PCs in education	16,322,694	2,172,000	1,824,106	1,054,871	36,778,755	66,391	48,816
PCs in homes	80,943,489	24,276,412	10,201,092	13,550,184	204,483,990	220,386	147,827
PCs in business & government	129,868,818	22,791,000	8,906,587	12,762,242	299,914,464	618,054	454,441
Total PCs installed	227,135,001	49,239,412	20,931,785	27,367,298	541,177,209	904,831	651,084
Telephone lines/HH	1.98	1.50	1.50	1.30	na	1.12	0.34

Note: na = data not available.

Source: WITSA (2002).

Table 4
Internet charges, 1999-2000

Country	Cost in US \$	Hourly charges US \$	Monthly total US \$
USA	20.0	0	20.0
Canada	13.6	0	13.6
United Arab Emirates	5.4	13.85	27.7
Egypt	26.4	15.6	42.0
Saudi Arabia	37.3	24.0	61.3

Source: 2 BITS (2001)

2.2 Market concentration and regional disparities

The diffusion of ICT in the Arab region is characterized by a market concentration in the Arab Gulf countries. Moreover, there is a wide gap between the Gulf countries and other countries of the region in terms of supply, demand, prices and intensity of the services.

Table 5 shows that although the Gulf countries account for less than 12 per cent of the region's population, these countries account for 76-78.6 per cent, 62 per cent and 80.6 per cent of total percentage of the population with access to Internet, main telephone lines and mobile telephones, respectively. Moreover, the Gulf countries account for 36.8 per cent of Internet services providers in the Arab world.

The wide differential between the Gulf countries and the other nations in the Arab region is obvious in the supply and demand, which can be measured by the percentage of the population accessing the Internet and the number of Internet users and subscribers, prices and intensity of the services. With regard to the supply of ICT, Table 5 shows that Egypt, Saudi Arabia and Lebanon have more than one hundred Internet services providers while all other Arab countries together have less than twenty companies providing similar services.

On the other hand, the differential in the demand is indicated by both the share of the population accessing the Internet and the number of Internet users and subscribers. Table 5, based on CIA global statistic data, illustrates that the United Arab Emirates (UAE), Bahrain, Kuwait, Lebanon and Qatar have a higher ratio of the population with access to the three ICT modes (telephone, mobile telephones and Internet). The gap between these countries and the other nations of the region, especially the poverty-stricken Yemen and Sudan, is very wide. These results are consistent with the findings of the Ajeeb Research Unit (2001a), which reports that within the Arab region, Internet penetration is highest in the UAE, where 24 per cent of the total population has access to the Internet. Bahrain, Qatar, Kuwait and Lebanon have the next highest level of Internet penetration with 16.67, 10.27, 8.25 and 6.56 per cent, respectively. All other Arab countries have less than 5 per cent of the population online, i.e. only a one-digit penetration. The gap between the UAE and the rest of the Arab world in terms of online penetration remains wide. Moreover, the Ajeeb Research Unit (2001a) indicates that the number of Internet users between March 2000–March 2001 increased by 57 per cent in the UAE. The growth rate is one of the highest in the world. The survey shows that the UAE achieved 22nd place in a worldwide ranking in the ratio of Internet users to the

population, thus outranking Central and Southern Europe and even some of the highly industrialized West European countries like France.

Moreover, Table 6 illustrates that the demand for ICT as measured by the number of Internet subscribers and users is unequally distributed and is concentrated mainly in some countries in the region. While both the UAE and Egypt rank among the highest number of users and subscribers, Yemen and Sudan are among the lowest. Moreover, a recent report by Arab Advisors Group (2002) shows that by the end of 2001, available bandwidth and Internet subscribers in Egypt, Jordan, Lebanon, Morocco, Oman, Saudi Arabia, Syria and the UAE exceed 1.08 million (i.e. up 47 per cent of total Arab countries subscribers since 2000). Oman, with a rating of 3.7, has the highest Internet bandwidth-per-subscriber scores, whereas 1 is the average score for the region. Morocco is next with 1.94, followed by Egypt with 1.71, and the UAE with 1.36. Saudi Arabia, Jordan, Lebanon, and Syria all have below average bandwidth-per-subscriber scores.

