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NOTE DE RECHERCHE

International Competitiveness in the Telecommunications and ICT Sectors: A Cross-Country Comparison

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Abstract

The ICTs and telecommunications contribute significantly to a country's economic growth and development. The use of the internet and other information technologies, once at the hands of the private firms and governments of developed economies, is starting to get into the top priorities of some developing economies. Developing countries in the Arab world lack the means and necessary resources to develop the new technologies. Nonetheless, some exceptions exist and there are signs of regional leadership among some Arab countries. Globally, however, the dominance of the developed world in ICT and telecom is not likely to change dramatically in the coming years. Even so, developing countries may have a possible role in making policy and business decisions in the future. Despite the progress realized by many Arab countries lately, especially in the ICT area, their performance is lacking compared to other developing countries in South East Asia and Eastern Europe. Arab countries spend much less on ICTs than other countries. At current investment levels, it will take almost 20 years for the Arab countries to double their ICT infrastructure, while the industrialized countries can achieve the same performance in just eight years.

JEL: L80, K10, 033

Introduction

Information and communication technologies (ICTs)[1] have been used widely around the world with increasing beneficial effects on productivity and economic growth. ICT infrastructure availability in a country and its rate of investment play a crucial role in the formation of the global knowledge-based economy (KBE). The most widely used indicators of infrastructure are fixed and mobile telephone densities, rate of access to personal computers and Internet penetration. Also, issues of quality of infrastructure and of services must be addressed when a comprehensive evaluation is made of a country's preparedness and its connectivity capacity. Indeed, the *digital access index* (DAI) recently developed by the International Telecommunications Union (ITU) takes into account a number of new variables such as education and affordability to access the IT infrastructure (ITU, 2003).

ICTs play a significant role in the economy because of their pervasiveness and the spillover effects to other industries. This is why they are considered to be "enablers" to other dependent industries (like manufacturing, trade, tourism, transportation, education, and financial services) and as such they contribute to growth and development. The use of ICTs in the production process allows other industries to increase their productivity and to offer better quality products and services at lower cost to consumers. Further, innovation is facilitated when new and existing firms find ways to apply and use the ICTs. In that sense, ICTs contribute to the creation of new businesses while they can help existing firms to expand in new markets. Trade, entrepreneurship and technological knowledge are thus stimulated and all of them create a more dynamic economic and business environment. Better quality workforce is required by the knowledge-based firms. The more educated workers and ICT trainees are, the better their positioning in taking advantage of the new opportunities created by ICTs. Employment and social inclusion are thus enhanced.

For all of the above, developing a strong ICT sector has become a top priority for many industrialized and developing economies. In an attempt to leapfrog into the future, increasing amounts of GDP are spent on ICTs around the world (8.3% in North America, 8% in Europe, 6.7% in Latin America and a mere 4% in the Arab world). A relatively low level of investment in ICTs results in marginal improvements of the sector and, because of limited spillover effects, in insignificant improvements of the rest of the economy. At current investment levels, it will take only eight years for the industrialized countries to double their ICT infrastructure, while it will take almost 20 years for the Arab countries. Statistical evidence shows that Arab countries lag behind world averages on every ICT indicator, with the notable exception of the United Arab Emirates (UAE) which exceed world averages in a number of connectivity indicators.

[1] The Information and Communication Technologies (ICT) industry encompasses computer software engineering, multi-media production, computer hardware and peripherals manufacturing, telecommunications, website development, computer and internet services, product distribution and servicing and education, training and research.

Such gross measures of performance hide necessarily stark individual country differences. Indeed, the picture is much better if we examine each Arab country separately, and not as a group. There is number of Arab countries (UAE, Egypt, Jordan, and Tunisia) that have embarked in sector reforms and developed laudable initiatives to boost activity in the ICT sector. Starting from their telecommunications sector, they have gone through a number of structural changes by introducing competition in the mobile telecom (competition in the fixed line segment of the market was not as successful as in the mobile) and data/internet markets and made a number of other more or less significant changes in some other sectors of the economy. Their awareness of the importance of ICTs to growth and economic and social development led some Arab countries to initiate programmes and ICT policies to promote the development of this sector. Nonetheless, many of these initiatives remain unexploited and they need a further refinement and development of a comprehensive ICT strategy and a sound regional ICT policy. Despite the notable progress in the telecommunications sector, policies such as local loop unbundling, access charges for mobile, fixed-line and especially internet dial-up rates should be addressed urgently should usage of ICTs in the Arab world be increased at the targeted levels. The governments in the Arab countries have a role to play in creating an environment that satisfies the exigencies for ICT growth. Facilitating the development of ICT sector through sound policies and regulations, supporting the development of ICT infrastructure through public and private domestic and foreign (FDI) investments and encouraging the use of ICTs by using subsidies and tax incentives, are some of the policy tools that may be used by Arab countries to achieve their goals in terms of ICT objectives.

This paper examines the state of the ICT industry and policies initiated by Arab countries to contribute to the development of the sector and facilitate the economic and social inclusion of their citizens. Strengths and weaknesses are highlighted and the Arab competitiveness performance with respect to ICTs is compared to the performance of a number of developing and developed countries that, not long time ago, were at low levels of development but they managed, through sound policies and initiatives, to leapfrog into the group of advanced economies. The examples of success of the benchmark countries are illustrative and serve to draw policy recommendations for the Arab countries.

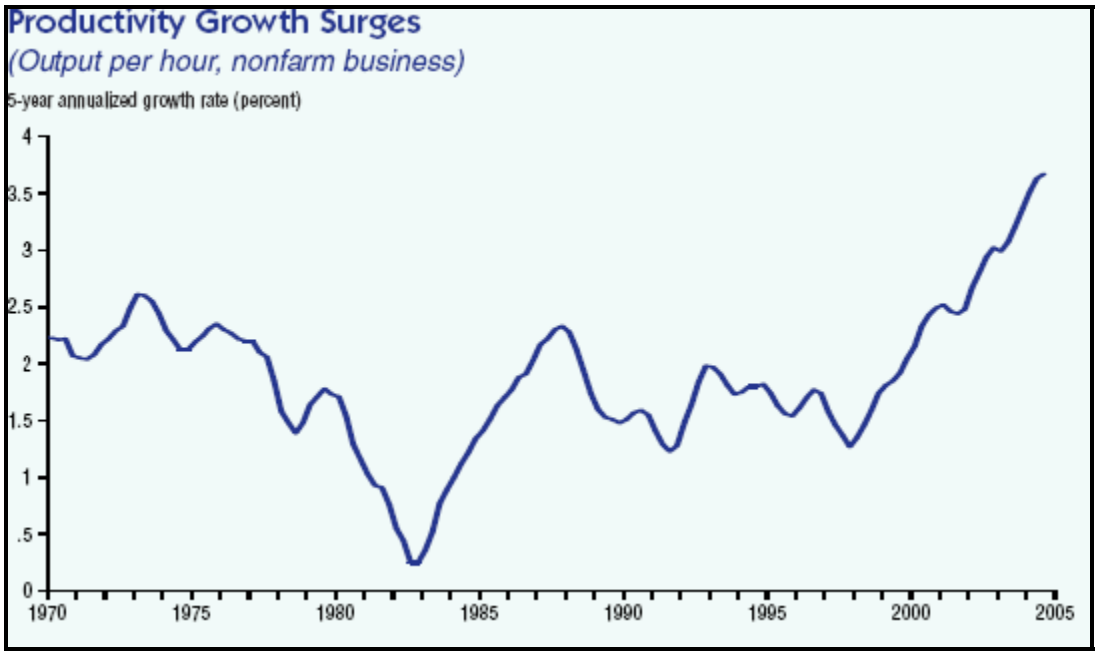
ICTs, Productivity and economic growth in the Arab world

Productivity has been rising in many developed economies at rates that have not been seen since mid 80s. In the USA output per hour has been increasing at an average rate of 3% per annum since 1995. This has got by surprise many economists and business specialists because the USA is, after all, the most technologically advanced economy. For years, productivity in the USA was declining steadily (from mid 70s to mid 80s) with a small increase afterwards and a further decline in the early and mid 90s. The Solow paradox – the observation that computers are ubiquitous but in productivity statistics – was almost generally accepted by pundits and doubts were cast over the potential of ICTs on increasing productivity and growth. With the sharp increase in productivity during the last decade, the Solow paradox seemed to have ended and new interest has surged in examining the relationship between ICTS and the rise in productivity.

Technological innovation and globalization has made early adopters of ICTs more dynamic and flexible and has expanded the possibilities for new markets and new organizational changes. Economies became more open and this required a better skilled workforce and more emphasis on policies that foster the creation of knowledge and new programmes in education. Policies that give incentives to firms and especially to small and medium sized enterprises (SMEs) to adopt the ICTs were multiplied (USA, EU, Canada, Costa Rica, etc.,) lately on the belief that SMEs are more flexible and therefore better equipped to confront the newly created intense competitive environment. In many developed economies, deregulation and privatization created new market conditions and this has led to overcapacity. This resulted in an across the board decrease in prices and in inflation and in the decline in profits for many dot-com companies. This is particularly true because ICTs have decreased the entry barriers in many business activities. Excess

capacity and easy entry led to well known bankruptcies (Worldcom, Enron, Global Crossing, etc.,), despite the increases in productivity.

Figure 1
Productivity growth in the USA, 1970-2005



Source : http://www.dallasfed.org/research/swe/2005/swe0501c.pdf

In the USA, productivity growth, as reported by the Bureau of Labour Statistics (2005), surged to almost 4% in 2005. This is mainly attributed to the ICTs. The use of ICTs alone does not guarantee increases in productivity. Firms that achieve high gains in productivity tend to combine investments in hardware and software with organisational changes. The latter may be expressed as the organisation of autonomous work groups, the introduction of team work and shift in responsibility to lower levels of hierarchy. Experiments in some developed economies (Germany, for instance) showed that the increase of employee participation in all levels of the production process is a strategy that brings benefits to the firm and the society in general[2].

