

ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

**TOWARDS AN INTEGRATED KNOWLEDGE SOCIETY IN ARAB
COUNTRIES: STRATEGIES AND IMPLEMENTATION MODALITIES**

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This publication has been prepared by Mr. Manuel Rincon, based on his field studies in Lebanon and Yemen, under the supervision of the Chief of the Information and Communication Technology Division, ESCWA, Mr. Omar Bizri, and the team leader for ICT Policies, Mr. Mansour Farah.

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Foreword

This study is aimed at contributing to streamlining the process of building an integrated knowledge society in accordance with the goals of the World Summit on the Information Society (WSIS). It provides a framework and a guide for the design and development of national strategies aimed at the realization and advancement of the knowledge society and knowledge-based economies, and the implementation of such strategies in Arab countries. The need for such a framework was highlighted during the first phase of WSIS, which was held in Geneva from 10 to 12 December 2003.

The recommendations of WSIS included proposals to launch strategies at national and regional levels, focusing on a number of areas, including universal access to information, affordable information and communication technology (ICT) infrastructure and services, and an enabling environment based on clear policies, laws and regulations, as expressed in the global Declaration of Principles and the Plan of Action, which were adopted during the Geneva phase of WSIS.

In this context, two particular groups must be empowered, namely, women and marginalized communities. With this in mind, the development of multilingual, diverse and culturally sensitive content on the Internet, as well as the independence and pluralism of the media were deemed essential. Activities aimed at promoting knowledge sharing while respecting intellectual property rights, thereby encouraging innovation and creativity, were also suggested during the first phase of WSIS.

The outcome of WSIS highlighted two main concerns, namely, financing and partnership, in reducing the digital divide between developing and developed countries. The Task Force on Financial Mechanisms for ICT for Development studied the issue of funding development initiatives and made recommendations. Other recommendations made during WSIS pertained to executing projects aimed at building an inclusive knowledge society in the spirit of partnership, involving all stakeholders, including Governments, the private sector, and non-governmental and international/regional organizations. The specific needs of member countries of the Economic and Social Commission for Western Asia (ESCWA) were highlighted at the Second Regional Preparatory Conference for WSIS, which was held in Damascus from 22 to 23 November 2004. This focused on partnerships for building the Arab knowledge society and led to a Regional Plan of Action based on partnership and regional collaboration.

The second phase of WSIS is scheduled to be held in Tunis from 16 to 18 November 2005 and will focus on the follow-up and implementation of the Geneva Declaration of Principles and Plan of Action by stakeholders at national, regional and international levels (WSIS, 2004a).

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ABBREVIATIONS AND EXPLANATORY NOTES

| | |
|----------|---|
| BCG | Boston Consulting Group |
| BDL | Central Bank or Banque du Liban |
| CR | concentration ratio |
| ESCWA | Economic and Social Commission for Western Asia |
| FDI | foreign direct investment |
| GCC | Gulf Cooperation Council |
| GDP | gross domestic product |
| ICT | Information and communication technology |
| ICTD TTF | ICT for Development Thematic Trust Fund |
| JICA | Japan International Cooperation Agency |
| NIC | National Information Centre |
| OECD | Organization for Economic Cooperation and Development |
| OGERO | Organisme de Gestion et d'Exploitation de l'ex Radio Orient |
| OMSAR | Office of the Minister of State for Administrative Reform |
| PEST | political-economic-social-technological |
| PPP | public private partnership |
| R&D | research and development |
| SeBIL | Secure Electronic Banking Infrastructure in Lebanon |
| SMEs | small and medium-sized enterprises |
| SWOT | strengths-weaknesses-opportunities-threats |
| TRA | Telecommunications Regulatory Authority of Lebanon |
| UNCTAD | United Nations Conference on Trade and Development |
| UNDP | United Nations Development Programme |
| USAID | United States Agency for International Development |
| WSIS | World Summit on the Information Society |

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

A hyphen (-) indicates that the amount is not applicable.

Parentheses () indicate a deficit or decrease, except as otherwise stated.

Executive summary

This study is aimed at providing a framework and guidelines for the design, development and implementation of national strategies towards the realization and development of a knowledge society and a knowledge-based economy in Arab countries. It analyses implementation concerns related to socio-economic initiatives, and builds an agenda for implementation modalities related to the development and sustenance of knowledge economies.

This study was motivated by certain issues raised during the first phase of the World Summit on the Information Society (WSIS), which was held in Geneva from 10 to 12 December 2003, and which highlighted the need for such guidelines; and also in recognition of the fact that an organized knowledge society in Arab countries provides an excellent opportunity for socio-economic development.

With this in mind, chapter I develops a common vision and understanding of the concepts of a knowledge society and a knowledge-based economy. Such a society, particularly in developed countries, is one that is beginning to stress the value of information, communication and knowledge for decision-making and action. The knowledge-based economy refers to the manner in which various high-technology businesses, particularly computer software, telecommunications virtual services, as well as education and research institutions, are able to contribute to the economy of a country as individual entities or by enabling other portions of the economy to function more effectively. This chapter also examines the benefits of a knowledge society and challenges related to its implementation.

A selection of the most powerful strategic tools that can be used to build national strategies and implementation plans are described in chapter II. The process of crafting a strategy towards the knowledge society starts by determining the mission, vision, values, goals and objectives of a strategy, as well as defining roles and responsibilities. This chapter proposes various guiding tools for this process, namely, a strengths-weaknesses-opportunities-threats analysis, a five-forces analysis, a Boston Consulting Group matrix, political-economic-social-technological analysis and the value chain. It also introduces the newest trends in crafting national strategies.

In addition, this chapter introduces the need to include measurement in the process of crafting and implementing strategies towards the knowledge society. It highlights the relationship between ICT and socio-economic growth and reveals the difference between measuring ICT impact at the firm level, and at the aggregated and sectoral levels in terms of ICT impact. Robert Solow's productivity paradox is presented, and the limitations of using macroeconomic measurements are illustrated.

Chapter III explores various aspects related to strategy crafting and implementation in two countries: Lebanon and Yemen. After carrying out interviews with decision makers in these countries, a two-sided model is proposed, with one side depicting the crafting of the strategy for a knowledge society and its main elements, and the other side representing strategy implementation and its main components. This chapter highlights initiatives towards the knowledge society in Lebanon and Yemen, and compares and contrasts the two countries.

Strategies and implementation modalities covering three main concerns, namely, partnership, financing and clusters are reviewed in chapter IV. While it can be difficult to reach a consensus on the content of a strategy, it is much more complex to institute measures that ensure and help to monitor the faithful implementation of that strategy. Indeed, the excellence of strategy does not guarantee that it will actually be implemented. With this in mind, this chapter focuses on modalities that can be adopted to enhance the effective implementation of a strategy.

Chapter V provides guidelines for knowledge society development and offers a number of recommendations to improve the process of crafting and implementing strategies towards the knowledge society in Arab countries. The annex to this study explores the effect of ICT on productivity and growth.

Introduction

From the ninth to the thirteenth century, the Arab world acquired its knowledge from the Greeks and Romans; it lay at the cutting edge of astronomy and mathematics, and helped to establish models of learning for the great European universities and in doing so, helped to give birth to the European Renaissance. The Arab world is capable of making similar advances in the present century, thereby enabling the region to participate in developing global knowledge.

Several economic, political and social reforms towards the knowledge society and knowledge-based economy have been initiated in recent years in most Arab countries. Such changes have not been driven by foreign pressure, but rather by the demands of the people within these countries.

However, efforts to expand and transform these reforms into a long overdue regional rebirth require national endeavours in order to move away from dependency on oil in the Gulf Cooperation Council (GCC) countries, and to alleviate poverty in others. Governments in Arab countries are beginning to understand the urgency of such reforms, and to perceive that crafting and executing strategies towards a knowledge society and a knowledge-based economy is a unique opportunity to make quantum leaps forward.

However, obstacles to progress continue to be an issue. For example, oil-rich Arab States do not necessarily manage their resources equitably and are not channelling enough efforts into pursuing new economic resources and knowledge. Another obstacle is the link between high population growth and limited education. This is related to the fact that in order to create more employment in the region, over 80 million jobs must be created by 2020, which is a growth rate that has not been achieved anywhere or at any time (World Economic Forum, 2004).

Moreover, despite the fact that a number of Governments have begun to adapt their economies to new realities, there is still a low level of readiness for the knowledge revolution in the Arab region. For example, while Jordan and the United Arab Emirates have been reforming regulations and rules, and investing in institutions over the past few years, in general, their knowledge-based economy readiness is lower than the overall level of economic development, as measured by gross domestic product (GDP); still, there is evidence that the knowledge revolution is getting underway in the region.

Indeed, no two Arab nations are alike, and therefore, rather than insisting on a common approach for all, solutions must be tailored to each country. Customized solutions for regional reform necessitate integration and cooperation among all countries, which entails the lowering of trade, labour, service and knowledge barriers, and improving knowledge and competitiveness.

Arab countries require a new form of development to be globally competitive. In times of change and uncertainty, knowledge-based development is capable of directing the growth model towards some of the problems in Arab countries, namely, education, poverty and the restricted rights of women. The knowledge revolution offers a unique opportunity to evolve in a direction that is better suited to the current and future socio-economic needs of Arab countries.

The knowledge society is based on a knowledge ecology, whereby the right environment must be generated to pave the way for participation, capacity building and technology transfer, and to avoid the brain drain phenomenon in a sustainable way. It has been noted that social, rather than financial concerns, are the biggest impediment to progress towards the knowledge society. These can be overcome with the assistance of awareness campaigns to counteract resistance to new ideas, thereby enabling the people of Arab countries to strive to make the necessary changes to enable the realization of a knowledge society.

The knowledge revolution offers benefit in terms of growth, private sector development, employment and a capable young labour force. Building a related strategy entails detecting regional and national strengths, in addition to opportunities and threats, with the aim of building Arab-specific comparative advantages that can reduce the knowledge gap.

A lack of governmental best practices is compelling Government executives to adopt private-sector concepts of knowledge strategy, despite the fact that the two sectors have different characteristics. With this in mind, this study reviews modalities that enable Government executives to adapt private sector theories, concepts and frameworks to enhance their strategic planning and execution capabilities. A better understanding of the strategic management process can potentially have a positive impact on the performance of Government executives.

Arab countries must therefore aim to make progress with regard to the following: (a) financing initiatives towards the knowledge society, by attracting foreign investment and promoting internal investment; (b) designing and developing such initiatives in cooperation with major stakeholders, Governments, the private sector and civil society; and (c) building clusters that will contribute to network-based development.

The Economic and Social Commission for Western Asia (ESCWA) can play a key role in assisting Governments in the region in these endeavours, by providing experience and the required infrastructure to ensure that the right strategies are crafted and the right initiatives are launched.

This study is therefore aimed at doing the following:

(a) Providing a framework and guidelines to enable the development and sustenance of knowledge economies;

(b) Analysing implementation concerns in relation to socio-economic initiatives, with an emphasis on factors related to influence and impact;

(c) Building an agenda for implementation modalities that is related to the development and sustenance of knowledge economies.

I. KNOWLEDGE SOCIETY AND KNOWLEDGE-BASED ECONOMY

A. INTRODUCTION

Knowledge and innovation are becoming important values and are also factors in wealth creation; both offer enterprises and Governments, at the micro and macro levels, new challenges and opportunities. At the macro level, Governments in developed countries and international economic bodies alike, are finding huge value in crafting strategies and frameworks for the emerging knowledge-based economy, which is one in which wealth and income gaps are increasingly being shaped by knowledge and innovation capabilities. For Arab countries, successfully embracing the challenges of a knowledge society and a knowledge-based economy could result in a quantum leap forward; failure, however, could mean sinking further and faster into underdevelopment and poverty.

Two main elements of the communications revolution can be identified as key aspects of any approach to governing that revolution. These elements, namely, socio-political and economic change, provide the basis for understanding the interaction between governance and global communications. The breakdown into these two elements reveals how global communications evolved from being the object and objective of vague policy statements into having a concrete impact on policymaking, strategy crafting and action planning within Arab countries.

This chapter provides definitions of the knowledge society and the knowledge-based economy, differentiating between a knowledge-based economy and other forms of economy. It highlights the benefits of the knowledge society, and examines the main challenges related to the implementation of such a society. It also considers issues that must be integrated into national strategies towards the knowledge society.

B. WHAT IS A KNOWLEDGE SOCIETY?

The concept of a knowledge society is often used to denote a more advanced developmental stage or to refer to a second-generation information society. Whereas an information society aims to make information available and provide the necessary technology, a knowledge society aims to generate knowledge, create a culture of sharing and develop applications that operate mainly via the Internet. The goal of the knowledge society is to fill societal needs, create wealth and enhance quality of life in a sustainable manner.

The term 'information society' emerged during the 1970s as an attempt to describe the revolutionary changes experienced by industrial societies.¹ In the twenty-first century, however, societies in developed countries have begun to stress the value of information, communication and knowledge for decision-making and action. Peter Drucker (1993) describes the new post-capitalist society as a place where capital and natural resources are no longer the only factors of production, but are being complemented by knowledge as resource. Manuel Castells (2000) favours the use of the term 'informational society' to highlight the political and economic repercussions of knowledge-based information generation, processing, transmission and use.

A knowledge society implies that a single resource can promote social cohesion and harmony. It describes the 'second phase of industrialization,' or 'informatization'. The broad nature of information and knowledge societies can lead to somewhat vague and overlapping definitions as to what these terms actually mean. Indeed, the information society specifically, can be understood as something that needs to trigger initiatives now more than ever; it is a phenomenon that focuses both on information infrastructure and on information connectivity within the public realm, both of which have very different impacts on society. In this context, the degree of penetration of related technologies is also highly relevant to the issue of knowledge societies. If these remain confined to an elite, knowledge societies will not flourish.

¹ It is estimated that information and communications technologies (ICTs) began to have a tangible socio-economic impact in Economic and Social Commission for Western Asia (ESCWA) member countries in the mid-1990s, with wide differences among countries.

The Commission of the European Communities (2003) defines the knowledge society as a society that is characterized by a number of interrelated trends, including major advances in diffusing and using information and communications technologies (ICTs), increased emphasis on innovation in the corporate and national context, the development of knowledge-intensive business service economies and knowledge management,² in addition to trends towards globalization and economic restructuring. Such trends have, to date, superseded the traditional ingredients of economic growth, which consist of capital, labour³ and natural resources, which are no longer the only factors affecting national competitiveness.

C. WHAT IS A KNOWLEDGE-BASED ECONOMY?

A knowledge-based economy complements the concept of a knowledge society, and is mainly used in the context of organizations and the private sector. The knowledge-based economy refers to the use of knowledge to produce economic benefits; in other words, an economy in which the generation and exploitation of knowledge has come to play the predominant role in the creation of wealth. A knowledge-based economy refers to the manner in which various high-technology businesses, particularly computer software, telecommunications and virtual services, in addition to educational and research institutions, can contribute to the economy of a country as individual entities, or by enabling other sections of the economy to function more effectively. A knowledge-based economy can be defined as the set of economic activities that involve the application of knowledge in the production process. In this sense, it is possible to define the knowledge society as that which displays the characteristics of a knowledge-based economy.

Knowledge is considered to be a resource that can create wealth and enhance quality of life. It can be defined as information that is used to make better decisions, which lead to rational actions. Knowledge can be in the form of documents, procedures, processes and skills that are directly linked to core needs and problems and that have a critical and beneficial impact.

The Organization for Economic Cooperation and Development (OECD) introduced the term 'knowledge-based economy' in 1996 to define an economy that is directly based on the production, distribution and use of knowledge and information. Furthermore, a knowledge-based economy can be defined as one in which the production, distribution and use of knowledge are the main drivers of growth, wealth creation and employment across all industries (OECD, 1996).

The most highly valued assets in a knowledge-based economy are intellectual assets, which refers to knowledge and experience acquired by workers and stored in networked digital documents and databases. The knowledge and creative genius of product strategists, developers and marketers is key factor in attracting, retaining and increasing the capabilities of knowledge workers and providing an environment for innovation and creativity. The digital age is not just an age of smart machines, but also of humans who combine intelligence, knowledge and creativity through networks to achieve breakthroughs in social development and wealth creation.

In such an economy, the demand for knowledge goods, their monetary value, and the salaries of knowledge workers reflect the societal value placed upon knowledge. Modern knowledge is based on ICT, which supports the knowledge-based economy. It is therefore possible to define an information economy as one that precedes a knowledge-based economy.⁴ By providing the necessary technological foundations, an information economy provides broad access to information while the knowledge-based economy is able to use information to create value and enhance socio-economic quality of life. In terms of economic impact, while access to information is a value in itself, the ability to use that information alters the basis of the economy.

² For a methodology on the implementation of knowledge management in Arab countries, see ESCWA, *Knowledge Management Methodology: An Empirical Approach in Core Sectors in ESCWA Member Countries* (E/ESCWA/ICTD/2003/9).

³ Capital and labour continue to be important in the context of a knowledge society, but are enhanced by information and knowledge.

⁴ These two concepts are often interchangeable in official documents.

According to OECD, the knowledge-based economy phenomenon has certain central characteristics: “strong non-inflationary growth, low unemployment, a rapidly increasing role for ICT ... and continued restructuring of enterprises and markets”. (OECD, 2000) It is highly dependent upon the creation and development of digital networks that transcend territory and geography. However, such digital networks do not appear to have the same impact on all national economies; OECD has noted large divergences among various countries. For example, the main beneficiary of the development of the Internet appears to be the United States of America, where since the 1990s, economic growth has been partially driven by the commercialization of the Internet. It has been noted, however, that the rolling out of digital networks worldwide provides an opportunity for the developing world to participate in global economic relations.

Moreover, the impact of networking on traditional economies has allowed the reorganization of firms; indeed, according to Castells, the basic unit of economic organization can now be described as a network comprising a number of organizations. In addition, ICT can bring about new opportunities for economic growth. New markets, new products and new services are being created bringing with them new sources of revenue. Furthermore, the consequences of a shift towards an e-economy will dramatically change the sociology of communities of all kinds.

There have also been changes in local and global economies as a result of the development of digital networks. This change has affected institutions, leading to changes in policy and changes in the functioning of institutions themselves. Proper governance must ensure that these effects are not negative and that benefits are extracted. In order to achieve this, most Governments decide to be involved as facilitators of the process of moving towards a knowledge society rather than implementers (Halazoun, 2004).

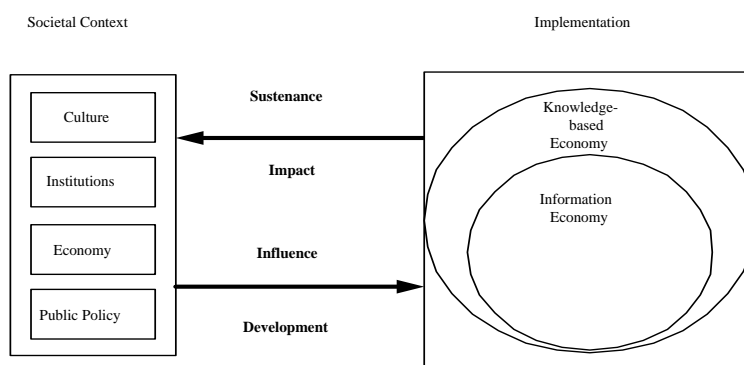
The development of a knowledge-based economy is not, however, based entirely on ICT. The cases of Ireland and Silicon Valley in the United States demonstrate that societal factors contribute significantly to the development and growth of a knowledge-based economy. In these cases, success has been highly dependant on institutional, public policy, and also economic and socio-cultural factors. For this reason, the development and sustenance of a knowledge-based economy through the integration of the aforementioned factors and those related to information, technology and people is essential.