Table 5
Access to main telephone lines, mobile phones, Internet, and ISP
in the Arab countries, 1996-2001

Country	Total population	Internet services providers (ISP) (a)	Percentage of population:			
			With access to main telephone lines (a)	With mobile telephones (a)	Using the Internet (a)	Using the Internet (b)
UAE	2,407,460	1	38.02	41.54	16.62	24.44
Bahrain	569,202	1	23.55	9.07	5.81	16.67
Kuwait	1,930,132	3	20.18	10.28	4.90	8.25
Lebanon	3,627,774	22	19.30	15.99	6.27	6.56
Qatar	762,887	1	18.46	5.65	5.58	10.27
Saudi Arabia	22,757,092	42	13.62	4.39	1.76	2.59
Syria	16,728,808	1	7.85	na	0.12	0.18
Jordan	5,153,378	5	7.82	0.22	1.70	4.57
Oman	2,622,198	1	7.67	2.28	1.91	3.36
Libya	5,240,599	1	7.25	na	0.14	0.40
Algeria	31,736,053	1	7.25	0.11	0.06	0.60
Egypt	69,536,644	50	5.71	0.55	0.43	0.82
Tunisia	9,705,102	1	6.74	0.52	1.13	2.89
Iraq	23,331,985	1	2.89	na	na	0.06
Yemen	18,078,035	1	1.61	0.18	0.07	0.08
Sudan	36,080,373	1	1.11	0.06	0.03	0.08
Djibouti	442,972	na	na	na	na	na
Total Arab states	281,355,999	133	189.03	90.84	46.53	86.08
Total Gulf states	31,048,971	49	121.50	73.21	36.58	65.58
% of the Gulf states to total Arab	11.04	36.84	64.28	80.59	78.62	76

Note: na = data not available.

Sources: (a) CIA (2001); (b) Ajeeb Research Survey (2001a).

Table 6
Internet users and subscribers in the Arab region, 1999-2001

Country	1999		2000		2001	
	Subscribers	Users	Subscribers	Users	Subscribers	Users
UAE	81,700	204,300	160,000	400,000	220,000	660,000
Egypt	51,800	207,200	55,000	440,000	70,000	560,000
Kuwait	25,100	62,800	40,000	100,000	55,000	165,000
Jordan	20,100	50,300	25,000	87,000	35,000	210,000
Oman	16,000	40,000	20,000	50,000	28,000	60,000
Tunisia	6,000	15,000	22,000	110,000	70,000	280,000
Morocco	14,100	32,500	15,000	52,000	55,000	220,000
Qatar	11,000	27,500	18,000	45,000	25,000	75,000
Yemen	2,500	6,300	3,000	12,000	3,500	14,500
Algeria	na	na	na	na	45,000	180,000
Libya	na	na	1,500	7,500	4,000	20,000
Sudan	na	na	2,000	10,000	7,000	28,000
Iraq	na	na	na	na	500	12,500
Palestine	na	na	na	na	na	60,000
Total	338,200	923,100	545,500	1,899,500	938,000	3,538,000

Note: na = data not available.

Sources: Internet Al Alam Al Arabi (1999) for the year 1999, DIT (2000) for the year 2000 and Ajeeb Research Unit (2001a).

Further, Table 4 shows the variation in the cost/price of the services between the UAE, Egypt and Saudi Arabia. For instance, in comparison to both Egypt and Saudi Arabia, the UAE had cheapest prices during the period 1999-2000. Furthermore, there are differences in the intensity of the service, as indicated by the number of websites. For instance, according to the Middle East Directory data, the UAE, Lebanon, Bahrain and Egypt together have more websites than Jordan, Kuwait, Saudi Arabia and Oman. Moreover, the data show that the Gulf countries account for 56.5 per cent of all the websites in Arab region, a clear indication of the wide gap that exists between the Gulf nations and other Arab countries.

3 The determinants of ICT diffusion in the Arab region

The wide divergence in ICT diffusion in the Arab region is probably a reflection of the differences in both economic growth (income as measured by GDP per capita) and human capital development (educational attainment as measured by the average years of schooling).

For instance, Table 7 illustrates that the share of the population accessing the Internet in the Arab countries significantly increases with an improvement in GDP per capita. Thus, the richest Gulf countries like the UAE, Bahrain, Qatar and Kuwait, which have a higher GDP per capita, also have a higher ratio of the population online to the Internet, while Yemen and Sudan, with a lower GDP per capita, are also accessing Internet less.

Similarly, Table 7 indicates that the share of the population accessing the Internet in the Arab countries increases with the rise in the average years of schooling. In particular, Bahrain and Kuwait, the richest Arab Gulf countries, have, on average, more years of schooling and thus also higher percentage of the population online to the Internet.