Factors contributing to productivity enhancement

The importance of ICTs in organizational change suggests that governments could have a role to play in both the provision of a high quality ICTs infrastructure and in the dissemination of information based on the benefits and costs of such initiatives. This is particular important for SMEs and the businesses operating in low skill intensive industries such as textiles, leather and clothing, food and beverages, and woodwork which appear to be slow adopters of e-business practices. This is pertinent to some Arab countries, especially Egypt and the group of Maghreb countries. Although it may be extremely difficult or nearly impossible to enhance global competitiveness, in a very short period of time, nonetheless, in the long term, some Arab countries may exploit their comparative advantage and introduce policies that take into account their specificities and identify factors that contribute to a strong productivity performance at a regional level. Experience showed that the factors below are contributing factors to productivity gains:

[2] For the representative sample of German business, the introduction of these measures increased average productivity by 8% in the 1999-2001 periods.

- good transport and telecommunication links
- high-tech clusters that encourage networking
- common vision among regional stakeholders
- a business culture that favours industry-science relations
- government policies that promote the region

As productivity surges, new questions arise about its sources and its consequences. Does a mere investment in ICTs lead to more productivity or the latter is related to a firm's corporate culture, organizational practices and institutional setting? Which corporate culture is more conducive to the realization of productivity gains? These are important theoretical questions to be answered before a comprehensive policy agenda is formulated. Firms in developing countries function in an entirely different business and institutional environment than in developed economies. Ambiguity over property rights, inadequate and/or inexistent or archaic competition and business laws, bureaucracy, corruption and red tape are all factors that influence negatively the adoption of ICTs. Firms in these countries cannot fully reap the benefits of innovations and organizational changes. SMEs and large firms alike and especially multinationals have difficulties in surfing into that environment.

If the relationship between ICTs and productivity were simple, it could have been possible to merely invest in ICTs and leap-frog in productivity and exports. Developing countries, could then easily elaborate growth policies that enhance productivity and economic growth. Brynjolfsson (2005) argues that productivity depends on both ICTs and organizational capital. Indeed, it is argued that the direct cost to a firm adopting an ICT is around 10% to 20% of total ICT cost. The rest encompasses costs associated with the organization of work after ICTs have been introduced to the company. The organization of processes, the strategies to manage risk, and the approaches to integrate knowledge and new ideas are important costs that must be managed by the digital firm appropriately.

It is further argued that ICTs are indeed the technologies that can bring significant enhancements in many aspects of business and social activities. The widespread use of ICTs has significantly simplified the supply chain management (SCM) of most businesses, has allowed firms to get a better insight of customers and develop better customer relations management (CRM) strategies, has permitted firms to offer customized goods and services and has transformed the production chain from mass production to mass customization. This has opened up new business opportunities and created possibilities for containment of costs and increase in business performance. Firms able to take advantage of productivity enhancements by adopting early and efficiently the ICTs have gotten a leg up on the competition. For sure, the first-mover advantage is not always a better strategy especially when the new technologies are changing constantly and become ever cheaper to use and more user-friendly. As technology matures, it is increasingly argued by many that the ICTs have become just another commodity and as such it is necessary for a firm to possess them as an input to compete but its mere possession is not enough to ensure a competitive advantage.

Contribution of S&T to productivity in Arab countries

Developing countries, and particularly Arab countries, cannot do without the ICTs. If the latter are indeed just another commodity their mere adoption is insufficient to provide the advantage they expect to have in order to be able to compete locally and internationally.

Despite the widespread recognition that ICTs are increasingly becoming an essential part of a business strategy and competitive advantage, the deployment of ICTs in an organization require investments in venture and human capital. Venture capital is scarce in developing countries and especially in Arab countries, and human capital is even scarcer. The brain-drain that inflicts many developing countries has important repercussions on economic development of less favoured economies. Serious brain-drain is facing Jordan and Egypt. Well-trained ICT professionals once got the working experience in their home country seek better paid work in the Gulf region.

Human and venture capital and a sound science and technology (S&T) policy are essential for economic development. Many East Asian countries were at the same level of development as they are many Arab countries now. But East Asian countries adopted, in a short period of time, a number of policies that permitted their development at an astonishingly fast rate. As a matter of fact, they adopted the following principles and practices:

- Adoption of economic development programs with special emphasis on science and technology and the creation of national champions.
- Adoption of strategies and policies aiming at both developing a qualified base of scientists and at building the necessary human and capital infrastructure necessary for economic development
- Creation of a mentality for collaboration between industry, academia and research and development institutes and centres with particular emphasis on finding practical solutions of specific technological problems.
- Adoption of policies aiming at promoting R&D programs through grants and subsidies and the participation of the private sector.
- Adoption of policies and programs to enhance the development of small and medium-sized firms.

The best example of the adoption of these policies is South Korea. In the 1960s, Korea was spending 2/10^{ths} of 1% of its GDP on S&T, approximately the same amount spend today by Middle-East countries. Nowadays, Korea spends around 2.6% of GDP on S&T and has a viable and highly competitive high-tech industry. Some Arab countries have recognized the importance of S&T and of the ICTs industry and adopted various policies and approaches. Saudi Arabia, for example, established as early as in 1977 the King Abdulaziz City for Science & Technology (S&T) as the starting point of its R&D policy. Its main objectives were to encourage basic scientific and applied research, coordinate the activities of research centres, and cooperate with the concerned agencies to define the national priorities and policies in the field of science and technology. The city supports a variety of researchers and research projects and sets priorities as to the establishment[3] of research institutes and collaborates with other research institutes and universities.

S&T plays a vital role in a country's economic development, and industry, government and academia share the responsibility for supporting the investment, development, use and commercialisation of its activities. A number of indices are used to measure a country's relative strength in the field of S&T. The number of a country's scientific publications and citations worldwide are two widely used indexes of relative strength. During the period 1997-2001, the USA and the EU15 accounted for 72% and 90% of

[3] The city established the Research Institute of Oil and Petrochemical Industries, and the Institute of Energy Research.

world publications and citations respectively. Only few developing countries had a share in both measures as it is indicated in the table below. Arab countries' relative share is insignificant, by world standards.

Table 1
Relative global strength in S&T, 1997-2001

Country	%share of world publications		%share of world citations		Ranking
USA	34.9	Declining	49.4	Declining	1
EU15	37.1	rising	39.3	Rising	
UK	9.4	Rising	11.4	Rising	2
Germany	8.8	Rising	10.0	Rising	3
Japan	9.3	Rising	8.4	Rising	4
France	6.4	Rising	6.9	Rising	5
Canada	4.6	Declining	5.3	Declining	6
Italy	4.1	Rising	4.4	Rising	7
China	3.2	Rising	1.6	Rising	19
India	2.1	Declining	0.9	Rising	22
South Africa	0.5	-	0.3	Rising	29
Iran	0.13	Rising	0.06	Rising	30
		Rising		Rising	

Source: King, D.A., 2004

Indeed, Arab countries as a whole have some of the lowest levels of research funding in the world, investing a mere 0.4% of GDP in R&D. Most of the funding comes from government sources while the private sector invests less than one percent of total R&D expenditure in the Arab world. Therefore, Arab countries lag behind in technology creation and diffusion[4] of new technologies. Such a performance in the S&T sector may explain why most Arab countries trail behind most benchmarked economies in the ICT sector. Technology transfer through FDI can benefit the Arab countries as the Malaysian experience has shown. But technology transfer without creative contribution from domestic resources will only result in technological dependence. Channelling a larger share of GDP into education producing a better quality workforce with the capacity to learn and adapt the ICTs will enhance the Arab competitiveness.

The ICT and telecommunications market in the Arab countries and in the world

The demand for ICT is affected by a number of macroeconomic factors, such as GDP growth, personal consumption spending, investment spending, government spending, population and employment. The contribution of each factor to ICT demand for the period 1999-03 and 2003-07 is indicated in the table below for each geographic region and in total.

[4] Technology creation is measured by patents granted to residents and diffusion by the share of high- and medium-technology exports in total goods exports).

Table 2
Macroeconomic factors affecting ICT spending

	Americas	Asia-Pacific	EMEA (Europe/Middle East/Africa)	Global total	Americas	Asia-Pacific	EMEA	Global total
	% growth 1999-2003				% growth 2003-2007 (forecast)			
GDP growth	3.8%	2.7%	6.0%	4.3%	5.8%	9.0%	8.4%	7.6%
Personal consumption	4.6	2.2	5.9	4.5	5.4	9.3	8.3	7.3
Investment	1.9	3.1	4.4	3.1	6.7	8.4	9.7	8.3
Government spending	5.5	5.5	7.0	6.1	4.6	8.0	7.8	6.8
Population	1.3	1.2	0.6	1.1	1.2	1.1	0.5	1.0
Employment	1.0	1.1	0.9	1.0	1.9	1.3	0.9	1.3

Source: http://www.witsa.org/digitalplanet/DP2004-Summary.pdf, and author's calculations

The information technology (IT) spending per employee (table 3) varies widely across sectors and countries. Worldwide, the finance industry is the one that spends the most per employee (around $8,000.00 in 2002) while at the other extreme is the construction industry which spends the least (around $100 in 2002). Despite the high rates of spending in some industries, the potential is still enormous and the applications of the IT are increasing at an accelerating rate in almost every sector of the economy.