The concept of a knowledge-based economy is fairly new, and it has not yet been possible to document the issue of its development and sustenance. This study develops, therefore, an influence-impact framework to document the influence of societal context, which comprises culture, institutions (infrastructure), economy and public policy, on the development of a knowledge-based economy. An economy, in turn, has an impact on societal context. Therefore, factors related to influence and those related to impact have implications for the development and sustenance of a knowledge-based economy. An adaptation of this framework is presented in figure I.

The factors that make up societal context are interrelated. Given such complexities, developing countries wishing to devise national strategies towards the knowledge society must look all factors as a whole, including those related to influence and impact in terms of socio-economic development, and not just consider isolated factors. For example, human infrastructure, which encompasses labour, educational institutions and employment, is closely related to cultural capacities, attitudes towards education and employment, educational policies, and demand for labour. In fact, in order to be entirely comprehensive, the model in figure I should contain other factors.

The factors in figure I can be addressed through national strategies aimed at making progress towards the knowledge society. Steps towards such a strategy have been taken, for example, in Lebanon, which finalized the “Lebanon information society paper” in 2003. This includes a common vision of the knowledge society in Lebanon, and acknowledges that the most important challenges are an enabling environment, namely, a legal framework and good governance, transparent and non-discriminatory mechanisms, and the adoption of standardization policies. The paper details stakeholders, including funding institutions. The paper contains priority initiatives based on the WSIS Declaration of Principles and Plan of Action, and also includes a list of proposed strategic actions (see chapter III, section B).

Figure I. Development-sustenance model of a knowledge-based economy



Source: Adapted by ESCWA from Eileen. M. Trauth, *Quality Research in IS: Issues and Trends*, (United States, Idea Group Publishing, 2000).

D. BENEFITS OF A KNOWLEDGE SOCIETY

Based on these definitions, the impact of the knowledge society, which is related to the knowledge-based economy, is significant. One of the benefits of the knowledge society is that it affects the way in which everyone lives; it is about much more than just the availability of information. Similarly, the knowledge society does not just have an impact on simple economic activity; it changes basic parameters and creates a knowledge-based economy. The knowledge society also acts as a framework in terms of grouping issues related to policy, strategy crafting and implementation modalities. Moreover, it fundamentally affects the role of the State as a provider to its citizens, acting as a facilitator in this relationship along with the private sector, civil society and other stakeholders. Finally, the knowledge society offers extensive benefits in terms of developing a cohesive and integrated society, and also creating wealth and enhancing quality of life for all.

The benefits of a knowledge society can be achieved in a variety of ways. One is through properly directed innovation. New modes of learning and knowledge are capable of generating prosperity; and a strong science and technology base, as well as a broad research and development capacity can facilitate progress. The capacity to direct research into new products, services and processes, ensuring that these come onto the market swiftly, accelerates an economy. Innovation means coming up with new ideas about how to do things better or faster. It is about creating or offering original products or services, utilizing new ideas and employing a skilled work force that is capable of using those new ideas.

On the basis that an emerging knowledge society and a knowledge-based economy present opportunities for society and the economy as a whole, it is clear that a portion of estimated economic growth in Arab countries in the next few years will be attributed to new and better knowledge.

Another important means of generating the benefits of a knowledge society is through investment in people and skills by promoting the culture of lifelong learning. The acceleration in the rate of change and the rate of learning drives an economy, which becomes a hierarchy of networks in the knowledge-based economy.

A third way of creating the benefits of the knowledge society is by developing communications infrastructures that reach all people, using broadband in more developed countries or narrowband in less developed countries. Better forms of infrastructure can transform economic activity with regard to the private sector and civil society; enable the development of new activities; and provide nations with comparative advantages. Good infrastructure is necessary to ensure economic progress, just as the discovery and use of electric power drove agricultural and industrial production. Economic development in the twenty-first century will primarily be driven by productivity increases as a result of the enhanced application of information and knowledge to economic activity. Ultimately, broadband is the medium through which information and knowledge will be accessed.

In terms of integration and employment, women, in particular, are expected to reap the benefits of a knowledge society (see table 1). Projections for 2010 suggest that the labour force participation rate of women will be 27.6 per cent, up from 21.5 per cent in 1995.

In summary, a knowledge society leads to citizens, who are more creative, gender balanced, adaptable and skilled. Learning and developing new skills and abilities not only leads to economic growth and prosperity, but also supports wider social objectives of inclusion and equality. Investment in people and skills does not only bring benefits to children and young people, but allows the creation of new skills that give rise to new jobs, new technologies and new industries.

Box 1 briefly reviews the strategy towards the knowledge society in Europe, highlighting its goals of social cohesion and sustainable economic growth.

TABLE 1. LABOUR FORCE PARTICIPATION RATES AND ANNUAL RATE OF GROWTH
(Percentage)

| | Men | Women | Both |
|-----------------|-------|-------|------|
| 1995 | 68.7 | 21.5 | 48.0 |
| 2000 | 67.8 | 23.4 | 48.0 |
| 2010-projection | 68.2 | 27.6 | 47.6 |
| 1995-2000 | (0.3) | 1.7 | 0.0 |

Source: ESCWA, *Survey of Social and Economic Developments in the ESCWA Region 2003-2004* (E/ESCWA/EAD/2004/4), p. 48.

Note: Parentheses () indicate a negative figure.

Box 1. Commission of the European Communities: strategy towards the knowledge society

The European Union is making an effort to promote the knowledge society and a number of policies, at all levels, have been launched to ensure the creation of a society that is capable of sustainable economic growth, with more and better jobs, and also increased social cohesion.

“Strategies for jobs in the information society”, a Commission communication of 4 February 2000 analysed the impact of the information society and presented a set of recommendations concerning learning, working, public services and enterprises.

In addition, the eEurope Initiative was launched: this encompasses various objectives and measures to ensure that the European Union will fully benefit from the changes being brought about by the information society. Two action plans, namely, eEurope 2002 and eEurope 2005, identify the priority initiatives in detail and monitor results.

The Lisbon European Council of 23 and 24 March 2000 set itself the strategic goal of becoming by 2010: “the most competitive and dynamic knowledge-based economy in the world”.^{a/} The European Employment Strategy enhances human potential through a broad integrated approach in terms of education, professional qualification, new roles within a changing work environment, and equal gender participation in economic activities.^{b/} The Commission communication that was presented at the Gothenburg European Council in June set the European Union’s strategy for sustainable development.

Source: Commission of the European Communities, *Building the Knowledge Society: Social and Human Capital Interactions* (SEC(2003)652).

a/ Europarl, “Lisbon European Council 23 and 24 March 2000: Presidency conclusions”. Available at: http://www.europarl.eu.int/summits/lis1_en.htm.

b/ Europa, “European employment strategy”. Available at: http://europa.eu.int/comm/employment_social/employment_strategy/index_en.htm.

E. MAIN CHALLENGES IN IMPLEMENTING THE KNOWLEDGE SOCIETY: BUILDING ABSORPTIVE CAPACITY

Given that the knowledge society and, by extension, the knowledge-based economy are not always perfect, this section reviews possible drawbacks, which are independent of geographic location or cultural environment.

In this context, the role of digital networks in helping to promote the knowledge-based digital economy is being contested, and the concept of a new economy is also under debate. Much of this discussion is speculative in nature, as borne out by the title of an OECD report published in 2000, which raises the question in its title: *Is there a new economy?* (OECD, 2000). At the local level, digital networks have two main risks, related to the impact of communications at the community level, and the implications of electronic commerce. At the international level, the risk is in terms of international trade, where the entire system is in the process of being reconfigured.

Another drawback of the knowledge society is related to the impact of the Internet, in that it will not necessarily lead to greater competition but to greater concentration. One of the most prominent aspects of the knowledge-based economy, namely, the development of free markets, is not necessarily having a direct cause-effect relationship in all telecommunications sectors.

Such drawbacks can be best understood by providing some theoretical background. Popular opinion holds that economic development is achieved through industrialization, capital accumulations—both investment market capitalization and savings—and the development of infrastructure. In general therefore, acquiring and applying ICT, information systems and related managerial practices in Arab countries should be a means of boosting development.

This has not necessarily been the case. Arab countries wishing to boost development first had to import all the necessary equipment. After several decades of transferring technology and operational management, however, improvements in the economic and social conditions of Arab countries have not materialized as expected (UNDP, 2002). Bearing this in mind, countries must learn from all experiences and not just from successes to ensure that future initiatives will be more effective and stimulating.

Moreover, it cannot be assumed that ICT applications that are successful in developed countries will be as successful or create the same value in other countries and under different circumstances. Initiatives aimed at building the knowledge society necessitate products that can be purchased freely on the international market, yet merely importing these products will not instantly put Arab countries on the same footing as their more developed counterparts in Europe or North America. This type of scenario has been witnessed in GCC countries, which do not necessarily suffer from critical constraints in terms of financing the knowledge society. However, the use of ICT in these countries is not always proportional to the investments being made, and therefore adaptation and customization are required.

From a financial perspective, Arab countries must develop domestic capital investment to generate capacity. While foreign capital ownership has benefits for Arab countries, some of the profit from such capital is repatriated back to the countries concerned, and absorptive capacity is not fully achieved. In many cases, once the foreign capital disappears, little benefit remains. Domestic capital investment, however, permits decision-making in a local context, which is extremely important in promoting the universal desire for self-determination.

Very often, the main bottleneck for Arab countries with regard to moving towards the knowledge society can be explained through the concept of capacity building, which is explored below. The concept of leapfrogging is also highlighted.

1. Absorptive capacity

Absorptive capacity is defined as the ability of a country to exploit what is transferred and to take advantage of the power of ICT practices to create sustainable socio-economic development. Similarly, the concept of indigenous technological capability assumes that skills and human capital, and also infrastructure, are absorptive provisions that must exist first. These concepts can therefore be summarized as follows:

- (a) An understanding of technological needs;
- (b) An effective identification of beneficial technologies and suppliers;
- (c) An ability to evaluate appropriateness;
- (d) Technical and organizational skills;
- (e) An ability to adapt imported practices to local conditions using one's own resources.

While lack of absorptive capacity on the part of a recipient creates considerable obstacles to the successful implementation of a knowledge society, external factors, including political and national security issues, employment implications and political and social instabilities are also significant.

The most important, and measurable of these external factors is education. Table 2, therefore, shows unemployment rates in selected ESCWA member countries for the period 1990-2001, as a means of highlighting the problem of unemployment in the ESCWA region in terms of moving towards the knowledge society.

TABLE 2. UNEMPLOYMENT RATES FOR SELECTED ESCWA MEMBER COUNTRIES, 1990-2001

| Country | Men | | Women | | Both sexes | |
|----------------------|-----------|-----------|-----------|-----------|------------|-----------|
| | 1990-1996 | 1996-2001 | 1990-1996 | 1990-2001 | 1990-1996 | 1996-2001 |
| Bahrain | 5.2 | 4.1 | 11.8 | 10.5 | 6.3 | 5.5 |
| Egypt | 7.6 | 5.6 | 24.1 | 22.6 | 11.3 | 9.2 |
| United Arab Emirates | 1.7 | - | 2.3 | - | 1.8 | - |
| Iraq | - | - | - | - | - | - |
| Jordan | 18.0 | 14.1 | 38.2 | 21.9 | 21.1 | 15.3 |
| Lebanon | 7.7 | 8.6 | 5.7 | 7.2 | 7.3 | 8.4 |
| Oman | 11.0 | 19.4 | 21.1 | 40.1 | 11.9 | 23.0 |
| Palestine | 24.5 | 27.3 | 19.6 | 14.1 | 23.8 | 25.5 |
| Qatar | - | 2.3 | - | 12.9 | - | 3.9 |
| Saudi Arabia | - | 3.9 | - | 9.1 | - | 4.6 |
| Syrian Arab Republic | 6.8 | 8.0 | 11.7 | 23.9 | 7.4 | 11.2 |
| Yemen | 14.8 | 12.5 | 24.1 | 8.2 | 15.1 | 11.5 |

Source: ESCWA, *Survey of Social and Economic Developments in the ESCWA Region 2003-2004*, (E/ESCWA/EAD/2004/4), p. 48.

Notes: A hyphen (-) indicates that the item is not applicable.

2. Leapfrogging

Leapfrogging strategies suggest the possibility of achieving development by bypassing some of the processes related to the accumulation of human capabilities and fixed investment. In other words, leapfrogging describes a situation whereby less developed countries are able to bypass stages that more developed countries have had to pass through, on the basis that developing countries do not need to follow the same development roadmap as developed countries. While developed countries build their capabilities incrementally on the basis of trial and error, developing countries do not need to make the same mistakes to achieve the same results. For example, students in Arab countries are now no longer required to learn Cobol programming (which students in other countries were previously required to learn) to develop open source software. Thus, the gaps in productivity and output that separate industrialized and developing countries can be narrowed through leapfrogging.

Another means of advancing progress is through the Internet, which offers a global flow of information that can be used to form virtual cyberspace domains, and which can overcome many of the constraints felt by developing countries. The Internet allows leapfrogging as a framework for development. Availability of absorptive capacity is the first condition for leapfrogging and the Internet is an ally in this regard; the Internet makes texts and instruction manuals available, allowing leapfrogging and leveraging absorptive capacity.

F. CONCLUDING REMARKS

National knowledge society and ICT strategies must include an analysis of the current status of the knowledge society (the 'as is' stage) and a vision of what the status should be in a fixed number of years (the 'to be' stage). The gap between these is the driver of what must be done during a certain period of time. This gap also acts as a driver in terms of prioritizing certain initiatives over others. Finally, analysis of a particular environment is critical, in that it provides a sense of reality for what can be achieved and the appropriate timing in that regard.

With this in mind, national strategies aimed at achieving progress towards the knowledge society must cover all variables that impact and influence development in a country. Furthermore, they must specify benefits that are realistic for a country and the particular bottlenecks that must be overcome.

II. ANALYTICAL TOOLS FOR CRAFTING STRATEGIES

A. INTRODUCTION

The formulation of strategy is a combination of rational and scientific considerations and educated, intuitive best guesses. The process of crafting a strategy aimed at achieving progress towards the knowledge society starts by determining the mission, vision, values, goals, objectives and also roles and responsibilities of that strategy (see box 2 for an example of a mission statement). Strategic thinking can be facilitated through the following: having a definite purpose in mind; having an understanding of the environment, particularly of the forces that affect or impede the fulfilment of that purpose; and being creative in developing effective responses to those forces.

The concept of strategy involves outlining the core issues facing a country that is moving towards the knowledge society. A core issue is one that, when identified, links various other symptoms and problems of a national concern together, and provides the insight to make the necessary decisions. A strategy is often necessary to help Governments to translate the chaos of daily events and decisions into an orderly means of dealing with a particular situation in a country.

This chapter aims at outlining possible core issues and describing the main tools and frameworks to craft strategies and plans of action to enable Arab countries to move towards the knowledge society, and which are realistic and achievable over a fixed period of time. This chapter proposes the following as guiding tools for the process: (a) strengths-weaknesses-opportunities-threats (SWOT) analysis; (b) five forces analysis; (c) Boston Consulting Group matrix; (d) political-economic-social-technological (PEST) analysis; and (e) the value chain. Moreover, it introduces the newest trends in crafting national strategies.

This chapter also introduces the need to include measurement in the process of crafting and implementing strategies towards the knowledge society. It shows the relationship between ICT and socio-economic growth and reveals the difference between measuring the firm level and the aggregated and sectoral level in terms of ICT impact. Robert Solow's productivity paradox is presented and the limitations of using macroeconomic measurements are introduced.

Box 2. India: Mission statement towards the knowledge society

India's strategy with regard to achieving progress towards the knowledge society does not focus on technological progress or spreading information and communication technologies (ICTs) to all citizens; rather it focuses on developing a successful software industry. During 2000-2001, India's software exports accounted for 14 per cent of total exports with revenues of \$6.2 billion and a growth rate that was 55 per cent higher than the previous fiscal year. This success was based on a strategy to improve quality and technical excellence.

The strategy prioritizes a business environment and a special legal framework that promotes scientific businesses. In most cases, the Government provides facilities to attract and retain the most talented specialists.

India's knowledge society strategy is guided by a mission statement, which is to become a knowledge superpower. Plans have been made to reduce illiteracy, mobilize the network of national technological and management institutes as a core training and research base, and to expand ICT infrastructure to offer universal access.

Source: World Bank Group, "Introductory note to the Conference", Knowledge for Development (K4D), a Forum for Middle East and North Africa (Marseilles, France, 9-12 September 2002). Available at: <http://lnweb18.worldbank.org/MNA/mena.nsf/0/689FA888DC72C1D685256C01006239C8?OpenDocument>.

B. STRENGTHS-WEAKNESSES-OPPORTUNITIES-THREATS ANALYSIS

In order to plan the process aimed at achieving progress towards the knowledge society, it is first necessary to consider the internal and external environment within a country. The internal environmental factors of countries or of a region can be classified as strengths (S) and weaknesses (W), while external factors relate to opportunities (O) and threats (T), to form the framework of SWOT analysis. This serves as a sound way of making better decisions, particularly given that it matches the national and regional resources, and the capabilities of a country, with its global environment. The factors that make up SWOT analysis are described below:

(a) *Strengths*: These are resources and capabilities that can be used to create an efficient economy and inclusive society, for example, cost advantages, proprietary knowledge, exclusive access to natural resources, patents, strong brand names, good reputation worldwide or favourable access to distribution networks. Expertise, innovative products and quality standards are important strengths in the knowledge society;

(b) *Weaknesses*: A lack of critical strengths are often characterized as weaknesses, for example, high cost labour, lack of patents or lack of local knowledge. Sometimes, a weakness can be the flip side of a strength. One example of this is the tourism sector in Arab countries: while hefty investment in this sector can be seen as a strength, it can also be perceived as a weakness, particularly when it prevents the sector from rapidly reacting to changes in the strategic environment, for example, political instability;

(c) *Opportunities*: These are areas where there is a need, which other countries or regions are not fully meeting. Some opportunities for growth can be related to the arrival of new technologies, the establishment of new standards or the removal of international trade barriers. Changes in social patterns, population profiles or lifestyle can also generate opportunities;

(d) *Threats*: These are often created by changes in the external environment, for example, shifts in consumer preferences, emergence of substitute products, new regulations or increased trade barriers.

SWOT analysis is a powerful tool that helps those formulating strategies to focus on factors other than the successes of other countries. Indeed, strategies cannot be defined solely by detecting the most attractive opportunities. Often, comparative advantages must be analysed by identifying a fit between strengths and potential opportunities. In certain cases, SWOT can be used to provide advice on how to overcome a certain weakness in order to enable a country or a region to pursue a compelling opportunity. One example of a country that undertakes this type of procedure is Egypt, which reviews weaknesses and opportunities with a view to overcoming them (see box 3).

In general, a SWOT analysis leads to the following different strategies:

- (a) S-O strategy, aimed at pursuing opportunities that are a good fit to strengths;
- (b) W-O strategy, aimed at overcoming weaknesses in order to pursue opportunities;
- (c) S-T strategy, aimed at identifying ways to use strengths to reduce the vulnerability to external threats;
- (d) W-T strategy, aimed at preventing weaknesses from making a country or region vulnerable to external threats.

Changes, innovations and new trends affect SWOT analysis, mainly by creating new opportunities. For example, the production of computers that follow standards related to sustainable development creates opportunities. Box 4 suggests selected strengths, weaknesses, opportunities and threats in Arab countries.

In addition, it must be noted that the results of SWOT analysis must not be static. This is a tool that must be used to create discussion, think out of the box and build a strategy that is realistic and creative. It must also be related to other strategic tools, including the five forces analysis and the value chain, which are reviewed below.