Table 7
Population accessing the Internet, GDP per capita and average years of schooling
for selected Arab countries, 1996-2001

Country	% of population accessing the Internet ^(a)	GDP per capita ^(b)	GDP per capita ^(c)	Average years of schooling ^(d)
UAE	24.44	22,800	18,060.0 ⁽¹⁾	na
Bahrain	16.67	15,900	9,370.0 ⁽²⁾	6.09
Qatar	10.27	20,300	na	na
Kuwait	8.25	15,000	18,030.0 ⁽³⁾	7.05
Lebanon	6.50	5,000	4,010.0 ⁽³⁾	na
Jordan	4.57	3,500	1,710.0 ⁽³⁾	7.37
Oman	3.36	7,700	5,050.0 ⁽⁴⁾	na
Tunisia	2.89	6,500	2,100.0 ⁽³⁾	4.20
Saudi Arabia	2.59	10,500	7,230.0 ⁽³⁾	na
Egypt	0.82	3,600	1,490.0 ⁽³⁾	5.05
Morocco	0.73	3,500	1,180.0 ⁽³⁾	na
Algeria	0.60	5,500	1,580.0 ⁽³⁾	4.72
Libya	0.40	8,900	5,730.0 ⁽⁵⁾	2.87
Syria	0.18	3,100	940.0 ⁽³⁾	5.74
Yemen	0.08	820	370.0 ⁽³⁾	na
Sudan	0.08	1,000	310.0 ⁽³⁾	1.91

Notes: ⁽¹⁾, ⁽²⁾, ⁽³⁾, ⁽⁴⁾ and ⁽⁵⁾ refer to the years 1998, 1999, 2000, 1995 and 1989, respectively.

na = data not available.

Sources: ^(a) www.ajeel.com for ICT data; ^(b) CIA (2001); ^(c) World Bank (2000) for GDP per capita data; and ^(d) Barro and Lee (2001) for the average years of schooling data.

Table 8
Determinants of ICT diffusion: Regression results for the period 1996-2001

	For 8 Arab countries		For 16 Arab countries	
	(1)	(2)	(3)	(4)
Constant	-5.220 (3.436)	-3.076 (4.740)	-0.0455 (1.548)	-2.117 (1.504)
GDP per capita ^(a)	0.0076 (0.000)			0.0087 (0.000)
GDP per capita ^(b)		0.0049 (0.000)	0.0094 (0.000)	
Human capital (Av. yrs. of schooling) ^(c)	0.746 (0.704)	0.935 (0.984)		
Adjusted R ²	0.638	0.323	0.598	0.710

Notes: (1) Standard errors are in parentheses; (2) The regression is done with 5% level of significance.

Sources: ^(a) CIA (2001) and ^(b) World Bank (2000) for GDP per capita data and ^(c) Barro and Lee database (2001) for the average years of schooling data, respectively.

However, the regression of the percentage of the population accessing the Internet as a dependent variable with respect to GDP per capita and average years of schooling as independent (explanatory) variables shows somewhat different results. Table 8 summarizes the regression results and illustrates that ICT diffusion is statistically significant with respect to income but not statistically significant with respect to human capital under the 5 per cent level of significance. Equations (1), (3) and (4) imply the statistically significant relation between the diffusion of ICT (the percentage of population accessing the Internet) and income variable (GDP per capita). However, Equations (1), (2), (3) and (4) indicate the non-statistically significant relation between the diffusion of ICT and human capital variable.

4 ICT opportunities and challenges for development in the Arab world

Like other modern technologies, ICT has the ability to impose the creative destruction effect by providing opportunities for development, but simultaneously also creating hazards to development in the Arab region.

4.1 ICT opportunities for development

Similar to other world countries, the Arab nations have the opportunity to benefit from the wide and fast diffusion of ICT. In particular, ICT has the potential to accelerate economic development in the region by:

- i) Promoting economic growth by facilitating the generation or increase of another sources of income and investment, thus enhancing sustainable development and welfare economy.
- ii) Enhancing employment opportunities by creating and initiating new jobs and increasing the employment rate of already existing jobs.
- iii) Improving the knowledge-based economy by (a) increasing the efficiency of the educational system and learning to benefit from long-distance teaching in the near future; (b) developing the communication system through the provision of cheaper, easier, faster and more efficient services; (c) Upgrading skills and developing human resources through improved educational and training systems and enhancing the capability of people.
- iv) Promoting the degree and the efficiency of the work organization.
- v) Accelerating the catching-up effect. The diffusion of ICT can be used to accelerate and facilitate efforts to bridge the gap with the advanced countries.
- vi) Minimizing poverty in the region by creating additional employment opportunities.
- vii) Advancing R&D efforts by motivating and facilitating the collaboration between research institutes and organizations in the region, thus promoting research activities in the region.