Table 3
Information technology (IT) spending per employee, worldwide, 2002, $'000

Sector	ICT spending per employee, worldwide, 2002, $'000
Finance	8.00
Utilities	2.75
Communication	1.75
Transport	1.25
Government	1.15
Manufacturing	1.00
Retail/Wholesale	0.49
Health care	0.48
Services	0.25
Education	0.25
Construction	0.10
Resource industries	0.05

Source: IDC, 2004

Table 4 indicates the global ICT spending by market segment and ICT's potential growth as forecast for the period 2003-2007 by World Information Technology and Services Alliance (2004). The expected growth rates of ICT spending over the years 2003-07 indicate that the manufacturing segment is a less intensive user of ICT relative to finance and government.

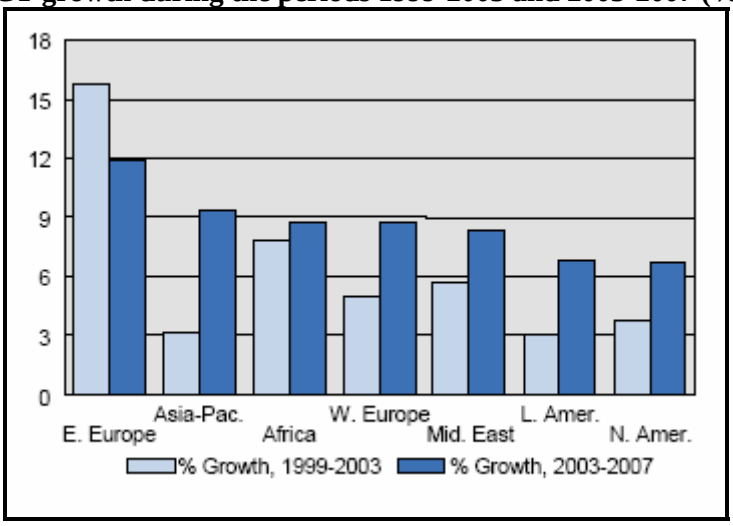
Table 4
ICT spending by Market Segment ($US Billions, Percent Growth)

	Year		
Market segment	**2003**	**% growth 1999-2003**	**% growth 2003-07**
Consumer	21,724	4.5%	7.3%
Manufacturing	18,280	2.6	7.0
Finance, Business	13,046	4.9	8.5
Trade	8,160	3.1	5.6
Government	6,184	6.1	6.8
Transport, Comm.	4,424	4.6	6.9
Services	4,320	4.0	10.2
Construction	4,124	5.4	7.4
Agriculture	1,962	1.0	3.9
Utilities	1,605	5.4	3.8
Mining	1,131	8.4	4.0

Source: http://www.witsa.org/digitalplanet/DP2004-Summary.pdf

Given that the financial sector is relatively less important than the manufacturing in most Arab economies, with the exception of the Arabian Gulf region, the ICT market will necessarily be limited unless Arab countries target export markets. It is important to note, however, that the financial sector and especially the banks in the GCC (Gulf Cooperation Council) countries are quite aggressive in adopting the IT and expanding infrastructure. By the end of 2003, they have spent over $1US billion, which, compared to IT spending of other developing countries, is substantial. Acquiring the latest banking technologies will continue to be a priority for the GCC financial industry and, therefore, demand for IT equipment and services will continue to grow in that region. Additionally, the e-readiness projects of many Arab countries will further boost demand for ICTs. Globally, however, if we compare the spending spree of various regions, it becomes clear that Middle East countries had the third slowest ICT growth rate during the period 1999-2003 and the same performance is expected for the years 2003-2007 (Table 5).

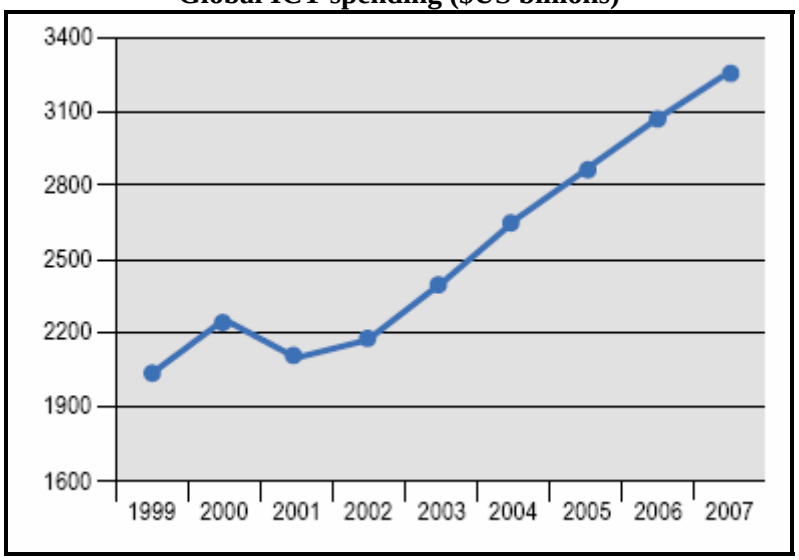
Table 5
ICT growth during the periods 1999-2003 and 2003-2007 (%)



Source: http://www.witsa.org/digitalplanet/DP2004-Summary.pdf

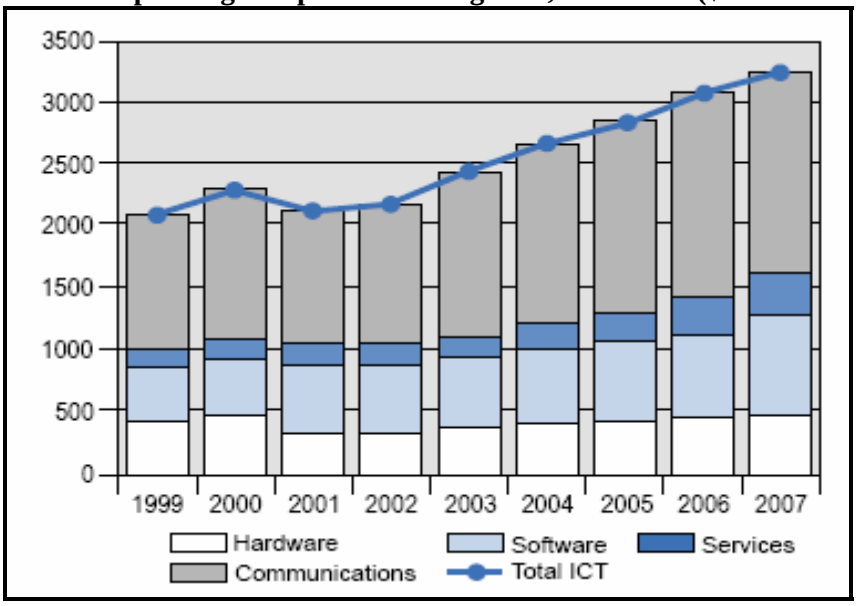
On a global basis, spending on IT is expected to be high given that global economic growth remains robust during the next two years[5], as forecast by WITSA, 2004. The figure below (table 6) shows that ICT spending reached its trough in 2001 with $2.1 trillion U.S. dollars. It is expected to increase to over $3.2 trillion in 2007[6].

Table 6
Global ICT spending ($US billions)



Source: http://www.witsa.org/digitalplanet/DP2004-Summary.pdf

Table 7
Total ICT spending and per market segment, 1999-2007 ($US billions)

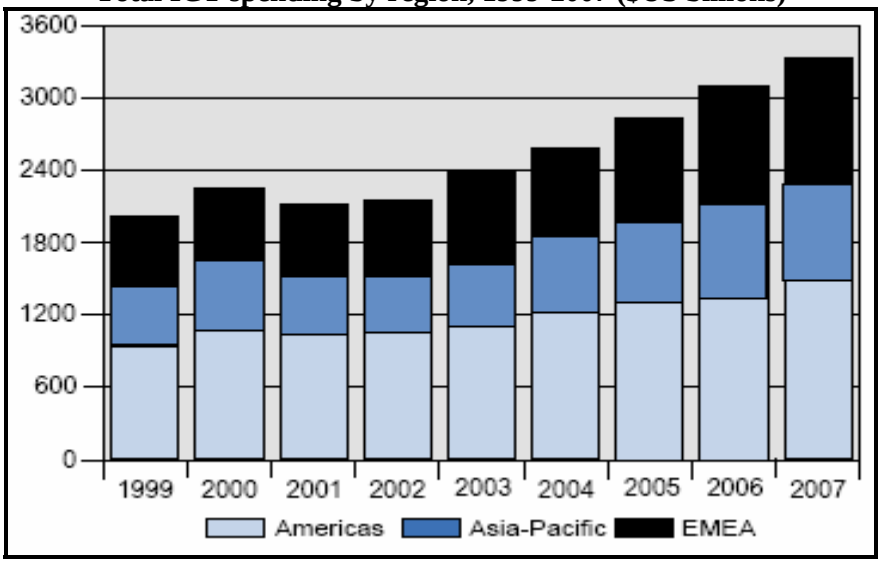


Source: http://www.witsa.org/digitalplanet/DP2004-Summary.pdf

[5] This prediction is based on barring any unexpected shocks that may disrupt the current economic upturn.
[6] There are stark differences across countries and across sectors in the use of IT. For instance, in Britain, 98% of general practitioners use computers in their offices while in the USA, 95% of them still use pen and paper.

Information-intensive industries invest ever increasing sums in ICTs. It is estimated that ICT-intensive industries (software developers, communication firms, financial services, etc) spend approximately 10% of their revenues to IT while the health care industry invests only about 2%.