Box 3. Egypt: National Plan for Telecommunication and Information

A National Plan for Telecommunication and Information was launched in Egypt in December 1999 through the Ministry of Communications and Information Technology. The national project is related to the set up and uses of the telecommunication and information industry in terms of serving the development objectives of the country.

The plan establishes the need to do the following:

- (a) Promote and develop the communication and information industries for the purpose of developing an advanced industry that depends on the thoughts and minds of Egyptian youth and occupies an advanced position among industrial exports;
- (b) Build an information society that can pursue and absorb the huge flow of information and up-to-date knowledge and optimize its usage;
- (c) Provide and develop communication and information systems to serve national issues associated with the reform and growth of the Egyptian economy, and raise the standard of living for citizens and families;
- (d) Provide the necessary manpower for the communication and information sectors.

It also establishes priorities for the following axes:

- (a) Axis one: Increase national demand for information technology and its use;
- (b) Axis two: Enter international markets to ensure a share of international demand;
- (c) Axis three: Develop human resources;
- (d) Axis four: Build alliances with international industries;
- (e) Axis five: Modernize the communication infrastructure;
- (f) Axis six: Ensure a suitable legislative environment for to promote industry.

This comprehensive plan, which relates to all aspects of the knowledge society, also includes a number of projects, some of which will be supervised in cooperation with other Ministries, with timelines of two to five years. The National Plan for Telecommunication and Information paved the way for the Egyptian Information Society Initiative.

Source: ESCWA, Profile of the Information Society in the Arab Republic of Egypt 2003 (E/ESCWA/ICTD/2003/11/Add.12).

Box 4. Strengths-weaknesses-opportunities-threats analysis in the Arab region

Key factors that have a bearing on the knowledge society in Arab countries are outlined below. Certain factors relate to some countries and not to others or are only relevant at a particular point in time.

(a) *Strengths*

These include the following:

- (i) Solid economic sectors, for example, the oil sector in Gulf countries or the tourism sector in Egypt;
- (ii) Good communication and transportation facilities;
- (iii) Sound international relationships with high potential countries;
- (iv) Preparation for information and communication technology (ICT) free zones, cybercities and business parks;
- (v) Developed financial sector;
- (vi) Completion of key national information society policy documents.

(b) *Weaknesses*

These include the following:

- (i) Lack of ICT professionals;
- (ii) High computer illiteracy rate among the population;

Box 4 (*continued*)

- (iii) Lack of awareness concerning the benefits of the knowledge society;
- (iv) Low level of openness of the economy, as measured by the value of international trade relative to gross domestic product;
- (v) Insufficient level of technological restructuring of the economy;
- (vi) Modest stock of foreign direct investment (see chapter IV, section B).

(c) *Opportunities*

These include the following:

- (i) The rapid availability of new technologies;
- (ii) Modernization of countries and their economies through the knowledge society;
- (iii) Not lagging behind industrialized economies;
- (iv) Creation of job opportunities;
- (v) Provision of ICT sector related training, not only for ICT professionals, but also for computer technicians, other personnel in cybercities and those employed in services close to cybercities;
- (vi) Creation of career opportunities for students, to encourage them to remain in the region;
- (vii) World Summit on the Information Society focus on gaining momentum for the knowledge society in Arab countries;
- (viii) Availability of best practices related to projects in such areas as e-Government, e-learning, e-health and e-business.

(d) *Threats*

These include the following:

- (i) Increase in debt as a result of the computerization process or political opportunism;
- (ii) Reliance on foreign direct investment and expertise;
- (iii) No guarantee of success in the ICT sector or of ICT applications;
- (iv) Fluctuation of foreign investments in the face of political instability;
- (v) Depersonalization as a result of new technologies;
- (vi) Problems related to not establishing highly competitive markets;
- (vii) Slow take-off of e-business and e-commerce in the global arena.

C. BOSTON CONSULTING GROUP MATRIX⁵

Strategies towards the knowledge society must contain and evaluate several strategic approaches, initiatives and projects, but must also prioritize certain initiatives over others, both in terms of urgency and resources. One of the most widely used models to display a portfolio of different initiatives is the Boston Consulting Group (BCG) growth share matrix. Figure II illustrates market growth rate versus relative market share, which in this case refers to growth in the global market rate versus country share in the global market relative to other countries.

Each initiative or project is prioritized according to where it is situated in the grid as follows:

⁵ See Boston Consulting Group. Available at: <http://www.bcg.com>.

(a) A cash cow is a national ICT initiative that has already grown to a large size, is already making a significant impact and deals with traditional elements of the knowledge society that are not rapidly changing. According to the BCG matrix, the cash cow enjoys a large share in a mature and slow growing industry. Cash cows require little intervention from Governments and contribute significantly to the national economy and to society inclusiveness. They can be used to inspire other initiatives. One example of a cash cow is the international telecommunication centres initiative in Yemen: it is well established, has already proved that it works and it serves as a basis for further development. Other people have claimed that the oil industry in the GCC countries is also an economic cash cow;

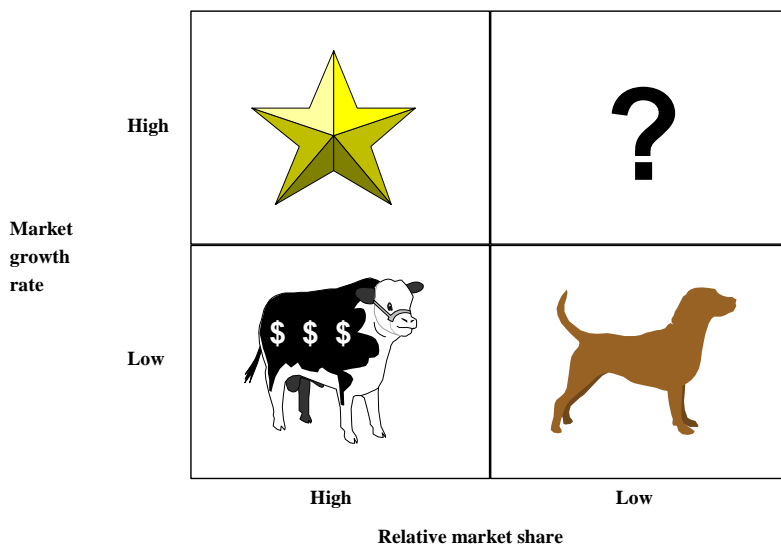
(b) A star is a large, working initiative in a revolutionary area. According to BCG, it enjoys a large share of the market in a fast growing industry. Stars contribute to GDP and to the creation of employment. They operate, for example, in the fast changing Internet application market and require attention from a Government to sustain their success. If successful, stars can become cash cows when their industries mature;

(c) A question mark enjoys a small share in a high growth industry. It requires a great deal of attention from a Government, and the question of whether it can succeed and become a star is uncertain;

(d) A dog enjoys a small share in a mature industry. It does not require substantial attention, but it ties up national resources that could be channelled into more innovative initiatives. Unless a dog is strategic in terms of protecting local culture or having a high social impact, the BCG matrix does not recommend its promotion.

Elements of the telecommunications sector in Egypt can be classified according to this matrix. According to the Arab Advisors Group (2005), the cellular market in Egypt grew dramatically in 2004 through two operators, namely, MobiNil and Vodafone, which both have different strategies. MobiNil's approach can be described as a star strategy in that it fuels future profitability by accelerating the growth of the Egyptian market. Vodafone Egypt employs a cash cow strategy, which actively seeks revenue and growth of profits rather than leadership in terms of customer numbers. According to the BCG matrix, the company following the star strategy has a greater chance of survival and of generating value for the country in the long run.

Figure II. Boston Consulting Group growth-share matrix



Source: Boston Consulting Group. Available at: <http://www.bcg.com/>.

While the BCG matrix can be used to compare and prioritize initiatives that are aimed at making progress towards the knowledge society in Arab countries, it does have limitations, and these are as follows:

(a) The matrix overemphasizes high growth, while in fact other traditional activities that grow at a lower rate also contribute to the knowledge society;

(b) According to the matrix, strength is evaluated according to relative market share. Strength, however, must be calculated as the sum of several criteria, each one with a weighting factor. Among other criteria, this can include share in the global market, intellectual and intangible capital, access to distribution channels, production capacity and a comparison of profit margins among countries.

In general, the matrix highlights the importance of prioritizing, cultivating, holding or harvesting initiatives, and cultivating strong initiatives in attractive areas, which has been the case in Chile (see box 5). It also recommends holding strong initiatives in unattractive areas and weak initiatives in attractive areas.

In addition, decisions to promote certain initiatives over others must consider the interaction between various initiatives, thereby taking into account, wherever possible, the broadest picture. This is as important as the ideas presented in the BCG matrix.

Box 5. Chile: Promotion of its traditional industries

Chile is considered to be one of the most developed economies in Latin America, with an average growth rate of 6.5 per cent over the past decade. The strategy of Chile towards the knowledge society is based on sustained investments in human resources, and also on the exploitation and creation of comparative advantages in relation to natural resources. As a result of making the best use of knowledge, information and communication technologies and other technologies, such traditional sectors as fish farming and viticulture have flourished and become leading exporters.

The strategy towards the knowledge society in Chile has focused on the creation of Fundación Chile, which is a semi-public innovation agency that has developed a remarkable set of instruments to aid Chile's transition into a knowledge society. This agency has mobilized international networks of experts to strengthen venture capital funds.

Source: World Bank Group, "Introductory note to the Conference", Knowledge for Development (K4D), a Forum for Middle East and North Africa (Marseilles, France, 9-12 September 2002). Available at: <http://lnweb18.worldbank.org/MNA/mena.nsf/0/689FA888DC72C1D685256C01006239C8?OpenDocument>.

D. POLITICAL-ECONOMIC-SOCIAL-TECHNOLOGICAL ANALYSIS

Another tool, which can be used to help Governments and other institutions prioritize ICT initiatives, takes into account political (P), economic (E), social (S) and technological (T) variables and is known as PEST analysis. These important environmental variables are described below:

(a) *Political variables:* These include new regulations and legal developments, in addition to the role of informal rules. They can also include tax policies, employment laws, environmental regulations, trade restrictions and tariffs, and political instability;

(b) *Economic variables:* These can include purchasing power, cost of capital, exchange rates and inflation rates;

(c) *Social variables:* These can include demographic and cultural aspects, employment and human rights;

(d) *Technological variables:* These can include R&D and levels of automation.

One area that can benefit for PEST analysis is e-banking strategy in Arab countries. Governments of Arab countries have shown a keen interest in the development, reform and liberalization of their banking and financial sectors, with Lebanon, for example, developing very solid standards and regulations to support the development of e-banking (ESCWA, 1999a). However, owing to a mixture of PEST variables, it is uncertain where banking, finance and insurance services will be located in the near future in Arab countries.

It is worth noting that all PEST variables, industry attractiveness and position in the BCG matrix can be classified as strengths, weaknesses, opportunities and threats within the framework of SWOT analysis. Five forces and value chain considerations, which are reviewed below, can also feed into SWOT analysis.

E. FIVE FORCES ANALYSIS⁶

1. *Components of the five forces analysis*

Another useful tool for crafting strategies, prioritizing initiatives and selecting implementation modalities is Michael E. Porter's five forces analysis (Porter, 1983). Porter develops a framework that suggests that an industry is influenced by five forces, which collectively, are a determinant of industry attractiveness. Based on Porter's ideas, strategy can be defined as the essence of how a country implements the knowledge society in its particular environment, encompassing a choice of goals and also operating policies.

Using Porter as a basis, it is possible to argue that strategies aimed at making progress towards the knowledge society compete for resources with other development areas in a country in the context of the social and economic environment, while strategic opportunities grow. In this sense, a competitive strategy assumes the presence of a very broad core model of competition that can be applied to any industry and situation. It is therefore possible, through this type of analysis, to identify crucial economic and competitive issues.

The five forces model can be broken down as follows:

(a) *Supplier power*: This force describes the ability to dictate the terms of operation. Weak suppliers may have to accept the terms; however, strong suppliers can push prices of their goods higher and reduce the profit margins of the buyer, thereby increasing the profit margins of the supplier. The main factor that determines how much power a particular supplier has is concentration of suppliers. If a supplier has to compete with many others, it is likely to accept stricter terms because suppliers can be switched;

(b) *Buyer power*: A strong buyer can force terms, while weak buyers can be exploited. Again concentration is an issue;

(c) *Barriers to entry*: These barriers can take the form of exclusive access to raw materials, the requirement of massive investment in technology, or patent protection; anything that gives the incumbent an unfair advantage. The experience curve is one of the most important entry barriers (see box 7). In general, the most profitable industries are those that are very difficult to enter;

(d) *Threat of substitutes*: If customers have access to another product that does a similar job, they will not accept excessive profits in an industry. Producers prefer a situation where there are no substitute products;

(e) *Degree of rivalry*: This is reviewed in greater detail below.

According to this model, in order to be globally competitive, it is necessary to gain a higher than average risk-adjusted rate of return in the ICT industry and in sectors where ICT is applied. In other words, it is necessary to determine a sustainable level of profitability. This can be achieved, in part, through sectoral structure.

This analysis is used in cases where a decision needs to be made on whether to promote, for example, the hardware industry, software industry or educational software industry. The industry in question must be competitive worldwide, and will only be successful if the rate of return is higher than the competing industry in other countries, for example, in China, India or Taiwan. In this context, one industry that could be promoted in Arab countries is the Arabic content industry, which does not face competition in the global

⁶ This section is based on M. E. Porter's ideas.

arena. However, it needs to provide products and services in a cost effective manner, according to the needs of customers.

Areas that could benefit from the five forces analysis include e-tourism and e-hospitality. This sector could be dramatically improved by developing advertising and e-commerce to complement services related to hotels and restaurants, transport, storage and communication, recreational, cultural and sporting services. For example, Egypt had 3.7 million visitors in 1996 and Saudi Arabia had 3.5 million pilgrims in the same year. In addition, the tourism industry recently contributed 6.5 per cent to GDP of Egypt and 3 per cent to GDP of the region as a whole (ESCWA, 1999b). These statistics need to be sustained and this can be facilitated through an analysis of suppliers (providers), buyers (tourists), barriers to entry (infrastructure) and substitutes (other geographic areas).

This model is useful in understanding which ICT industries and ICT-based sectors must be promoted in a specific country or region. It also provides analytical tools that make it possible to develop strategic implications for the industry under study and particular competitors. Jordan is a good example of a country that has based its knowledge society strategy on developing the ICT sector and, in general, the private sector (see box 6).

Box 6. Jordan: Strategy towards the knowledge society

In 1999, His Majesty King Abdullah II launched a strategy aimed at transforming Jordan into a knowledge society. The original REACH Initiative report presented a national strategy that was designed to help Jordan to develop an export-oriented information technology services sector, and which was to be implemented by the Ministry of Information and Communications Technology.

The strategy of the REACH Initiative is related to efforts aimed at promoting the ICT sector and maximizing its ability to compete in local, regional and global markets. It outlines a clear plan, specifying actions to be implemented by the private sector, the Government and by other stakeholders. This comprehensive framework embraces actions in the following areas:

- (a) Regulatory framework strengthening;
- (b) Infrastructure development;
- (c) ICT industry development;
- (d) Capital and finance;
- (e) Human resource development;
- (f) Government support.

The REACH Initiative aims to make Jordan a major regional ICT services leader and an internationally recognized exporter of ICT products and services by capitalizing on its core human capital advantage. The REACH Initiative set the following goals:

- (a) 30,000 ICT-related jobs (20,000 direct and 10,000 indirect) by 2004;
- (b) \$550 million in annual exports by 2004;
- (c) \$150 million in cumulative foreign direct investments by 2004.

It is also worth mentioning the Jordan Vision 2020 document, which is a great vision statement that includes qualitative and quantitative objectives for 2020.

The Information Technology Association of Jordan (int@j) also plays an important role in facilitating this process of moving towards a knowledge society in Jordan, by circulating surveys soliciting feedback and providing monitoring. In September 2002, the third version of the REACH initiative was launched, demonstrating a commitment to evolve and maintain dynamism.

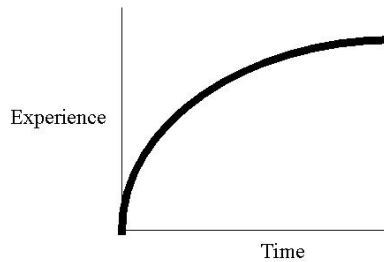
Jordan's strategy provides a very good example of building an ICT sector that is capable of competing in the global arena. Its implementation is also a good example of how to use internal resources to start initiatives towards the knowledge society while also leveraging resources from international organizations. Jordan's national e-readiness assessment is a very good example of detecting comparative advantages in a country, and using them to prioritize initiatives.

Source: Government of Jordan, REACH 3.0, Launching Jordan's Software and ICT Services, September 2002; and ESCWA, Profile of the Information Society in the Hashemite Kingdom of Jordan 2003 (E/ESCWA/ICTD/2003/11/Add.10).

Box 7. The experience curve

The grandfather of all planning concepts is the experience curve, which has been popularized by the Boston Consulting Group. It deals with the limited capacity of individuals and nations with regard to learning how to obtain competitive advantages. The slope and the duration of the experience curve can vary greatly among industries.

The experience curve can explain the development of processing industries within the manufacturing sector in ESCWA member countries. For example, processing industries accounted for 9.7 per cent of GDP in GCC countries in 1998. By increasing learning and benefiting from experience, GCC countries should be able to generate higher returns from these industries (ESCWA 2001a).



Source: The Boston Consulting Group, "The experience curve". Available at: http://www.bcg.com/this_is_bcg/mission/experience_curve.jsp.

2. Degree of rivalry

Porter's five forces configure the degree of rivalry in an industry. The competitive arena requires countries and regions to gain a competitive advantage over other countries and regions to achieve a certain share in the market. Some sectors display a higher degree of rivalry than others. These differences are measured in terms of sector concentration. The concentration ratio (CR) is one such measure. It indicates the percentage of market share that is held by the four largest players. A high CR indicates that the largest players hold a high concentration of market share, and therefore, the sector is concentrated, and close to a monopoly.

A low CR points to a fragmented market, where players act in counter-response to others. The intensity of this rivalry can be cut-throat, intense, moderate or weak, depending on how aggressively parties look for competitive and comparative advantages. This is usually achieved by altering prices, but can also be done by differentiating products or services through innovations with regard to production, products or services. Other ways of gaining advantages include using channels of distribution more creatively or integrating vertically and merging with suppliers. In addition, using technologies helps organizations, sectors and countries to gain competitive advantages, generate profits and can lead to more inclusive societies.

Bearing this mind, ICTs can be used to improve sectors in Arab countries that have a low concentration of market share. For example, hardware production is extremely concentrated, and therefore the region has little chance of becoming competitive. However, given that software production has a low level of market concentration and operates with little rivalry, it presents possibilities related to the Arabic language.

It is also worth noting that various factors influence the level of rivalry. One of these is a larger number of players with equal market share, as this leads to more intense rivalry, owing to the fact that players are forced to compete for a small number of customers and resources. Rivalry is also generated as a result of the fixed costs of final products or services, in the sense that sectors become very sensitive to economies of scale. For example, there is a high level of rivalry in computer production. This area also has

high exit barriers, in that it is expensive to abandon products. This is what drives the sector to keep producing even when it is no longer profitable to do so. The model recommends avoiding such markets.

Fast growing markets are not as competitive as other types of markets, based on the fact that revenues can be improved by simply expanding the market. This is the case of some niche ICT applications, for example, translation software, distance-learning content and water plants information management system.