- viii) Insuring gender equality in the region by increasing both education and employment opportunities for women.
- ix) Promoting e-commerce. Investments in ICT have the potential to push/enhance e-commerce. Both Internet and the recent growth in e-commerce can help facilitate the fast delivery of products or services to large number of consumers within the Arab region and to new different markets, thus improving commerce both within the Arab nations and other countries outside the Arab region. This, in turn, will enable the region to generate further revenue from e-commerce. For example, according to information from the Middle East polls, the region's revenue from e-commerce revenue has increased from US\$ 0.53 billion in 1999 to US\$ 2.22 billion in 2001. Projections for the end of 2003 estimate a total revenue of US\$ 7.21 billion.

4.2 ICT challenges for development

In addition to potential opportunities ICT offers for development, it can also impose challenges to development in the Arab region. In particular, the adverse effects of ICT may become apparent as:

- i) Increased competition: in order to be able to deliver competitive goods and high quality-services efficiently to global markets, the Arab world needs not only to enhance its productive capacity but also to increase and accelerate its investment rates in ICT and related infrastructure. This, in turn, creates the need to enhance the technological capabilities of the region, to raise funds for R&D, to develop scientific research that matches both local and global needs, and to promote collaborative research activities between the Arab countries.
- ii) Growing unemployment rate: ICT, similar to other technologies, has the tendency to cause the so-called labour saving-skilled biased effects by reducing employment either through the removal and elimination of jobs or through reduction of already existing jobs, particularly those hiring unskilled labour.
- iii) Widening regional disparities: ICT has the propensity to increase the already existing gap and disparities within the region.
- iv) Increased inequality and the rift between the Arab countries and the developed countries. ICT may have an adverse effect on the already existing gap that exists in ICT investment and ICT infrastructure, and technological capability.
- v) Furthermore, the need for further public investment in ICT could create some difficulties especially in the poor Arab countries, where the allocation of public fund is targeted to meet different social needs, particularly to reduce poverty rate, promote education, health and other infrastructure. Public funds and/or investment in these budget items are given special priority and therefore compete with public investments in ICT and related infrastructure.
- vi) Moreover, the success and increase of e-commerce in the Arab world is faced by several challenges/obstacles such as (a) the relative newness of online commerce and setting-up of e-commerce in the region; (b) the low Internet

user rates in the region;⁶ (c) inadequate and slow Internet services; (d) the high costs of building and managing websites; and (d) the inability to ensure and secure transactions due to the low level of electronic commerce transactions.

5 Conclusions

This paper examines the status of ICT in the Arab world, and the opportunities and challenges ICT can trigger for the countries of the region. Section two shows that despite the recent growth in the demand for ICT, the ICT market is very limited and lags far behind the advanced countries in terms of demand, supply and spending. The paper illustrates the market concentration of ICT diffusion in the Arab Gulf countries and the wide disparities between these and the other Arab countries with regard to supply, demand (percentage of population accessing the Internet, Internet subscribers and users), prices and intensity of the services. Section three illustrates that the richest Arab Gulf countries, with a higher GDP per capita and better average years of schooling, also have higher percentage of the people accessing the Internet, while poorer Arab countries with a lower GDP per capita and less schooling, also have a correspondingly smaller percentage of inhabitants accessing the Internet. However, the regression results show that the diffusion of ICT significantly increases with an increase in economic growth (income as measured by GDP per capita), while the influence of human capital development (education as measured by the average years of schooling) is somewhat doubtful. Section four shows that ICT has the potential to accelerate economic development through increased employment opportunities, improved e-commerce, better human resources, upgraded skills and enhanced capabilities. On the other hand, ICT has the potential to create some obstacles to development by intensifying competition, eliminating certain jobs, particularly unskilled labour, increasing regional disparities within the Arab region and furthermore, escalating the already existing gap and inequality between the advanced countries and the Arab world.

⁶ For instance, the results of the Internet Arab World survey conducted by Internet Arab World Magazine (IAW)–DIT (1998) show that only 4 per cent of Internet users in the Arab countries made a purchase through the Internet within the span of a year.

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