Table 8
Total ICT spending by region, 1999-2007 ($US billions)



Source: http://www.witsa.org/digitalplanet/DP2004-Summary.pdf

On a regional basis there is unequal spending on ICTs. Traditionally, America was more inclined to ICT industry and spends more than the Asia-Pacific and EMEA countries (table 8).

The Arab ICT market

The ICT market in Arab countries is rather nascent. Arab countries invest a very little percentage of their GDP in ICTs. The average investment level for the Arab world is a mere 4% of GDP compared to 8% in industrialized countries. Insufficient investments in that sector imply that the development of this industry will be slow and this will result in a slow growth of other sectors that depend on ICTs. Nonetheless, some governments in Arab countries have recently shown increasing interest in the industry and have decided to make the necessary reforms in order to develop it and attract foreign capital. Diversification and reduction of their oil dependency is one of the goals of some governments such as the UAE.

The most important ICT markets in the Arab world are the ones of Saudi Arabia, Egypt, UAE and Jordan. Indeed, the Saudi ICT industry is one of the largest and fastest growing markets in the Arab world. The country's government has embarked on a grand scale projects aimed at expanding the ICT infrastructure. Because of the government aggressive plans to increase the use of new technologies and especially of ICTs in a short period of time, demand for software products, computer equipment, IT services and data communications is quite high. For the period 2002-2003, the demand for ICT products and services grew at an average compound rate of 8.3% (table 9). It is worth mentioning that the digitalization of the Saudi Arabia's telecommunications industry (it is presently totally digitalized) contributed to these growth rates.

Table 9
Saudi Arabia's ICT market

	2002 (US$)	2003 (US$) (estimates)	CAGR (compounded average growth rate)
Software products	1,000	1,295	9%
Computer equipment	850	1,041	7
IT services	1,300	1,592	7
Data communications	550	772	12
Total	**3,700**	**4,700**	**8.3**

Source: Madar Research Group, 2004

Another interesting market for which data exist is the one of Jordan. Jordan's ICT industry is mainly regional. It is concentrating its export activities in the neighbouring Arab countries although significant inroads are being realized in the North America market (table 10).

Table 10
Jordanian ICTs exports by region

Region	Exports ($)	Percentage (%)
Other Arab	28,059,000	40%
Gulf	26,098,000	37
The Americas	13,053,000	19
Europe	2,323,000	3
South East Asia	118,000	1
Africa	77,000	0,001
Total	**69,728,000**	**100%**

Source: Information Technology Association, Jordan, 2003 ICT Industry Statistics, 2004

The government of Jordan initiated a blueprint toward an information society and its goals were set out in the REACH initiative. Its vision is to make Jordan a major regional IT leader and an internationally recognized exporter of IT products and services.

Table 11
Domestic and Export revenues for Jordanian ICTs Industry, 2001-2003

Revenues and investment	2001	2002		2003	
	In $	In $	Growth rate	In$	Growth rate
Domestic revenues	130,000,000	188,448,000	45%	226,183,000	20%
Export revenues	40,000,000	40,038,000	0%	69,728,000	74%
Total revenues	**170,000,000**	**228,486,000**	**34%**	**295,910,000**	**30%**
Cumulative investments	60,000,000	68,000,000	13%	79,656,250	17%

Source: Information Technology Association, Jordan, 2003 ICT Industry Statistics, 2004

Based on its strengths and exploiting its human and capital advantages, its ICT industry witnessed an overall growth in revenues in 2003 by more than 30%. Starting from total revenue of approximately $170M in 2001, it reached $228M in 2002 and $296M in 2003. Its sales were chiefly destined to the Arab countries but its export market was the Americas and Europe as well. The major part of its revenues comes from the sale of hardware and technology provision, licensing, software development and communications and internet services. The ICT sector employs 3,550 employees divided among technical, marketing and sales, administrative and management departments.

Table 12 shows the demand for ICT services and equipment and its decomposition in world demand and demand by the most important Arab countries in terms of ICT.

Table 12
ICT spending worldwide and by major Arab countries, in $US (millions, 2003)

	World	Saudi Arabia and the Gulf	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), 2004

As it was mentioned above, compared to the industrialized countries, the ICT industry in Arab countries is currently small. However, it is highly dynamic and innovative, with enormous potential for growth, increasing employment and higher export levels. Its relatively low cost structure, its proximity to vital European and Asian markets and the commitment of many Arab governments to nurture the ICT industry and expand business opportunities, will continue to contribute to the rapid development of the ICT industry in this region. A high percentage of Arab ICT companies export regionally and internationally.

The state of the networked economy of Arab and benchmarked countries

Despite the erosion of the overall competitive position of some Arab countries, the Arab competitiveness as a whole has increased recently. The success of this group of countries is greatly attributed to its willingness to proceed with regulatory and institutional reforms in major sectors of the economy such as telecommunications, electricity, transport and financial markets. Simultaneously, they developed ICTs policies to reap the advantages offered by the new technologies and the internet. Policy makers in the region want to further exploit the new possibilities and to integrate the Arab countries into the networked economy. The Arab countries start, however, from low levels of knowledge of the new economy and their economic and financial means may not suffice to invest in ICT infrastructure and take advantage of the *Information Age*. Basically, the Arab countries tend not to have the same infrastructural facilities and support as the industrialized countries, which are the prerequisites for being able to reap the benefits of new technologies.

Even so, there are good examples of countries which managed to get into the information age with levels of development almost equal to the current one of the Arab region. For instance, a group of countries, such as Chile, South Africa, Malaysia and Korea were, not long time ago, close to many Arab countries in terms of economic development. Regulatory and institutional reforms across the border and other sound macroeconomic and sectoral policies have profoundly transformed their economic landscape and led them to higher levels of economic prosperity and well-being, in a relatively short period of time. These are good examples of best

practices in developing policies that managed to convert these countries in knowledge-based economies with an enviable level of development. To understand what happened and how these countries managed to increase their well-being, is imperative to analyse, compare and evaluate their policies and their results. This will provide guidance to the leaders of Arab countries in formulating and adapting their own ICT policies accordingly. To get a better perspective, it is interesting to make a comparative study of each country's development with respect to its ICT and telecommunications industries.

Technological changes, regulatory reforms and investments in information and communication technologies (ICT) in Arab countries have contributed to the modernization of their telecommunications network and created a business environment suitable for sustained economic growth. Table 13 shows the Arab and benchmark countries' mobile teledensity for the year 2004 and the actual and forecast number of users for the years 2006 and 2010. By any means, Gulf countries dominate the scene. Table 14 shows the number of internet users and host countries in the Arab region and for the benchmark countries. The latter dominate by far the Arab countries. Nonetheless, the countries of the Gulf region and especially the UAE are surpassing Chile and they are very close to Malaysia and Portugal. This is quite impressive, indicating that the policies adopted by the country are bearing fruits and its citizens become technology savvy and more knowledgeable.

Table 13
Mobile users and teledensity in Arab and benchmark countries, 2004-2010

Country	Mobile users, 2004 (millions)	Mobile users, 2006 forecast (millions)	Mobile users, 2010 forecast (millions)	Teledensity, %, 2004
Algeria	1,45	1.6	4,5	4.51
Bahrain	443.1	0,6	0,6	65.35
Egypt	8,5	10.1	17,6	11.28
Iraq	20.1	0,9	3,8	0.79
Jordan	1,3	1,6	2,0	23.61
Kuwait	1,4	1,7	2,0	62.89
Lebanon	775.1	2,0	2,6	20.52
Libya	100.2	0,2	0,4	1.78
Mauritania	300.1	0,3	0,4	9.72
Morocco	7,3	9,6	11,7	22.76
Oman	464.9	0,8	1,0	16.02
Qatar	376.5	0,5	0,5	44.81
Saudi Arabia	7,2	5,6	6,7	28.09
Syria	400.3	0,8	1,6	2.22
Tunisia	1,9	1,0	1,6	19.04
UAE	2,1	2,3	2,5	83.2
Yemen	411.1	1,0	1,4	2.05
Benchmark countries				
Chile	6,5	10,0	11,2	40.74
Korea	33,5	41,3	42,6	69.37
Malaysia	11,1	14,2	16,8	47.29
Portugal	9,3	8,6	8,6	88.42
South Africa	16,8	14,2	15,2	38.04

Sources: World Development Indicators 2004, CIA Fact Book, 2005, UMTS Forum Report, 2004, author's calculations

Table 14
Internet users and hosts in Arab and benchmark countries, 2004

Country	Internet users, 2004(millions)	Internet hosts, 2004 (thousands)	Internet-user density, 2004 (%)
Algeria	500,000	897	1.5
Bahrain	195,700	1,334	27.7
Egypt	4.2	3,401	4.3
Iraq	25,000	NA	0.1
Jordan	457,000	3,160	7.9
Kuwait	567,000	3,437	22.4
Lebanon	400,000	6,998	11.2
Libya	160,000	67	2.7
Mauritania	300.1	25	0.4
Morocco	800,00	3,627	3.2
Oman	180,000	726	7.5
Qatar	376.5	221	18.3
Saudi Arabia	1.5	15,931	6.9
Syria	220,000	0,8	3.3
Tunisia	630,000	281	6.2
UAE	1,110,200	56,283	29.6
Yemen	100,000	138	0.5
Benchmark countries			
Chile	3.575 (million)	202,429	25.8
Korea	29.22 (million)	694,206	63.3
Malaysia	8.692 (million)	107,971	35.9
Portugal	3.6 (million)	346,078	34.4
South Africa	3.1 (million)	288,633	7.3

Sources: World Development Indicators 2004, CIA Fact Book, 2005, UMTS Forum Report, 2004, author's calculations

Table 15 shows some economic, demographic and social characteristics of Arab countries and compares them to the benchmarked countries. The Arab countries in MENA region are relatively poorer than the ones in the Gulf region. The disparities are quite evident in all categories and indices used. Nonetheless, even within the MENA group there are still a lot of differences especially at the level of development and openness of the economy. Some MENA countries have a competitive advantage over other countries in the region especially in the area of ICT and telecommunications in particular. Jordan, Tunisia and Morocco compare quite well to other Middle-East countries. Although their literacy rates differ substantially among them, their investments in ICT have been increasing, chiefly because of sound regulatory reforms and strong institutions in the telecommunications and ICT sectors.