F. THE VALUE CHAIN

The value chain is a description of all the activities that are required to take a product from conception to end use and beyond, and includes such activities as design, production, marketing, distribution and support to the final consumer (see figure III). The activities that make up a value chain can be contained within a single organization or divided among different ones. They can be contained within a single geographical location or spread over wider areas.

Value chains show that making progress towards the knowledge society is not solely dependent on promoting sectors, but that such progress also relies on promoting certain activities within sectors. For example, the value chain is relevant to the process of Arabizing software. While it is possible that some Arab countries find it hard to conceive of competition with India in terms of the software industry, the application of the concepts embodied in the value chain indicate that such a notion is possible, by means of promoting certain activities, for example, purchasing software, translating it into Arabic, and then selling and distributing it in Arab countries.

Another example of this is promoting the last activity in the value chain, namely, customer care, or call centres in countries where workers speak a number of languages, for example, in Lebanon. An example of promoting one activity in the value chain can be seen in Egypt, which on the basis of low labour costs is competitive in manufacturing, which is the first activity in a value chain.

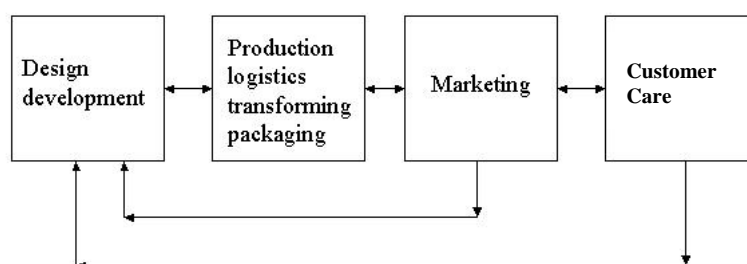
Value chain analysis is important in that it helps to understand the advantages and disadvantages of Arab countries in terms of specializing in production or in services. The ways in which producers are connected to final markets can influence gains from participating in global markets.

Most value chains contain activities that are divided among multiple organizations and spread across a wide geographical area. Such value chains are becoming increasingly prevalent and elaborate. It can be noted in this context that while many organizations have maintained international operations and trading relationships for decades, some for more than a century, in recent years, a global economic system has emerged, which is tightly integrated and often managed on a day-to-day basis. It is now no longer possible to isolate the process of economic development from these global systems. Moreover, single chains now tend to have many links, while intermediary producers in a particular value chain often feed into a number of different value chains.

The availability of the Internet now ensures that the all value chain activities are governed and connected to final markets. This frees countries from having to be efficient in the production link in the chain, and also from those factors that determine the participation of particular groups of producers in final markets.

A good example of the application of the value chain in Arab countries is in the services sector. This sector is defined as the upper part of the value chain in each industry, or the part more closely related to the final customer. It recently accounted for more than 50 per cent of GDP in ESCWA member countries, and up to 80 per cent in Lebanon. This sector is considered to be the main source of employment in the region, and encompasses infrastructure, marketing, commercial, and professional and personal services (ESCWA, 1999b). The promotion of this industry is based on the comparative advantage of Arab countries related to capabilities in sales, marketing and customer care.

Figure III. A graphic representation of a value chain with four links



Source: Compiled by ESCWA.

G. NEW TRENDS IN CRAFTING STRATEGIES

While the latest trends in strategic management tools support the value of SWOT analysis, BCG matrix and the value chain analysis, they also emphasize the need for innovation as a means of obtaining comparative advantages.

In fact, the nature of competitiveness is shifting, particularly in developing countries. A decade ago, the challenge was to restructure, achieve lower costs and raise quality. Now, however, the sustainable comparative advantage of Arab countries cannot be achieved by producing standard products using standard methods, but rather by innovating at the global level, as has been the case in Dubai (see box 8).

Box 8. Dubai knowledge society strategy focus on innovation

Similarly to other parts of the Arab world, Dubai has made little progress in instituting innovations in the areas of research and development (R&D), and academic research. Levels of R&D expenditure as a percentage of GDP, and the ratio of scientists and engineers in R&D to total population, are similar to those in other parts of the Arab world, and much lower than levels in developed countries.

At the same time, information and communication technology (ICT) indicators, particularly mobile phone density and Internet penetrations in Dubai are comparable to those of key cities in the most developed countries. According to Madar Research, mobile phone density recently amounted to 90 per cent which was higher than the average in Western Europe. Internet penetration stood at 39 per cent, which was also higher than other developing countries. In addition, recent research showed that ICT spending was 2.7 per cent of GDP, and ICT spending per capita was \$450, both similar values to those in Western Europe.

In the past two years, however, the strategy towards the knowledge society has focused on rectifying the situation in Dubai. The Government has laid out ambitious plans, which are expected to yield tangible results before 2010.

Source: Madar Research, *Dubai Knowledge Economy 2003-2008*, Vol. III, October 2004.

The concept of national innovative capacity can be used to describe the vitality of innovation in a country (Porter and Stern, 2001). In fact, a country has the potential, as both a political and economic entity, to produce innovation.

Box 9 lists a number of factors that support innovation throughout an entire economy, including the following: human and financial resources devoted by a country to R&D and technological advances; public policies with a bearing on innovative activity; and the level of technological sophistication of an economy. Important policy choices include the protection of intellectual property, tax incentives for innovation and the openness of the economy to trade and investment.

Box 9. Elements of the national innovative capacity framework

The common innovation infrastructure includes the following elements:

- (a) Cumulative technological sophistication;
- (b) Human capital and financial resources available for R&D;
- (c) Resource commitments and policy choices.

The cluster-specific environment for innovation includes the following elements:

- (a) Quality of linkages between institutions;
- (b) Context for strategy and rivalry;
- (c) Factor (input) conditions;
- (d) Demand conditions;
- (e) Related and supporting industries.

Source: Michael E. Porter and Scott Stern, "Innovation: Location matters", *MIT Sloan Management Review*, (Summer 2001).

It has also been claimed that innovation and new technologies take place disproportionately in clusters—geographic concentrations of interconnected institutions in a particular field (Porter and Stern 2001). One of the possible explanations for this fact is that clusters stress the following four national attributes that trigger innovation:

- (a) The presence of high-quality inputs;
- (b) A context that encourages investment in combination with intense local rivalry;
- (c) Pressure and insight gleaned from sophisticated local demand;
- (d) The local presence of related and supporting industries.

Clusters offer potential advantages in perceiving both the need and the opportunity for innovation. Clusters can also provide flexibility and capacity to turn new ideas into reality.

The most important centres of innovative activity in emerging economies are the Republic of Korea, Singapore and Taiwan. They have made substantial investments in upgrading their innovative capacities over the past decade and achieved significant increases in patenting rates. Ireland has also established infrastructure and industrial clusters consistent with strong innovative activity. In addition, China, India and Malaysia are exerting considerable efforts in terms of developing bases for innovation and clusters with a large innovative capacity.

In Arab countries, innovation is most important in the ICT sector. This sector encompasses Internet service providers (ISPs), cellular companies and software. However, while significant investment and financing has materialized mainly in the sphere of mobile communications during the past decade, a huge digital divide remains between GCC countries and other countries in the Arab region.

The apparent paradox of globalization is that ideas and technologies that can be accessed from a distance do not serve to boost competitive advantage owing to the fact that they are widely available. In a global economy, harnessing local advantages is crucial.

H. MEASUREMENTS FOR CRAFTING AND IMPLEMENTING STRATEGIES TOWARDS THE KNOWLEDGE SOCIETY

Strategies towards the knowledge society are aimed at harnessing ICT to improve socio-economic conditions in a country. Measuring the degree of this improvement is an essential tool for three reasons. First, measurement allows a country to understand its situation and enables comparisons between different regions and countries. For example, a weakness in SWOT analysis can be measured through numbers. This

helps to prioritize initiatives aimed at making progress towards the knowledge society. Accordingly, a strategy can exclude ICT initiatives that do not have the most influence on influence socio-economic development at the national level.

Second, measurement is an objective tool for monitoring implementation in that it can be backed up by periodic feedback reports that indicate progress against goals. Moreover, proxies and estimates help to monitor the process of implementing strategies. Even a qualitative or rough measurement system assists Governments in tracking the implementation of national strategies by comparing actual results against strategic goals and objectives. Often a scorecard—a set of reports, charts and specialized displays—is built that allows Governments to monitor change; regular reports can be prepared to assess whether implementation is on target or not.

Third, measurement is useful in predicting events or results. Knowledge society measurements are strong predictors of future growth. This is related to the fact that investing in the knowledge society and the knowledge-based economy is a long-term investment, and while results can be seen in the short term, they are mainly noted in the long term. In addition, it can be crucial to predict the impact of new investments in ICT based on past investments.

A measurement system typically comprises systematic methods of setting national development goals for a strategy. In crafting strategies towards the knowledge society, Governments agree on a set of objectives that can be expressed in terms of measurement and on a reasonable timetable for their achievement.

1. ICT and socio-economic development

The concepts of national development, inclusion of societies and economic growth are difficult to define and to measure. In general, development means improvement in the following areas:

- (a) Social change: including wider employment and education;
- (b) Environment: including sustainable use of natural resources;
- (c) Institutions: including institution building;
- (d) Economic growth: including productivity enhancement and improvement of macroeconomic variables, for example, GDP and economic growth.

While ICT can potentially effect improvements in all these areas, the sections below mainly focus on measurements related to the impact of ICT on productivity, employment and economic growth, at the firm, sectoral and industry level, and at the macroeconomic level (also see the annex to this study).

2. Firm, sectoral and industry level measurements

Firm level data often offers the strongest evidence of the economic impact of ICT. Firm level data also points to factors that influence the impact of ICT that cannot be observed at the aggregate level. For example, the role of ICT in helping firms to gain market share can only be examined using firm level data, as can the role of organizational change. Moreover, firm level analysis can help to distinguish the impact of ICT from that of other, often firm-specific, sources of growth.

Over past years, much progress has been made in developing statistics on the use of various ICTs in the economy. At the same time, many countries have developed databases that provide detailed and comprehensive data on the productivity of individual firms. It is possible that combining these two sources of information will establish a link between the productivity of a firm and its use of ICT. Moreover, if these databases cover a large proportion of the economy, they will also be able to link the productivity of individual firms to that of the economy as a whole.

Firm level studies also show that the use of ICT is only one component of a much broader range of changes that help firms to enhance productivity. This includes complementary investments in, for example, appropriate skills, and organizational changes, including new strategies, new business processes and new organizational structures. Use of ICTs by firms is also often linked to the ability of a company to innovate. Users of ICTs often try to make their investments more valuable through experimentation and innovation, for example, the introduction of new processes, products and applications.

However, aggregate and sectoral evidence is much less conclusive about the benefits of using ICT. Investment in ICT capital has contributed to growth in most countries, and the ICT-producing sector has contributed to productivity growth in some countries. There is, however, little evidence that industries using ICTs have experienced more rapid productivity growth.

It is important to note that no universally valid set of indicators exists for any of the Arab countries or for different situations. However, even countries that are widely known to have benefited from the information society, for example, China, India, Ireland and the Republic of Korea have not succeeded in developing a commonly accepted group of indicators and used them to describe or predict the impact of ICT on their economies. Group meetings and further studies are therefore necessary in Arab countries to construct a set of indicators focused on monitoring progress towards the knowledge society.

It is also important to remember that the main effects of ICTs are to change processes, generate new relationships with clients and providers, and build innovative structures. These qualitative factors make it very difficult to measure the real value being created by ICTs. Attempts to measure the real value generated by ICTs include the calculation of investment and return on investment. However, ICTs in themselves have no value in isolation from education, innovation and other initiatives, and therefore it makes no sense to evaluate them in isolation of other factors. For this reason, it is relevant to include indicators of capacity building. These show the extent to which a country is capable of extracting the benefits of ICT in its national development.

3. Limitation of macroeconomic measurement

Some Arab countries have a form of measurement system or a kind of scorecard, usually managed by national statistics offices, that is used to compare actual facts with planned objectives for a miscellaneous collection of measures. These suffer from problems related to the quality of the information, the number of indicators, and the issue of alignment for the reasons outlined below.

First, only certain descriptive indicators can be used quantitatively, namely, telephone density and Internet penetration, and only certain readiness indicators, for example, legal framework and network infrastructure. It is much harder, however, to produce high quality measurements related to ICT capacity building and the impact of ICT on socio-economic development.

Second, sometimes there are just too many indicators to keep track of; a great many national strategies maintain that they are tracking 200 or more knowledge society indicators. It is hard to imagine trying to drive a car with 200 dials on the dashboard. Yet Governments seem to have little trouble driving their countries with 200 dials on the dashboard. Data is very difficult to gather, computations are very complex and, unfortunately, the tools for making sense out of these data are not so developed.⁷

The third problem is something that has been called the “principle of obliquity” (Hammer, 2001). Ministries often lack direct control of many of the measures being tracked. On the one hand, there is a need to monitor such measurements as ICT impact on employment or GDP (table 3 illustrates the impact of ICT

⁷ After an indicator is defined, it must be computed. Most of the time, computation involves the use of other basic indicators. It is often the case in the ESCWA region that basic indicators are not updated, are unreliable or non-existent. In such cases, more complex indicators include the sum of errors and are therefore less reliable. The only way to keep track of them is to use proxy indicators or estimates, which are heavily dependant on each national situation. As a general rule, a weak estimate or a proxy are much more valuable than no indicator at all. Moreover, even if an indicator is not computable in a country, it is still very important to understand, quantitatively, what a strategy should achieve.

on GDP in Jordan). On the other hand, these measurements cannot be precisely defined and can only be pursued obliquely. What can be controlled, however, are individual initiatives towards the knowledge society. Unfortunately, the impact of any individual action on a national strategy is negligible. Measurements must be derived from national strategies and from an analysis of the key processes required to achieve those strategies, which is not a simple procedure.

TABLE 3. CONTRIBUTION OF THE JORDANIAN ICT SECTOR TO GDP, 1998

| | Number of firms | Number of employees | Gross output (Thousands of United States dollars) | Gross value-added (Thousands of United States dollars) |
|---|-----------------|---------------------|---|--|
| Software consulting and supply | 33 | 278 | 2 131 | 1 464 |
| Maintenance operations | 43 | 114 | 531 | 391 |
| Retail computer sales | 400 | 2 500 | 14 321 | 11 272 |
| Computer-aided/printing and design | 8 | 98 | 1 574 | 76 |
| Manufacture of electricity - distribution and control apparatus | 9 | 146 | 4 364 | 1 830 |
| Manufacture of insulated wires and cables | 6 | 801 | 23 869 | 4 003 |
| Manufacture of monitors and receivers | 2 | 291 | 28 496 | 8 556 |
| Telecommunications services | 5 | 5 423 | 252 151 | 218 610 |
| Total ICT sector | 506 | 9 651 | 372 438 | 246 203 |
| GDP in 1998 | | | | 4 408 000 |
| ICT as a percentage of GDP | | | | 5.6 |

Source: ESCWA, *Profile of the Information Society in the Hashemite Kingdom of Jordan*, (E/ESCWA/ICTD/2003/11/Add.10), p. 2.

From a very different perspective, there is a major limitation to the process of measuring as an integral component of crafting and implementing strategies: while measurements are essential, macroeconomic indicators must be used extremely carefully, in that they represent the economy in a way that does not show ICT impact. R. Solow's productivity paradox, which states that the computer age can be seen everywhere, but in the productivity statistics, is concerned with the fact that despite enormous improvements in ICT, aggregate output statistics—for example, those related to productivity growth—do not record any corresponding benefit.

This paradox is often quoted, but is there really a paradox, and if so, what can be said about it? What is relevant now is whether growing investment in ICT will reverse the productivity slowdown. According to a number of sources, global productivity increased at approximately 2 per cent per annum until 1973, and labour productivity grew at the rate of some 3 per cent; after 1973, these productivity growth rates were nearly zero and 1 per cent, respectively. Worse slowdowns have been observed in most economies of Arab countries.

The productivity paradox also strikes a chord owing to the fact that the introduction of the knowledge society is much talked about, but very hard to quantify. It is often said that firms produce a much larger proportion of quality change at present than they did in the past, and quality change, including more customized products and the growth of services, means that information is a much more important contributor to the production process than it used to be. If it is true that the use of information is on the increase, or that information has become a more productive input, then ICTs are more important than ever in modern economy.

However, productivity figures, as compared over several decades, are almost always constant. In terms of economic growth, the curves are linear and not exponential as would be expected. Rapid development of

ICTs and the acceleration of the speed at which business is conducted have not resulted in higher levels of economic growth.

The application of ICTs results in productivity gains within firms, and it is widely accepted that ICTs also effect income distribution and social cohesion. In this context, only figures related to the micro level and the firm level clearly show that ICTs increase productivity and therefore economic growth. The aggregation of such micro level results, however, does not increase the macro level. This is the basis of the productivity paradox, and the root of the difficulty in establishing a solid relationship between ICT and economic growth. It is also perhaps the reason that most countries do not publish knowledge society indicators related to economic growth, preferring instead, purely descriptive indicators concerning, for example, the number of Internet users or the number of electronic business transactions.

According to Moore's Law the capacity of memory chips has been roughly doubling every two years. Moreover, the computing power of microprocessors has also been doubling every two to three years. As a result, the computing power of microprocessor chips has increased by more than two orders of magnitude since the early 1970s.

This rapid change in ICT innovation and investment has brought worldwide expectations of higher productivity and prosperity. However, Solow's productivity paradox highlights the concern that investment in and diffusion of ICTs is perhaps not being represented in macroeconomic indicators. One reason for this is the fact that benefits will only be realized in the long run.

However, Solow penned his paradox in 1988, when the world was very different from today. Times have changed dramatically; there has been a dot.com and a dot.bomb. Moreover, these days, firms create innovative relationship with each other; they exchange information and make all kinds of transactions in new ways. It is now possible to talk about the existence of an ICT-leveraged economy, with ICTs at the forefront of a new revolution that aims at doing the following:

- (a) Reducing friction;
- (b) Reducing search costs;
- (c) Reducing cost of replication;
- (d) Increasing speed;
- (e) Increasing learning;
- (f) Creating networks.⁸

In sum, countries that are able to learn from the global perspective and invest in ICT capital have enormous potential for reducing costs, enhancing productivity and improving living standards in the future. However, using related measurements for crafting and implementing strategies towards the knowledge society must be done very carefully.

I. CONCLUDING REMARKS

Strategies towards the knowledge society must include a description of the country in question, in terms of basic infrastructure and development, for example, the number of phone lines and number of ICT graduates. Indicators and timeframes must accompany these descriptions. The knowledge society is a complex phenomenon that must also be investigated in terms of promoting the ICT sector and creating awareness, which must be done by using well-proven and powerful strategic tools.

⁸ This is based on Metcalfe's law, which relates to the fact that until a critical mass of users is reached, a change in technology only affects the technology. However, once critical mass is attained, social, political and economic systems change. For example, it is possible to consider the Internet. It reached critical mass in 1993, when there were roughly 2.5 million host computers on the network. By November 1997 this network contained an estimated 25 million host computers. Given the fact that computing costs are continuing to drop rapidly, and that this dominant computing network is growing exponentially, a social, political and economic revolution is likely.

This chapter reviews several tools that can help Arab countries to craft strategies and determine modalities of implementation. One of these is SWOT analysis, which is useful in finding the perfect fit between national and regional resources, and the global environment. Another is BCG matrix, which helps to compare and prioritize several strategic approaches, initiatives and projects. ICT initiatives can also be prioritized using PEST analysis, which helps to develop an understanding of the most important environmental variables.

With regard to promoting an ICT sector and encouraging ICT acceptance in traditional sectors, the five forces analysis can be used to help to identify crucial economic and competitive issues through five basic competitive forces that determine the attractiveness of a particular ICT initiative.

Another useful tool is the value chain, which breaks down sectoral activity into different sequential links, enabling decisions to be made regarding the promotion of some parts of the chain and the harvesting of others. Finally, innovation is introduced as the basis for sustainable comparative advantage in Arab countries and the basic factors leading to national innovative capacity are listed.

This chapter also reviews the importance of including measurements for three purposes: (a) establishing the starting point in relation to strategies towards the knowledge society; (b) monitoring the implementation of strategies; and (c) predicting the future.

Countries must determine the extent to which they wish to focus on moving towards the knowledge society as a driver of socio-economic development, either through a process of low growth or through sustained income growth, which is characterized by innovation and participation in the global economy, and therefore an emphasis on learning.

There is a need to compare and prioritize alternative ICT initiatives to ensure that the knowledge society in Arab countries becomes a part of their culture, society, economy and the global knowledge society.

In sum, a strategy for the knowledge society must have the following main characteristics:

(a) It must ensure innovative, effective and efficient use of ICT. Countries must ensure the availability of ICTs, for example, telephony and Internet, and must exert strenuous efforts to deploy them;

(b) It must detect unoccupied niches in the regional and global environment, thereby enabling a country to focus on a reduced number of ICT initiatives.

III. CASE STUDIES

A. INTRODUCTION

This chapter aims to describe the process of crafting a strategy for the knowledge society and the implementation of such a strategy in Lebanon and Yemen. Lebanon was chosen for its pluralism and level of development, and for the examples it offers in terms of leadership. Yemen was chosen on the basis that it is the only least developed country in the ESCWA region, and because it has experienced accelerated change in the past decade. These case studies illustrate some important considerations for strategy, particularly in terms of leadership.

The information presented below is based on official documents and reports produced by the public and private sectors, and by various international organizations and research bodies; it is also heavily based on interviews with Government and private sector executives.

This chapter introduces a model to analyse the efforts of the Governments of Lebanon and Yemen with regard to making progress towards the knowledge society. It also compares and contrasts the efforts and initiatives of these Governments.

The model provides a framework for analysing the process of crafting and implementing a knowledge society strategy in Lebanon and Yemen, in the context of the four-pillar World Bank framework,⁹ and E. J. Wilson's "quad", (Wilson, 2003).¹⁰ It also helps to identify challenges and success factors.

In addition, the model is two-dimensional, representing on the one hand the formulation of the knowledge society strategy, and on the other hand, the implementation of the strategy (see figure IV). These are linked by a leadership component, which is capable of transforming a vision into results. Leadership can effect changes by establishing a sense of urgency, formulating a strategy and endorsing its implementation.

The upper side of the model, which is related to the drafting of a strategy, is based on SWOT analysis combined with an understanding of the comparative advantages of the country. The lower loop includes key elements that influence the strategy execution process, for example, articulating and communicating the strategy, creating awareness and alignment amongst the various stakeholders, ensuring financial support for the strategy and securing the commitment of leadership that is endowed with the right executive power.

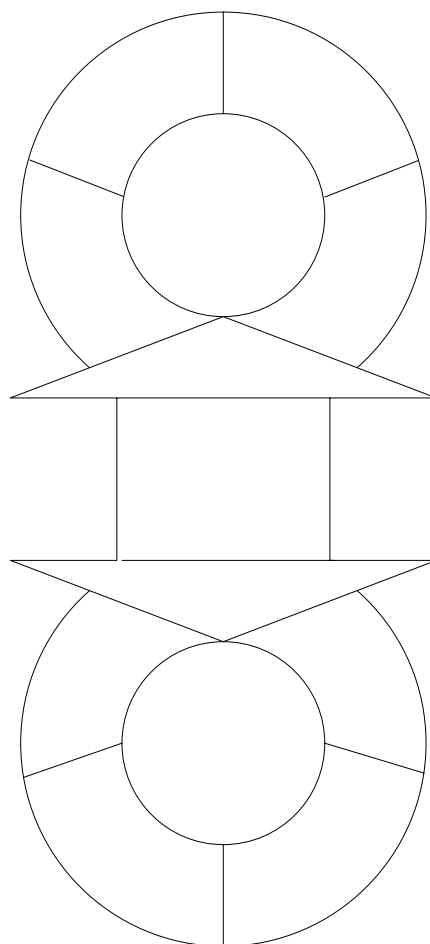
Strengths are resource capabilities that enhance competitiveness. Comparative advantage is achieved through a combination of resources that allow the delivery of a higher competitive value. Weaknesses relate to what a country lacks, or does poorly and which hinder its move towards the knowledge society. Threats consist of external factors that represent a menace to the pursuit of a knowledge society.

The model presents information as follows: (a) variables related to strategy; (b) variables related to leadership; and (c) variables related to implementation of the strategy.

⁹ According to the World Bank, efforts towards developing a knowledge-based economy can be described by means of a four-pillar framework: the economic and institutional regime, human resources, innovation, and telecommunications and information infrastructure.

¹⁰ For Wilson, a quad, which comprises the first few individuals from a Government, the private sector, NGOs and research bodies, usually champions the institutional reforms that are needed to start the transition towards a knowledge society.

Figure IV. Model for developing and implementing a knowledge society strategy



B. INITIATIVES TOWARDS THE KNOWLEDGE SOCIETY IN LEBANON¹¹

Lebanon is a small country with a population of approximately 4.5 million people and few natural resources. The two most important sectors are banking and tourism. Since the end of Lebanon's 15-year civil war in 1991, the country has made progress in rebuilding its economic infrastructure and political institutions. Nearly 15 years later, Lebanon has realized that it must embrace the digital economy or find itself relegated to the status of an underdeveloped country for years to come.

Various ministerial entities, with the help of external consultants and international funding, have attempted to devise initiatives to draft strategies to transform Lebanon into a knowledge-based economy. A strategy document was prepared that was largely the work of the Office of the Minister of State for Administrative Reform (OMSAR). This was reviewed by concerned public and private sector stakeholders, and resulted in the Lebanon Information Society Action Plan 2003-2010. Lebanon presented the "Lebanon Information Society Paper" (November 2003), which contained the country's national strategy towards a global knowledge society, to WSIS in 2003.¹² An e-strategy project was initiated in 2003, with funds from

¹¹ Much of the information in this section is based on interviews with the following: Raymond Khoury, Office of the Minister of State for Administrative Reform (OMSAR); Ali Nahle, Banque du Liban; Alan Horne, Telecommunications Regulatory Authority (TRA); Radwan Hable, Ministry of Economy and Trade in Lebanon; Ayman Kayssi, American University of Beirut; and Fadi Makki, Ministry of Economy and Trade. This list of names has been reproduced without formal editing.

¹² As follow-up to the first phase of WSIS, which was held in Geneva from 10 to 12 December 2003 and in preparation for the second phase, which is scheduled to be held in Tunisia from 16 to 18 November 2005, countries have been forming working groups that involve people from all sectors, including the public and private sectors, civil society and academia, to work on the prioritization of national projects for presentation to WSIS and funding.

OMSAR and the ICT for Development Thematic Trust Fund (ICTD TTF) of the United Nations Development Fund (UNDP).

In cooperation with the European Union, the Ministry of Economy and Trade launched the Ecomleb project in 2004, which is an 18-month-long initiative aimed at promoting e-commerce. The Ministry is concentrating on building an appropriate e-commerce infrastructure, which aims to trigger a large number of initiatives in the country.

Another development is being initiated by the Central Bank, or Banque du Liban (BDL), which is in the process of establishing the Secure Electronic Banking and Information for Lebanon (SeBIL) project which set the groundwork for the creation of a secure national platform for e-banking and e-finance. SeBIL will provide infrastructure, as well as security and management layers for e-banking and e-payment countrywide. The project, which serves as a master plan to completely automate the banking sector in Lebanon, is financed by BDL, with private banks expected to participate on a per use basis. The expected implementation timeframe for SeBIL is two years. BDL has been authorized to implement any e-banking solutions as long as they are confined to a closed circle of banks in a business-to-business fashion; in addition, two circulars have been issued by BDL since March 2000, requesting banks to implement online transactions between head offices and branches, and encouraging them to offer Internet banking services. BDL is also pushing for the adoption of two laws, namely, an e-signature law and a law on the privacy of information.

There are also developments in other areas. The Ministry of Education has embarked on the design of an educational management information system, and the World Trade Organization (WTO) has mandated the liberalization, privatization and corporatization of the telecom sector.

In addition, OMSAR started work on a national e-strategy to implement ideas along eight tracks in 2005, aiming to build consensus through brainstorming workshops and quick-win projects and by working on securing new funding from regional and international organizations.

Most of the strategies and projects mentioned above, despite being carried out by different entities, converged in providing the following:¹³

(a) A readiness assessment report on the current state of the various sectors that are considered to have an enabling role in the move towards an integrated knowledge society and a knowledge-based economy, focusing on telecommunications and information infrastructure, human resources and capacity building, and the economic and institutional framework;

(b) A set of recommendations calling for the following actions: improving ICT infrastructure; reducing costs and increasing access to telecommunications and the Internet; providing a legal framework adapted to the requirements of a knowledge-based economy; and building human capacity and a leadership role for the Government.

1. *Knowledge society strategy*

(a) *Strengths and comparative advantage*

Most of those interviewed for this study agreed that Lebanon's main strengths with regard to building a knowledge society are related to its human capital, a successful diaspora,¹⁴ its geographic location, a more liberal economy than other Arab countries, a traditionally successful services sector, for example in banking and tourism, regional leadership in such knowledge-based industries as media and publishing, and finally an open and multilingual culture.

¹³ Government of Lebanon, "Lebanon Information Society Paper", November 2003 and *Lebanon Information Society Action Plan 2003-2010*, November 2003.

¹⁴ Rough estimates put the number of expatriates and people of Lebanese origin living abroad at up to 12 million people.

The value of the Lebanese individual vis-à-vis the knowledge society, both within Lebanon and in the diaspora was also acknowledged. These factors, in combination with a traditional openness and exposure to the Western world and a long tradition of maintaining an entrepreneurial and services-oriented culture, form a comparative advantages for Lebanon that cannot be easily replicated elsewhere. These assets can be leveraged and used for building the main elements of the knowledge society in Lebanon. The importance of small and medium-sized enterprises (SMEs) was also noted, particularly the entrepreneurial potential of individual ICT initiatives originating from SMEs. One interviewee commented that SMEs are an important pillar of the economy, in that many ICT initiatives start as individual projects in the private sector, and later serve to drive the participation of the Government.¹⁵

Interviewees also noted that Lebanon has a comparative advantage in its high quality human resources in the ICT sector, with workers who are able to become rapidly skilled in using new technologies, for example, in the area of software development for business or security applications and content creation.

(b) *Weaknesses*

According to those interviewed, Lebanon must deal with a number of weaknesses, including a large national debt that is crowding out economic growth, an inefficient bureaucracy and public administration, an outmoded legal framework, an ICT infrastructure that is well wired but does not offer state-of-the-art digital data services at affordable rates, social disparities and a digital divide across age, gender, education, geographic area and income.

All those interviewed highlighted the problem of the absence of a clearly stated and Government-endorsed national strategy for the knowledge society. They also emphasized that a major weakness was related to a lack of continuity as a result of frequent changes of leadership. In addition, interviewees noted that efforts must be exerted to develop skills and services in knowledge and content management.

With regard to the telecommunications sector, one interviewee mentioned that given that Organisme de Gestion et d'Exploitation de l'ex Radio Orient (OGERO), the leading telecommunications provider in Lebanon, is still owned by the Government, all new investments, including, for example, those required to build a public data network, require approval from the Cabinet.¹⁶ He also advocated the privatization and corporatization of the telecoms sector.¹⁷

Another weakness was noted in the area of banking. Interviewees stated that Lebanon was not yet completely ready to handle advanced banking operations; indeed, laws to promote e-banking have been pending since 2001, and still need to be approved by Parliament. They also said that the issue of business-to-customer (B2C) e-banking must be addressed through additional laws.

In terms of e-readiness, interviewees felt that there were certain structural weaknesses in the decision-making process and in relation to implementation mechanisms and that these presented major handicaps in terms of moving towards a knowledge society.

(c) *Opportunities*

Opportunities can be defined as avenues that enable Lebanon to make progress towards the knowledge society. Interviewees agreed that successfully implementing an integrated knowledge society strategy would enable Lebanon to tap into a wide spectrum of opportunities. In this context, substantial potential growth is possible in the traditionally successful service industries that Lebanon depends on, for example, tourism,

¹⁵ According to Radwan Hable.

¹⁶ Organisme de Gestion et d'Exploitation de l'ex Radio Orient (OGERO) provides national and international telephone and data services on the fixed network in Lebanon. Its role includes the operation, maintenance, sales, marketing, billing and management of the Ministry of Telecommunications fixed network. It was established in 1972 and is under the supervision of the Minister of Telecommunications.

¹⁷ According to Alan Horne.

through e-tourism, banking, through e-banking, and also media and publishing, by promoting online content creation. Growth is also possible in niche software development, and in value added services and activities, for example, by creating international and regional call centres that could leverage the potential of local human capital. The area of e-services, which already boasts some e-commerce sites, could provide Lebanon with major opportunities in the future.¹⁸

Another means of generating opportunities is through the telecoms sector. In this context, interviewees noted that the Telecommunications Regulatory Authority of Lebanon (TRA) could help to effect major improvements in the quality of service and the pricing scheme in the telecom sector, particularly in the context of the Telecoms Law, no. 431 of July 2002, which is concerned with opening up the sector to private participation,¹⁹ which is a source of opportunities and a means of contributing to alleviating poverty.

(d) *Threats*

In addition to political instability in the Middle East region, threats were perceived to be in the form of increased competition from neighbouring countries in sectors where Lebanon previously held a traditional lead, for example, tourism and banking services. Interviewees also felt that delays in moving towards an integrated knowledge society threaten the value of Lebanon's potential comparative advantages as other neighbouring countries continue to build their resource capacities at a more rapid pace. Delays also result in Lebanese knowledge workers, who are one of the main strengths of the country, finding work in countries where they can better actualize their potential.

Another threat with regard to Lebanon's knowledge society pertains to improvable levels of quality (Halazoun, 2004). Quality is crucial and could threaten a successful move towards the knowledge society. The private sector needs to discipline itself by working on quality, and also on such issues as copyright and intellectual capital. Addressing such issues is not entirely the role of the Government, but the Government plays an important role in promoting associations and private sector in this direction.

According to one interviewee, the establishment of Government entities or national committees for ICT issues must be encouraged, as a lack of such bodies is a threat to the success of any knowledge society-related initiative. The awareness of the need for such entities was raised in 1998, as a result of national ICT policy and strategy project at OMSAR that was funded by the World Bank. The first national committee for ICT was created in 2000 based on work carried out by the Ministry of Economy and Trade. The original goal was to form a committee comprising peers from the public, private, academic and civil society sectors; however, this did not happen and the committee was eventually only made up of representatives from the Government. This committee was dismantled in 2002 and replaced by a ministerial committee, which meets infrequently.

With this in mind, some interviewees agreed that some national ICT initiatives have not been sustained throughout Government changes, thereby resulting in a lack of continuity.

Interviewees noted that other threats are also related to aspects of the Government and its political structure. For example, the e-Government strategy that was developed in late 2002 by OMSAR, which lacks executive power, is still awaiting the approval of the Council of Ministers. Interviewees also noted that religious balance is an issue when it comes to choosing the members of any national committee, and that the appointment of officials can be affected by political pressure or disagreements.

¹⁸ For example, see the Al Rifai Roastery website. Available at: <http://www.alrifai.com/>.

¹⁹ The Government of Lebanon is creating an independent TRA to regulate the telecom sector with the aim of creating a competitive environment in which high quality services can be delivered at competitive prices to facilitate the development of the Lebanese economy and to provide benefits to all citizens.

2. Leadership

(a) Visionary leadership

The model in figure IV illustrates the central role of leadership in the formulation and execution of strategy. As suggested by the upper loop in figure IV, leadership towards the knowledge society must be visionary in nature, and be able to create an all-encompassing and inspiring vision of a knowledge society that stems from a clear understanding of where the country is, and where it can and wants to go. The vision sets the direction to be followed; and it describes the desired aspects of the knowledge society. It brings together various different entities; for example, Ministries, the private and financial sectors, some NGOs and other entities that promote the knowledge society and that are already deploying individual and separate efforts. Each of these has its own guiding vision and its own understanding of a country's future. These separate visions must be pooled to form a shared vision that will include different forms of knowledge that can become more readily available, in a faster and cheaper way, to a wider group of people, who in turn will generate knowledge of their own.

In this context, interviewees agreed that there was a need to establish a leading nationwide vision with regard to making progress towards a knowledge society. This could be facilitated by doing the following: (a) establishing an official Government entity for ICT; (b) considering changes to the Ministry of Telecommunications after privatization of the telecommunications sector; and (c) forming a new ICT ministry.

Another suggestion related to the fact that while pluralism is healthy, opposing directions could cause problems and should be unified under a common umbrella, namely, by creating a body to act as a unifying and guiding framework for various private sector initiatives, which as one interviewee suggested, could be known as the Information and Communications Technology Association of Lebanon (INTEL@C).

Other interviewees reiterated that radical reforms must be implemented to move the country in the right direction, including reforms of the Telecoms law.

(b) Executive leadership commitment

The lower loop of figure IV highlights the importance of executive leadership in terms of ensuring that change is occurring. The experience of neighbouring countries shows that a clearly articulated national vision and strategy coupled with a solid commitment from the highest levels of Government is a key driver of the successful adoption and implementation of knowledge related strategies. Such commitment is necessary in Lebanon, according to interviewees.

In this context, some interviewees mentioned that endorsing knowledge society initiatives through laws, which must be done through the institutional framework, is often a lengthy procedure. One way that the Government could be more effective in terms of executive leadership is to improve this procedure, for example by establishing a mechanism to fulfil this role.

It is also worth noting that strategies tend to be drafted by individual Ministries through consultancy projects, which are usually financed by international organizations. Not all of these strategies are endorsed by a ministerial-level committee or by an executive authority. Implementation of strategies at the national level requires executive power and commitment on the part of the leadership to ensure that strategies can achieve their maximum potential. At present, individual strategies and projects are being implemented by the bodies that initiated them, which can limit the potential of such endeavours; these need to be bolstered by new laws or the lowering of ICT tariffs, among other things.

This results in momentum that can never effectively build up and a rising amount of frustration among entrepreneurial entities that have acted as first movers towards the knowledge society. According to interviewees, any strategy, vision or initiative at the national level in Lebanon must be the outcome of a consensus among the three political branches or poles of power in the country, namely, the president, the

prime minister and the head of Parliament. According to officials from various ministries, none of these has clearly declared himself a champion of a strategy for a knowledge society in Lebanon.

Those interviewed agreed on the importance of an official Government ICT entity, for example a Ministry or an agency, supported by a multi-stakeholder national committee, with executive power. This Ministry or agency would have three main ICT roles, in that it would act as: (a) a facilitator, providing the proper environment and incentives; (b) a regulator, creating a liberalized and fairly regulated ICT environment; and (c) a leader, leading by example on the grounds that the Government, as a significant user of ICT, would be in a position to implement and showcase best ICT practices.

3. *Knowledge society implementation*

(a) *Alignment and coordination*

It is important to achieve synergy among all individual actors. The isolated strategies of individual knowledge society stakeholders must be linked and integrated to ensure that resulting efforts exceed the sum of the individual parts. Lebanon has not yet achieved formal cooperation or dialogue among its various Ministries and other sectors in terms of coordinating strategic efforts to move towards a knowledge society.