Table 15
Demographic, Literacy, and Wealth Indicators for Arab and benchmark countries (2004)

Country	Population (millions)	Population growth rate (%)	Literacy Rate (%)	Gross fixed investment % of GDP	GDP PPP US$ per capita	GDP – real growth rate (%)
Algeria	32,129	1.22	70.00	1.613	26.2	6.1
Bahrain	677,886	1.51	89.16	11,518	12.8	5.6
Egypt	76,117	1.78	57.7	1,424	15.8	4.5
Iraq	25,375	2.7	40.4	NA	3,500	52.3
Jordan	5,611	2.56	91,3	11.6	4,500	5.1
Kuwait	2,258	3.44	83.5	8.0	21,300	6.8
Lebanon	3,777	1.32	87.4	26.0	5,000	4
Libya	5,632	2.33	82.6	9.9	6,700	4.9
Mauritania	3,086	2.9	41.7	583,28	1,800	3
Morocco	32,209	1.57	51.7	22.4	4,200	4.4
Oman	2,903	3.32	75.8	13.5	13,100	1.2
Qatar	840,290	2.61	82.5	22.9	23,200	8.7
Saudi Arabia	25,796	2.31	78.8	17.2	12,000	5
Syria	18,017	2.34	76.9	16.3	3,400	2.3
Tunisia	9,975	0.99	74.2	24.5	7,100	5.1
UAE	2,524	1.54	77.9	20.8	25,200	5.7
Yemen	20,025	3.45	50.2	16.1	800	1.9
Benchmark countries						
Chile	15,824	0.97	96.2	23.9	10,700	5.8
Korea	48,426	0.38	97.9	28.7	19,200	4.6
Malaysia	23,522	1.8	88.7	21.7	9,700	7.1
Portugal	10,566	0.39	93.3	22.3	17,900	1.1
South Africa	44,344	-0.31			11,100	3.5

Sources: World Development Indicators 2004, CIA Fact Book, 2005, author's calculations

Table 16 shows the differences between the Arab countries (taken as a group) and some industrialized economies with respect to a number of key IT variables. The numbers show that despite the increase in ICT spending worldwide, most MENA countries still spend very little compared to the more advanced economies of the U.S., U.K., Germany, and Japan. Furthermore, demand in Arab countries for ICT and services are very low compared to other economies. Factors such as low literacy rates, low GDP per capita, and high prices for internet services may explain the differences.

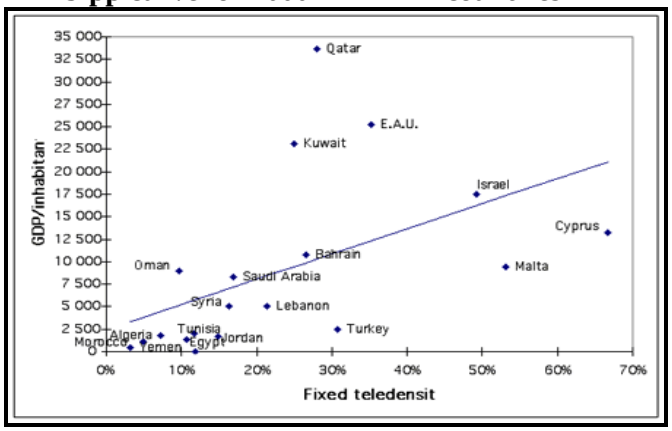
Table 16
ICT spending and IT variables in selected Arab countries compared to USA, Japan, UK, Germany and world total, 2001

	Telecommunications	Total IT spending	**Total ICT spending**	ICT/GDP (%)	**IT variables (PCs installed)**
USA	265,954	546,681	**812,635**	7.9	**227,135,001**
UK	46,370	91,356	**137,726**	9.7	**20,931,785**
Germany	56,385	98,260	**154,645**	7.9	**27,367,298**
Japan	225,761	188,012	**413,772**	9.6	**49,239,412**
Gulf States & Saudi Arabia	3,276	2,918	**6,194**	3.6	**904,831**
Egypt	1,337	1,046	**2,383**	2.5	**651,084**
World total	1,037,877	1,377,221	**2,415,098**	7.6	**541,177,209**

Source: Gentzoglanis, A., 2002

Figure 2 relates GDP per capita, an index of economic growth, to fixed teledensity for the Arab countries. It is an attempt to examine the link between the two variables. The graph indicates that, indeed, MENA countries are in line with the Jipp[7] theory. The Jipp curve (ENCIP, 2002) linearly correlates the teledensity ratio and a country's GDP. It shows how well a country performs in terms of telecommunications equipment compared to other countries with similar GDP per capita. Countries below the curve are over-equipped while the ones above the curve are under-equipped. As far as the fixed lines density is concerned, the countries such as Algeria, Lebanon, Morocco and Tunisia are under-equipped while Jordan, Syria, Egypt and Turkey are over-equipped. With regard the mobile lines density, countries as Algeria, Tunisia and Syria are under-equipped while Jordan, Morocco and Turkey are over-equipped. Both, Egypt and Lebanon are just rightly equipped.

Figure 2
Jipp curve for 2000 in MENA countries



Source: Bezzina, J., IDATE, 2003

[7] Jipp A. (1963). Wealth of nations and telephone density. Telecommunication Journal, No.6, 199-201.

MENA countries have a tremendous potential in growth in the ICT in general and in telecommunications industry in particular. According to IDATE estimates, the number of fixed main lines throughout the MENA region could grow by over 67% during the five coming years. Tables 17 and 18 show the growth of the online population worldwide and compares it to Arab region. Growth is consequently likely to occur in areas with low levels of teledensity. The number of fixed lines in the MENA15 should only increase by around 106.88%, whereas this figure should more than double in the MEDA area (108.71%).

Table 17
Growth of the "online" population worldwide, 2000-02

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

Source: Nua Internet Surveys (2000 and 2002).

Table 18
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 population		Internet Service Providers (ISP)
		With mobile telephones	Using the Internet	
United States	69.77	24.89	53.23	7,800
United Kingdom	58.47	21.79	32.64	245
The Netherlands	57.14	25.54	42.55	52
Japan	47.63	50.39	21.35	73
Average Arab countries	11.81	6.99	3.10	8.31

Source: CIA (2001).[3]

Countries such as Egypt, Morocco, Tunisia, Jordan and the ones in the Gulf region have gone through an important number of macroeconomic and microeconomic reforms and the latter have already contributed to increase their economic performance. These countries are relatively well positioned in the region. Nonetheless, other countries in the world managed (Korea, Malaysia) to reform their telecommunications and ICT industries faster than the Arab countries with great success threatening thereby their emerging regional competitive advantage.

The main policy instruments for policy makers can be grouped into five categories:

- Blueprint and clear policy objectives for the economy and the sector
- Regulatory and institutional reforms of the ICT and telecommunications sectors
- Commitment on policy objectives and realization of the targets
- Revamp of the financial markets and FDI rules
- Tariff level and design to accelerate the fulfillment of the objectives

These instruments are interrelated through their impact on the industry and the economy, and they can be used simultaneously to create an enabling environment for investment and growth in the Arab region.

FDI in the ICT and telecommunication sectors in Arab countries

It has been established in economic theory that foreign direct investment (FDI) favours growth and prosperity. A country's capacity to attract FDI is a definite advantage and many developing countries have recently recognized it and adopted policies to promote FDI. Costa Rica, Chile and Argentina in Latin America, China, Korea and India in Asia and Poland, Hungary and Czech Republic in Central Europe are notable examples. For instance, Bangalore, the city at the heart of India's booming information-technology industry attracts most of the country's FDI and has become the hub of the great Indian boom in software and remote services, such as call-centres (known as "business process outsourcing", or BPO). Mumbai has also become a service city and 60% of its recent economic growth is attributed to the city's transformation into a service economy.

Costa Rica's recent economic growth is attributed to the adoption of ICTs. The installation of computer laboratories in every rural and urban public school, the introduction of smart cards and their use in many sectors of the economy (health, transportation, public administration, etc.), the development of multipurpose/multimedia mobile units transportable to any rural community providing Internet and e-mail services, training in ICTs and medical services, are some examples of the early adoption and contribution of ICTs to the economy's increase in exports and economic growth. Costa Rica has been the fastest growing economy in the region and the most diversified one. Its conversion from the old to the new economy has been possible thanks to a stable political system and a population with skills and capacity to adjust to the new economic conditions since it is a country with literacy rate of above 98%.

Concentration of FDI in the Arab world

FDI contributes, among other things, to the flow of information and the use of ICTs, but the Arab countries receive less FDI relative to other regions. In fact, the Arab countries receive about twenty times lower inflows of FDI compared with the Latin America and the Caribbean and about thirty two times lower than the Asia-Pacific region. Among the Arab countries, Saudi Arabia, Jordan and Egypt had in 2001 the lion’s share of FDI stock in the region. In fact FDI stock in Arab world is mainly concentrated in five countries: Saudi Arabia, Egypt, Tunisia, Bahrain, Jordan and Morocco. These are the countries with a relative economic and political stability and an advanced level of structural reforms. Indeed, during the 1990s almost all Arab countries passed new investment legislation and revamped their capital markets regulations and restrictions limiting foreign ownership.