Coordination, however, is key, and contributes to avoiding the duplication of efforts or overlapping that has occurred with regard to e-initiatives in Lebanon. Partnerships between the private and public sector, and with other sectors, for example, education must be built. Coordination is particularly important between the Government and the private sector, which suffer from a tense relationship, with one blaming the other for lack of progress.

One interview suggested that in the absence of official committees to handle knowledge society issues, the Government must promote partnerships among Ministries. It was also noted that informal cooperation channels do operate between some Ministries, for example the Ministry of Economy and Trade and the Ministry of Telecommunications with regard to the issue of e-banking. Bearing these points in mind, interviewees recommended the creation of a national-level commission, including representatives from the public and private sectors to define a proper vision and utilize relevant experience and expertise.

The various stakeholders to be involved in e-strategy include the Government, the private sector, academia, civil society, and national, regional and international associations and organizations. As the need to enforce ICT standards arises, other potential stakeholders could include the Lebanese Standards Institution (Libnor), and other international standards groups. Interviewees stressed the need for stakeholders to complement each other's activities. Similarly, the rapidly increasing numbers of associations in the private sector must also streamline and consolidate their efforts. NGOs can contribute to the knowledge society by educating the needy or the underprivileged in skills that match the requirements of a particular community, thereby contributing to poverty alleviation.

Collaboration can be achieved in a number of ways, for example through peer-to-peer specialization group meetings, which are often more effective than committees, particularly in relation to information and knowledge gathering and sharing. On a wider scale also, regional communities of practice or practitioners are more effective than regional committees; they should be focused on enabling ICT themes, namely, infrastructure, the legal framework, content, knowledge and the human capital.

(b) *Communication*

In order to ensure that a knowledge society strategy is successfully implemented, it must be clearly articulated and translated into initiatives and clear objectives that are unambiguously communicated to all stakeholders. In Lebanon, setting targets for objectives and estimating progress based on either quantitative or qualitative measures can be challenging. For example, individual strategies that have already resulted in successful projects and initiatives tend to remain unfocused, in many cases, as a result of a lack of alignment and the absence of fully endorsed national strategy that has been properly communicated to all those concerned.

(c) *Awareness*

Creating a sense of urgency highlights the importance of successfully implementing a national strategy towards the knowledge society. A sense of urgency also encourages consensus, and the participation and contribution of new stakeholders. Generating awareness is key to the successful of implementation of knowledge society strategies: stakeholders must have an understanding of where the strategy should lead, why they must contribute to its successful implementation and how it will eventually benefit them. Some Lebanese initiatives have incorporated awareness campaigns, for example, Ecomleb. In addition, NGOs are also trying to create awareness of the benefits of a knowledge society through such projects as the Lebanon Development Gateway.²⁰

However, some interviewees felt that more could be done with regard to the issue of raising awareness of various knowledge society-related issues, for example, the potential role of TRA, which is expected to have a positive effect on GDP and Government assets.²¹ In addition, awareness must be raised among various sectors, businesses and industries with regard to creating associations or user groups of ICT and telecommunications to represent their interests and communicate them to the Government or the relevant body.

The awareness aspect is closely related to capacity building in the area of human resources and capital. With this in mind, awareness must be raised regarding the importance of adapting the education system, ICT curricula and overall education strategy to the needs of the global market.

(d) *Financial support*

A supportive financial and budgeting structure is an important success factor in the implementation of knowledge society strategy. In this context, interviewees complained about the difficulty of securing budgets that are clearly linked to a strategy for a knowledge society. For example, the Ministry of Telecommunications declared that it was unable to institute an enabling infrastructure for a knowledge society owing to a lack of financial resources to hire the necessary domain experts. It is therefore clear that in Lebanon, national strategies must be backed up by a matching financial strategy that outlines fund-raising mechanisms and sources, both external and internal. This financial strategy must also ensure that the allocation of funds is aligned with the objectives and priorities that are articulated in a national strategy.

For example, the first e-strategy for Lebanon was drafted with the help of funds from the Government of Japan through the UNDP ICT4D TTF framework. One interviewee noted in this context that civil society and NGOs tended to receive international funds for development in Lebanon, and that efforts should be made to channel initiatives funded in such a way towards the national strategy. Another example of financing is TRA, which is an independent Government body and is self-funded by the license fees it generates.

4. *Conclusion*

This case study shows that the knowledge society is gradually becoming one of the main priorities for various Lebanese stakeholders. In this context, Government leadership in both the formulation and implementation of strategies is critical. Ensuring the existence of the most suitable institutional frameworks to enable investments to yield desired results is also extremely important.

Lebanon has started its own journey towards the knowledge society. Cooperation among representatives from the private sector, the Government, NGOs and research bodies is beginning to emerge. The majority of knowledge society initiatives, however, are guided and encouraged by international organizations, including the United Nations, the European Commission and the World Bank. In terms of moving towards the knowledge society, Lebanon also benefits from the fact that it enjoys a comparative

²⁰ This is being implemented by the Collective for Research and Training on Development Action (CRTDA). Available at: <http://crttd.org/ldg/>.

²¹ According to Alan Horne.

advantage over other countries in its educated, multilingual and open human capital, both at home and in the diaspora. At the same time, legal, political and institutional factors must be improved to enable knowledge-based economic growth.

It is also worth noting that isolated initiatives for drafting and implementing strategy on the part of various stakeholders are in progress in Lebanon. These show a sound appreciation of the country's strengths and weaknesses, in addition to the opportunities and threats it faces. In this context it can be underlined that without the right implementation framework, good visions and strategies lose their value. With regard to Lebanon, therefore, it is necessary to stress that strategies cannot be implemented without the clear endorsement of an executive leadership that has the power to make progress and swiftly remove obstacles. Furthermore, to ensure sound implementation and synergy, mechanisms for cooperation and knowledge sharing must be established among various stakeholders and actors to create the required alignment with strategies.

C. INITIATIVES TOWARDS THE KNOWLEDGE SOCIETY IN YEMEN²²

1. *General information*

Yemen covers an area of 460,000 km² and has a population of approximately 20 million. The Government of Yemen is currently attempting to modernize a society that only recently started to open up to the rest of the world during the last generation. Since 1994, Yemen has been slowly crawling towards greater stability, with occasional setbacks.

Yemen, which is the only least developed country in the ESCWA region, has been struggling with a number of monumental challenges in its pursuit of socio-economic development during the past decade. These challenges include the unification of the North and the South, high poverty rates, high and increasing unemployment rates, alarming illiteracy rates, poor infrastructures and, most importantly, a widening knowledge gap between Yemen and the rest of the world. Various Governmental entities have drafted plans and strategies that are meant to face those challenges, drive social and economic development in the country and set the path towards a knowledge society.

As early as 1995, the National Information Centre (NIC), which is directly linked to the Office of President, was established to initiate an information infrastructure. The Centre has developed a number of databases covering politics, economics, industrial development, agriculture development, law and history, and is credited with carrying out an information survey in 2001.

The Ministry of Telecommunications and Information Technology, in the context of a five-year plan covering the period 2001-2005, adopted a national programme of information technology, which is aimed at using ICT to further social and economic development and to improve performance and productivity in various governmental entities.

²² The information in this section is based on interviews with the following: Mutahar Al-Abassi, Deputy Minister for Development Plans; Daoud Al-Hidabi, University of Science and Technology, Sana'a; Toufic Sufian, Sana'a University; Fadhi Al-Mamari, International Telecommunications Company; Said Al-Dobai, University of Sana'a and Ministry of Education; Mohammed H. Melhi, Chairman, YemenSoft and Infinit Education; Han C. J. Blom, Ministry of Higher Education and Scientific Research; Loay A. Aldibsi, Management Centre for International Cooperation; Yehia Alrewi, University of Aden; Kai Partale, National Hotel and Tourism Institute, Sana'a; Ameen Hassan Alkaderi, Education Development Centre; Abdulkarim Al-Subbary, Faculty of Science, Sana'a University; Mohamed Mutahar, Ministry of Education; and Kamal Al-Gibri, Ministry of Telecommunication and Information Technology. This list of names has been reproduced without formal editing.

2. Initiatives

A number of initiatives and programmes to promote ICT in higher education and Government institutions have been initiated in the past five years, often financed by such international organizations as UNDP. In 2004, the Ministry of Higher Education and Scientific Research established a national ICT policy for higher education, through the National Master Plan 2005-2008. The Ministry of Telecommunications and Information Technology has also started to move towards an e-Government structure by means of such initiatives as the e-Rial.²³

While these initiatives and projects are being carried out by different entities, they provide the following:

(a) A survey of the current state of those sectors that have a vital role in ensuring that Yemen moves towards an information society, covering telecommunications and information infrastructure, poverty and illiteracy rates, human resources and capacity building, and economic and institutional frameworks;

(b) A number of recommendations related to improving ICT infrastructure, reducing costs and increasing electricity, telephone and Internet penetration rates, restructuring Government institutions, providing a legal framework adapted to the requirements of an information economy, and building human capacity and coordination between the various initiatives and efforts.

Based on interviews with experts and reviews of initiatives and projects, various aspects related to the crafting and implementation of knowledge society strategies are explored below.

3. Knowledge society strategy

(a) *Strengths and competitive advantage*

The geographic location of Yemen is one of its most important strengths, and gives the country a significant competitive advantage. The port of Aden, which is situated mid-way between Northern Europe and the Far East, and was one of the largest harbours in the world during the 1960s, offers an example of how this advantage could be used to initiate progress towards the knowledge society in Yemen, by means of establishing a free trade zone there, similar to the Dubai Internet City free trade zone. Given that such zones provide a knowledge economy ecosystem that supports the business development of ICT companies, such a zone could create jobs and opportunities for private enterprises in the ICT hardware and software sector.

Another of a Yemen's strengths is its rich cultural heritage, which could form the basis of a flourishing tourist industry. This could be promoted by the knowledge society, namely, through e-tourism and e-commerce.

(b) *Weaknesses*

Yemen's journey towards the knowledge and information society is hindered by a number of weaknesses, one of the most prominent of which is the fact that it is beset by alarmingly high illiteracy rates. This is compounded by a significant population growth rate, limited economic resources, soaring unemployment levels and rising poverty rates. In addition, interviewees noted that Yemen has an outdated primary and higher education system, which is failing to correct excessive deficiencies in the capacity building of human resources, which in turn has led to persistent shortages in qualified personnel in such areas as technology or scientific research. Yemen also suffers from a significant gender divide, with women accounting for some three-quarters of the total illiterate population.²⁴

²³ See the e-rial website. Available at: <http://www.e-rial.post.ye>.

²⁴ See Early Childhood Development Virtual University. Available at: <http://www.ecdvu.org/>.

Other significant weaknesses include a lack of proper basic infrastructure, as well as a highly inefficient public administration that is plagued by a lack of transparency and accountability (Alrewi, 2004).

(c) *Opportunities*

The process of moving towards an information and knowledge society could lead to a number of opportunities for Yemen. For example, the introduction of ICT and e-Government in various public and Government institutions is a means of restructuring the outdated bureaucratic public administration, and could lead to improved transparency, accountability and efficiency.

In addition, such projects as the community development portal, mobile Internet units and telecentre franchises promise to reduce illiteracy, particularly in rural areas (UNDP, 2002). Given that public, legal and ICT infrastructure is at an early stage of development in Yemen, a real opportunity exists with regard to adopting tested best practices and technologies that would allow Yemen to take greater strides towards the knowledge society.

(d) *Threats*

According to those interviewed for this study, three main threats are particularly relevant to Yemen in terms of making progress towards the knowledge society. The first of these is resistance to change, which is threatening the implementation of a national information and knowledge strategy; the second is the reluctance of bureaucrats in public institutions to move ahead, which is threatening to overcome the implementation of an e-Government project (Alrewi, 2003).

The third threat is related to political opportunism and misuse of the contributions of international donors, which is not only jeopardizing specific projects, but also chances of gaining future support. Political dissension and instability also constitute a major threat that could hinder progress towards a knowledge society.

4. *Leadership*

(a) *Visionary leadership*

The role of leadership in crafting and implementing a strategy cannot be overemphasized. As highlighted in the section above, and in the upper loop of figure IV, leadership is instrumental in driving a strategy from the formulation to the execution stage, and must play a visionary role by creating an all-encompassing and inspiring vision of a knowledge society. Bearing this in mind, interviewees noted that there have only been isolated examples of such leadership in Yemen, on the part of various Government bodies and Ministries, for example, the Ministry of Telecommunication and Information Technology, or NIC, which is involved in building the ICT sector in Yemen. Overall, a clear vision in terms of a strategy towards the information society is still absent and a well defined leadership commitment to a national strategy has yet to materialize.

(b) *Executive leadership*

Executive leadership is another vital component in crafting and implementing strategies, as emphasized above. For example, NIC, which as mentioned above is linked to the Office of the President, could be endowed with executive power.

However, NIC is still at a stage where it acts as an information centre, by compiling databases on various aspects of the country. It has not yet demonstrated any role in setting a strategy for promoting a Yemeni knowledge society.

5. *Knowledge society implementation*

(a) *Alignment and coordination*

As is the case in Lebanon, isolated plans and projects that have been initiated by individual stakeholders and actors must be linked and integrated to achieve a greater impact. However, a cooperation framework to coordinate efforts and initiatives to move towards the information society is lacking among the various Ministries on the one hand, and among the Government and other sectors on the other hand (Alrewi, 2005). E-initiatives and projects tend to be duplicated and overlapping rather than be complementary. Partnerships between the private and public sector as well as other sectors such as education have yet to be built.

(b) *Communication*

As mentioned above with regard to Lebanon, knowledge society strategies must be clearly articulated and translated into initiatives and clear objectives that are unambiguously communicated to all stakeholders. In this sense, NIC has a role in drafting an ICT strategy and performing relevant surveys that could contribute to setting targets for objectives and estimating progress based on accurate measurements. Interviewees also noted that individual strategies that have already resulted in successful projects and initiatives tend to remain unfocused, often as a result of a lack of alignment and the absence of fully endorsed national strategy that has been properly communicated to all those concerned.

(c) *Awareness*

There is a need to create a sense of urgency regarding the importance of successfully implementing a knowledge society strategy in Yemen. However, given that other developmental issues and initiatives related to basic health, poverty alleviation and the improvement of literacy rates, and the condition of women and human rights top the agenda for socio-economic development in Yemen, the knowledge society is still considered an ambitious goal and therefore tends to be underemphasized.

(d) *Financial support*

Like Lebanon, Yemen must ensure that a supportive financial and budgeting structure is in place to ensure success in implementing knowledge society strategies. The national information society strategy needs to be backed up by a matching financial strategy that identifies external and internal funding mechanisms and resources. This financial strategy must also ensure that the allocation of funds is aligned with the objectives and priorities articulated in a national strategy.

6. *Conclusion*

Despite the fact that Yemen has much to achieve, it has started its journey towards the information and knowledge society. While the country suffers from a number of significant weaknesses, opportunities for major socio-economic improvements can be realized in through a successfully drafted and executed strategy. Leadership in both the formulation and implementation of strategies is critical, particularly when it comes to establishing the right driving vision. It is also important for Yemen to coordinate efforts and avoid the duplication of initiatives, to streamline the strategy execution process and improve effectiveness and efficiency.

D. LEBANON AND YEMEN: SIMILARITIES AND DIFFERENCES

The fact that the same conceptual model was used as a framework to study Lebanon and Yemen makes it possible to compare and contrast the initiatives of the two countries.

Both Lebanon and Yemen have suffered from civil wars and political unrest that have hindered their social and economic development, leaving both countries with outdated ICT and other forms of

infrastructure, an inefficient public sector and a legal framework that does not cater for the Internet revolution.

However, a comparison of selected recent national indicators shows some clear differences between the two countries (see table 4). Lebanon is three times more urbanized than Yemen; its per capita GDP is 10 times higher, its population growth rate is much lower, and its literacy rates are much higher than Yemen. In addition, ICT indicators reveal that Yemen clearly lags behind Lebanon in that it has less telephone lines and a lower rate of Internet penetration, lower number of Internet hosts and considerably less published content on the Internet.

TABLE 4. COMPARISON OF INDICATORS FROM LEBANON AND YEMEN

| Indicator | Yemen | Lebanon |
|---|-------|---------|
| Urban population, as percentage of total population | 25 | 90 |
| GDP per capita per year (in dollars) | 445 | 4 883 |
| Cellular subscribers, as percentage of total population | 3.6 | 27 |
| Personal computers, as percentage of total population | 0.2 | 10 |
| Human Development Index | 0.47 | 0.75 |
| United Nations Conference on Trade and Development | 0.08 | 0.26 |
| ICT Diffusion Index | | |
| Gender Development Index | 0.42 | 0.73 |
| Literacy rate for adults over the age of 15 | 0.53 | 0.86 |

Source: ESCWA, ICT indicators database, 2005.

(a) *Strengths and competitive advantage*

Lebanon and Yemen have a geographical location that is in their favour, and which serves, in both cases, as a bridge between East and West. In addition, both countries have the potential for a flourishing tourism industry. However, while Lebanon counts its human capital as one of its major resources, Yemen needs to work on building its human capacity.

(b) *Weaknesses*

Lebanon does not suffer from the problems that Yemen suffers from, namely, high population growth rates, acute poverty or high illiteracy rates. However, both Lebanon and Yemen must strive to make improvements in a number of areas, for example, with regard to ICT infrastructure, bureaucratic public administration and outdated legal frameworks.

(c) *Opportunities*

Opportunities for Lebanon are mainly related to its ability to leverage its human capacity in such services industries as e-banking, and also in online content creation or even niche software application development markets. Opportunities for Yemen are related to its adoption of already tested best practices and technologies.

(d) *Threats*

Both Lebanon and Yemen are threatened by political instability. In addition, Lebanon is further threatened by a drain of its most important resource, namely, its human capital, which is being absorbed by neighbouring countries, including Yemen.

(e) *Leadership*

One of Lebanon's major handicaps in its journey towards the knowledge society is a lack of leadership commitment and the absence of a Government champion with the necessary executive power to drive

initiatives and strategies. The problem for Yemen is different, and relates to the fact that its leaders are not endeavouring to adopt a national strategy for a knowledge society. Moreover, knowledge society issues are a minor component of development plans for Yemen rather than an overriding aspect of any development strategy.

(f) *Alignment and coordination*

Proper mechanisms for the coordination and alignment of strategies in both countries are lacking, resulting in weaker impact of strategies and lost momentum of individual initiatives.

(g) *Communication*

Communication is related to alignment and coordination, and is a major success factor in the implementation of any strategy. Both Lebanon and Yemen suffer from a lack of proper communication mechanisms, which could potentially undermine the results of initiatives and threaten their momentum.

(h) *Awareness*

As a result of greater exposure to the Western, Lebanon enjoys a higher level of awareness with regard to the urgency of adopting a national strategy for the knowledge society. Yemen, however, continues to struggle with development issues that are considered to be a higher priority than issues related to the knowledge society.

(i) *Financial support*

Financial support for knowledge society strategies has been affected by the fact that Lebanon and Yemen do not have a clearly adopted national strategy for the knowledge society.

E. CONCLUDING REMARKS

Strategy is defined above as a way of providing direction and scope over the long term, with the aim of achieving advantages through the configuration of limited resources, human or otherwise, within a changing environment, to meet the needs of citizens. Both case studies show that the development of a strategy rests on outlining the mission and the vision of a strategy, and then performing a strategic analysis that provides an assessment of strengths, weaknesses, threats and opportunities. This should be followed by the formulation of a plan of action, at which time objectives are set and the strategy is articulated. This must be carried out by an effective leadership, which has the ability to create a vision, and the capacity to design the strategy and to execute it.

The execution of a strategy is more crucial and challenging than defining the strategy itself, and must be followed by a feedback process to evaluate, monitor and ensure that necessary modifications or corrections are made. The case studies on Lebanon and Yemen offer some lessons learned in relation to successfully executing a strategy, including the importance of the following:

(a) Translating a strategy into operational terms by describing the strategy in a consistent way through objectives, initiatives and measures. In this regard, measurement helps to communicate expectations and results, and contributes to governing progress with regard to individual initiatives and in terms of general strategy implementation;

(b) Aligning implementation with the strategy by creating synergy across various initiatives;

(c) Making strategy the major concern through education and raising awareness;

(d) Making strategy a continuous process by linking it to the budgeting process and securing financial support;

(e) Mobilizing change through the executive leadership to ensure that strategic implementation is on track.

IV. IMPLEMENTATION MODALITIES

A. INTRODUCTION

While it can be difficult to reach a consensus on the content of a strategy, what is much more complex is the institution of measures that ensure and help to monitor the faithful implementation of the strategy. Moreover, it can be the case that despite the high quality of a strategy, it could fail to be implemented. With this in mind, the focus of this chapter is on the modalities that must be adopted to enhance the effective implementation of a strategy. In addition to anticipating possible obstacles to the realization of a knowledge society and a knowledge-based economy, this chapter explores ways of confronting these obstacles, and reviews the establishment of a monitoring and follow-up mechanism.

Given the findings of previous chapters, the major challenge with regard to the implementation of strategies is a sense of reality. A strategy must be specific, realistic and give stakeholders a goal to strive towards. Information society strategies must be related to concrete actions on the ground, the means to finance these actions, a coordination framework and the environment or cluster in which it will operate, as this provides links to other initiatives, and encourages the networking effect.

Partnership is another key element for successful initiatives aimed at making progress towards the knowledge society. The role of implementing a strategy for building the knowledge society, therefore, belongs not only to Governments, but also to the private sector and NGOs.

According to a WSIS report, countries must launch initiatives to implement ICT as a development enabler and create a more inclusive knowledge society; the report also noted that all partnership, financing and clustering modalities must be used. It also suggested, however, the necessity of a thorough review of the adequacy of countries in meeting the challenges of ICT for development, which means, in other words, that some modalities could be inadequate for some forms of implementation, based on the fact that implementing ICT initiatives is not the same as implementing initiatives related to poverty reduction or other development initiatives (WSIS 2004b).

The possible inadequacy of implementation modalities for knowledge society strategies is related to the dynamism of ICTs and the fact that ICT applications are evolving so rapidly. This dynamic aspect makes it very difficult to envision what type of impact ICTs will have in the next few years, and what type of partnerships and financing will be necessary or adequate. In this context, strategies—and governance schemes—must be crafted in such a way as to be flexible enough to accommodate future technological development. In addition, strategies and implementation plans must focus on donors, and also on project management itself.

Another possible source of inadequacy is the difference between projects that aim to make a direct social impact and projects with a profit goal. While all projects are aimed at effecting social change and developing a more cohesive society, some lean more towards generating profits, than alleviating social concerns. Both types of projects require a different partnership structure and a different approach to financing mechanisms. This issue is reviewed in greater detail below.

A three-point implementation plan covering financing, partnership and clusters is suggested in this chapter, which also includes recommendations regarding the creation of national steering committees for the implementation of strategies towards the knowledge society. This chapter also includes information regarding successful clusters in ESCWA member countries.

B. FINANCING THE CREATION AND GROWTH OF THE KNOWLEDGE SOCIETY

Financing the creation and growth of the knowledge society is a means of achieving the goal of transforming Arab countries into key players in the information revolution. However, significant funds are needed to achieve this goal.

In this context, some \$40 billion must be spent on ICT infrastructure in the ESCWA region to bring ICT penetration rates in member countries up to world averages (ESCWA, 2004). Moreover, R&D accounted for only 0.5 per cent of GDP in Arab countries recently, which means that a significant amount of financial resources are needed to build new networks of R&D institutions and move away from net imports of technology.

During the past decade, the development of ICT infrastructure in Arab countries has been financed from Government budgets, which mostly comprised revenues generated by telecommunication ministries, or from donor and international financial institution programmes that provided substantial capital infrastructure investments. However, financial strategies and modalities must move towards reliance on capital from the private sector, in alignment with the transformation of the ICT sector and ICT development.

In the present environment, Government and private sector organizations wishing to attract funds must take into account the fact that financing modalities are negotiated on a global scale. At this level, international investors and financiers are driven by a risk-return reward mentality and the need to achieve a maximization of profits in investments. Such knowledge is key to enabling all countries, including those at the bottom of the pyramid, to participate in the new knowledge society. With this in mind, countries must change their mindsets from being receptors of funds to fund-raisers, and therefore be able to establish the right conditions for attracting funds.

The first condition for attracting funds is a well-established enabling environment. A supportive environment for business must be created, and policies for the open entry of ICT products, fair competition and market-oriented regulation must be devised. Furthermore, the establishment of national e-strategies and the integration of ICT into poverty reduction and/or other national development strategies is a prerequisite for funding. Such national e-strategies establish a set of key priority areas for intervention, many of which are linked to the priorities stated within national development strategies. Donors align their aid and partnership strategies to the priorities outlined in such development strategies.

Policy incentives are also useful in attracting funding for projects in rural areas for the purposes of poverty alleviation, and could include such measures as removing restrictions on competitive entry for the ICT business sector and local community network operators.

1. Projects for profit

Projects that are designed to make a profit are financed either through foreign direct investment (FDI) or through debt and private equity. This is explored in greater detail below.

(a) Foreign direct investment

The international private sector is becoming the dominant player with regard to investing in infrastructure, particularly in the areas of fixed and mobile telephony, computers, and the Internet and other forms of ICT. Projects targeting these areas aim to improve social conditions, but are mostly designed to generate profits. The main modality for financing such projects is FDI. For example, China has made FDI a central pillar of its strategy to make progress towards the knowledge society, as underlined by the ubiquitous presence of ICT firms in the country, either as individual entities or as joint ventures with Chinese firms. China understands that such multinational companies as Motorola possess unrivalled technological and financial advantages over Chinese firms. Moreover, China decided to re-enter into the World Trade Organization in 2001, and initiated moves to liberalize control of FDI, thereby enabling China to move ahead with internal economic reforms and develop a local ICT industry that is globally competitive.

However, FDI has yet to be a significant factor in Arab countries in terms of moving towards the knowledge society. According to the United Nations Conference on Trade and Development (UNCTAD), FDI decreased in 2000 in ESCWA countries, and after the dot.com boom, but is once more on the increase, particularly in mobile telephony. According to UNCTAD, FDI accounted for approximately 6 per cent of GDP in ESCWA member countries in 2005; however, this amount fluctuates from year to year, and is the lowest ratio of FDI to GDP in the world, which means that it is hindering inflows of knowledge and

technology. In 2002, FDI inflows into the ESCWA region amounted to \$1,626 million, representing only 0.25 per cent of global flows of FDI, a drop of 7.8 per cent from the 2001 figure of \$1,760 million (see table 5).

With regard to cases where the private sector finances infrastructure, multilateral development banks and international donors are shifting from investing in public resources to funding policy reforms and other environment enablement initiatives. For example, rather than financing the development of infrastructure, the World Bank Group is moving towards directly financing the ICT private sector through the International Finance Corporation, which they feel multiplies private foreign and domestic investment fivefold.

International donors now have new priorities, for example, ICT policy and strategy development, and ICT initiatives for development in education, employment, health as well as other areas related to poverty alleviation. They are also becoming knowledge providers, providing technical assistance, best practices and trust funds.

TABLE 5. FOREIGN DIRECT INVESTMENT INFLOWS TO THE ESCWA REGION 1998-2002
(Millions of United States dollars)

| Country/area | 1998 | 1999 | 2000 | 2001 | 2002 |
|--|--------------|----------------|----------------|--------------|--------------|
| GCC countries | | | | | |
| Bahrain | 180 | 454 | 364 | 81 | 218 |
| Kuwait | 59 | 72 | 16 | (147) | 7 |
| Oman | 101 | 21 | 44 | 42 | 40 |
| Qatar | 347 | 113 | 252 | 296 | 326 |
| Saudi Arabia | 4 289 | (780) | (1 884) | 20 | (350) |
| United Arab Emirates | 258 | (985) | (515) | 257 | 95 |
| Subtotal | 5 234 | (1 105) | (1 723) | 549 | 336 |
| More diversified economies | | | | | |
| Egypt | 1 076 | 1 065 | 1 235 | 510 | 647 |
| Jordan | 310 | 158 | 787 | 100 | 56 |
| Lebanon | 200 | 250 | 298 | 249 | 257 |
| Syria | 82 | 263 | 270 | 205 | 225 |
| West Bank and Gaza Strip | 58 | 19 | 62 | 11 | 41 |
| Yemen | (226) | (328) | 6 | 136 | 64 |
| Subtotal | 1 500 | 1 427 | 2 658 | 1 211 | 1 290 |
| ESCWA | 6 734 | 322 | 935 | 1 760 | 1 626 |
| Developing countries | 191 284 | 229 295 | 246 057 | 209 431 | 162 145 |
| World | 686 028 | 1 079 083 | 1 392 957 | 823 825 | 651 188 |
| ESCWA/developing ratio (percentage) | 3.52 | 0.14 | 0.38 | 0.84 | 1.00 |
| ESCWA/world ratio (percentage) | 0.98 | 0.03 | 0.07 | 0.21 | 0.25 |

Source: United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2003; FDI Policies for Development: National and International Perspectives* (Switzerland, United Nations, 2003), pp. 249-251.

Note: Parentheses () indicate a negative value.

(b) Debt and private equity

International organizations that fund projects that have a social impact and that also make a profit use two main financing modalities: the first is external, and includes among other things, banking debt and organizational bonds; the second is internal, and includes private equity from the equity market.

The external modality comprises a loan for a fixed period of time, and incorporates the use of bonds, non-bank trade credits, multilateral-type funding and bilateral loans. In some cases the loan is based on low interest rates and small amounts of capital, namely, microcredits. Arab countries tend to use debt as a mode of financing.

The second modality includes seed financing, which consists of giving small amounts of capital to entities with promising business plans under very specific conditions. The equity market has huge potential in Arab countries and is being underused, and is considerably smaller than in other low and medium income countries. Equity finance is more appropriate for innovative projects or at the start-up and early stages of firms. Moreover, given the fact the financial systems of Arab countries tend to be debt markets that focus on funding working capital rather than creating capital goods, equity investments must be promoted.

Both modalities are based on quality and risk assessment of projects. With this in mind, knowledge society initiatives that incorporate a sustainable, profitable project have a greater chance of being financed than those that do not. In financial terms, either the debt holder receives a contractual debt repayment or the shareholder obtains a return on equity. This process of one entity financing another is beneficial for both sides, particularly in the case of debt, when the venture has lower risk in terms of debt repayment or in the case of an equity market, when a higher return on equity than other investment opportunities in a global context can be obtained. Furthermore, an arbitrage situation must be provided and there must be exit strategies for investors, including the possibility of reselling the equity, or a project deadline. Indeed, the policy environment must guarantee certain rights.

For example, the mobile telecommunications sector in Arab countries has been successfully financed through FDI using these modalities. However, it has been argued that FDI failed in terms of technology transfer and did not attract further investments, and that is also failed to create employment in the long term. It is important to learn from these experiences to avoid risks in the future.

With this in mind, it is possible to achieve more effective fund-raising for projects designed to make a profit by ensuring that countries do the following:

- (a) Devise a regional, national and sectoral plan of action with clear objectives and measurable milestones;
- (b) Define industrial projects so that they can be integrated into the global marketplace;
- (c) Devise business plans that include a financial component that is integrated with human resources and structure;
- (d) Ensure the existence of groups of economic interest to lead the implementation of a project.

It is also worth noting that in order to attract funding and investment, Arab countries must decrease the brain drain, for the reason that the risk capital industry mainly funds innovation as venture capital, and young privately-held companies are given equity or equity-related investments. In such cases, the investor often acts as an advisor or a member of the board of directors of a firm.

Moreover, initiatives towards the knowledge society are based on intellectual property assets and face certain issues vis-à-vis financing, including the following: (a) their value is long term; (b) few physical assets can be offered at the beginning; (c) products and services are often untested in markets and therefore, impacts and results are hard to predict; and (d) products and services quickly become obsolete. Cash flow and future revenue streams are therefore very difficult to evaluate.

In sum, building the knowledge society cannot be achieved solely through public funds, but must also include private investment. Governments now have a different role; they can develop guarantee schemes, as has been the case in Europe.

2. Non-profit projects

National and regional strategies aimed at making progress towards the knowledge society must also incorporate initiatives that rely on grants, and are funded by donors who understand that the goal is social change itself, not profit. Some of the services provided by such projects include access to public telephones, multipurpose community telecentres, access to electronic applications in rural areas and other innovative ICT initiatives for development and poverty alleviation.

Other ICT initiatives of a social nature are related to the promotion of digital Arabic content, which at present is much less developed than technological infrastructure in the region, but which is just as vital. Such initiatives suffer from a lack of funding.

Social grass-root initiatives in Arab countries tend to be small pilot projects or small-scale projects led by NGOs, private sector foundations, municipalities and international organizations, operating with little coordination and alignment. However, such initiatives can be unified through national strategies that establish priorities and encourage the alignment and escalation of projects, so that they can have a strong and coherent impact.

Non-profit projects also include information systems to improve the efficiency of local and national Governments, namely, e-Government applications, and these require urgent funding from donors in the Arab region. While such initiatives cannot be expected to provide profits themselves, they do, however, form the basis for the longer-term development of small enterprises and the private sector in general.

It used to be the case that initiatives were financed without too much regard for results: times, however, have changed; these days, donors are more determined than ever to meet social goals, but in order to justify funding they now require detailed reports, evidence of a relationship with national priorities and a clear link between individual initiatives and their role in the implementation of strategies towards the knowledge society. In other words, donors want to see a social return on their money, or rather, results that can be measured in terms of achieving social change.

The main sources of financing for such projects in the Arab region include the World Bank, European Commission, United Nations agencies, the United Nations Development Account, national funds and the United States Agency for International Aid (USAID) (see box 10), Islamic Development Bank, private sector companies and some private sector foundations. Other extremely important sources of funding include the official development assistance (ODA) programmes of OECD.

Another mechanism to fund such projects is the National Universal Service/Access Fund. Despite the fact that this is in a very preliminary phase of implementation, this fund is expected to contribute towards lowering the costs of delivery of ICT equipment to Arab countries and promote community access (see box 10).

Domestic sources of finance include microfinancing, venture capital, small ICT business incubators, public credit instruments, franchises, reverse auction mechanisms and other more innovative schemes. These domestic modes require a balance of external seed funding, technical expertise and advice regarding best practices, risk mitigation and commitments to support local entrepreneurs.

Box 10. Examples of financing for development initiatives

(a) *United Nations Development Account*

The United Nations Development Account funds the technical cooperation activities of the economic and social entities of the United Nations. Development Account projects are aimed at capacity building, through subregional, regional and interregional economic and technical cooperation among developing countries, and are implemented as individual projects that are aimed at achieving a distinct development impact. The projects serve as a natural extension to the normative and policy activities of the implementing agencies in their follow-up to United Nations conferences and summits on economic and social affairs. Projects are executed by member entities of the Executive Committee on Economic and Social Affairs.

Box 10 (*continued*)

With regard to the knowledge society, the fourth tranche of the Account focuses on capacity building for meeting Millennium Development Goals through partnerships, knowledge management and taking advantage of information and communications technology.^{a/}

(b) *Japan International Cooperation Agency*

The Japan International Cooperation Agency (JICA) acts as a bridge between the people of Japan and developing countries, advancing international cooperation by sharing knowledge and experience and working to build a more peaceful and prosperous world. It advances its activities around the pillars of a field-oriented approach, human security, and enhanced effectiveness, efficiency and speed.

In order to promote the knowledge society, individual third country training programmes were initiated in 1986, with the aim of training developing country counterparts involved in technical cooperation projects being undertaken by JICA, and to be applied in circumstances where it was judged that training would be more effective in a third country than in Japan. For example, a third country training programme was established in Jordan in 1992.^{b/}

(c) *United States Agency for International Development*

The United States provides assistance to foreign countries to further its foreign policy interests, namely, expanding democracy and free markets and improving the lives of citizens in the developing world. Spending less than 0.5 per cent of the federal budget, the United States Agency for International Development (USAID) works around the world to achieve these goals. USAID is the principal United States agency to extend assistance to countries recovering from disaster, trying to escape poverty and engaging in democratic reforms.

In 2004, USAID received requests for a total of \$1.4 billion in the Middle East and North Africa region, including from Egypt for \$575 million, Jordan for \$250 million, West Bank and Gaza for \$75 million and Lebanon for \$32 million.^{c/}

(d) *German Agency for Technical Cooperation*

The German Agency for Technical Cooperation (GTZ) operates in the area of international cooperation for sustainable development worldwide, and has a long history in the Arab region. It provides viable, forward-looking solutions for political, economic, ecological and social development in a global world. It supports complex reforms and change processes. All of its activities are geared to improving people's living conditions and prospects on a sustainable basis. GTZ's priority themes include ICT and economy, the private sector, vocational training and education.^{d/}

(e) *National Universal Service/Access Fund*

A fund for financing development projects was launched in the context of a 2004 WSIS report, in the understanding that financing is one of the main bottlenecks for implementing the knowledge society. Governments aim to offer services beyond those provided by the open market through this fund. The fund relies on innovative financing schemes to be more effective in serving more projects with fewer resources.^{e/}

a/ See United Nations, "Development Account". Available at: <http://www.un.org/esa/devaccount/>.

b/ See JICA. Available at: <http://www.jica.go.jp>.

c/ See USAID. Available at: http://www.usaid.gov/policy/budget/cbj2004/asia_near_east/me_summary.pdf.

d/ See GTZ. Available at: <http://www.gtz.de/en/>.

e/ See WSIS, *The Report of the Task Force on Financial Mechanisms for ICT for Development*, (December 2004). Available at: <http://www.itu.int/wsistffm/final-report.pdf>.

C. PARTNERSHIP

1. *Importance of partnership*

Partnership is one of the key elements of a successful initiative. Multi-stakeholder partnerships can trigger innovative ICT initiatives, and are very successful in mitigating risks and enhancing demand for ICT. They are also the best way to achieve capacity building, which triggers innovation, and social and business entrepreneurship.

It can also be noted that partnerships and cooperation among public, private and civil society organizations, the community and financial stakeholders are crucial to the process of building an ICT sector in Arab countries.

Regional cooperation is also critical in implementing ICTs for development, and is a means of boosting such countries as Yemen, which lags behind other Arab countries. As highlighted above, Yemen is severely constrained in terms of developing its public and private sectors. However, the development of regional infrastructure could help to serve national infrastructure in Yemen, and enable it to use its limited resources more effectively.

Research institutes, incubators and technopoles are examples of the type of partnership that must be encouraged in Arab countries. In Arab countries, development models for information or knowledge societies require national-foreign partnerships, where skills often come from foreign corporations, as is the case in the King Abdulaziz City for Science and Technology in Saudi Arabia or Dubai Internet City.

2. *Public private partnership*

The traditional roles of the public and private sectors are changing. Governments are increasingly playing the role of facilitator, rather than service provider; and companies within the private sector are not just striving for profits, but acquiring responsibilities of a social nature.