Although the introduction of new legislation aimed at creating an enabling environment for domestic and foreign firms, the degree of reforms and the investment incentives offered vary significantly from country to country. For instance, as far as capital markets legislation and regulation are concerned, the Arab countries in North Africa outpaced the rest of the Arab world, particularly with regard to provisions for new financial instruments such as venture capital and private equity funds. The creation of new institutions aim at facilitating and encouraging the creation of more competitive businesses, deepening financial markets and attract higher levels of FDI.

Table 19
Concentration of FDI Stock in Arab Countries
(percentage of total stock in Arab world)

Country Saudi Arabia	Year 2001
Egypt	34%
Tunisia	22%
Bahrain	14%
Morocco	7%
UAE	7%
Oman	3%
Qatar	3%
Jordan	2%
Algeria	2%
Syria	2%
Lebanon	1%
Yemen	1%
Kuwait	1%
Mauritania	0%
Libya	N.A.

Source: UNCTAD, 2001

Furthermore, the privatization programmes have had as an effect to increase the FDI inflow to the countries with more advanced levels of reforms. In the early 2000s, Morocco has received the lion's share of FDI when it decided to partially privatize its national telecommunications carrier, Maroc Telecom, while the privatization of the Telecommunications Corporation of Jordan accounted for 28% of existing FDI stock in the country. The privatization policy is an attractive strategy to lure foreign direct investment and increase the capital inflow in the region. A priori, the higher the openness of the market the higher is the penetration ratio of FDI. And the price tag of a privatized telecommunications firm that is granted monopoly rights is higher than the one that operates under competitive conditions. Further, investors are willing to pay more for telecom firms in countries where the regulatory reforms take place *before* privatization. The establishment of a credible regulatory authority before privatization is also contributing to higher investments in the telecommunications industry and penetration ratios. Morocco, for instance got a quite substantial price from the privatization of its Telecom monopoly firm because it had just applied these basic principles (Gentzoglanis, A., 2002, 2003, 2004). Mauritania, on the other hand, failed in its efforts to privatize its industry on several occasions because privatization, inter alia, preceded the regulatory reforms (Gentzoglanis, A., 2003).

At present, plans to liberalize the telecommunications industry are in advanced stages in many Arab countries. Three North Africa Arab countries (Algeria, Tunisia and Morocco) have liberalized their telecommunications industry while Egypt and the GCC countries have their International Long Distance (ILD) communications markets under monopoly (de facto or de jure). Bahrain and Jordan liberalized their Telecom market in 2004 and they expect to grant fixed-line licenses during 2005. Egypt, also, is expected to liberalize its fixed market in 2006 and Saudi Arabia’s two new data licensees both have international gateway rights. The liberalization of the telecommunications industry will make entry easier and as new operators set up this will lead to more bandwidth requirements. Demand for international service will increase as international service rates will go down as a result of tariff rebalancing. High demand, especially with the increased uptake of high speed broadband Internet, will push operators onto obtaining greater international bandwidths from global operators such as FLAG and SEA-ME-WE. Table 20 shows the competitive conditions in the telecommunications industry in selected Arab countries and the average rate for a three minute call. Competition seems to result in an increase in local rates (rate rebalancing

effect). Table 21 shows the level of openness in the telecommunications industry in Arab countries and compares it to the benchmark countries.

Table 20
The status of the International Long Distance (ILD) telecommunications markets and average cost per call in Arab countries

Country	Status of the International Long Distance (ILD) telecommunications markets	Average tariff of a local telephone call (US$ per 3 minutes)		
		2001	2002	2003
Algeria	C (competition)	0.02	0.02	0.04
Morocco	C	0.08	0.08	0.09
Tunisia	C	0.08	0.15	0.17
UAE	M (monopoly)	NA	NA	NA
Bahrain	M	0.05	0.05	0.05
Jordan	M	0.04	0.04	0.05
Egypt	M	0.01	0.02	0.02
Benchmark countries				
Portugal	O (oligopoly)	0.11	0.11	0.13
Korea	O	0.03	0.03	0.03
Chile	C	0.10	0.10	0.10
South Africa	C	0.07	0.09	0.15
Malaysia	C	0.02	0.03	0.02

Source: http://www.econstats.com/wb/Cnt106.htm and author's calculations

The benchmark group of countries shows more similarities in their level of reforms than the Arab countries. Portugal and Korea have a fair degree of openness of their telecommunications market while Chile, South Africa and Malaysia have a completely open telecommunications industry.

Table 21
The level of structural reforms of the telecommunications market in MENA and benchmarked countries[8]

Country	Very Low (0-3)	Low (3-5.5)	Fair (5.5-7.5)	Quite high (7.5-10)
Syria	1998-2001	2001	2004	
Saudi Arabia	x			
Qatar	x			
Oman	x			
Libya	x			
Iran	x			
Mauritania		x		
Kuwait	x			
Yemen	X (1998)	X (2001)		
Tunisia	x	x		
Lebanon	x	x		
Egypt		x		
Bahrain		X (2001)	x	
Algeria	x	x	x	
Jordan		x	x	
Morocco			x	
UAE				
Benchmark countries				
Korea			x	
Malaysia				x
Portugal			x	
Chile				x
South Africa				x

Source: Rossotto et al. (2003) and author's calculations

International competitiveness of Arab countries - measuring the digital divide

The lack of a country's capability to participate in advanced ICTs because of problems associated with connectivity and access to information highways is termed "*digital exclusion*". The difference in the level of deployment of ICTS among countries is termed "*digital divide*". A digital exclusion or even the existence of a digital divide has significant consequences on the prospects of a country's development in the future. Rapid advances in the ICTs have cumulative effects on economic growth and failure to recognize their importance and to deploy them rapidly would damage the competitiveness of the reluctant country.

Erstwhile resource-based economies (Canada, Finland, Sweden, etc.,) managed to grow in the past because of the abundance of these particular resources. In the same vain, some developing countries managed to grow based on their comparative labour advantage, i.e., on cheap industrial labour. Further, the GCC realized high growth rates because of the abundance of oil reserves and sound economic policies. Today the new economy is increasingly based on knowledge and firms base their competitive capacity on

[8] Rossotto et al. (2003) measure market openness in the telecommunications industry by examining the degree of effective competition in the industry, the existence of regulation that favours competition, the degree of independence of the regulatory agency and the openness of the country to FDI.

factors such as mastering new information technologies and using information to their advantage. This increases the efficiency and the effectiveness of business processes, improves the efficiency of distribution channels and reduces the costs of production and marketing and facilitates the access to new and more global markets. Furthermore, it makes easier the access to capital markets facilitating thereby the finance of investment projects. Both consumers and producers benefit because of the availability of more customized products and services and because of their higher quality. Customization is possible thanks to the ICTs, a method that allows the realization of more profits and a better satisfaction to consumers.

E-commerce has become a way of life in some advanced economies, especially in the USA, Europe and parts of Asia but it is still far behind in less developed economies and in Arab countries. Nowadays, in developed economies, it is hard to find new firms to want to get established without implementing the ICTs in their management, production and administrative processes. It is not only because their uses make them more efficient but because customers and especially suppliers demand the use of ICTs. Internet EDI is a fact of life of many traditional and electronic firms. Firms in developing countries not espoused the ICTs would have hard times to get integrated into the global market. The higher the difference in use of ICTs between firms and other organizations in developed and less developed economies, the higher would be the digital divide. Gini coefficients and Lorenz curves are increasingly used to measure the digital divide and the inequality that exists between developed and developing economies. Traditionally, variables such as the number of internet users; PCs, internet host in a country and the number of telephone mainlines and mobile subscribers are used to calculate the Gini coefficients.

Gini coefficients compare cumulative shares of each variable of interest (internet hosts for example) relative to the cumulative share of the world's population. A distribution is more equal the lower the value of Gini coefficient. A value of one means that the distribution is perfectly unequal since one individual gets the whole pie. By contrast, a zero (0) Gini value means perfect equality since a given percentage of the population gets the corresponding percentage of the variable in question. For instance, if 20% of the population gets 20% of the Internet usage, the Gini coefficient is equal to one and we have a perfect equality. The evolution of the Gini coefficients for the period 1995 to 2002 worldwide is given in table 22. The results are striking. Mobile telephony has shown a dramatic shift in inequality with a 26% reduction between 1995 and 2002, while Internet hosts remains stubbornly unequal during the same period. As far as the other technologies are concerned, they showed a small decline in inequality. Taking globally, the digital divide persists and apart from the use of mobiles, it remains relatively stable over time (table 22).

Table 22
Gini Coefficients 1995-2002 worldwide

	Year				
Variables	**1995**	**1999**	**2000**	**2001**	**2002**
Telephone mainlines	0.688	0.614	0.592	0.567	0.551
Mobile subscribers	0.822	0.735	0.703	0.655	0.609
Internet users	0.871	0.786	0.757	0.735	0.671
Internet hosts	0.910	0.913	0.916	0.915	0.913
PCs	0.791	0.764	0.754	0.747	0.730

Source: The Digital Divide: ICT Development Indices 2004, Geneva, December 2004, UNCTAD

The picture is a bit different if the assessment is done at a regional, i.e., Arab level. BAH analysed the Arab ICT sector and the results show a difference between the GCC nations and the North Africa Arab countries. Exaggerating slightly, it can be said that there is a digital divide between the two groups of countries (table 23).