With this in mind, public private partnership (PPP) is the most important modality for implementing projects. This is based on the fact that while projects and firms that include innovation can be constrained by liquidity, PPP establishes a model that enables Governments and private sector to work together in terms of managing projects and mechanisms of financing, thereby easing the issue of constraints.

Knowledge society initiatives, for example, those targeting education reform and ICT infrastructure, require extensive capital availability and can therefore benefit from PPP modalities. While public expectations of the knowledge society are increasing, national budgets are dwindling. Moreover, many Governments are obliged to seek more innovative ways of attracting private investment to meet public objectives. This means that in the present environment, occasional cooperation is insufficient. There is a need to institutionalize and systematize PPPs in such a way that both sectors work towards mutual interests, and so that each partner uses his specific experience and abilities for the common good.

This modality provides Governments with private capital, and allows them to utilize private management expertise and specific sector know-how. It provides the private sector with a number of advantages, including commercial interest and business growth with a high investment security, and also brand, prestige, image and diversification, in terms of geography, market and products. The result is a win-win situation where Governments, the private sector and the citizens all gain benefits.

This modality is based on the signing of a 'partnership agreement', whereby public and private partners collaborate for a defined period of time in relation to one or more specific phases of a planned project, with a varying degree of involvement. The decision-making process and the board of directors can either be mainly based on the public or the private side, and in the case of the latter, the public sector monitors progress and sets frameworks.

The scope of PPP is often very different, and varies depending on whether it relates to, for example, building telecommunications infrastructure or developing social services. In the latter case, NGOs, churches, women groups and youth organizations can also play a role in the design and development of projects, reaching out and involving communities, delivering services themselves, screening for eligibility for Government support programmes and services, providing training and raising funds from the private sector.

Key success factors of PPP modalities include transparency, visibility, accountability and external auditing. The partnership must involve all components from the beginning with a clear structure of responsibility and commitment from all partners. The main obstacles for PPP are that additional efforts on the part of management and staff are required, dispersion of responsibilities, the notion of privatization, political and cultural constraints and bureaucracy.

One important final point is that the knowledge society involves long-term processes and long-term partnerships require perseverance and regular attention. There is a danger that partnerships, as a factor of their relative complexity, will not last long enough to respond to demands.

D. KNOWLEDGE CLUSTERS

One of the most common modalities for the implementation of a knowledge-based economy is the knowledge cluster and direct association of partners (ESCWA, 2001b). Therefore, initiatives aimed at making progress towards the knowledge society must be launched in clusters. While the cluster model can be applied to a multitude of industries, it is particularly useful for ICT applications and the ICT sector. Member countries of OECD agree on a definition of clusters as a combination of manufacturing and services industries in the ICT sector and other ICT-based sectors that capture, transmit and display data and information electronically (OECD 2001). Box 11 offers examples of how this modality has been applied in some Arab countries.

The role of clusters in a knowledge-based economy has increased in the past years and today clusters are a symbol of the knowledge society. Indeed, the development of ICT clusters attracts various interested parties, including scientists, senior politicians, regional development practitioners, ICT industry leaders and entrepreneurs. Clusters enable countries to become involved in the knowledge-based economy by offering a framework to design or assemble products linked to ICT or to use ICT to enhance the efficiency of other sectors. Therefore, Governments wanting to effect progress have built technology parks, enterprise centres, ICT incubators and hubs (UNDP 2002).

Key features of clusters include internal networking, linkages and formal and informal interactions. Commercial and non-commercial transactions are very important for clusters, which are said to exist by virtue of the existence of locally confined linkages. It has also been noted that a cluster comprises industries that are linked through vertical or horizontal relationships (Porter, 1990).²⁵

A variety of dedicated technology zones are being developed in ESCWA member countries; these focus on regional growth and aim to emulate the success of Silicon Valley, the site of the original modern ICT cluster (see box 12) and other successful clusters, including those in the following countries:

- (a) *Singapore*: electronics/precision-engineering clusters;
- (b) *Finland*: mobile commerce, wireless equipment and data security clusters;
- (c) *Scotland*: semi-conductor industry and assembly lines clusters;
- (d) *Ireland*: electronics hardware manufacturing, software products and services and call centres clusters.

²⁵ M. E. Porter's competitive theory is a means of understanding industry cluster development, and is detailed in his *Competitive Advantage of Nations* series, various years.

Most ICT communities, clusters or hi-tech parks are in some stage of Government-sponsored development. In order to show commitment, Governments must promote FDI, offer tax breaks, and provide cheaper labour, state-of-the-art office space, high-speed Internet access, research labs and cut-rate telecommunications.

The idea of clusters reveals a substantial paradox in the knowledge society, namely, the paradox of economic geography during an era of global competition. On the one hand, the knowledge society shows a trend toward decentralization based on virtual relationships. It is recognized that changes in technology and competition have diminished many of the traditional roles of location. On the other hand, industries, for example, tourism or finance, seem to maintain a particular affinity for clusters. Clusters, or geographic concentrations of interconnected companies, are a striking feature of virtually every national, regional, state and even metropolitan economy. Often ICT expertise continues to revolve around proximity: proximity to a university, proximity to an influential market, proximity to competing and ancillary firms, proximity to new technologies and ideas and proximity to knowledge.

As the old reasons for clusters diminish in proportion to the increase in importance of globalization, new reasons for establishing clusters, based on competition, are growing in importance in an increasingly complex, knowledge-based and dynamic economy. Clusters represent a new way of thinking about national, state and local economies, and they necessitate new roles for companies, Governments and other institutions in enhancing competitiveness.

Box 11. Selected clusters in ESCWA member countries

(a) *Bahrain*

Proposed: iTeknoCity

Proposed: Bahrain Technology Park

(b) *Egypt*

In operation: Mubarak City for Scientific Research and Technology Applications

In operation: Egypt's Smart Village

In operation: Sinai Technology Valley

Proposed: Northern Coast Technology Valley

(c) *Jordan*

Proposed: CyberCity

Proposed: Hashemite University Technology Park

(d) *Lebanon*

In operation: Berytech, Technological Pole

Proposed: Beirut Emerging Technology Zone

(e) *Oman*

In operation: Knowledge Oasis Muscat

Proposed: Sultan Qaboos University Science Park

(f) *Saudi Arabia*

In operation: Prince Abdullah Bin Abdulaziz Science Park

Box 11 (continued)

(g) *United Arab Emirates*

In operation: Abu Dhabi Centre of Excellence for Applied Research and Training Technology Park

In operation: Dubai Internet City

Proposed: Knowledge Village

Source: United Nations Industrial Development Organization, "Technology parks – Middle East and North Africa region". Available at: <http://www.unido.org/doc/26781>.

Box 12. Best practices: Silicon Valley

Silicon Valley is synonymous with the development of ICT and is the original modern cluster grouping. Situated south of San Francisco, it has become the most intensely innovative enterprise zone in the world.

Silicon Valley is an industrial cluster that employs 1 million people, some 40 per cent of whom have at least a bachelor's degree, and more than a third are foreign-born. The Valley is loaded with start-ups and former start-ups. Venture capitalists invested more than \$6 billion in 1999 in new or young Valley companies, and 77 companies had initial public offerings, mainly related to the Internet.

The great advantage of Silicon Valley is its ability to attract quality labour and venture capital. A large pool of engineers, scientists, and software experts are available to both new and old companies.

Source: SiliconValley.com. Available at: <http://www.siliconvalley.com/mld/siliconvalley/>.

E. CONCLUDING REMARKS

This chapter tackles the critical factors in the implementation of initiatives towards the knowledge society; it reviews modalities that allow the successful implementation of such projects, noting that in the first place, every initiative must be financed. This chapter elaborates on specific, feasible project financing schemes for each type of initiative. Two sources of financing are reviewed besides grants, namely, capital markets (debt) and equity markets. This chapter also notes that initiatives must be executed through partnerships, and that most knowledge society initiatives should operate in clusters in order to trigger innovation and make an impact.

This chapter can be viewed as a three-point implementation plan in that it describes the main considerations in relation to modalities of implementation, namely, financing, partnership and clustering. Institutional and human capacity-building activities are guided by the choice of implementation modality.

Crafting strategies and deciding on implementation modalities is a closed cycle in the sense that the process of deciding on financing, partnership and clustering provides a good opportunity for rethinking the strategy. This makes a strategy dynamic and open to change, which in turn is enabled by monitoring of the implementation process.

This cycle can be described as one in which strategy drives implementation, with a feedback link that completes the loop. Feedback is important in that it updates the strategy, keeping the strategy dynamic and alive. Feedback in relation to implementation is also a means of fine-tuning the adequacy of modalities of implementation to fit the reality of a particular country.

Most Arab countries will benefit from ICT in the long run, and a few will benefit tremendously. It is possible to build a booming high-tech sector by leveraging regional advantages and strong local loyalties. It

is also possible to apply ICT to enhance those sectors that already contribute to GDP. In this regard, increasingly integrated micro policies and strategies that enhance economic development and complement macro policies and strategies must be designed to achieve greater stability in the general economic environment. In this context, there is a need to develop effective and flexible modalities of implementation that can have a real impact on socio-economic development.

The last step in the implementation process is the creation of national steering committees. Such committees must comprise representatives of the three principal stakeholders, namely, the Government, which focuses on leadership concerns, the private sector, which provides the customer focus, and civil society, which focuses on the citizen. Meeting at least once a quarter under a rotating chairmanship, steering committees can, among other things, deliberate on eliminating constraints with regard to the implementation of the knowledge society at the national level, offer solutions to institutional and human capacity constraints, and generally ensure proper coordination. Representatives of professional associations, trade unions, and NGOs should be invited from time to time to contribute to the deliberations of these committees. While broad governance issues will be handled by the steering committees, matters specific to the implementation of each aspect of the knowledge society should be referred to focal points.

This process must be monitored. If the national steering committees and the constituent focal points diligently pursue the objectives assigned to them, they should be able to submit periodic reports on accomplishments. In particular, the framework proposed in this study makes it possible to ascertain how much a country has achieved at a certain point in time in terms of outlining and executing a strategy. Institutional and human capacity-building measures must be a component of the reports compiled by the national steering committees.

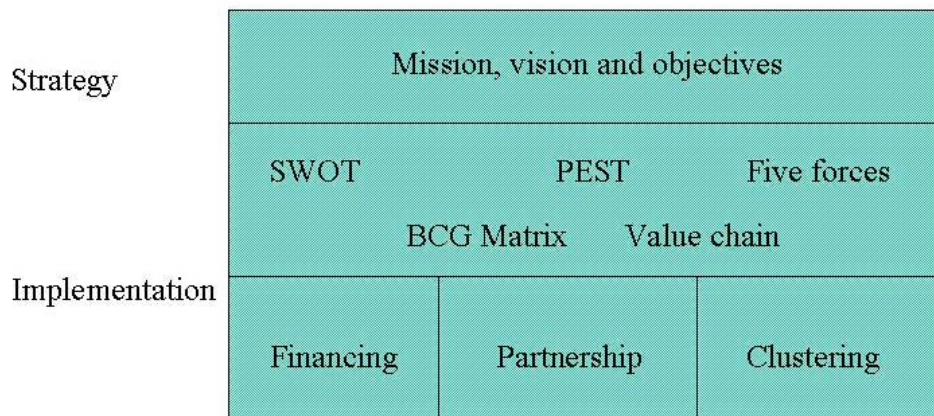
V. CONCLUDING REMARKS AND RECOMMENDATIONS

Moving towards the knowledge society means adopting customs and attitudes that value knowledge as a personal asset, an organizational resource and an economic prerequisite. The region must start moving into intellectual capital leverage, and must strive to create, disseminate, share and make such capital more productive. In doing so, it will be possible to create a society and economy that will appreciate and predict the value of intellectual capital.

A. GUIDELINES FOR KNOWLEDGE SOCIETY DEVELOPMENT

This study proposes a framework that is aimed at facilitating the process of crafting and implementing strategies towards the knowledge society (see figure V).

Figure V. Framework for crafting and implementing strategy



It also provides guidelines for Arab countries in terms of making progress towards a knowledge society. These guidelines comprise the following ten steps:

(a) *Step 1*: Formulate a national mission, vision and objective statements that are related to the knowledge society and economy, and achieve consensus among all relevant stakeholders, namely, Governments, the private sector and civil society;

(b) *Step 2*: Analyse the environment, in other words, determine the main issues for a country moving towards the knowledge society through the application of core strategic management tools, namely, SWOT analysis, BCG matrix, five-forces analysis, value chain and PEST;

(c) *Step 3*: Analyse the difference between the actual status quo and the desired status in a fixed number of years with regard to the knowledge society and economy;

(d) *Step 4*: Use a measurement system that relates ICT to socio-economic development indicators to better understand and prioritize initiatives towards the knowledge society and economy;

(e) *Step 5*: Prioritize initiatives towards the knowledge society to align them with objectives;

(f) *Step 6*: Create awareness of the characteristics of the knowledge society and the values that support it, both socially and economically, as well as the importance of agreed priorities;

(g) *Step 7*: Provide financing mechanisms for prioritized initiatives;

(h) *Step 8*: Orchestrate a network of partners for prioritized initiatives;

(i) *Step 9*: Promote and develop knowledge clusters, networking and the direct association of partners around prioritized initiatives;

(j) *Step 10*: Develop a monitoring and feedback system, including socio-economic impact indicators, to keep the strategy dynamic and alive.

B. RECOMMENDATIONS

The abovementioned guidelines are complemented by the following recommendations:

(a) Craft national strategies that include all variables that have an impact or which influence development in a country and ensure that strategies are realistic;

(b) Learn from international best practices, which provide examples that are relevant to Arab countries with regard to the process of crafting national strategies;

(c) Identify core issues in a way that makes it possible to unite all the symptoms and problems of a national situation and to provide insight for decisions;

(d) Ensure that leadership is committed to the knowledge society and is ready to facilitate change, sponsor initiatives and support projects;

(e) Coordinate efforts and avoid duplication of initiatives to streamline the strategy execution process;

(f) Establish an environment that can attract funds, including a legal system for private sector development, policies for poverty reduction and a climate of transparency, as well as create awareness of the possible modalities for financing initiatives;

(g) Facilitate dialogue among the relevant stakeholders to promote cooperation for initiatives;

(h) Incorporate institutional and human resources issues in all initiatives for the knowledge society and economy;

(i) Follow the recommendations and plan of action of WSIS, which has created momentum for countries to detect the main benefits, overcome the main limitations and establish priorities with regard to moving towards knowledge societies.

Annex

EFFECT OF ICT ON PRODUCTIVITY AND ECONOMIC GROWTH

Information and communications technologies (ICTs) are having a far reaching impact on economic productivity²⁶ and the success of individual firms, particularly when combined with investments in skills, organizational change, innovation and the creation of new firms. While this impact can be observed and measured at the firm level, it is much harder to detect and measure in terms of national economic productivity in Arab countries.

The widespread diffusion of the Internet, mobile telephony and of broadband networks demonstrates how pervasive such technology is becoming. However, despite this, many questions remain concerning the impact of ICT on economic productivity. For example, how precisely, do ICTs affect economic growth and the efficiency of firms, and what conditions enable ICT to enhance economic productivity?

ICT has the following three effects on productivity and growth:

- (a) They operate as capital goods: investment in ICT contributes to overall capital deepening and therefore helps to raise labour productivity;
- (b) They contribute to more rapid productivity growth in the ICT-producing sector as a result of rapid technological progress in the production of ICT goods and services;
- (c) Greater use of ICT contributes towards increasing the overall efficiency of firms, thereby raising productivity. Greater use of ICT can also contribute to network effects, for example, lower transaction costs and more rapid innovation, which improve the overall efficiency of the economy.

These effects can be measured and examined at three different levels of aggregation, namely, at the macroeconomic level, the sectoral or industry level, and the firm level.

The first effect is related to ICT investment. Capital deepening through investment establishes ICT infrastructure and networks. For example, ICT investment in selected Arab countries can be compared to that of developed countries and the world (see annex table 1).

Given that investment mechanically adds to the capital available to workers, it contributes to labour productivity growth. Estimates show that this typically accounted for between 0.3 and 0.8 percentage points of growth in GDP and nearly 1 per cent of growth in terms of labour productivity over the period 1995-2001 for developed countries. Investment in software accounted for up to a third of the overall contribution of ICT investment (OECD, 2004).

The second possible economic effect of ICT is linked to the existence of a sector producing ICT goods and services. In Finland, Ireland and the Republic of Korea, approximately 1 percentage point of aggregate labour productivity growth over the period 1995-2001 was attributed to the strong productivity of the ICT manufacturing sector (OECD, 2004). Furthermore, an ICT-producing sector is important for ICT diffusion. For example, a strong ICT sector could help to generate the skills and competencies needed to benefit from use of ICT, in other words, it could generate capacity in Arab countries. Moreover, it could also lead to spin-offs, as in the case of Silicon Valley or in other high technology clusters. While the existence of an ICT sector supports ICT diffusion, it is not a prerequisite for benefiting from such technology.

²⁶ Productivity, which is also known as labour or worker productivity, can be defined as the value of goods and services produced over a period of time, divided by the hours of labour used to produce them. High productivity is key to enabling the unemployment rate to drop to low levels without risking inflation.

ANNEX TABLE 1. ICT SPENDING IN SELECTED ARAB COUNTRIES COMPARED TO DEVELOPED COUNTRIES AND THE WORLD TOTAL, 2001
(Billions of United States dollars)

| | United States | Japan | United Kingdom | Germany | World total | Saudi Arabia/GCC States | Egypt |
|------------------------|---------------|-------|----------------|---------|-------------|-------------------------|-------|
| Hardware | 136 | 49 | 21 | 24 | 376 | 1.043 | 0.417 |
| Software | 96 | 13 | 13 | 14 | 196 | 0.302 | 0.124 |
| Services | 199 | 52 | 27 | 27 | 425 | 0.922 | 0.245 |
| Internal | 107 | 67 | 26 | 29 | 345 | 0.557 | 0.223 |
| Other office equipment | 7 | 4 | 2 | 2 | 33 | 0.094 | 0.038 |
| Total IT spending | 546 | 188 | 91 | 98 | 1 377 | 2.918 | 1.046 |
| Telecommunications | 265 | 225 | 46 | 56 | 1 038 | 3.276 | 1.337 |
| Total ICT spending | 812 | 413 | 137 | 154 | 2 415 | 6.194 | 2.383 |

Source: Samia Satti O. M. Nour, "ICT opportunities and challenges for development in the Arab world", discussion paper No. 2002/83, United Nations University and World Institute for Development Economics Research, September 2002, p. 6.

Note: Discrepancies in totals can be attributed to rounding up.

A third effect of ICT is on the productivity of those sectors of the economy that are intensive users of ICT, usually the services sector, namely, finance, business services and distribution. Annex table 2 presents indicative figures comparing Arab countries and developed countries, showing that Arab countries lag far behind other countries.

ANNEX TABLE 2. ICT RATIOS IN SELECTED ARAB COUNTRIES COMPARED TO DEVELOPING COUNTRIES AND THE WORLD TOTAL, 2001

| | United States | Japan | United Kingdom | Germany | World total | Saudi Arabia/GCC States | Egypt |
|---|---------------|-------|----------------|---------|-------------|-------------------------|-------|
| ICT/GDP (percentage) | 8 | 10 | 10 | 8 | 8 | 4 | 2 |
| ICT/capita (thousands of United States dollars) | 3 | 3 | 2 | 2 | 0.4 | 0.3 | 0.04 |
| Software/hardware spending (percentage) | 71 | 27 | 64 | 60 | 52 | 29 | 30 |

Source: Samia Satti O. M. Nour, "ICT opportunities and challenges for development in the Arab world", discussion paper No. 2002/83, United Nations University and World Institute for Development Economics Research, September 2002, p. 6.

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