Table 23
Assessment of the ICT Sector in some Arab Countries

	Environment				**Readiness**				**Uptake/Usage**			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Bahrain			x				x			x		
Jordan		x					x			x		
Egypt		x				x			x			
Lebanon		x					x			x		
Saudi Arabia		x					x			x		
Syria	x				x				x			
UAE			x				x				x	
Korea	26				12				8			
Chile	33				34				32			
Portugal	27				37				38			
S. Africa	38				44				35			
Malaysia	29				29				38			

Source: BAH Analysis, 2004

Table 23 ranks the Arab countries and compares them to the reference group of countries. International ranking is given as well for comparison reasons. The Gulf Arab countries are ranked higher than the Arab countries in North Africa. UAE is even close to the highest ranked countries of the reference group, being second only to Korea. The GCC countries have nothing to envy from the benchmarked countries. They occupy a similar position internationally.

Table 24
WEF's ranking of the most networked nations: comparison of Arab and benchmarked Countries (Network readiness index 04-05)

Arab countries	**Ranking among Arab countries**	**World ranking**	**Benchmark countries**	**Ranking among the benchmark countries**	**World ranking**
Qatar	1		Korea	1	20
UAE	2	23	Malaysia	2	26
Bahrain	3	33	Portugal	3	31
Oman	4		South Africa	4	37
Jordan	5	44	Chile	5	35
Tunisia	6	31			
Saudi Arabia	7				
Morocco	8	54			
Egypt	9	57			
Algeria	10	80			
Lebanon	11				
Yemen	12				

Source: http://www.rediff.com/money/2005/mar/09wef1.htm

The World Economic Forum (WEF) publishes annually the Global Information Technology Report (GIR). The Report uses the *'Networked Readiness Index' (NRI)* the degree of preparation of a nation or community to participate in and benefit from ICT developments". The NRI is composed of three

component indexes which assess the e*nvironment* for ICT offered by a given country, the *readiness* of the country's individuals, business and governments and the *usage* of ICT among the country's major stakeholders. The 2004-2005 Report covers a total of 104 countries, among them, the UAE and Qatar.

ITU's digital access index (DAI)[9] is more comprehensive and it takes into account affordability and education to construct its index. It classifies the countries in four digital access categories: high, upper, medium and low. This index has the advantage in lumping together countries with similar average scores. For the year 2002, none of the countries examined here could be categorized in the high digital access. Again the GCC (UAE, Bahrain, Qatar and Kuwait) were in the upper category the same as Portugal and Chile from the referenced group countries. The Arab countries from North Africa (Lebanon, Jordan, Libya, Egypt and Morocco) and Oman and Saudi Arabia from GCC were classified as medium digital access countries. Lastly, Syria and Yemen are classified in the low digital access category (table 25).

Table 25
ITU's ranking of the most digitilized nations:
comparison of Arab and benchmarked Countries (2004)

Arab countries	High access*	Upper access	Medium access	Low access
UAE		0.64		
Bahrain		0.60		
Qatar		0.55		
Kuwait		0.51		
Lebanon			0.48	
Jordan			0.45	
Saudi Arabia			0.44	
Oman			0.43	
Libya			0.42	
Egypt			0.40	
Morocco			0.33	
Syria				0.28
Yemen				0.18
Benchmark countries				
Korea	0.82			
Portugal		0.65		
Chile		0.58		
Malaysia		0.57		
South Africa			0.45	

http://www.itu.int/newsarchive/press_releases/2003/30.html
*High: 1-0.70; upper: 0.69-0.50; medium: 0.49-0.30 and low: 0.29-0.

It is interesting to note that, since the year 2000, almost all selected Arab countries have realized gains in terms of ICT readiness. Nonetheless, differences do exist among themselves and it seems that they will continue to exist because of the difference in policies pursued by each government. Thus, some Arab countries lag far behind the others while some others leapfrog into the future by realizing significant gains in short period of time. UAE for instance, is the most advanced in the region with an overall rating

[9] The digital access index (DAI) consists of eight variables grouped into five categories (availability of infrastructure, affordability of access, educational level, quality of ICT services, and internet usage). An indicator is constructed by using each variable. The overall DAI is obtained as a weighted average of each indicator.

of three (3) in all of the three dimensions of ICT industry (23). A common characteristic of all of the Arab countries (with the exception of UAE and Lebanon) is that in terms of usage they are still in their infancy. A number of factors may explain the slowness in the use of ICTs. Apart from the low literacy rate in the region and the fact that most of the content is in English, the price to access the ICTs is quite high, despite the progress realized lately.

Indeed, telecom services prices, PC prices and internet dial-up rates are quite high for most Arab countries making access to and use of ICTs a luxury good. It goes without saying that privatization, deregulation and the entrance of mobile operators in the region has changed the telecommunications landscape with interesting results. Telephone penetration has increased in these countries dramatically while these changes gave an impetus to the ICT markets. Nonetheless, the telecommunications markets remain quite concentrated, despite the reforms, and service charges have not been reduced sufficiently. The governments should play a more proactive role in favouring more competitive markets which will result in a better quality service and at lower prices.

Developing countries in general and Arab countries in particular have a great opportunity and potential to actively participate and compete in the new globalized market, should they invest and develop the necessary know-how in ICTs. The question is not whether they should respond to the challenges of ICTs but how to respond and what are the best means to actively participate and reap the benefits of ICTs. Best practices (Korea, Costa Rica, India, South Africa, etc.,) adopted by developing and in transition economies have shown that the early adoption of ICTs have had positive consequences on many aspects of economic, social and political aspects. The pervasiveness of ICTs is not limited to the traditional means of communication such as radio, television, telephone and the computers but it covers every aspect of life, health and disease prevention, environment, traffic congestion reduction, safety, education, work (teleworking), government, etc.

Despite the positive economic contribution of ICTs, many developing and Arab countries are remarkably very slow to use it and adopt it in government and business. The current figures of ICT growth reflect activity by 5% of the world's population. This is particularly striking since the figures show that even for basic services such as telephone and electricity, 70% of the world population has never used a telephone while more than two billion people lack the basic service of electricity. To be effective and capable to use the ICTs a country must have an efficient telecommunications environment and a population with the necessary skills (education, literacy, technical, legislative, etc.) and knowledge. Most Arab countries have a large percentage of young but most of them are unskilled workers. By western standards, women in most Arab countries are marginalized (women constitute 28 percent of the total labour force in the MENA region, the lowest level of female labour force participation in the world) and their contribution to the economic system is negligible. Literacy rates are relatively low despite the recent progress in many Arab countries lately.

Policies to promote ICT development in Arab countries

The recognition of the importance of ICTs for development and economic prosperity has sparked a number of initiatives among developed and developing economies to develop and implement policies that promote the diffusion and use of ICTs and encourage the even access to ICTs in urban and rural geographic regions. More precisely, these policies aim at addressing the issues that arise from the impact ICTs have on business, society, labour force, technology and international cooperation. Thus, the ICT policies recognize that coordinated multi-level (government, private sector) initiatives are necessary to address the issues arising from the ever widespread use of ICTS around the world. The policies must be articulated around the following main themes: network infrastructure; technology development and

diffusion; development of skills, training and education programmes; and development of cooperation initiatives among international partners.

In the past decade or so, many countries made tremendous technological advances and are positioned to become more competitive in technology development because of their investments in R&D, in science and technology and human capital and ICTs infrastructure. Their success in the marketplace may depend on a number of additional factors such as political stability, access to financial capital and an adequate infrastructure capable in supporting technological and economic advancement. A number of leading indicators have been constructed in assessing the potential of a country to become an important exporter in high technology products and services. These indices are classified in four categories and include the indices of national orientation, socioeconomic infrastructure, technological infrastructure and productive capacity.

Table 26
Indices for assessing a country's potential to become an exporter in ICTs

Index	Description
National orientation	Explicit or implicit national strategies involving collaboration between the public and private sectors
Socioeconomic infrastructure	The existence or not of social and economic institutions supporting and developing the economic, social, physical and organizational resources essential to a modern, technology-based industrial economy. Dynamic capital markets, continuous capital formation, increasing levels of FDI (foreign direct investment) and investments in education are some of the indicators of socioeconomic infrastructure.
Technological infrastructure	Government institutions that contribute to a country's capacity to develop, produce, and market new technologies. Indicators include the existence of legislation that protects intellectual property rights, competency in high-technology manufacturing, and the ability to produce qualified scientists and engineers.
Productive capacity	Physical and human resources allocated to the production of manufacturing products and the efficiency with which those resources are used. Indicators include the quality and productivity of the labour force, the existence of skilled labour, and innovative management practices as well as the current level of high-technology production.

The major industrialized countries recognized earlier the importance of ICTs than developing countries and devoted resources in converting their economies to high-technology industries. The latter grew at an inflation-adjusted rate of almost 6.5% during the period 1980-2002, while the other manufactured goods industry grew at 2.4%. The latest data through 2002 show output in high-technology industries to grow faster than output in other manufacturing industries. As late as 2001, high-technology manufacturers accounted for 21% of the USA's total manufacturing output. The corresponding figures were 17% for the U.K., 16.2% in France, 15.8% in Japan, and 9.3% in Germany. The share of high-technology industries in the world markets was 32% in 2001 for the USA alone. This indicates that the world ICTs market is dominated by the USA and it is shared by some well-known European industrialized economies. Nonetheless, developing Arab countries can exploit some niche markets and compete with industrialized nations in the ICTs sector.

For instance, Taiwan and South Korea transformed their economies over the years and committed to increasing the resources used in the ICTs sector. Thus, in the 1980, high-technology manufactures accounted for a mere 8.2% of Taiwan's total manufacturing output and by 2001 this proportion reached an

astonishing 29.2%. As far as Korea is concerned, the corresponding figures were 6.1% in 1980 and 31% in 2001. Such stellar performance requires an explicit commitment on behalf of the government to adopt policies that promote the ICTs industry. The Arab countries, with exception of Egypt, Kuwait, UAE, Morocco, and Tunisia and to a lesser extent Saudi Arabia are still debating about which strategy is better to adopt to enhance their performance.

The factors that can explain the performance of major players in the ICTs sector are the economies of scale and the openness of the industrialized economies to foreign competition. Trade exercises pressures on the exporting ICT firms to reduce costs and remain competitive. Economies of scale are realized by serving large domestic and foreign markets. The Arab countries enjoy a large market size which shares some common characteristics such as language and culture which makes trade easier. Although considerable progress has been accomplished during the last decade or so in terms of foreign tariffs and regulations, especially since some Arab countries became members of the World Trade Organization (WTO), still many of them lack the necessary infrastructure to liberalize their foreign trade. The lack of openness is thus a hurdle to the improvement of their competitiveness, especially for Syria and Lybia.

Gaining an enviable position in the global market is not easy but keeping this position is even harder as it is evident from the change of the leading positions among major world rivals. For instance, the USA has become a major supplier of office and computer machinery in the global market since 1997, overtaking long time leader Japan. During the 1980s the EU, led by Germany, was the dominant player, but in the 1990s Japan took over the lead. China and Korea are increasingly getting stronger by overtaking an increasing share of the ICTs market, especially during the 1990s and 2000s. These countries continue to invest in ICTs contributing to innovation and the realization of major productivity gains and production efficiencies. In the USA, for instance, the ICTs industry has spent more than three times the amount that all industries spent on industrial equipment and it exceed combined industry spending on industrial, transportation and all other equipment.

What it takes for successful ICTs

The factors that determine a country's success or failure in ICTs are not quite obvious. Nonetheless, the survey of academic literature and best practices indicate that some common characteristics apply to most of the successful countries and there are ways and economic tools to bring a country to a respectable level of development with respect to ICTs. The UAE, Jordan and to a lesser degree Egypt and Tunisia from the Arab world and Korea and Malaysia from Asia are a case in point. These are:

Business, economic and institutional environment: the countries with successful ICTs industry are not extremely poor (an average of $11,000 GDP per capita) so a minimum level of development seems to be necessary. Yemen and Mauritania for instance could not expect to be become successful in the ICTs industry before they solve the poverty problem[10]. Successful ICTs countries have good basic educational systems, high literacy rates and training capabilities. They operate close to the leading edge in the ICTs use and have communities well connected to the global economy through the use of a developed telecommunications system and by importing/exporting IT products and services. Although it is not necessary to have a large internal market to reap the benefits of economies of scale, a country's openness to foreign trade and the quality of domestic customers create the need for an export ICTs industry (Jordan, for instance).

[10] Ironically, the ICTs are seen as a vehicle for development and reduction of poverty. This is true when a country has already passed a minimum level of poverty and governments could tackle other social problems.

The production of ICTs hardware cannot be done in isolation either. It requires integration into the global production chains of the MNCs which are located in Europe, Asia and the Americas. The production of ICTs software is not geography-bound as it is clear with the Bangalore experience in India, Egypt and Jordan. Efficient telecommunication systems and broadband connections to the Internet are all that is required to get in contact with major customers in the ICTs markets abroad. The English-speaking countries have an advantage over other countries given that English has become a de facto language in the computing world. Nonetheless, there are examples like Costa Rica which is becoming a major supplier of Spanish-language software for Spain and Latin America. The Arab countries have a large market and it is natural that an Arab country takes the lead to become a major supplier of software in Arabic. Egypt seems to become a major player in the region for this segment of the market.

Infrastructure: telecommunications infrastructure is becoming critical in providing a competitive advantage to the countries with ambitions to become leaders or to maintain a position in the ICTs. Indeed, experience demonstrated that the production and use of ICTs requires an advanced telecommunications infrastructure. Countries with successful ICTs industries are world or regional leaders in terms of quality of their telecommunications infrastructure enabling them to get connected to the global business community more productively and to make use of the Internet and e-commerce activities more efficiently. A high quality national information infrastructure (NII) with ease access to the global information infrastructure (GII) is thus essential in getting a competitive advantage over neighbouring countries.

National ICTs policies: technological self-sufficiency policies are doomed to failure as it has been demonstrated by past import-substitution policies adopted during the decades of 70s and 80s by many developing and developed economies. In the past such policies failed even in large economies such as India, China and Russia. Such a policy seems inappropriate for Arab countries with smaller economies. Given that ICTs production and use require sophisticated manpower, Arab countries are in a relative disadvantaged position compared to even small countries such as Hong Kong and Singapore. Arab countries, especially the ones with adequate labour force and low wages, like Egypt and Saudi Arabia, are better served by promoting labour-intensive production activities, such as simple assembly, to produce mature technology products.

Governments play a crucial role in promoting ICTs production and use. In 1981, the government of Singapore has elaborated a national plan for promoting the production and use of ICTs. To attract MNCs to invest in the industry, the Singapore government offered various incentives while it decided to promote the use of ICTs in both the private and public sectors. Without government involvement, it is doubtful whether Singapore would have a success in attracting foreign capital and MNCs, in developing its own ICTs industry, or becoming a regional leader in the use of ICTs. South Africa, Malaysia, etc., have also elaborated national ICT strategies with great success as illustrated in the annexes below. The annexes explain in more detail these policies and evaluate them by comparing the performance of the Arab countries to the one of benchmark countries with respect to the efficiency of the ICTs.

Building on other experiences and adapting successful policies into the Arab context can help Arab countries to strengthen their competitiveness and further exploit the opportunities created by the ICTs production and use. Targeting a regional leadership rather than a global one in the ICT sector is a reasonably manageable strategy that can bring benefits to Arab societies. The UAE experience is a case in point.

Other countries managed to become successful in their own ways with little or none government support for ICTs. Hong Kong, Denmark and New Zealand did well as far as the use of ICTs is concerned but are not significant players in the production of ICTs. Hong Kong failed to develop an indigenous ICTs

industry and as a result it never managed to delve into more advanced ICTs manufacturing and R&D activities.

Thus, the issues of information access become increasingly important as economy becomes more global and society evolves in a way that depends on sophisticated ICTs and global connectivity. Some governments, for political reasons, may control access to the information flows but such a policy may retard their participation in the global information economy and deprive its citizens from reaping the benefits of the new economy.

Summary and conclusions

Arab countries are increasingly concerned about their competitive position in the field of ICTs. Although some of them are performing relatively well, being close or even over passing some developed economies in the installation and use of ICTs, the majority of the Arab world falls far behind the world average and the prospects are not that great unless drastic measures and comprehensive policies are taken to promote the adoption and expansion of the ICTs in all aspects of life.

The experience of some developing and emerging economies with the adoption of ICTs demonstrate unequivocally that bridging the digital divide is a rewarding policy that enables countries to increase their competitiveness and their performance on an international level. Best practices demonstrate that a number of factors may contribute to the rapid ICTs adoption and expansion. For instance, in Costa Rica and in the Republic of South Korea the governments played a crucial role in the deployment and use of ICTs. In Kore and Malaysia, a compromise was achieved among important ICTS stakeholders. The government, consumers and market operators found a way to deal with the issues of implementing ICTs and they managed to agree on a model that would allow competition to foster encouraging investments in ICTs and reduce unemployment. ICT programmes and restructuring policies gave incentives to firms to expand into new markets creating jobs and realizing profits at a level high enough to maintain an impressive level of activity in ICTs but without compromising the benefits to consumers. This type of sharing risks and rewards was a successful strategy for major stakeholders in both countries. In Egypt, a dynamic Ministry has played the catalytic role in the relative success to implement the ICTs all over the country. The cases of Jordan and the UAE are also examples to be followed by others.

Thus unless a country is willing and able to develop a comprehensive ICTs policy and share it with major stakeholders, the self-implementation of ICTs in the economic system has scant chances of success. Dynamic private and public sectors in conjunction with policies to promote skills and create a knowledgeable workforce are a *sin qua non* condition for a country's successful transition from a low income to an above average position in the international competitive arena. Private sector initiatives cannot suffice to accomplish this task. Growth and prosperity in low income countries in general and the Arab countries in particular need a comprehensive policy that encompasses training and economic incentives to increase growth and prosperity. FDI and national investment cannot be attracted by merely announcing a policy to attract investment. Unless regulatory, proprietary, intellectual property, competition policies, and other related policies are enacted and implemented, investments in ICTs will not materialize and deprived countries will lack behind other more dynamic ones compromising thereby the long run viability of the country. Arab countries have a great potential but sustained efforts should be made to bridge the digital divide between them and the rest of the world.

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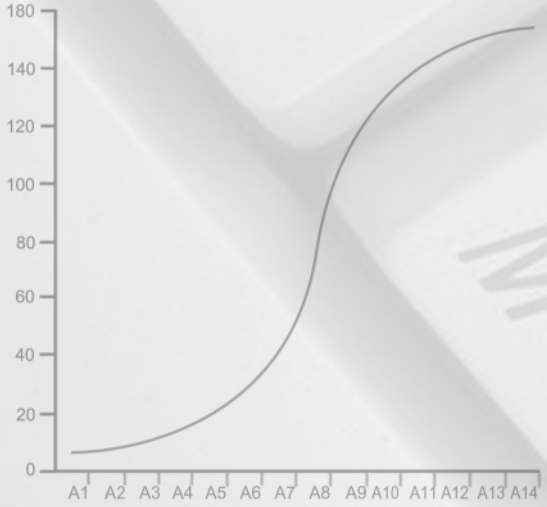

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